water NEW ZEALAND
The New Zealand Water & Wastes Association Waiora Aotearoa

Draft Paper for Water Industry Consultation

5 July 2017

Proposed

New Zealand Operator Certification Scheme

Table of Contents

1 Introduction

The Havelock North campylobacter outbreak in August 2016 highlighted to industry the importance of ensuring that the systems in place to supply drinking water are robust and effective. The resulting Government Inquiry has raised questions about the training and competence of staff involved in the management, supervision and operation of the water treatment and reticulation system.

It is now evident to many in industry that the absence of an effective system for the training, qualification, competency assessment and continuing professional development of staff is a serious gap in the provision of safe drinking water to many New Zealand communities.

While the Inquiry will eventually make recommendations in this space which may or may not be acted on by Government, it is the responsibility of industry to step up and take a leadership role in this area now. While regulation may or may not follow, we need to implement such a scheme on a voluntary basis as soon as possible.

To that end the Board of Water New Zealand wishes to propose the development of the system of Certification as described in this paper for those involved in the water treatment and wastewater sectors. It is proposed to include managers, supervisors and operators. The extent to which we initiate a system of continuing professional development for those holding water reticulation qualifications has yet to be resolved, but under consideration.

There are differences of opinion within industry as to the urgency of implementing a certification regime for wastewater, but it has been included to paint the full picture of what we consider is required. There is always the option of implementing certification for wastewater operators as a second stage.

This consultation paper details the requirements the Board believes are appropriate for such a Certification scheme. The Board recognises that what is included in this paper is a major change for industry. It will be challenging to implement, require a significant financial and human investment by employers, and take time to do. Some form of transitional provisions may well be required.

However, they also believe it is absolutely essential if we are to maintain the confidence of the general public. It is the intention of the Board that we table this proposal with the Havelock North Drinking Water Inquiry on 21 July 2017, recommending to them that the Inquiry calls for Government to make such a scheme mandatory. That is, required by regulation under the Health Act. We will speak in support of the proposal to the Inquiry when it reconvenes on 7 August 2017.

We acknowledge the very short notice of this paper due to the timing of the Inquiry. Water New Zealand would like *high level/preliminary views* on the document sent to ceo@waternz.org.nz by Monday 17 July. Or call to discuss with John Pfahlert on 021 150 9763.

More detailed submissions can follow to the same email address by 14 August 2017.

John Pfahlert
Chief Executive
Water New Zealand

2 Problem Definition

The water industry in New Zealand does not have a mandatory certification scheme for personnel operating water and wastewater treatment plants and their associated reticulation systems. The potential consequences of having unskilled water or wastewater treatment operations staff are considerable and include:

- **Large scale public health incident** – From improperly treated drinking water or network contamination.
- **Large scale environmental damage** – From discharge of improperly treated wastewater or treatment chemicals.
- **Large scale asset infrastructure damage** – From negligent operation of water and wastewater assets.

In other sectors, such as health, there are onerous certification requirements for professionals, even though those individual professionals are responsible for fewer patients in a lifetime than those served daily by many treatment plants.

The importance of operator training was accurately summarised by Justice O'Connor when investigating the cause of the Walkerton incident (where a pathogenic strain of *E.coli* contaminated the drinking water of the 5,000 population town of Walkerton in Ontario Canada, in May, 2000):

> *"The ultimate protection of public health lies in the hands of the plant operator. The more knowledgeable the operator, the greater the public health"*

This statement applies equally to engineers and managers who administer water systems for Councils and Council Controlled Organisations. This is supported by the findings of the recent Havelock North Drinking Water Inquiry Stage 1 (May, 2017):

> *"Some managers at the District Council in the present case seemed to have little or no knowledge about protozoan pathogens and the significant risks associated with them."*

Over the past 3 years Water NZ, Connexis and the Water Industry Operations Group had been developing a system of continuing professional development (CPD). On May 3rd 2017 the Water Industry Professional Association (WIPA) was launched with the objective of providing a system of registering and recording CPD of staff working in the water industry.

WIPA is a collaboration between the Water Industry Operations Group, Connexis (the Infrastructure Industry Training Organisation) and Water New Zealand. WIPA is a voluntary registration scheme; there are entry requirements based on qualifications, experience and endorsements. In order to maintain registration individuals are required to undertake CPD.

Providers of CPD training course are assessed and courses pre-approved by a management committee of the WIPA in an attempt to ensure that the quality of CPD training is high. Whilst the objective of the WIPA is to ensure and maintain a high level of competency within the industry it is not competency based i.e. there is no formal assessment of competency. Nor is there any requirement that a person working in the industry participate in the scheme.

Therefore the current WIPA scheme lacks the veracity of a fully-fledged certification scheme for ensuring competency in the industry and indeed it lacks the drivers that a mandatory scheme would have.

Water New Zealand wishes to be proactive in promoting a full mandatory certification scheme for the water industry and in developing a roadmap for transitioning from the voluntary WIPA scheme to a mandatory certification scheme.

The framework for a full mandatory certification scheme is presented in this white paper for industry consultation.

3 Approach Taken

The approach taken for the development of a certification framework has been based on other international certification schemes, and is as follows:

1. Provide a points system for classification of water and wastewater treatment plants.
2. Determine the level of certification required to operate and manage plants of a given classification.
3. Provide a framework for certification.

It should be noted that the proposed certification scheme is for personnel managing, supervising and **operating** water and wastewater treatment plants and their associated reticulation systems.

Certification for personnel **installing** and **maintaining** reticulation systems is already undertaken by the Civil Trades Certification Board (refer to Appendix C). It is recognised that there are some limitations with this delineation with respect to potable water reticulation systems whereby the Civil Trade Certificate in Pipeline Construction and Maintenance has two available qualifications which meet the schemes education requirements (New Zealand Certificate in Utilities Maintenance and New Zealand Certificate in Pipe Installations) and only one of these includes a unit standard on pathogens.

Furthermore the practical disinfection module is only compulsory for the water strand of the utilities maintenance qualification. The relevant qualifications are currently under review and it is proposed that the pathogens unit standard is made compulsory for both qualifications and that staff who work on potable water reticulation systems will need to have completed the disinfection practical.

The following background research is presented in the appendices:

- A review of water industry certification and training requirements in the USA and Australia – Appendix B
- A review of other relevant certification and registration systems within New Zealand – Appendix C

4 Classification of Treatment Plants

A five tier classification system is proposed for both water and wastewater treatment plants. The determination of the treatment plant tier is based on a points system. In essence the larger or more complex the treatment plant is, then the higher level of points and therefore a higher level of certification required to operate the plant.

The points system for water treatment plants is shown in Table 1. Examples of the calculated points for a selection of water treatment plants are shown in Appendix D.

The points system for wastewater treatment plants is shown in Table 2. Examples of the calculated points for a selection of wastewater treatment plants are shown in Appendix E.

The treatment plant classification as a function of the total points assigned is shown in Table 3.

Table 1: Water Treatment Quantitative Assessment for Certification Tiers

Parameter	Criteria	Points Awarded
Capacity		
	Points per ML/d up to a max of 50 points)	0.5
Source Protozoa Risk		
	Secure Groundwater	2
	3 Log	4
	4 Log	8
	5 Log	12
Source Max Turbidity (for at least 1 hour, over 2 years. Grab samples if no online. Available data for new sites)		
	<15	0
	15 - 100	2
	> 100	5
Source P2s		
	Points per P2	2
Surface Water Filtration Treatment		
	Conventional or direct (gravity or pressure)	15
	Diatomaceous Earth	12
	Slow sand, membrane, cartridge, or bag filter	8
Residuals Recycling		
	Backwash water supernatant recycled as part of process	2
	Thickener supernatant / dewatering liquids recycled	5
Additional Processes (for each unit process)		
	Clarification (Includes DAF)	3
	Additional Filtration Stage (Any type)	3
	Fluoridation	3
	Powdered activated carbon	3
	Potassium permanganate	3
	Microstrainers	3
	Other	3
Disinfection Treatment (Including Emergency Disinfection)		
	Ozone	10
	Chlorine / Chloramine	10
	Chlorine dioxide	10
	UV	7
Points for Disinfection/ Oxidation Treatment Used for Protozoal Credits		
	Ozone	5
	Chlorine dioxide	5
	UV	3
	Other Oxidants	5

Table 2: Wastewater Treatment Quantitative Assessment for Certification Tiers

Parameter	Proposed Criteria	Points Awarded
Size		
	Points per ML/d up to a maximum of 50	0.5
	Points per sludge production (per average disposed Dry Tonne/d) up to a max of 20	2
Discharge Location [1]		
	Marine coastal	4
	Marine harbour	8
	Land application	12
	Freshwater	14
Treatment Process		
	Primary	2
	Secondary	16
	Tertiary	18
Sludge Application		
	Landfill	2
	Reuse	10
Odour Risk		
	Low risk (i.e. in rural area)	2
	Medium risk (i.e. in semi - industrial zone, or sparsely populated area)	5
	High risk (i.e. dense residential area nearby)	10

Notes: [1] Some sites discharge sludge and effluent to multiple locations, if this is the case the site only gets the score from the highest scored location.

Table 3: Treatment Plant Points and Classification Tiers

Total Water or Wastewater Treatment Plant Points	Plant Tier
<20 points	T1
20-39 points	T2
40-59 points	T3
60-79 points	T4
80 or more points	T5

5 Level of Certification Required

One of the central tenets of the certification system proposed is that there is no cross compatibility between water treatment and wastewater treatment. Water treatment qualifications and/or experience cannot be used for wastewater certification; wastewater qualifications and/or experience cannot be used for water certification. That is not to say that individuals cannot be certified in both water and wastewater operations but it should be noted that this will require completing the requirements of the water treatment certification and the wastewater treatment certification.

5.1 Water Treatment and Associated Reticulation Systems

In order to align with the treatment plant classification a five tier certification process is proposed. Each of the following operations roles will have different requirements:

- An **Operator** is defined as someone who is in direct charge of a water treatment facility for discrete periods of time e.g. a shift or for callout cover. An operator does not have the authority to make changes to critical control set-points or critical alarm levels.
- A **Supervisor** is defined as someone who has overall responsibility for the day-to-day, hands-on, operation of a water treatment facility.
- A **Manager** is defined as someone who is the direct manager of assets and staff operating water supply facilities (including supervisors). This role will almost always be an office based individual, and may or may not report directly to the Executive of the organisation, or to a dedicated Operational Manager.

Water treatment plant operators and supervisors will be required to achieve the certification tiers shown in Table 4 in order to operate plants of a given classification tier.

Table 4: Minimum Certification Requirements for Supervisors and Operators of Water Treatment Plants

Water Treatment Plant Tier	Supervisor	Operator
T1	T3	T1
T2	T3	T1
T3	T4	T2
T4	T5	T3
T5	T5	T3

Notes: [1] A reticulation system is considered to be linked to a treatment plant. Thus if the treatment plant is a T5 the associated reticulation system is considered a T5. For reticulation systems that have multiple treatment plants linked to them then the score of the highest connected plant will apply to the whole reticulation system.

Managers of water treatment facilities must sum the total site score for each of the water treatment plants that they manage in order to determine their management tier. The resulting management certification tier is shown in Table 5.

Table 5: Minimum Certification Requirements for Managers of Water Treatment Plants

Sum of Water Treatment Plant Scores	Manager
<100	M1
100-249	M2
>250	M3

5.2 Wastewater Treatment and Associated Reticulation Systems

As with water (Section 5.1) a five tier certification process is proposed. Each of the following operations roles will have different requirements:

- An **Operator** is defined as someone who is in direct charge of a waste water treatment facility for discrete periods of time e.g. a shift or for callout cover. An operator does not have the authority to make changes to critical control set-points or critical alarm levels.
- A **Supervisor** is defined as someone who has overall responsibility for the day-to-day, hands-on, operation of a waste water treatment facility.
- A **Manager** is defined as someone who is the direct manager of assets and staff operating waste water facilities (including supervisors). This role will almost always be an office based individual, and may or may not report directly to the Executive of the organisation, or to a dedicated Operational Manager.

Wastewater treatment plant operators and supervisors will be required to achieve the certification tiers shown in Table 6 in order to operate plants of a given classification tier.

Table 6: Certification Requirements for Supervisors and Operators of Wastewater Treatment Plants

Wastewater Treatment Plant Tier	Supervisor	Operator
T1	T3	T1
T2	T3	T1
T3	T4	T2
T4	T5	T3
T5	T5	T3

Managers of wastewater treatment facilities must sum the total site score for each of the wastewater treatment plants that they manage in order to determine their management tier. The resulting management certification tier is shown in Table 7.

Table 7: Certification Requirements for Managers of Wastewater Treatment Plants

Sum of Wastewater Treatment Plant Scores	Manager
<100	M1
100-249	M2
>250	M3

6 Certification Framework

6.1 Overview

6.1.1 Water Treatment & Associated Reticulation

The certification requirements for supervisors and operators of water treatment plants are summarized in Figure 1. The certification requirements for managers of water treatment plants are summarized in Figure 2.

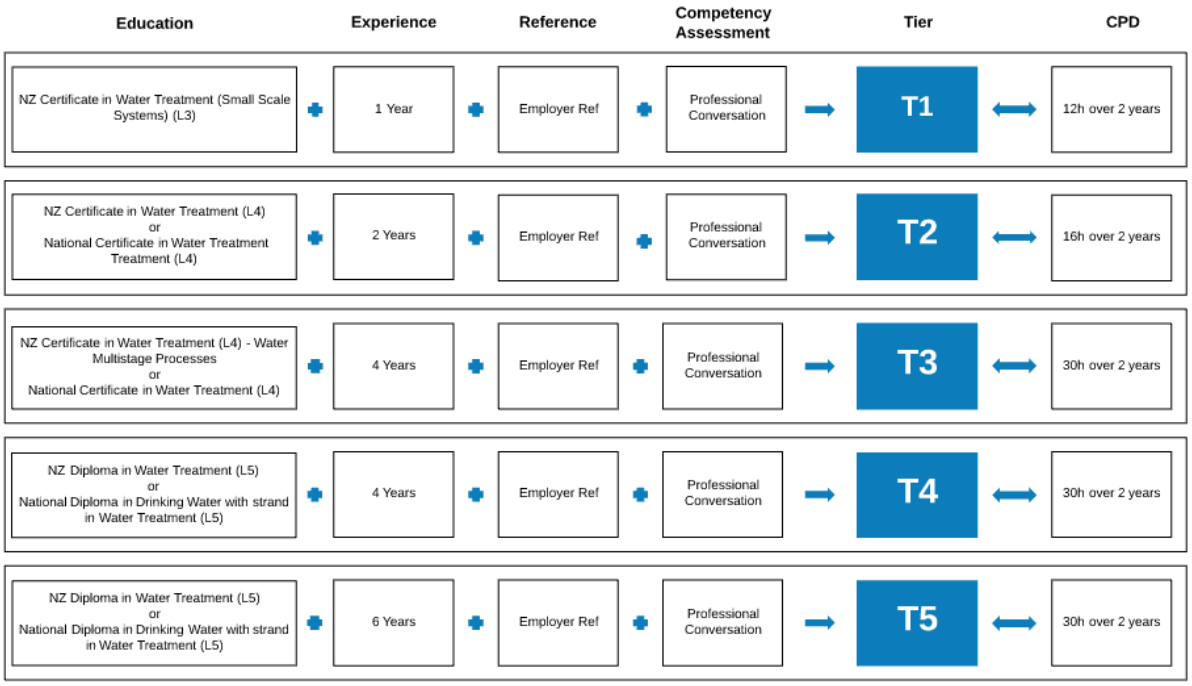

Figure 1: Summary of the Certification Framework – Supervisors and Operators of Water Treatment Plants.

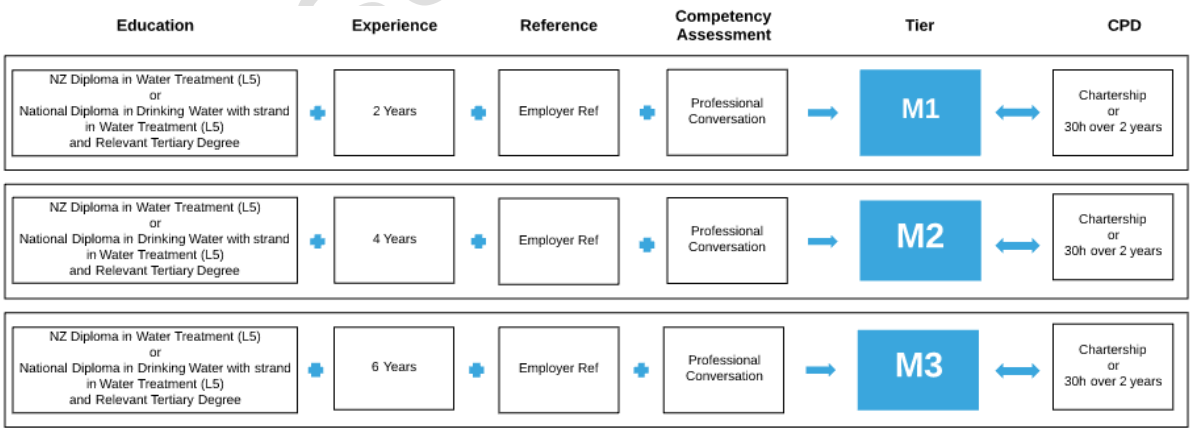

Figure 2: Summary of the Certification Framework – Managers of Water Treatment Plants.

6.1.2 Wastewater Treatment & Associated Reticulation

The certification requirements for supervisors and operators of wastewater treatment plants are summarized in Figure 3. The certification requirements for managers of wastewater treatment plants are summarized in Figure 2.

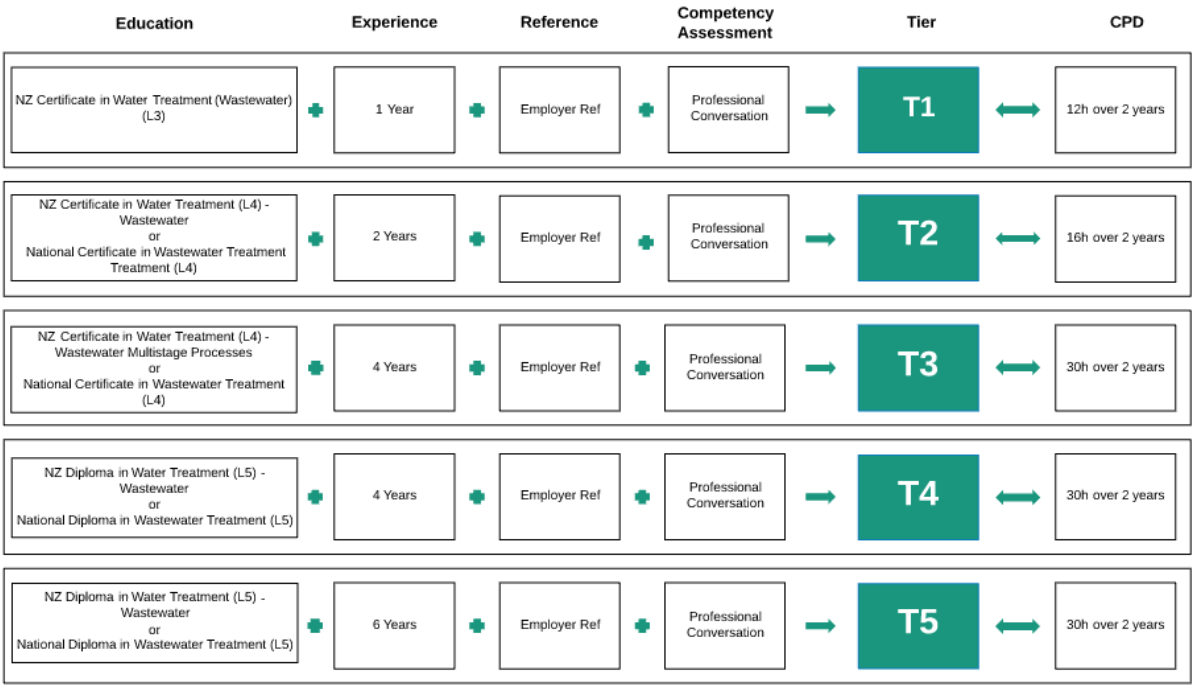

Figure 3: Summary of the Certification Framework – Supervisors and Operators of Wastewater Treatment Plants.

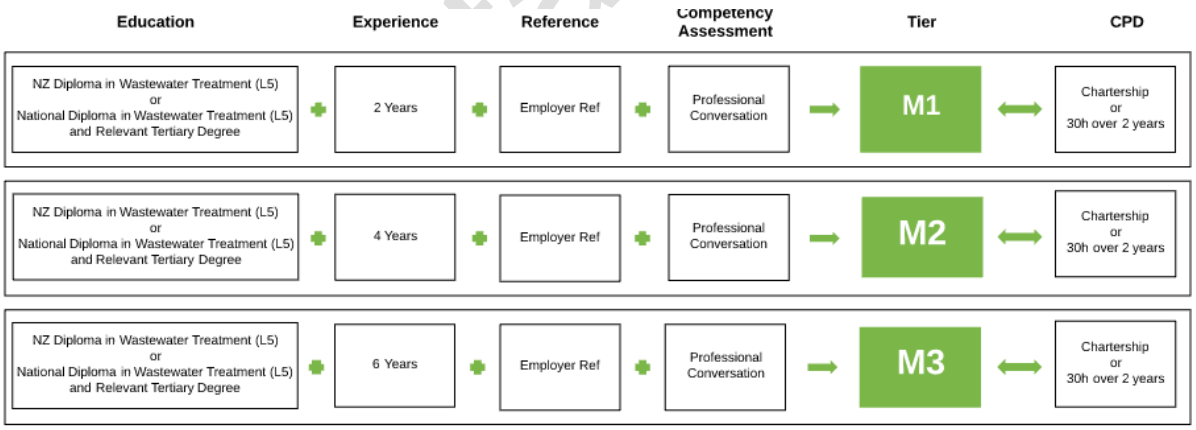

Figure 4: Summary of the Certification Framework – Managers of Wastewater Treatment Plants.

6.2 Education Requirements

6.2.1 Water Treatment & Associated Reticulation

6.2.1.1 Supervisors and Operators

The qualifications required for certification are shown in Table 8 for the new NZQA qualifications and in Table 9 for the legacy qualifications.

Reticulation and Drinking Water Assessor (DWA) qualifications have been deliberately excluded as the requirements are for qualifications based on operating treatment plants.

Table 8: Acceptable Qualifications for Water Treatment Certification – New NZQA Qualifications

Qualification	NZQA credits	Tier Level Requirement
New Zealand Certificate in Water Treatment (Small Scale Systems) (Level 3)	40	T1
New Zealand Certificate in Water Treatment (Level 4) *strands in Drinking-Water,* *strands in Drinking-Water Multistage Processes*	 70 120	 T2 T3
New Zealand Diploma in Water Treatment (Level 5) *with strands in Drinking-Water*	120	T4, T5

Note: None of the qualifications listed here includes the safety training that employers are responsible for providing under the Health and Safety in Employment Act (2015). Employers are entirely responsible for assessing what training is required and providing it regardless of the operator's tier level.

Table 9: Acceptable Qualifications for Water Treatment Certification – Old Qualifications

Qualification	NZQA credits	Tier Level Requirement
No equivalent		T1
National Certificate in Water Treatment (Level 4)	134	T2, T3
National Diploma in Drinking Water Treatment (Level 5) *with strand in Water Treatment*	159-164	T4, T5

Note: None of the qualifications listed here includes the safety training that employers are responsible for providing under the Health and Safety in Employment Act (2015). Employers are entirely responsible for assessing what training is required and providing it regardless of the operator's tier level.

6.2.1.2 Managers

The certification requirements for managers are the Tier 5 requirements in Table 8 or Table 9 **and** a relevant tertiary degree. A relevant tertiary degree is defined as a Bachelor or Masters degree (complying with the Washington Accord) in engineering or in physical, chemical, or biological sciences.

6.2.2 Wastewater Treatment & Associated Reticulation

6.2.2.1 Supervisors and Operators

The minimum qualifications required for certification are shown in Table 10 for the new qualifications and in Table 11 for the legacy qualifications.

Table 10: Acceptable Qualifications for Certification – New NZQA Qualifications

Qualification	NZQA credits	Tier Level Requirement
New Zealand Certificate in Water Treatment (Wastewater) (Level 3)	45-46	T1
New Zealand Certificate in Water Treatment (Level 4) *strands in Wastewater,* *strands in Wastewater Multistage Processes*	 70 120	 T2 T3
New Zealand Diploma in Water Treatment (Level 5) *with strands in Wastewater*	120	T4, T5

Note: None of the qualifications listed here includes the safety training that employers are responsible for providing under the Health and Safety in Employment Act (2015). Employers are entirely responsible for assessing what training is required and providing it regardless of the operator's tier level.

Table 11: Acceptable Qualifications for Certification – Old Qualifications

Qualification	NZQA credits	Tier Level Requirement
No equivalent		T1
National Certificate in Wastewater Treatment (Level 4)	134	T2, T3
National Diploma in Wastewater Treatment (Level 5)	131	T4, T5

Note: None of the qualifications listed here includes the safety training that employers are responsible for providing under the Health and Safety in Employment Act (2015). Employers are entirely responsible for assessing what training is required and providing it regardless of the operator's tier level.

6.2.2.2 Managers

The minimum certification requirements for managers are the Tier 5 requirements in Table 10 or Table 11 **and** a relevant tertiary degree. A relevant tertiary degree is defined as a Bachelor or Masters degree (complying with the Washington Accord) in engineering or in physical, chemical, or biological sciences.

6.3 Experience

6.3.1 Water Treatment & Associated Reticulation

6.3.1.1 Supervisors and Operators

The minimum water treatment experience requirement for supervisors and operators is shown in Table 12.

Experience (in the context of operators and supervisors) means the daily performance of activities consisting of the oversight of any process operation at a water treatment facility.

It is recommended that, prior to commencing work on a site, uncertified operators are given a thorough internal initial training period by their employers. Even though under the proposed certification system they would have limited responsibilities it is still best practice risk mitigation to ensure uncertified operators have in-house training. This should include, at a minimum, teaching them about the applicable regulations that apply at the site, presenting them up-to-date operations and maintenance manuals, and ensuring they have all the safety training needed to work on site.

Table 12: Supervisors and Operators Water Treatment Experience Requirements

Tier	Experience Requirements (years)
T1	1
T2	2
T3	4
T4	4
T5	6

Note: Relevant experience cannot be claimed whilst working towards a qualification.

Evidence of experience will need to be submitted to the certification board in the form of a portfolio.

6.3.1.2 Managers

The minimum experience requirement for water treatment manager is shown in Table 13.

Management experience is defined as post degree experience undertaking people management, risk management, and operational analysis. At least half of the management experience must be gained from the municipal drinking water treatment industry.

Table 13: Management Experience Requirements

Tier	Experience Requirements (years)
M1	2
M2	4
M3	6

Note: Relevant experience cannot be claimed whilst working towards a qualification.

Evidence of experience will need to be submitted to the certification board in the form of a portfolio.

6.3.2 Wastewater Treatment & Associated Reticulation

6.3.2.1 Supervisors and Operators

The minimum wastewater treatment experience requirement for supervisors and operators is shown in Table 14.

Experience (in the context of operators and supervisors) means the daily performance of activities consisting of the oversight of any process operation at a wastewater treatment facility.

It is recommended that, prior to commencing work on a site, uncertified operators are given a thorough internal initial training period by their employers. Even though under the proposed certification system they would have limited responsibilities it is still best practice risk mitigation to ensure uncertified operators have in-house training. This should include, at a minimum, teaching them about the applicable regulations that apply at the site, presenting them up-to-date operations and maintenance manuals, and ensuring they have all the safety training needed to work on site.

Table 14: Supervisors and Operators Wastewater Treatment Experience Requirements

Tier	Experience Requirements (years)
T1	1
T2	2
T3	4
T4	4
T5	6

Note: Relevant experience cannot be claimed whilst working towards a qualification.

Evidence of experience will need to be submitted to the certification board in the form of a portfolio.

6.3.2.2 Managers

The minimum experience requirement for wastewater treatment manager is shown in Table 15.

Management experience is defined as post degree experience undertaking people management, risk management, and operational analysis. At least half of the management experience must be gained from the municipal wastewater treatment industry.

Table 15: Management Experience Requirements

Tier	Experience Requirements (years)
M1	2
M2	4
M3	6

Note: Relevant experience cannot be claimed whilst working towards a qualification.

Evidence of experience will need to be submitted to the certification board in the form of a portfolio.

6.4 References

All applicants for water and wastewater certification need a letter of endorsement from their employer verifying the applicant's role and capability. The applicant's endorsement letter should be signed off by a suitably qualified person within their employing entity. As a guide, it should be the most senior technical officer within the organisation with responsibility for the water/wastewater treatment system. This endorsement shall be accompanied by evidence of competency assessments conducted within the organisation.

6.5 Interview / Professional Conversation

For all tiers of water and wastewater certification there will be an interview/professional conversation with the Certification Board (or accredited assessor).

An interview/professional conversation will not take place until a minimum of six months has elapsed since the completion of the education requirements.

6.6 Continuing Professional Development

Once certified an individual will be required to undertake continuing professional development (CPD) in order for the certification to be renewed. The renewal process will be on a two year basis. It is essential that the quality of CPD provided is high and is assessed. This will be one of the key roles of a certification board.

6.6.1 Supervisors and Operators

The CPD requirements for supervisors and operators are shown in Table 16.

Table 16: Supervisors and Operators Continuing Professional Development Requirements (CPD)

Tier	CPD Requirements (h/2 years)
T1	12
T2	16
T3	30
T4	30
T5	30

6.6.2 Managers

Managers are also to be certified through Chartership programmes run by professional bodies. There are a wide range of existing Charterships available either through the Institute of Professional Engineers New Zealand (IPENZ) or through international industry specific accreditations such as Institution of Chemical Engineers, Chartered Institute of Water and Environmental Management or Royal Society of Chemistry. Chartership will need to be maintained for renewal of their certification as a manager of water treatment facilities. The renewal process will be on a two year basis.

If Managers are not certified through Chartership programmes run by professional bodies then as a minimum they will need to complete the CPD requirements in Table 16.

6.7 Further Considerations

In order to ensure public health and environmental security there should be protection against uncertified operators. When a new operator enters the workforce they shall not be allowed to practice unsupervised until they are certified. Supervised experience is defined as the following:

- Uncertified operators are not allowed to work shifts on their own until they are certified.
- Uncertified operators may attend small satellite sites alone to perform minor tasks, however a certified operator must also be on-shift and be able to join them in case something goes wrong.
- Uncertified operators should not be allowed to adjust SCADA systems or any operating set-points.
- Uncertified operators may undertake minor routine maintenance tasks (such as removing debris from an inlet screen, clearing a blocked lime line, or taking non-critical daily samples) under the direction (but without visual supervision) of a Certified operator.

Uncertified managers are also a risk to public and the environment. However, as there is often only one manager within an organisation, if the current manager departs before a new one is certified, it is may not be possible to provide an overlap between managers. It is proposed that the employing organisation manage this risk by having a clearly defined framework for support of uncertified managers. When an uncertified manager starts in the role the employer should hold a meeting to determine what defines normal *day-to-day operations* versus what is a *substantial change* in the context of their specific water supply or wastewater network. It is recommended that uncertified managers must get higher sign-off before making anything internally defined as a *substantial change*.

7 Certification Oversight

A Certification Board will need to be established to develop, maintain and govern the Operator Certification Scheme on behalf of the water industry. It is expected that the Certification Board and the proposed certification scheme will supersede the current WIPA scheme. How this will happen has yet to be determined.

The exact make-up of this Certification Board and its position within the industry will need to be determined and may well be influenced by the findings of the Stage 2 of the Havelock North Drinking Water Inquiry. Regardless of the configuration of the Certification Board, it will have the following responsibilities:

- Governance of the certification scheme, including financial oversight;
- Maintaining public facing webpage(s);
- Facilitating the certification process;
- Maintaining a register of certified operators & managers;
- Maintaining a register of assessors;
- Maintaining a register of approved continuing professional development providers;
- Facilitating the assessment of continuing professional development providers;
- Facilitating interview / professional conversations;
- Collecting application fees;
- Tracking of continuing professional development hours;
- Facilitating the certification renewal process;
- Facilitating complaints and disciplinary proceedings.

8 Implementation Timeframe

A staged implementation timeframe is proposed whereby drinking water treatment certification becomes mandatory after a period of 3 years with wastewater certification becoming mandatory after an additional 2 years (5 years total).

9 Impacts on Employers

The positive impacts of a mandatory certification scheme on employers of treatment staff will be as follows:

- Reduced risk of public health incidents;
- Reduced risk of environmental damage;
- Reduced risk of asset infrastructure damage;
- A more competent and skilled workforce;
- Enhanced standing of staff within the wider community;
- A more motivated and engaged workforce.

A mandatory certification scheme will have the following negative impacts on the employers of treatment staff:

- Increased training costs if staff are largely untrained at present;
- Requirement to pay for staff certification fees;
- Likely increase in operators' and managers salaries;
- Increased competition for competent staff.

10 Consultation and Feedback

The Board of Water New Zealand understands that this proposal is a significant change for the water industry. It also recognises that time provided to seek initial responses from industry is very short, and clearly less than desirable. The time pressure is driven somewhat by our need to respond to the timetable of the Havelock North Drinking Water Inquiry, and the requirement to develop and refine this paper.

Preliminary industry views should be sent to the Chief Executive of Water New Zealand by close of business on Monday 17 July 2017. ceo@waternz.org.nz or call John Pfahlert on 021 150 9763 to discuss.

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https://www.waternz.org.nz/Attachment?Action=Download&Attachment_id=2071

11 Appendix A – Water Industry Stakeholder Overview

There are a number of key stakeholders who interact with operations staff in the water industry. These are defined below. The interactions between these stakeholders is shown schematically in Figure 5. This illustrates the complex nature of the water industry in New Zealand.

Employers are those who employ water operators and are largely Regional, City or District Councils, Council Controlled Organisations, or Civil Contracting firms offering water operations services contracts.

Connexis is New Zealand's infrastructure Industry Training Organisation (ITO), offering national qualifications, which include water treatment, wastewater treatment and water reticulation. The Water Industry Group (WIG) of Connexis made up of representatives from key stakeholders (e.g. Water New Zealand, Water Industry Operators Group), and key clients (e.g. Watercare, Downer, City Care).

DWA's are the Drinking Water Assessors employed by the DHB on behalf of the Ministry of Health (MoH), they are responsible for gathering and auditing monitoring and compliance data from water suppliers and reporting to MoH.

Registered **Training Providers** are a range of private or public entities approved by NZQA.

Water New Zealand is a non-profit New Zealand organisation with 1500 members that supports the three waters (drinking water, waste and storm waters.) with technical guidance documents, education and submissions on behalf of the three waters. The expertise and experience of Water New Zealand's membership is harnessed through an interlocking framework of Special Interest Groups (SIGs).

WIOG (Water Industry Operations Group) is an Incorporated Group set up by a committed group of Water and Wastewater Industry Operations Professionals, for all Water and Wastewater Professionals and other involved individuals and organisations.

WIPA Water Industry Professionals Association is a Continuing Professional Development scheme which was jointly established by the Water Industry Operators Group and Water New Zealand, and is supported through a Service Level Agreement by Connexis (the infrastructure industry training ITO).

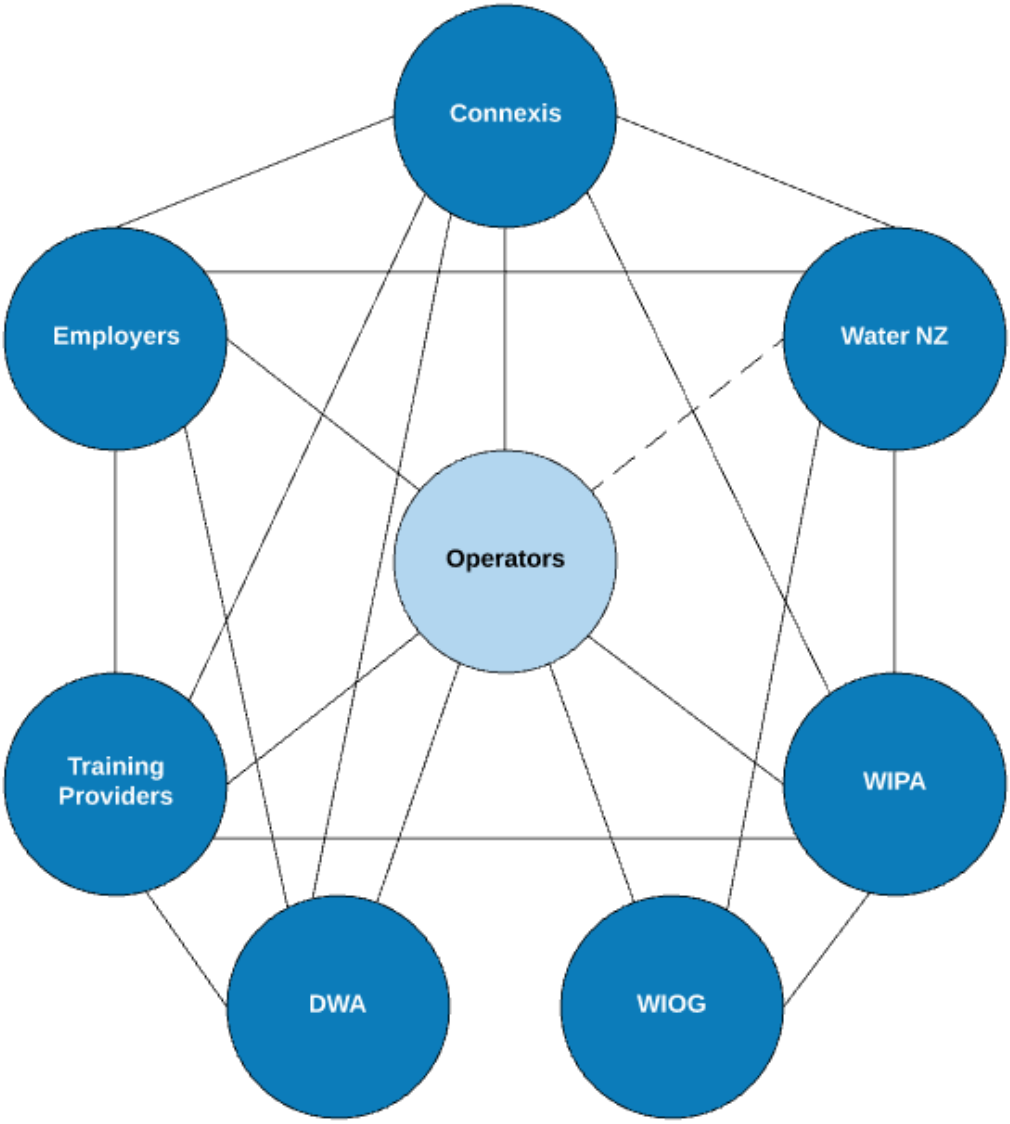


Figure 5: Operation Certification Stakeholder Relationship Schematic

12 Appendix B – International Certification Systems

Water Industry training certification requirements are well defined in the USA and Australia. The requirements vary from State to State in USA. It is worth noting that the populations of some States greatly exceed to the total New Zealand population. The population residing in each State of USA and Australia is presented below. However, as most systems are tiered based on the population served by the treatment plant large States' (such as California) are still relevant exemplars to the New Zealand certification. A range of State populations are presented as a sample of the USA system.

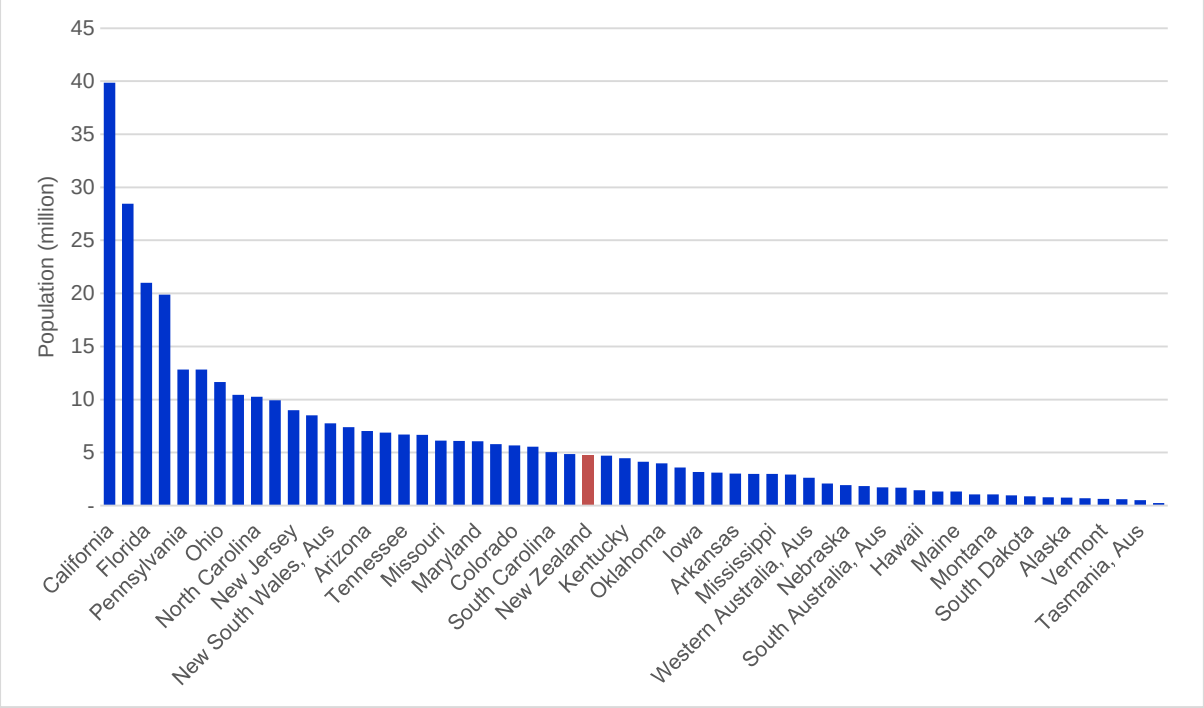


Figure 6: Population of USA and Australian States compared to New Zealand

12.1 State of California, USA (Large Size State Example) – Water

12.1.1 Classification of Systems

Broadly the larger and more complex the system the more the training and qualifications are required to operate them. The following tiers quantify the system complexity.

- Treatment Systems are classified as T1-T5 according to a point system (Water Boards California, 2001). The following is a list of factors which drive the points higher:
    - Flow rate: systems with higher flows achieve a linearly higher score up to 95ML/d where a maximum score is reached (note: approx. equal to a maximum points achieved at a population served of around 380,000 people assuming 200L/person/day)
    - Raw water source: surface waters increase score relative to groundwater
    - Raw water coliform count: higher median counts increase score up to a maximum score at median Coliform counts greater than 10,000 per 100 mL
    - Maximum influent turbidity sustained for at least one hour (from on-line turbidimeter or as a grab sample): high counts increase score up to a maximum at 100NTU

- Chemical contaminants: similar to New Zealand Drinking Water Standards Maximum Allowable Values there are limits for organic and inorganic chemical contaminants such as Influent Water Nitrate and Nitrite as well as radioactive compounds. Higher contamination compared to the allowable value increases score
- Filtration treatment: if the treatment plant contains filtration (where conventional, direct, or inline and diatomaceous earth filtration types are weighted more heavily than membrane or cartridge filtration) this increases the score, additionally if treatment contains backwash recycles this increases its score
- Disinfection treatment: each of ozone, chlorine/chloramine, chlorine dioxide, or other oxidants increases the score, UV also increases the score but to a lesser extent

- Distribution systems are classified as D1 to D5 by population served. The population categories are:
  - D1: ≤1,000
  - D2: 1,001 - 10,000
  - D3: 10,001 - 50,000
  - D4: 50,001 - 5 million
  - D5: > 5 million

12.1.2 Certification Requirements

Certification requirements are presented below (abridged) as per Water Boards California (2016). The years' of site experience requirement can be reduced with relevant practical tertiary qualifications or with experience as a wastewater operator.

Table 17: California Water Treatment Operator Certification Requirements

Tier	Academic qualifications	Exam Required	Theory Training Hours	Years' site experience
T1	High school diploma (or +1 extra year as an operator experience)	T1 exam	None	None
T2		T2 exam	1 x 36 hr course	None
T3	High school diploma	T3 exam	2 x 36 hr course	1 year T2 + 1 extra year or relevant degree
T4	T3 certification required	T4 exam	3 x 36 hr course	1 year T3 + 3 extra years or relevant degree
T5	T4 certification required	T5 exam	4 x 36 hr course	2 years T4 + 3 extra years or relevant degree

12.1.3 Certification Renewal & Continuing Professional Development (CPD) requirements

Certification must be renewed every 3 years. Contact Hour requirements for the three year interval for each certification tier are as follows:

- D1, T1: 12 hours
- D2, T2: 16 hours
- D3, T3: 24 hours
- D4, T4: 36 hours
- D5, T5: 36 hours

No more than 25% of the contact hours can be met from relevant safety training.

12.2 State of California, USA (Large Size State Example) – Wastewater

12.2.1 Classification of Systems

There are five levels of operator certification (Grades I – V). Operators can also be registered as Operator-in-Training.

Tier	Years' site experience	Design Flow (Million Gallons/d)
T1	Primary	<1
	Modified Treatment Pond	All
T2	Primary	1-5
	Biofiltration	<1
	Modified Treatment Pond	All
T3	Primary	5-20
	Biofiltration	1-10
	Activated Sludge	<5
	Sequencing Batch Reactor	<1
	Tertiary	<1
T4	Primary	>20
	Biofiltration	10-30
	Activated Sludge	5-20
	Sequencing Batch Reactor	1-10
	Tertiary	1-10
T5	Biofiltration	>30
	Activated Sludge	>20
	Sequencing Batch Reactor	>10
	Tertiary	>10

12.2.2 Certification Qualification Requirements

When a new operator enters the force they must clock the 1,800 hours (or one year) of Operator-In-Training (OIT) experience. Grade II through Grade V OIT certificate applicants must have passed an examination at that grade level or higher and the applicant's examination results must not have expired (examination results are valid for four years based on the date listed on the examination pass letter). Requirements for certification as a fully-fledged operator are as below. Minimum education requirements are a successful high school diploma.

The Water Board does not specify how many operators must be employed at each grade; however, the Chief Operator's certification grade level must be equal to or higher than the WWTP's classification.

Table 18: California Wastewater Experience Requirements

Tier	Years' site experience
T1	1 year full time
T2	1-2 years full time
T3	1-4 years full time
T4	2-6 years full time
T5	4-10 years full time

Note: Amount of experience required depends on level of experience (i.e. any years' experience at lower grade plants counts for less at a higher grade) and education (i.e. Bachelors or higher degrees or Engineering Degrees approximately halve the experience requirement)

12.2.3 Certification Renewal & CPD requirements

Once certified operators go onto a public register alongside the tier of plant they are certified to run. The re-application document for renewal does not include CPD requirements. Certificates are valid for two years.

12.3 State of Illinois, USA (Medium Size State Example) - Water

12.3.1 Classification of Systems

CWSs are classified as Class A, B, C, or D, according to source water and complexity of treatment:

- Class D: Distribution, storage, pumping
- Class C: Ground water that utilize chemical feed only
- Class B: Ground water that includes filtration, aeration and filtration or ion exchange
- Class A: Surface water or ground water under the direct influence (GWUDI) that include coagulation, lime softening or sedimentation

12.3.2 Certification Qualification Requirements

Applicants must have a high school degree, pass an exam with a minimum score of 70 percent for a specific class of system, and meet the following experience requirements:

- Class D: At least 6 months of experience or training
- Class C: At least 1 year of experience or training
- Class A and B: At least 3 years of experience or training

12.3.3 Certification Renewal & CPD requirements

Certificates must be renewed every 3 years.

- Class C and D operators must accumulate 15 hours of training.
- Class A and B operators are required to accumulate 30 hours of drinking water-related training within this period.

12.4 State of Illinois, USA (Medium Size State Example) - Wastewater

12.4.1 Classification of Systems

Wastewater treatment facilities are classified as either domestic or industrial facilities. Municipal wastewater treatment facilities are classified in one of four groups as follows:

- Group 4 - Lagoon treatment systems. Group 4 facilities require a wastewater operator certified at the Class 4 or higher level (Class 3, Class 2, or Class1).
- Group 3 - Fixed film processes and Imhoff tank systems with a design average flow (DAF) of less than 1.0 MGD, and all primary treatment systems. Group 3 facilities require a wastewater operator certified at the Class 3 or higher level (Class 2, or Class1).
- Group 2 - Activated sludge systems with a design average flow (DAF) of less than 1.0 MGD. Group 2 facilities require a wastewater operator certified at the Class 2 or higher level (Class1).
- Group 1 - All domestic wastewater treatment systems 1.0 MGD DAF or more, excluding lagoon systems and primary treatment systems. Group 1 facilities require a wastewater operator certified at the Class 1 level.

Group K Industrial wastewater treatment facilities require Class K certified wastewater operators. Group K facilities shall consist of industrial wastewater treatment works, pre-treatment works, domestic wastewater treatment works owned and operated by industries, and spray irrigation that is collected and discharged.

12.4.2 Certification Qualification Requirements

One must obtain a score of 70 on a certification examination after meeting the class based certification requirements as follows:

- Class 4: 1 year wastewater operating experience and high school education or equivalent
- Class 3: 3 years wastewater operating experience and high school education or equivalent
- Class 2: 6 years wastewater operating experience and high school education or equivalent
- Class 1: 8 years wastewater operating experience and high school education or equivalent
- Class K: Active supervision and/or operation of an industrial wastewater treatment facility
- Operator-In-Training Basic: 3 months wastewater operating experience or 1 wastewater course

Substitutions are as follows:

- Class 3, Class 2, and Class 1 certification levels, up to 50% of the total requirement may be combined credit received for completed wastewater courses, college credits, and related collection system or public water supply operating experience.
- The Class 4 level receives 3 months substitution credit for a high school diploma or GED, and up to 6 months credit for wastewater courses.

12.4.3 Certification Renewal & CPD requirements

There is no renewal requirement for wastewater operator certificates in Illinois at the present time. Currently, a wastewater operator certificate has no expiration date. There are two ways a certified operator may become uncertified. One is that an operator may voluntarily return his certification to the Operator Certification Unit. The other is that the Agency may revoke an operator's certificate due to improper actions performed by the operator in the course of operating a wastewater treatment facility. It should be noted that although there is no renewal

requirement for wastewater certificates at the present time, this does not preclude the institution of wastewater certificate renewal at some point in the future.

12.5 Kansas (Small Size State Example) - Water

12.5.1 Classification of Systems

Systems are classified based on source, population, and complexity of treatment, as follows:

- Small System: Distribution system only or chlorination of ground water (<501)
- Class I: Chlorination of ground water (501 - 1,500 people served) or treatment of ground water (<501 people served)
- Class II: Chlorination of ground water (1,501 - 5,000 people served), treatment of ground water (501 - 2,500 people served) or treatment of surface water (<2,501 people served)
- Class III: Chlorination of ground water (5,001 - 20,000 people served), treatment of ground water or surface water (2,501 - 10,000 people served)
- Class IV: Chlorination of ground water (>20,000 people served), treatment of ground or surface water (>10,000 people served)

12.5.2 Certification Qualification Requirements

All operators must accrue points based on education, experience, and training for each system class:

- High School degree: 12 points
- 2-year environmental technology degree: 6 points
- College: 1 point/year
- 10-hour course: 0.25 points
- California State University correspondence course: 1 point
- Semester course (54 hours): 1.5 points

Point requirements:

- Small System: 12.5 points, 6 months of experience
- Class I: 13 points, 1 year of experience
- Class II: 14 points, 1 year of experience
- Class III: 16 points, 2 years of experience
- Class IV: 18 points, 2 years of experience

12.5.3 Certification Renewal & CPD requirements

Certificates are valid for 2 years. In order to renew, all operators (except small operators) must complete a minimum of 10 hours of training. Small system operators must complete 5 hours of training during each 2-year period.

12.6 Kansas (Small Size State Example) – Wastewater

12.6.1 Classification of Systems

Systems are classified into one of four tiers plus a special small system tier as follows (Kansas Dept. of Health, 2017):

- Small System: Non-overflowing Wastewater Ponds (any population)
- Class I: Any Secondary Facility (<1001 people served) and Overflowing Wastewater Ponds (any population)
- Class II: Any Secondary Facility (1,001-5,000 people served)
- Class III: Any Secondary Facility (5,001-25,000 people served) and Advanced or Specialised Facility (<5,000 people served)
- Class IV: Any Secondary Facility (>25,000 people served) and Advanced or Specialised Facility (>5,000 people served)

Where secondary is defined as any of trickling filters, rotating biological contactors, and activated sludge and where advanced is defined as any chemical, biological, or physical treatment to provide nutrient removal beyond secondary treatment; or including effluent clarification.

12.6.2 Certification Qualification Requirements

As soon as a new operator commences work they must register as an operator in training. Operators in training are allowed to work on-site to gain experience but all sites have minimum numbers of certified operators that vary with tier level.

There is an examination required for all levels of operator certification. In addition to the exam there is an experience and training requirement as per Table 19. The points are gained with education or training according to a prescribed register of rates. There is no clear hours per points correlation but as an indication a two year technology degree yields 6 points and an approved 40 hour course yields 1 point. Therefore the training points can approximately be regarded as equivalent-full-time weeks enrolled in a training course.

Table 19: Kansas Wastewater Operator Certification Requirements

Class	Points	Years of experience
Small System	12.5	6 months
Class I	13	1 year
Class II	14	1 year
Class III	16	2 years
Class IV	18	2 years

12.6.3 Certification Renewal & CPD requirements

Ten hours of training are required during every two-year renewal period for Class I – IV water and wastewater operators. Five hours of training are required every two years for Small Systems operators. Training must be directly related to the subject matter of the certificate the operator holds. If the training is pertinent to water supply and wastewater operators (pump maintenance, for example). Failure to attain the required continuing education will result in non-renewal of an operator's certificate.

12.7 Australia -Water

The Water Industry Operators Association (WIOA) is the recently (2016) appointed national Certifying Body for operators. The Water Industry Skills Taskforce (WIST) was the original developer of the Certification Framework. Framework ownership was not the WIST's long-term goal, as WIST itself is not a legal entity. Several attempts were made to find an appropriate federal government agency to act as owner, without success, before eventually appointing WIOA to be the certifying body.

12.7.1 Classification of Systems

The complexity of each drinking water treatment system determines the competency and capability required of the certified operator.

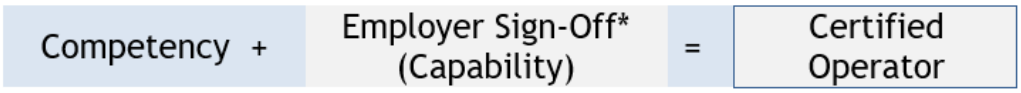
The complexity of each Drinking Water Treatment System will be measured through an approved process endorsed by the relevant state and territory regulator (Government Skills Australia, 2016). However, the National Water Industry Operator site (WIOA, 2016) has the following tier classification is qualitatively defined as:

- Low Complexity - Will include drinking water systems where no treatment barriers are in place or where disinfection is the only treatment barrier.
- High Complexity - Will include drinking water systems that have two or more treatment barriers in place.

The Water Industry Operators Association in its capacity as the Certifying Body must maintain records of the System Complexity Rating and resultant category (Low/High).

12.7.2 Certification Requirements

There is both a competency requirement and an employer sign-off requirement, as described by the schematic below, as well as the full-page diagram on the next page.



Employer Sign-off must be undertaken by a suitably qualified person. As a guide, it should be the most senior technical officer within the organisation with responsibility for the Water Treatment System.

Experience Requirements can only be attained through participating in the operational setting unique to the Drinking Water Treatment System for a period not recommended to be less than Table 20. However, it should also be gained before the maximum timeframe in Table 20 is reached.

Table 20: Minimum Experience Timeframes, Maximum Limits on Achieving Competency

System complexity	Minimum timeframe for experience	Maximum timeframe to achieve competency
Low	6 months including training	12 months including training
High	24 months including training	36 months including training

Training Requirements are as follows:

Table 21: Training Requirements

System complexity	Fit For Purpose Competency Requirement	Mandatory Units
Low	Fit for purpose units from the National Water Package. Units selected may or may not result in a qualification at Certificate level II.	Apply the risk management principles of the water industry standards, guidelines and legislation Sample and test drinking water
High	Fit for purpose units from the National Water Package. Disinfection units may also be required. Units selected will likely result in the award of a qualification at either Certificate level III or IV.	Apply the risk management principles of the water industry standards, guidelines and legislation Sample and test drinking water Perform laboratory testing

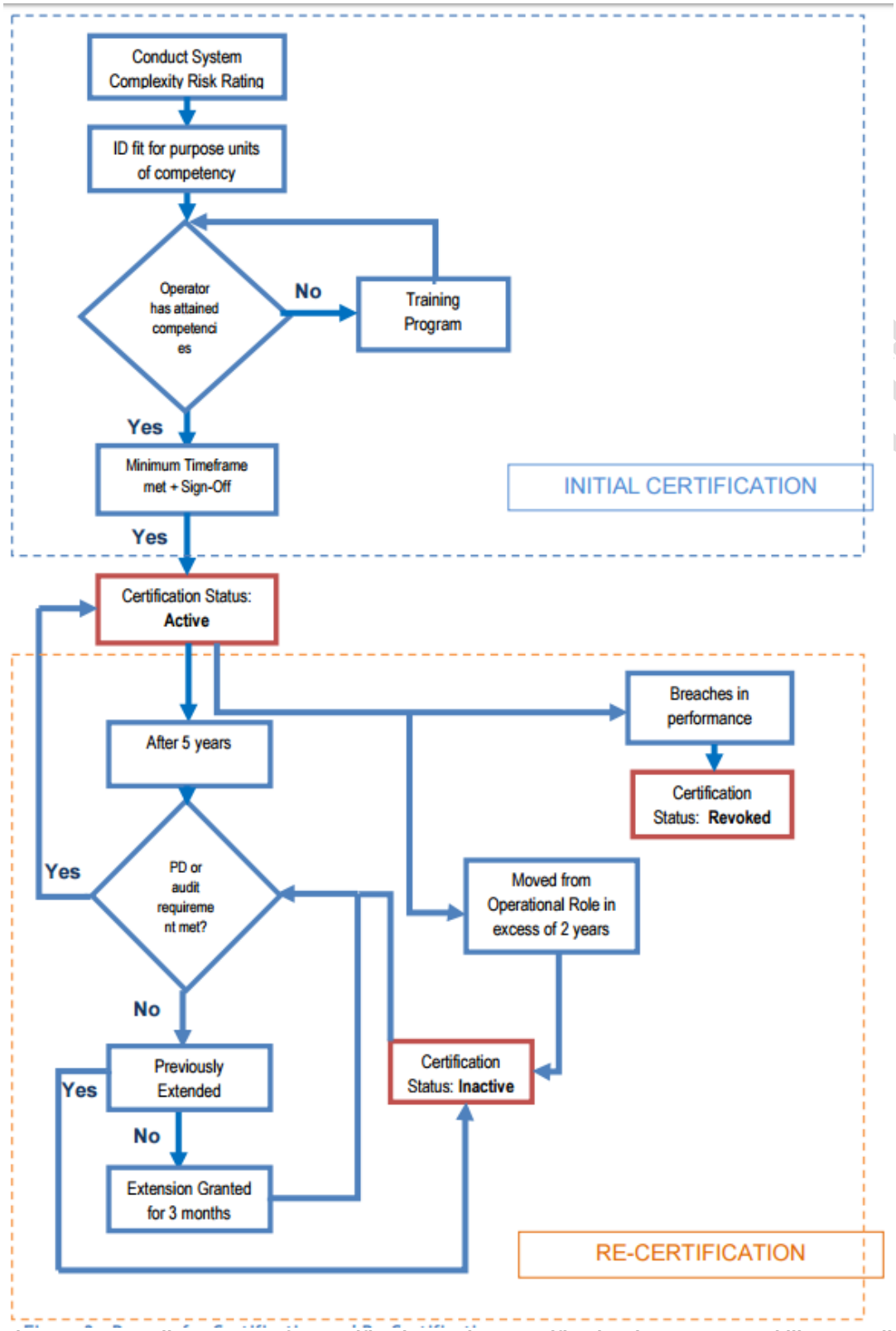


Figure 7: Australian Process for Certification and Re-Certification (Government Skills Australia, 2016)

12.7.3 Certification Renewal & CPD requirements

Certification is valid for a five (5) year period. Operators may obtain re-certification either by demonstrating they have been undertaking CPD or they may undertake an interview with a person who is approved or nominated by the Certifying Body to prove their currency.

There are two pathways for this in Australia:

- Pathway #1 – Participation in the Professional Development Program: For a low and high complexity site the operator must undertake continuing professional development to gain 5 or 15 points respectively. There is a wide range of activities and points assigned to them, most training activities result in one day of training or conference attendance yielding one point. Therefore this system roughly requires high tier operators to undertake 3 days training per year.
- Pathway #2 - Audit / Demonstration of current competence: The Drinking Water Supplier or the Certified Operator may elect to undertake a Certification Audit within three months of the expiry of their Certification. The Certification Audit shall be performed by an operationally competent person, who is independent and approved or nominated by the Certifying Body using an appropriate audit methodology/tool.

12.8 Australia - Wastewater

The Australian wastewater and recycled water certification system was published as a draft for consultation in March 2017. As it is still in consultation the requirements may change from what is listed here. It is closely aligned with their drinking water certification requirements.

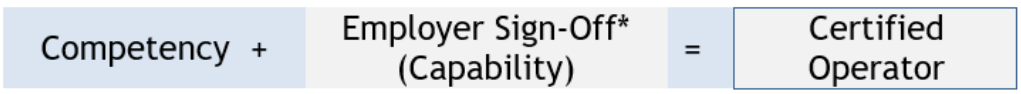
12.8.1 Classification of Systems

The tier classification is qualitatively defined as:

- Low Complexity - Will include Wastewater or Recycled Water Treatment Systems where low technology wastewater treatment processes are utilised. Low complexity treatment processes can include lagoons, trickling filters, rotating biological contactors, Imhoff tanks or small package treatment plants. Disinfection for reuse or discharge purposes may also be undertaken at this level.
- High Complexity – Will include Wastewater or Recycled Water Treatment Systems where higher technology treatment processes are utilised. High technology wastewater treatment processes can include intermittent aeration/oxidation ditches, membrane bioreactors, biological nutrient removal and dissolved air flotation. Includes recycled water use for irrigation purposes where less than 2 recycling processes are employed.

12.8.2 Certification Requirements

There is both a competency requirement and an employer sign-off requirement, as described by the schematic below.



Employer Sign-off must be undertaken by a suitably qualified person. As a guide, it is the most senior technical officer within the organisation with responsibility for the Wastewater or Recycled Water Treatment System. The following training is required in Australia.

Table 22: Site Complexity and Training Requirement

Training Unit Name	Certified wastewater operator – low complexity	Certified wastewater operator – high complexity	Certified recycled water operator
Minimum period for experience in a –Wastewater or Recycled Water Treatment System	12 months inclusive of training	12 months inclusive of training	TBC (note: this table is from a draft document)
Apply risk management principles of the water industry standards, guidelines & legislation	Optional	Optional	Mandatory
Sample and test wastewater	Mandatory	Mandatory	Mandatory
Apply Environmental & Licensing Procedures	Mandatory	Optional	Optional
Apply Environmental & Licensing Procedures	Optional	Mandatory	Mandatory
Perform laboratory testing	Optional	Mandatory	Mandatory
Fit For Purpose units of competency from the NWP	Mandatory	Mandatory	Mandatory

12.8.3 Certification Renewal & CPD requirements

Refer to the water pathways and requirements as the CPD proposal is the same.

12.9 Summary of Water and Wastewater Sector Certifications Abroad

Conclusions from this evaluation are:

- Most systems have 4-5 levels of classification. Australia has the simplest classification system in that there are only two types of operator, even small USA states like Wyoming and Virginia have at least four plant classification types;
- All systems have both a training-hours and experience-hours component;
- Many systems allow reduced experience hours if extra training or qualifications are held;
- Many systems include exams;
- Typically high classification certifications require 2-3 years' experience;
- California seems to be unique in requiring that operators have to work their way up to the larger sites' certifications, additionally they are alone in requiring up to 5 years' experience to run their highest classification site. However, it is worth noting that cities like LA have nearly 4 million residents so that explains why the requirements at the high end are more onerous.
- Australia has a shorter wastewater experience hours' requirement than their water experience requirement.

- Illinois wastewater requirement is less than their water requirement considering the available education substitutions on wastewater.

13 Appendix C - New Zealand Certification & Registration Schemes

13.1 Civil Trade Certification Model

In 2015 a Civil Trades Certification Board was established to oversee the initiation of a new trade regime and the registration of Civil Infrastructure Tradespeople.

Prior to the introduction of the Civil Trade Certification model there was no industry wide and transferable trade qualification for jobs such as road building and pipe laying. Civil Contractors New Zealand (CCNZ) estimates that the civil construction sector carries out more than $12 billion of work annually and employs in excess of 40,000 workers, therefore the scale of the Civil Trade Certification model is considerably larger than the water industry.

13.1.1 Classification of Systems

Civil Trades Certifications come in one of three areas:

1. Road Construction and Maintenance, with Endorsement(s):
    a. Earthworks
    b. Road Construction
    c. Road Maintenance
    d. Non-Structural Concrete
2. Pipeline Construction and Maintenance, with Endorsement(s):
    a. Trenched
    b. Trenchless
    c. Water
    d. Wastewater and Stormwater
3. Road Surfacing, with Endorsement(s):
    a. Bituminous Mixes
    b. Chipseal
    c. Slurry
    d. Binder Manufacturing
    e. Bituminous Mixing operation
    f. Bituminous Spraying Operation

13.1.2 Certification Requirements

The individual's level of experience will define what pathway they take to certification, out of the options below.
To achieve Civil Trade Certification the Applicant must satisfy the Board that they:

1. Qualification: Hold a Board approved Civil Infrastructure Trades Qualification (these include a variety of trade specific training accredited to Level 4). The Level 4 qualification can be gained from:
    a. RCC – Recognition of Current Competence: Requires minimum of 5 years' experience with at least two at a high level of skill
    b. New Zealand Apprenticeship (taking approximately 3 years)
    c. Sector Qualification Pathway – a level 4 in Civil Infrastructure
2. Hours: Demonstrate 8000 hours practical experience within the industry sector for which Trade Certification is sought, this is approximately equal to 4 years equivalent full time experience. Of these

8000 hours, 2000 hours of experience must be verified to have been completed at a Level 4 competency in accordance with the Civil Trades Practical Experience Guidelines.

3. Recommendation: Hold both the following letters of recommendation:
    a. One from a senior representative of the Applicant's employer verifying the Applicant's capability; and
    b. One from a senior representative of an external organization attesting to the Applicant's character and suitability to be awarded Civil Trade Certification.
4. Evaluation: Have successfully completed an evaluation with a Trade Certification Evaluator which may include a discussion with the Applicant about their work history to establish the Applicant's competency and suitability for Civil Trade Certification.

13.1.3 Certification Renewal & CPD requirements

Certificates are valid for three years. Re-certification requires a fee-paid and re-processing. The Applicant must submit their application for Recertification at least two months prior to expiry of their Civil Trade Certificate. So long as their trade certificate is current and they have been working regularly in the industry their certification is renewed.

13.2 New Zealand: Sanitary Plumbing Certification Model

13.2.1 Classification of Systems

Plumbers, Gasfitters, and Drainlayers Act 2006 defines Plumbers and designates the Plumbers, Gasfitters, and Drainlayers Board as responsible for the registration and licensing for plumbers. The broad definition of a sanitary plumber is anyone undertaking work of fixing or unfixing any sanitary fixture or sanitary appliance, or any associated fittings or accessories. There is only really one type of licence but that has different tiers with each tier being permitted to undertake a wider range of activities, as follows:

Table 23: Levels of Plumbing Certification Available

Authorisation type	Tier and Activities Allowed
Licence category	**1st Tier | Certifying plumber** The highest qualification available. These people are qualified and registered. They are responsible for ensuring both their own work and the work of anyone they supervise is done competently. **2nd Tier | Tradesman plumber** These people are qualified and registered and usually work independently. However, a nominated certifying tradesperson (supervisor), is ultimately responsible for ensuring that the work is done competently. **3rd Tier | Journeyman plumber** These people have completed a trade qualification but have not passed the Board's licensing exam. They are registered and authorised. **Training | Limited certificate trainee plumber** These are people who are working towards becoming qualified. They can do the work but must be supervised by a certifying person who is ultimately responsible for ensuring the work is done competently.
Exemption for plumbing under	**Exemptions** These people are not registered and don't have a full qualification, but they can do plumbing

supervision	work provided they are supervised by a certifying person (direct supervision for the first two years), who must ensure that the work is done competently.

13.2.2 Certification Requirements

How Plumbing licences are obtained for a Certifying Plumber (abridged):

1. Applicants must have qualifications or experience from one of:
    a. held a licence as a licensed or tradesman plumber more than 24 months under the supervision of a certifying plumber
    b. International qualifications equivalent to level 4 on the National Qualifications Framework, and passing a practical proficiency assessment
2. Applicants must pass Examination No. 9195 as set by the Board. This examination tests applicants on the following:
    a. Ability to perform trade calculations such as:
        i. basic hydraulics;
        ii. physics as it relates sanitary plumbing;
        iii. corrosion protection;
    b. Materials selection, their properties and applications;
    c. Preparation of plumbing drawings;
    d. Design of plumbing systems including
        i. pipe sizing;
        ii. hot and cold water reticulation design;
        iii. water storage systems;
        iv. backflow prevention;
        v. pipe sizing;
    e. The ability to access and apply relevant plumbing documentation including:
        i. Acts and regulations;
        ii. standards;
        iii. codes; and
        iv. manufacturers' instructions.
    f. Management of the effect on the integrity of structures relating to the design and installation of sanitary plumbing systems, including weather tightness considerations as they relate to penetrations to the building envelope and the coordination with other services.

13.2.3 Certification Renewal & CPD requirements

For registered person (i.e. Journeyman, Tradesman or Certifying), undertaking CPD is a condition of licence renewal.

The following defines the points requirement:

- Under the new scheme (that consultation was held on in 2012) tradespeople have to obtain a minimum of 12 CPD points every year for the holder of a single licence, 20 CPD points for two trades and 24 CPD points for three trades.

- At least 75% of points that a tradesperson obtains must be from structured programmes that are accredited by the Board.[1]
- A maximum of 25% of a tradesperson's CPD points may be from self-directed learning. Self-directed learning could include researching and reviewing published material, attending seminars or industry conferences or other non-accredited programmes. One hour of self-directed learning will be worth one CPD point.

13.3 Water Industry Professionals Association (WIPA) – CPD Registration Scheme

WIPA has a documented process for promoting and recording CPD for water industry operations staff.

13.3.1 Classification of Systems

The WIPA comprises a two tier classification system. The tiers are defined as follows:

- Tier 1 is for WIPs at an operational level i.e. those people that currently hold a level 3 & 4 NZ Water Industry qualification.
- Tier 2 is for WIPs who are more supervisory/senior level i.e. those who hold a level 5 NZ water industry qualification, or are employed in a multi-stage process treatment plant (where multi-stage treatment has the same definition as per the New Zealand Certificate in Water Treatment (Level 4) qualification).

13.3.2 Certification Requirements

Applicants are eligible when they hold an approved NZQA water qualification and have been working in the industry for a minimum of four years. Further to this there is recommendation letter requirement from:

1. The Applicant's employer verifying the Applicant's role, capability and length of service
2. A senior person outside the Applicant's organization attesting to character and suitability

13.3.3 Certification Renewal & CPD requirements

Re-registration is proposed to be every two years. Undertaking CPD is the only specified condition of re-registration. All WIPs are required to complete not less than 30 hours of CPD over the two year registration period. This can be a blend of personal development and task based development. The CPD for re-registrations is presented in Table .

Table 24: WIPA CPD Requirements for Re-registration

Tier	Description	Task based (hours)	Personal Development (hours)
1	Operators	20 Max	10 Min
2	Multi-stage process plant operators, Leading hand/Supervisor/Managers	10 Max	20 Min

[1] It is noted that the quality of CPD provided as part of this scheme is believed to be variable and is not to be used a benchmark for the quality of CPD to be provided as part of a water industry certification scheme.

14 Appendix D – Examples of Water Plant Classifications

A selection of plants from across the country have been classified using the scoring system described in Table 25.

Table 25: Water Treatment Plants Sample Tier Results

No.	Plant	Owner/Operator	Points	Tier
1.	Ardmore	Watercare	95	T5
2.	Te Marua	Wellington Water	92	T5
3.	Invercargill	Invercargill District Council	71	T4
4.	Wainuiomata	Wellington Water	69	T4
5.	Waterloo	Wellington Water	65	T4
6.	Whararoa	Fonterra	61	T4
7.	Nelson	Nelson City Council / Fulton Hogan	61	T4
8.	Morrinsville	Matamata Piako District Council	51	T3
9.	Levin	Horowhenua District Council	46	T3
10.	Te Aroha	Matamata Piako District Council	41.5	T3
11.	Waitoa	Fonterra	38	T2
12.	Tokomaru	Horowhenua District Council	36.5	T2
13.	Matamata	Matamata Piako District Council	36.5	T2
14.	Shannon	Horowhenua District Council	34.5	T2
15.	Brookvale	Hastings District Council	34	T2
16.	Foxton	Horowhenua District Council	32.5	T2

15 Appendix E – Examples of Wastewater Plant Classifications

A selection of plants from across the country have been classified using the scoring system described in Table 25.

Table 26: Wastewater Treatment Plants Sample Tier Results

No.	Plant	Owner/Operator	Points	Tier
1.	Rotorua WWTP	Rotorua District Council	118	T5
2.	Bromley WWTP	Christchurch City Council / Citycare	112	T5
3.	Mangere (Island Road)	Watercare	108	T5
4.	Pukete WWTP	Hamilton City Council	94	T5
5.	Moa Point WWTP	Wellington City Council	87	T5
6.	Seaview WWTP	Hutt City Council	85	T5
7.	Rosedale (Albany, North Shore) WWTP	Watercare	84	T5
8.	Totara Road WWTP	Palmerston North	81	T5
9.	Tahuna WWTP	Dunedin City Council	80	T5
10.	Clifton WWTP	Invercargill City Council	76	T4
11.	New Plymouth WWTP	New Plymouth	58	T3
12.	Wallacetown WWTP	Southland District Council	57	T3
13.	Pukekohe (Friedlander Road) WWTP	Watercare	55	T3
14.	Porirua WWTP	Porirua City Council	54	T3
15.	Whangarei WWTP	Whangarei District Council	53	T3
16.	Chapel Street WWTP	Tauranga City Council	52	T3
17.	East Clive WWTP	Hastings District Council	52	T3
18.	Paraparaumu WWTP	Kapiti District Council	51	T3
19.	Blenheim WWTP	Marlborough District Council	50	T3
20.	Te Maunga WWTP	Tauranga City Council	48	T3
21.	Te Anau	Southland District Council	37	T2
22.	Wanaka	Queenstown Lakes District Council	37	T2
23.	Warrington	Dunedin City Council	18	T1
24.	Onemana	Thames Coromandel	18	T1