

**FIELD                    ENGINEERING AND TECHNOLOGY****Review of *Water Industry* unit standards**

<b>Subfield</b>	<b>Domain</b>	<b>Id</b>
Water Industry	Drinking-Water	18438, 18448-18457, 18460
	Drinking-Water Assessment	18439-18447
	Wastewater Treatment	17877-17888, 19179-19198
	Water - Generic	17870-17876, 19200, 19205
	Water Reticulation	18458, 18459, 19201-19204, 19206-19215, 19354, 19436
	Water Treatment	17889-17901, 19199, 19347-19353, 19356, 19357

The Agriculture Industry Training Organisation has completed the review of the unit standards listed above.

**Date new versions published**

**September 2008**

**Planned review date**

**December 2013**

**Summary of review and consultation process**

The review was carried out because these unit standards had reached their expiry date, and feedback from industry and moderators indicated that changes were required to reflect current industry practices.

Key industry representatives and Agriculture ITO staff from each of the water industry sectors (domains) were recruited for the unit standard and qualification review panels, and meetings were convened. Initial discussions focused on the current status of the industry sector, any changes which had occurred since the last review which impacted on training, and the future direction of the industry.

The information was collected and taken into consideration when reviewing existing unit standards and changes were made in consultation with review panel representatives. New unit standards were written where gaps were identified.

Feedback received since the last review was also considered by the review panel, and where this was considered valid, was included in the updated versions of unit standards.

Draft unit standards were circulated for internal ITO consultation to training advisors, key accounts managers, and moderators. Suggestions were further considered by the review panel and incorporated if valid. Final drafts were then placed on the website and all stakeholders were notified of the opportunity to provide feedback. Stakeholders consisted of water industry employers, any industry which had an association with water, industry sector organisations, training providers, and other ITOs.

Feedback was considered by the review panels, and unit standards were updated. Unit standards were endorsed by the Water Industry Committee prior to submission to NZQA for evaluation and registration.

## **Main changes resulting from the review**

### **Domain Drinking-Water**

- Unit standards 18438 and 18445 (domain Drinking-Water Assessment) have been replaced by unit standard 24896 which covers the requirements of the new legislation, the Heath (Drinking-Water) Amendment Act 2007.
- Unit standard 18448 has been replaced by unit standards 24897 and 24898 to include abstraction and pre-treatment processes.
- Unit standard 18452 has been replaced by unit standard 24899 as the performance criteria have been substantially rewritten to assist clarity, and credits have increased from 6 to 10.
- Unit standard 18453 has been replaced by unit standards 24900-24902 to reflect the different types of disinfection processes.
- Unit standard 18454 has been replaced by unit standard 24903, and credits have increased from 2 to 8.
- Unit standard 18455 has been designated category D expiring, however unit standard 24904 has been recommended as an alternative.
- Unit standards 18457 and 18460 have been replaced by unit standards 24905 and 24906 as their content has been substantially rewritten to assist clarity.

### **Domain Drinking-Water Assessment**

- Unit standard 18439 has been replaced by unit standard 24907 as a new element has been added to expand the assessment requirements for Public Health Risk Management Plans.
- The level for unit standard 18440 has decreased from 5 to 4 to better reflect the level of complexity required to achieve competency.
- Credits have decreased for unit standards 18439, 18440, 18444, and 18446 to better reflect actual time taken to achieve competency.
- Unit standards 18442 and 18443 have been replaced by unit standard 24908.
- Unit standard 18444 has been replaced by unit standard 24909 and though they share the same title, the content has changed substantially.
- Unit standards 18445 and 18438 (domain Drinking-Water Assessment) have been replaced by unit standard 24896 (domain Drinking-Water).
- Unit standard 18447 has been replaced by unit standard 24911 as the requirements for the use of a Water Information New Zealand database have been expanded.
- New unit standard 24912 has been written to cover the preparation of Public Health Risk Management Plans.

### **Domain Wastewater Treatment**

- The level of unit standard 17877 has increased from 2 to 4, and the credits increased from 10 to 18 to better reflect the level of complexity required and actual time taken to achieve competency.
- Unit standards 17878 and 17879 have been replaced by unit standard 24927, and credits have increased to 9.
- Credits for unit standard 17882 have increased from 7 to 10 to better reflect actual time taken to achieve competency.
- Unit standard 17883 has been replaced by unit standard 24929 and credits increased from 7 to 10.
- Unit standard 17884 has been replaced by unit standard 24930 as the content has been expanded, the level has increased from 3 to 4, and credits increased from 7 to 10.

- Unit standard 17888 has been replaced by unit standard 24931 and credits decreased from 10 to 6.
- The content of unit standards 19179, 19180, 19184, 19185, 19186, 19193, and 19194 have been replaced by unit standards 17880, 24932, 24933, 24937, 24938, 24939, 24943, and 24944 respectively, to more accurately reflect the requirements of industry, and credits have increased.
- The content of unit standards 19181, 19182, 19183, 19190, 19191, 19192, and 19195 have been replaced by unit standards 24928, 24934, 24935, 24936, 24940, 24941, 24942, and 24945 respectively, to more accurately reflect the requirements of industry.
- Unit standard 19187 has been designated category D expiring, however unit standard 24913 has been recommended as an alternative.
- Unit standard 19189 has been designated expiring and will not be replaced as it is no longer required by industry.
- Unit standard 19196 has been rewritten to more accurately reflect the requirements of industry and credits have decreased from 5 to 4 to better reflect actual time taken to achieve competency.
- Credits have decreased for unit standard 19197 from 25 to 12 to better reflect actual time taken to achieve competency.
- New unit standard 24947 has been written to cover activated sludge processes in wastewater treatment.
- New unit standard 24948 has been written to cover general knowledge relating to the characteristics of, and sources that affect, wastewater.

### **Domain Water - Generic**

- A new element has been added to unit standard 17871 relating to personal health and safety, and the level and credit have increased from 2 to 3 to better reflect the level of complexity required and actual time taken to achieve competency.
- Credits have increased for unit standards 17874, and 19200 from 4 to 6 and 2 to 3 respectively to better reflect actual time taken to achieve competency.
- Unit standards 17872 and 17873 have been replaced by unit standards 24913 and 24904 which also cover process control.
- Unit standard 17875 has been replaced by separate water and wastewater unit standards, 24915 and 24916, and reclassified into domains Water Treatment and Wastewater Treatment respectively.
- Unit standard 17876 has been replaced by unit standard 24917 as a new element was added to cover quality control, quality assurance, and product standards.

### **Domain Water Reticulation**

- Unit standard 19202 has been replaced by unit standards 24918 and 24919 to include the requirements of open cut excavation and pipe refurbishment or maintenance, and level and credits have increased from 2 to 3 to better reflect the level of complexity required and actual time taken to achieve competency.
- Unit standard 19203 has been replaced by unit 24920 to include trench excavation and reinstatement for water reticulation, and credits have increased from 2 to 16.
- Credits have decreased for unit standard 19204 from 4 to 2, and increased for unit standard 19212 from 8 to 10.
- Unit standard 19206 has been replaced by unit standard 24921 as a new element has been added for using mechanical plant, and credits have increased from 7 to 10.
- Credits have increased for unit standard 19207 from 3 to 5 to better reflect actual time taken to achieve competency.

- Unit standard 19208 has been replaced by unit standard 24922 as a new element has been added for knowledge of water supply mains shut-down and re-commission, and credits have increased from 8 to 10.
- New unit standards 24923-24926 have been written to cover gaps identified by industry.

### **Domain Water Treatment**

- Unit standard 17889 has been replaced by unit standards 24950 and 24951 as the requirements for responses to emergency and process failure required a separate unit standard for a wider application across other sectors of the water industry, and the level has increased to 4.
- Unit standard 17892 has been designated category D expiring as a new series of disinfection process unit standards (24952-24957) have been written.
- Unit standard 17893 has been designated category D expiring as a new series of process specific unit standards (24958-24963) have been written.
- Credits for unit standards 17894 have increased from 5 to 7 to better actual time taken to achieve competency.
- Credits and level for unit standard 17895 have decreased from 7 to 5 and 4 to 3 respectively to better reflect the level of complexity required and actual time taken to achieve competency.
- Credits for unit standard 17896 have increased from 7 to 10 to better actual time taken to achieve competency.
- Unit standards 17898 and 17899 have been replaced by unit standards 24964 and 24965 as a new element has been added to each for the handling of chemicals, and credits have increased from 6 to 8, and 1 to 2, respectively.
- Credits have decreased for unit standard 19199 from 25 to 12 to better reflect actual time taken to achieve competency.
- The level for unit standard 19347 has increased from 5 to 6 to better reflect the level of complexity required to achieve competency.
- Unit standard 19350 has been designated category D expiring and new filtration process unit standards (24966-24969) have been written for each type of filtration process.
- Unit standard 19351 has been designated category D expiring and new disinfection process unit standards (24970-24972) have been written for each type of disinfection process.
- Unit standard 19352 has been replaced by unit standard 24973 to more accurately reflect drinking-water treatment waste management processes, and credits have increased from 3 to 4.
- Unit standard 19353 has been designated category D expiring, however unit standards 24904 and 24913 have been recommended as alternatives.
- New unit standard 24975 has been written to cover an identified gap in drinking-water consumption and water loss detection.
- New unit standard 24974 has been written to cover the knowledge around coagulation and flocculation processes.

**Unit standards categorised as category C or D expire at the end of December 2010.**

## Impact on existing provider accreditations

Current Accreditation for			Accreditation extended to		
Nature of accreditation	Classification or Id	Level	Nature of accreditation	Classification or Id	Level
Standard	19203	3	Standard	24920	3
	19206	2		24921	2

## Impact on Accreditation and Moderation Action Plan (AMAP)

AMAP 0179 has been updated to reflect the changes made to the standards.

## Impact on existing qualifications

Qualifications that contain the reviewed standards or classifications are tabled below.

<b>Affected</b>	The qualification lists a reviewed classification (domain or subfield) in an elective set The qualification lists a standard that has changes to level or credits The qualification lists a C or D category standard
<b>Not materially affected</b>	The qualification lists a standard that has a new title The qualification lists a standard that has a new classification

The following Agriculture Industry Training Organisation qualifications are affected by the outcome of this review and will be reviewed in 2009. The items that generated the affected status have been listed in **bold**.

Qualification title	Classification or standard in the qualification
National Certificate in Wastewater Treatment (Site Operator) [Ref: 0879]	<b>17871, 17873, 17874, 17875, 17876, 17877, 17878, 17879, 17880, 17882, 17883, 17884, 17888</b>
National Certificate in Water Reticulation (Service Person) (Level 3) with strands in Water, and Wastewater [Ref: 0962]	<b>19201, 19202, 19203, 19204, 19206, 19207, 19208, 19212,</b>
National Certificate in Water Reticulation (Supervisor) (Level 4) with strands in Water, and Wastewater [Ref: 1259]	<b>19207, 19204</b>
National Certificate in Water Treatment (Site Operator) [Ref: 0880]	<b>17871, 17873, 17874, 17875, 17876, 17889, 17892, 17893, 17894, 17895, 17896, 17898, 17900, 17899</b>
National Diploma in Drinking-Water with strands in Drinking-Water Assessment, and Water Treatment (Site Technician) [Ref: 1012]	<b>18438, 18439, 18440, 18441, 18442, 18443, 18444, 18445, 18446, 18447, 18448, 18449, 18450, 18451, 18452, 18453, 18454, 18455, 18457, 18460, 19199, 19347, 19348, 19349, 19350, 19351, 19352, 19353, 19354, 19356</b>
National Diploma in Wastewater Treatment (Site Technician) [Ref: 0966]	<b>19179, 19180, 19181, 19182, 19183, 19184, 19185, 19186, 19187, 19188, 19189, 19190, 19191, 19192, 19193, 19194, 19195, 19196, 19197</b>

The following qualifications are also affected by the outcome of this review. The relevant SSBs have been notified that their qualifications require revision.

Qualification title	Classification or standard in the qualification	SSB Name
National Certificate in Civil Works and Services (Road-Opening -Trenching) with optional strands in Electricity Supply, Gas Distribution, and Water Services [Ref: 1000]	19201, <b>19202</b> , <b>19206</b>	InfraTrain New Zealand
National Certificate in Transportation of Waste and Recoverable Resources (Liquid and Hazardous Waste) [Ref: 1226]	<b>19207</b>	Tranzqual ITO

### Review categories and changes to classification, title, level and credits

All changes are in **bold**. The details of recommended alternative unit standards are in *italics*.

Key to review category	
<b>A</b>	Dates changed, but no other changes are made - the new version of the standard carries the same Id and a new version number
<b>B</b>	Changes made, but the overall outcome remains the same - the new version of the standard carries the same Id and a new version number
<b>C</b>	Major changes that necessitate the registration of a replacement standard with a new Id
<b>D</b>	Standard will expire and not be replaced

#### Subfield Water Industry

Id	Domain	Title	Level	Credit	Review Category
18438	Drinking-Water	Demonstrate knowledge of legislation relating to drinking-water and drinking-water suppliers	5	4	C
18445	Drinking-Water	Describe drinking-water assessors' legal powers, and demonstrate their roles	5	5	C
<b>24896</b>	<b>Drinking-Water</b>	<b>Describe the Health (Drinking-Water) Amendment Act 2007 relating to drinking-water and drinking-water suppliers</b>	<b>5</b>	<b>4</b>	
18448	Drinking-Water	Describe the contribution of catchment characteristics to raw water quality management	5	10	C
<b>24897</b>	<b>Drinking-Water</b>	<b>Describe the contribution of catchment characteristics to raw water quality management</b>	<b>5</b>	<b>8</b>	
<b>24898</b>	<b>Drinking-Water</b>	<b>Describe abstraction and pre-treatment processes for potable water</b>	<b>5</b>	<b>8</b>	

Id	Domain	Title	Level	Credit	Review Category
18449	Drinking-Water	Describe the water/solids separation process, and management of critical points <b>Describe the management of the separation process of water and solids</b>	5	4	B
18450	Drinking-Water	Describe coagulation and flocculation processes, and management of critical points <b>Describe the management of coagulation and flocculation processes</b>	5	6	B
18451	Drinking-Water	Describe hardness and corrosion control, and management of critical points <b>Describe the management of pH, alkalinity, hardness, and corrosion control</b>	5	5	B
18452  24899	Drinking-Water  <b>Drinking-Water</b>	Describe drinking-water treatment filtration processes, and management of critical points <b>Describe the management of drinking-water treatment filtration processes</b>	5  5	6  10	C
18453  24900  24901  24902	Drinking-Water  <b>Drinking-Water</b>  <b>Drinking-Water</b>  <b>Drinking-Water</b>	Describe drinking-water treatment disinfection processes, and management of critical points <b>Describe the management of chlorine and chlorine dioxide disinfection processes</b> <b>Describe the management of ozone disinfection processes</b> <b>Describe the management of ultraviolet (UV) disinfection processes</b>	5  5  5  5	8  8  5  5	C
18454  24903	Drinking-Water  <b>Drinking-Water</b>	Describe water treatment waste management processes, and management of critical points <b>Describe the management of water treatment plant waste management processes</b>	5  5	2  8	C
18455  24904	Drinking-Water  <i>Water- Generic</i>	Describe process control in a water treatment plant, and management of critical points <i>Describe process control, P and I drawings, and SCADA, for a water or wastewater plant</i>	5  5	3  5	D

Id	Domain	Title	Level	Credit	Review Category
18456	Drinking-Water	Describe preventive maintenance and monitoring of product standards for drinking-water treatment	5	3	B
18457	Drinking-Water	Assess a water treatment plant for optimal output	6	12	C
<b>24905</b>	<b>Drinking-Water</b>	<b>Assess the optimisation of a drinking-water treatment plant</b>	<b>6</b>	<b>12</b>	
18460	Drinking-Water	Describe drinking-water microbiology of Public Health and drinking-water supplies	3	4	C
<b>24906</b>	<b>Drinking-Water</b>	<b>Describe drinking-water contaminants of public health significance</b>	<b>4</b>	<b>4</b>	

Domain      Drinking-Water Assessment

Id	Title	Level	Credit	Review Category
18439	Demonstrate knowledge of Public Health Risk Management Plans (PHRMP) and their implementation	5	3	C
<b>24907</b>	<b>Demonstrate knowledge of Public Health Risk Management Plans (PHRMP) and their implementation</b>	<b>5</b>	<b>4</b>	
18440	Describe drinking-water standards and the relevant Ministry of Health quality management strategy	5 4	4 3	B
18441	Assess drinking-water supplier's Public Health Risk Management Plans (PHRMP) <b>Assess drinking-water suppliers' Public Health Risk Management Plans (PHRMP) for adequacy</b>	6	8	B
18442	Plan inspections of drinking-water supplies	6	6	C
18443	Conduct inspections of drinking-water supplies and verify compliance with PHRMP and DWSNZ	6	8	C
<b>24908</b>	<b>Plan and conduct inspections of drinking-water supplies, and verify compliance with PHRMP and DWSNZ</b>	<b>6</b>	<b>8</b>	
18444	Produce a final report on, and communicate, drinking-water supply inspection findings	6	5	C
<b>24909</b>	<b>Produce a final report on, and communicate, drinking-water supply inspection findings</b>	<b>6</b>	<b>3</b>	
18446	Assess competence of drinking-water field analysts	6	6 5	B
18447	Maintain a Water Information New Zealand (WINZ) database on local drinking-water supplies	4	4	C
<b>24911</b>	<b>Describe and use a Water Information New Zealand (WINZ) database on local drinking-water supplies</b>	<b>4</b>	<b>4</b>	
<b>24912</b>	<b>Prepare a Public Health Risk Management Plan (PHRMP) for a large drinking-water supply</b>	<b>6</b>	<b>6</b>	<b>New</b>

## Domain Wastewater Treatment

<b>Id</b>	<b>Title</b>	<b>Level</b>	<b>Credit</b>	<b>Review Category</b>
17877	Operate and monitor a wastewater treatment plant	2 4	10 18	B
17878	Undertake sampling and testing procedures for wastewater treatment	3	7	C
17879	Demonstrate knowledge of sampling procedures and measurements for wastewater treatment	3	5	C
<b>24927</b>	<b>Describe, and undertake sampling and testing procedures for wastewater treatment</b>	<b>3</b>	<b>9</b>	
17880	Demonstrate knowledge of preliminary processes in wastewater treatment	3	2	C
<b>24928</b>	<b>Demonstrate knowledge of preliminary processes in wastewater treatment</b>	<b>3</b>	<b>2</b>	
17881	Demonstrate knowledge of primary processes in wastewater treatment	3	5	B
17882	Demonstrate knowledge of sludge digestion processes in wastewater treatment	4	7 10	B
17883	Demonstrate knowledge of bio solids management in wastewater treatment	4	7	C
<b>24929</b>	<b>Demonstrate knowledge of biosolids management in wastewater treatment</b>	<b>4</b>	<b>10</b>	
17884	Demonstrate knowledge of activated sludge processes in wastewater treatment	3	7	C
<b>24930</b>	<b>Demonstrate knowledge of activated sludge processes in wastewater treatment</b>	<b>4</b>	<b>10</b>	
17885	Demonstrate knowledge of oxidation pond and aerated lagoon processes in wastewater treatment <b>Demonstrate knowledge of oxidation ponds in wastewater treatment processes</b>	3	7	B
17886	Demonstrate knowledge of fixed growth reactor processes in wastewater treatment	3	7	B
17887	Demonstrate knowledge of tertiary processes in wastewater treatment	3	7	B
17888	Demonstrate knowledge of pumping systems in wastewater treatment	3	10	C
<b>24931</b>	<b>Demonstrate knowledge of pumping systems in wastewater treatment</b>	<b>3</b>	<b>6</b>	
19179	Describe surface water oxygen chemistry, and the impact of wastewater discharge on surface water	5	4	C
<b>24932</b>	<b>Describe the impact of effluent discharge on the environment</b>	<b>5</b>	<b>10</b>	
19180	Describe wastewater treatment separation processes, and management of critical points	5	4	C
<b>24933</b>	<b>Describe wastewater treatment separation processes, and critical points</b>	<b>5</b>	<b>6</b>	

Id	Title	Level	Credit	Review Category
19181	Describe wastewater activated sludge treatment processes, and management of critical points	5	10	C
<b>24934</b>	<b>Describe wastewater activated sludge treatment processes, and critical points</b>	<b>5</b>	<b>10</b>	
19182	Describe wastewater fixed growth reactor treatment processes, and management of critical points	5	6	C
<b>24935</b>	<b>Describe wastewater fixed growth reactor treatment processes, and critical points</b>	<b>5</b>	<b>6</b>	
19183	Describe wastewater oxidation pond treatment processes, and management of critical points	5	4	C
<b>24936</b>	<b>Describe wastewater oxidation pond treatment processes, and critical points</b>	<b>5</b>	<b>4</b>	
19184	Describe lagoon type wastewater treatment processes and management of critical points	5	6	C
<b>24937</b>	<b>Describe lagoon type wastewater treatment processes, and critical points</b>	<b>5</b>	<b>4</b>	
19185	Demonstrate knowledge of sewage bio-solids management	5	8	C
<b>24938</b>	<b>Describe wastewater sludge and biosolids management</b>	<b>5</b>	<b>10</b>	
19186	Describe effluent disinfection, and management of critical points	5	5	C
<b>24939</b>	<b>Describe effluent disinfection, and critical points</b>	<b>5</b>	<b>4</b>	
19187	Describe process control in a wastewater treatment plant, and management of critical points	5	3	D
<i>24913</i>	<i>Describe processes, process control, and monitoring, in a water or wastewater treatment plant</i>	<i>3</i>	<i>5</i>	
19188	Describe preventive maintenance and monitoring of product standards for wastewater treatment	5 <b>3</b>	3	B
19189	Describe wastewater reticulation system management, and management of critical points	5	12	D
19190	Test the affect of wastewater discharge on surface water oxygen	5	4	C
<b>24940</b>	<b>Interpret data to determine the effect of effluent discharge on the environment</b>	<b>5</b>	<b>4</b>	
19191	Optimise and manage sedimentation and flotation processes in wastewater treatment	5	4	C
<b>24941</b>	<b>Manage, monitor, and optimise separation processes in wastewater treatment</b>	<b>5</b>	<b>4</b>	
19192	Optimise and manage fixed growth reactor processes in wastewater treatment	5	4	C
<b>24942</b>	<b>Manage, monitor, and optimise fixed growth reactor processes in wastewater treatment</b>	<b>5</b>	<b>4</b>	

Id	Title	Level	Credit	Review Category
19193	Optimise and manage oxidation pond processes in wastewater treatment	5	2	C
<b>24943</b>	<b>Manage, monitor, and optimise oxidation pond processes in wastewater treatment</b>	<b>5</b>	<b>3</b>	
19194	Optimise and manage lagoon processes in wastewater treatment	5	2	C
<b>24944</b>	<b>Manage, monitor, and optimise lagoon processes in wastewater treatment</b>	<b>5</b>	<b>3</b>	
19195	Optimise and manage solid waste management processes in wastewater treatment	5	5	C
<b>24945</b>	<b>Manage, monitor, and optimise solid waste processes, and dispose of solid waste, in wastewater treatment</b>	<b>5</b>	<b>5</b>	
19196	Optimise and manage effluent disinfection processes in wastewater treatment	5	5	C
<b>24946</b>	<b>Manage, monitor, and optimise effluent disinfection processes in wastewater treatment</b>	<b>5</b>	<b>4</b>	
19197	Report on a wastewater treatment plant topic or improvement	5	25	B
			<b>12</b>	
19198	Assess a wastewater treatment plant for optimal output, and describe critical points	5	12	B
<b>24947</b>	<b>Manage, monitor, and optimise activated sludge processes in wastewater treatment</b>	<b>5</b>	<b>5</b>	<b>New</b>
<b>24948</b>	<b>Describe the characteristics of, and sources that affect, wastewater</b>	<b>4</b>	<b>15</b>	<b>New</b>

Id	Domain	Title	Level	Credit	Review Category
17870	Water-Generic	Carry out safe practices when working in water and wastewater treatment plants	2	2	B
17871	Water-Generic	Describe safe practices when working with hazards in water and wastewater treatment plants	2	2	B
			<b>3</b>	<b>3</b>	
17872	Water-Generic	Demonstrate knowledge of plant automation using PLCs's in water and wastewater treatment plants	4	8	C
17873	Water-Generic	Demonstrate knowledge of process control and monitoring in water and wastewater treatment plants	3	5	C
<b>24904</b>	<b>Water-Generic</b>	<b>Describe process control, P and I drawings, and SCADA, for a water or wastewater treatment plant</b>	<b>5</b>	<b>5</b>	
<b>24913</b>	<b>Water-Generic</b>	<b>Describe processes, process control, and monitoring, in a water or wastewater treatment plant</b>	<b>3</b>	<b>5</b>	

Id	Domain	Title	Level	Credit	Review Category
17874	Water-Generic	Demonstrate knowledge of basic science theory relating to water	3	4 <b>6</b>	B
17875	Water-Generic	Demonstrate knowledge of legislation and agencies relating to water and wastewater treatment	4	5	C
<b>24915</b>	<b>Water Treatment</b>	<b>Demonstrate knowledge of the legislative framework and agencies relevant to drinking-water supply</b>	<b>3</b>	<b>3</b>	
<b>24916</b>	<b>Wastewater Treatment</b>	<b>Demonstrate knowledge of the legislative framework and agencies relevant to wastewater treatment</b>	<b>3</b>	<b>5</b>	
17876	Water-Generic	Demonstrate knowledge of water and wastewater treatment plants process management systems	3	5	C
<b>24917</b>	<b>Water-Generic</b>	<b>Demonstrate knowledge of water and wastewater treatment plants quality management</b>	<b>4</b>	<b>5</b>	
19200	Water-Generic	Demonstrate knowledge of, and apply mathematics in the water industry <b>Demonstrate knowledge of, and apply, mathematics in the water industry</b>	2	2 <b>3</b>	B
19205	Water-Generic	Demonstrate knowledge of pathogens, diseases, and their control in the water industry	3	2	B

## Domain Water Reticulation

Id	Title	Level	Credit	Review Category
18458	Describe drinking-water supply reticulation systems	5	8	B
18459	Describe drinking-water reticulation system management, and management of critical points	5	8	B
19201	Demonstrate knowledge of, and locate, reticulated services in the water industry <b>Demonstrate knowledge of reticulated services and their location, in the water industry</b>	3	4	B
19202	Demonstrate knowledge of trenching, and trenchless pipe installation for water reticulation	2	2	C
<b>24918</b>	<b>Describe open cut trench excavation, and the physical implications of dewatering</b>	<b>3</b>	<b>3</b>	
<b>24919</b>	<b>Describe trenchless pipe installation, and pipe refurbishment or maintenance</b>	<b>3</b>	<b>3</b>	
19203	Lay pipes for water reticulation	3	2	C
<b>24920</b>	<b>Excavate and lay pipes, and reinstate trench for water reticulation</b>	<b>3</b>	<b>16</b>	

<b>Id</b>	<b>Title</b>	<b>Level</b>	<b>Credit</b>	<b>Review Category</b>
19204	Produce and use as-built plans in the water industry	3	4 <b>2</b>	B
19206	Select, use, and maintain hand tools and equipment in water reticulation	2	7	C
<b>24921</b>	<b>Select, use, and maintain tools and equipment in water reticulation</b>	<b>2</b>	<b>10</b>	
19207	Enter, work in, and exit a confined space in the water industry	3	3 <b>5</b>	B
19208	Demonstrate knowledge of water supply and reticulation systems	3	8	C
<b>24922</b>	<b>Demonstrate knowledge of water supply and reticulation systems</b>	<b>3</b>	<b>10</b>	
19209	Demonstrate knowledge of water reticulation systems cleaning and disinfection	3	4	B
19210	Service, clean, disinfect, and restore reservoirs or reticulation mains	3	4	B
19211	Describe water supply mains materials and fittings, and causes and prevention of pipe failure	3	6	B
19212	Demonstrate knowledge of wastewater collection systems	3	8	B
	<b>Demonstrate knowledge of wastewater collection and treatment systems</b>		<b>10</b>	
19213	Demonstrate knowledge of blockage clearance and wastewater maintenance	2	3	B
19214	Carry out wastewater pipe unblocking and access chamber maintenance	3	3	B
19215	Describe wastewater systems and materials, and causes and prevention of pipe failure	3	6	B
19354	Manage drinking-water reticulation system and critical points	5	8	B
	<b>Manage drinking-water reticulation systems and critical points</b>			
19436	Manage wastewater reticulation systems and critical points	5	8	B
<b>24923</b>	<b>Demonstrate knowledge of stormwater and drainage systems and their components</b>	<b>3</b>	<b>6</b>	<b>New</b>
<b>24924</b>	<b>Shut down and re-commission a drinking-water supply mains</b>	<b>3</b>	<b>4</b>	<b>New</b>
<b>24925</b>	<b>Prepare, install fittings, and charge up a pipe line, and check for leaks and operation, for water reticulation</b>	<b>4</b>	<b>4</b>	<b>New</b>
<b>24926</b>	<b>Refurbish or replace hydrants and valves for water reticulation</b>	<b>4</b>	<b>4</b>	<b>New</b>

Domain Water Treatment		Level	Credit	Review Category
Id	Title			
17889	Operate a water treatment plant under supervision	3	10	C
<b>24950</b>	<b>Operate and report on a water treatment plant under supervision</b>	<b>4</b>	<b>10</b>	
<b>24951</b>	<b>Describe emergency situations and process failure conditions in a water treatment plant</b>	<b>4</b>	<b>2</b>	
17890	Undertake sampling and testing procedures for water treatment	3	7	B
17891	Demonstrate knowledge of quality sampling techniques and programme design for a water treatment site	3	5	B
17892	Operate core water treatment processes	3	9	D
17893	Operate water treatment filtration and fluoridation processes	4	7	D
17894	Demonstrate knowledge of surface water and groundwater sources and pre-treatment <b>Demonstrate knowledge of surface water and groundwater sources and pre-treatment</b>	3	5 <b>7</b>	B
17895	Demonstrate knowledge of water treatment separation processes	4 <b>3</b>	7 <b>5</b>	B
17896	Demonstrate knowledge of water treatment filtration processes	4	7 <b>10</b>	B
17897	Demonstrate knowledge of water treatment disinfection processes	4	6	B
17898	Demonstrate knowledge of water treatment pH and alkalinity control processes	4	6	C
<b>24964</b>	<b>Demonstrate knowledge of hardness, pH, and alkalinity control processes in water treatment</b>	<b>4</b>	<b>8</b>	
17899	Demonstrate knowledge of water treatment fluoridation processes	3	1	C
<b>24965</b>	<b>Demonstrate knowledge of water treatment fluoridation processes</b>	<b>3</b>	<b>2</b>	
17900	Demonstrate knowledge of water treatment taste and odour control processes <b>Describe organic compounds including taste and odour control in water treatment processes</b>	4	4	B
17901	Demonstrate knowledge of water treatment waste management processes	3	4	B
19199	Report on a water treatment plant topic or improvement <b>Report on a water supply topic or improvement</b>	5	25 <b>12</b>	B
19347	Optimise and manage the catchment characteristics and abstraction process for drinking-water supply <b>Optimise and manage abstraction and pre-treatment processes for drinking-water supply</b>	5 <b>6</b>	10	B

Id	Title	Level	Credit	Review Category
19348	Optimise and manage the water/solids separation process, and manage critical points <b>Optimise and manage separation processes for drinking-water treatment</b>	5	4	B
19349	Optimise and manage coagulation and flocculation processes, and manage critical points <b>Optimise and manage coagulation and flocculation processes for dinking-water treatment</b>	5	6	B
19350	Optimise and manage filtration processes for drinking-water treatment, and manage critical points	5	6	D
24966	<i>Optimise and manage sand filtration processes for drinking-water treatment</i>	5	8	
24967	<i>Optimise and manage mechanical filtration processes for drinking-water treatment</i>	5	4	
24968	<i>Optimise and manage membrane filtration processes for drinking-water treatment</i>	5	8	
24969	<i>Optimise and manage diatomaceous earth filtration processes for drinking-water treatment</i>	5	4	
19351	Optimise and manage chlorine-based water treatment disinfection systems, and manage critical points	5	8	D
24970	<i>Optimise and manage chlorine disinfection processes for drinking-water treatment</i>	5	8	
24971	<i>Optimise and manage an ozone disinfection process for drinking-water treatment</i>	5	8	
24972	<i>Optimise and manage ultraviolet (UV) disinfection processes for drinking-water treatment</i>	5	8	
19352	Optimise and manage water treatment waste processes, and manage critical points	5	3	C
24973	<b>Optimise and manage drinking-water treatment waste processes</b>	5	4	
19353	Identify and manage process control in a water treatment plant, and manage critical points	5	3	D
24904	<i>Describe process control variables, methods, piping and instrumentation (P and I) drawings and SCADA</i>	5	5	
24913	<i>Describe processes, process control, and monitoring, in a water or wastewater treatment plant</i>	3	5	
19356	Optimise and manage hardness and corrosion control, and manage critical points <b>Optimise and manage hardness and corrosion control for drinking-water treatment</b>	5	5	B
19357	Manage preventive maintenance and monitoring of product standards for drinking-water treatment	5	3	B
24952	<b>Operate ultraviolet disinfection processes in water treatment</b>	4	10	New

<b>Id</b>	<b>Title</b>	<b>Level</b>	<b>Credit</b>	<b>Review Category</b>
24953	Operate chlorine disinfection processes in water treatment	4	12	New
24954	Operate ozone disinfection processes in water treatment	4	12	New
24955	Operate organic control processes, including taste and odour control, in water treatment	3	8	New
24956	Operate pH and alkalinity control processes in water treatment	4	8	New
24957	Operate pre-treatment processes in water treatment	3	6	New
24958	Operate coagulation and flocculation processes in water treatment	4	16	New
24959	Operate separation processes in water treatment	4	8	New
24960	Operate media filtration processes in water treatment	4	10	New
24961	Operate membrane filtration processes in water treatment	4	12	New
24962	Operate waste separation processes in water treatment	3	8	New
24963	Operate fluoridation processes in water treatment	4	8	New
24966	Optimise and manage sand filtration processes for drinking-water treatment	5	8	New
24967	Optimise and manage mechanical filtration processes for drinking-water treatment	5	4	New
24968	Optimise and manage membrane filtration processes for drinking-water treatment	5	8	New
24969	Optimise and manage diatomaceous earth filtration processes for drinking-water treatment	5	4	New
24970	Optimise and manage chlorine disinfection processes for drinking-water treatment	5	8	New
24971	Optimise and manage ozone disinfection processes for drinking-water treatment	5	8	New
24972	Optimise and manage ultraviolet (UV) disinfection processes for drinking-water treatment	5	8	New
24974	Demonstrate knowledge of coagulation and flocculation processes	3	6	New
24975	Describe drinking-water consumption, and water loss and methods of leak detection in drinking-water supply	5	5	New