QUALIFICATION SPECIFICATION

Ofqual Ref	Level
603/1171/X	Diploma at Level 3

Water Network – Distribution

Issue 1 – March 2017

CABWI AWARDING BODY

www.cabwi.co.uk

ABOUT THE QUALIFICATION SPECIFICATION

This specification for CABWI Awarding Body's **Level 3 Diploma in Water Network - Distribution (Ofqual Ref: 603/1171/X)** is designed to provide assessment centres with information on the qualification's content, structure and delivery.

This document provides both general assessment guidance and more detailed information, including general requirements for the qualification and specific requirements for each unit, where applicable. It also includes sections relating to personnel and facilities approval. If you or your centre has any queries relating to the qualification or its delivery, please contact either your allocated external quality assurer (EQA) or the CABWI office (Tel: 020 7469 2641; E-mail: enquiries@cabwi.co.uk).

This guidance (and updated versions issued during the qualification's lifetime) will be produced electronically and can be accessed via the CABWI website (www.cabwi.co.uk) or by contacting the CABWI office (enquiries@cabwi.co.uk). Additional materials available for this qualification include questions and answers which can be used to support assessment.

Further information relating to the delivery of CABWI qualifications, including copies of CABWI's current forms and centre administration manual, may be obtained direct from the CABWI office by contacting:

The Systems & Process Co-ordinator
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1. QUALIFICATION OVERVIEW

1.1 Qualification objective

The CABWI Level 3 Diploma in Water Network - Distribution is designed to demonstrate the occupational competence of learners. This qualification can be used both for the upskilling of existing staff and for the on-programme learning element of related apprenticeships.

The content, structure and assessment requirements of the qualification were developed by CABWI Awarding Body, in consultation with representatives of the water industry and its training and assessment providers.

This Occupational Qualification sits in the Regulated Qualifications Framework (RQF) and is regulated by Ofqual.

If the assessment team identifies any queries or issues with the content of the qualification units or the structure, the centre should contact its external quality assurer or the CABWI office in the first instance. The awarding body can then provide advice on the most suitable course of action and consult further with qualification users, employers and/or training providers as necessary.

1.2 Qualification structure

To achieve a full Level 3 Diploma in Water Network - Distribution, a learner must complete the 8 mandatory units from the table below. Where required the additional units may be taken in addition to the mandatory units. This is not required for achievement of the qualification but may further support on-programme learning for apprentices.

Mandatory Units – *all learners must complete the following seven mandatory units*	
3101	Water Treatment and Networks – Regulation and Compliance (H/615/5329)
3102	Water Treatment and Networks – Science and Applied Mathematics (Y/615/5330)
3202	Water Networks – Customer Service (F/615/5354)
3203	Water Network Distribution – Water Quality and Hygiene (J/615/5355)
3205	Water Network – Materials and Components (R/615/5357)
3206	Water Network – Operation of Service Reservoirs, Pumps and Trunk Mains (Y/615/5358)
3207	Water Network – Operation of District Metered Areas (D/615/5359)
3209	Water Network Distribution – Supply Interruptions (D/615/5362)
Additional Units – *learners may take the following unit in addition to the qualification if required*	
3204	Water Network Distribution – Water Supply (Water Fittings) Regulations (L/615/5356)
3208	Water Network – Asset Management (R/615/5360)
3303	Water Network – Leakage Detection and Location (H/615/5363)

1.3 Total Qualification Time, Guided Learning Hours and Credit

To meet regulatory requirements, all RQF qualifications must be assigned a number of Guided Learning Hours (GL`H) and a number of hours for Total Qualification Time (TQT). These figures are assigned to the qualification during the development process, through consultation with industry specialists and training and assessment providers.

Guided Learning Hours is an estimate of the number of hours a learner would be expected to spend working towards a qualification, under the immediate guidance or supervision of a provider of education or training (e.g. a tutor, lecturer, supervisor, etc.).

Total Qualification Time is an estimate of the total amount of time (in hours) that a learner could reasonably be expected to achieve the level of attainment required for the award of a qualification. The TQT for any qualification is calculated by adding the number of hours assigned for Guided Learning to the estimated number of hours that a learner could reasonably be expected to spend in preparation, study or any other education or training activity, including assessment, that may be directed by, but not under the immediate supervision of a tutor, lecturer, supervisor, etc.

Please note: The GLH and TQT figures assigned by CABWI to its qualifications are notional, and it is not mandatory for centres to provide a specific number of GLH in delivery a qualification. Learners and their employers should be aware that different individuals may take different amounts of time to complete their assessment successfully.

The Qualification GLH is: 339 hours
The Total Qualification time is: 508 hours
The Credit Value of the qualification is: 51 Credits

1.4 Relationship to apprenticeships

This qualification can be used to support the on-programme learning for the Water Process Technician Apprenticeship Standard.

2. QUALIFICATION APPROVAL REQUIREMENTS

All centres seeking to deliver CABWI regulated qualifications must complete the application process using CABWI's current centre and personnel application forms, providing information about how the centre will meet CABWI's centre recognition criteria. Information relating to CABWI's centre recognition process can be found in CABWI's *Centre Administration Manual*, a copy of which is available on the CABWI website.

Any centre recognition application requires details of:

- the title of the qualification(s) for which approval is required, *or* a list of the unit(s) if seeking unit approval only;
- the assessment and quality assurance team members, and named centre co-ordinator (it is helpful to provide a chart or diagram showing the team structure);
- proposed facilities, locations for assessment and storage of records (including satellite sites). This includes any proposed arrangements for the use of simulated activities in a realistic working environment;
- how the centre will meet the CABWI centre recognition criteria and any additional requirements relating to the specific qualification(s) they wish to deliver;
- how assessment and quality assurance will be conducted *for the specific qualification(s) required*.

If the organisation is already a recognised assessment centre with CABWI or any other awarding body, qualifications delivery and quality assurance systems and processes will already be in place. CABWI recommends that centres align the delivery of this qualification with their current systems, providing this allows them to meet the specific scheme requirements and centre recognition criteria.

A centre seeking to deliver the CABWI Level 3 Diploma in Water Network - Distribution must also ensure that it has the resources, including facilities and personnel, to meet the qualification-specific requirements described in this section.

2.1 Centre facilities

Facilities and equipment requirements

As this is an occupational qualification practical activities are expected to be naturally occurring in the work environment. Where this is not possible use of a simulated or realistic working environment may be acceptable. Unit information defines where this is likely to be acceptable.

Use of realistic working environment and simulated activities

The unit information in section 4 identifies where the use of a Realistic Working Environment (RWE) or Simulation is acceptable. The RWE or simulated activities must be approved by the centre's EQA before assessments commence.

Records storage

All qualification records must be stored securely, and centres must maintain records of:

- learners
- assessments and assessment decisions
- internal quality assurance.

The records must be:

- sufficient to provide an audit trail
- retained for at least three years, to allow for monitoring (by the awarding body or the regulatory authorities) to take place.

Some records will include learners' personal information (subject to the Data Protection Act) and others may include details of written or oral underpinning knowledge questions asked during assessment, which must not be freely available to learners. It is vital that these records are held securely by the centre. Secure storage facilities will be verified by the external quality assurer during centre approval and at subsequent monitoring visits.

2.2 Personnel resources for qualification delivery

A centre must have at least one fully-qualified and occupationally competent assessor, and one fully-qualified and occupationally competent internal quality assurer (IQA) in order to be recognised to deliver the Level 3 Diploma in Water Network - Distribution.

Each assessor, IQA, assessor-candidate or IQA-candidate must submit the appropriate personnel application, together with relevant supporting evidence of qualifications and occupational competence. The qualifications and occupational expertise requirements for assessors and IQAs delivering the Level 3 Diploma in Water Network - Distribution are set out below.

Centre co-ordinator / centre manager

The centre must have a named central point of contact for the administration of CABWI qualifications. They are responsible for ensuring that the correct application forms are submitted to the awarding body and for providing (either in person or via other designated personnel) details of learners who require registration and certification for particular qualifications.

Assessors

Assessor qualifications

In order to assess learners for the Level 3 Diploma in Water Network - Distribution, an assessor must have relevant occupational expertise, and must hold one of the following qualifications:

- Level 3 Award in Assessing Competence in the Work Environment, or
- Level 3 Certificate in Assessing Vocational Achievement, or
- Assessing Candidates Using a Range of Methods (A1), or

- D32 – Assess Candidate Performance and D33 – Assess Candidate Performance Using Diverse Evidence.

CABWI does not require assessors who hold earlier versions of assessor qualifications to complete the current versions. However, assessors must ensure that they are aware of current assessment practice, and must ensure that they review their skills, knowledge and understanding of assessment processes and practice regularly, and undertake relevant CPD. This activity may be undertaken in conjunction with the assessment centre(s) where the assessor works.

Assessor-candidates

Assessor-candidates are individuals who meet the occupational expertise requirements to assess the qualification, but who do not yet hold an assessor qualification.

They may apply to CABWI for an assessor-candidate licence, for a maximum period of 18 months, while they undertake their assessor qualification. All assessment decisions taken by assessor-candidates must be countersigned by a fully-qualified assessor who is also approved to assess the same unit(s).

Assessor-candidates working on the QCF Level 3 Diploma in Water Network - Distribution must be undertaking one of the following assessor qualifications:

- Level 3 Award in Assessing Competence in the Work Environment, or
- Level 3 Certificate in Assessing Vocational Achievement.

These are the two current assessor qualifications, developed as part of the Training, Assessment and Quality Assurance (TAQA) suite of qualifications, which cover the assessment of workplace competence.[1]

When seeking approval from CABWI, assessor-candidates may be required to provide confirmation of the assessment centre where they are registered to take their assessor qualification, and when they expect to complete the qualification.

Occupational expertise and assessor requirements

Any assessor or assessor-candidate who wishes to assess the Level 3 Diploma in Water Network - Distribution must also show that they can meet the criteria listed in the table below (the column on the right provides examples of evidence against the requirements: please note that these are suggestions, and the lists are not exhaustive).

Assessor criteria	Potential sources of evidence
• In-depth technical and practical knowledge of the areas they are assessing.	• CV confirming occupational experience relating to those unit(s)/qualification(s) for which approval is required - through an industry operational role and/or delivering operational training and/or assessment in activities covered by the unit(s) required.
• Up-to-date knowledge and relevant technical/industrial experience in the areas they are assessing. (The	

[1] The required qualifications for assessors may be updated during the lifetime of this qualification. CABWI can provide confirmation of the current requirements on request.

Assessor criteria	Potential sources of evidence
experience must be not more than 5 years old, and at a level relevant to their assessor role and the level of the award.) Specific occupational experience that is at least at the same level as the qualification and/or unit(s) that they are assessing.	• Occupational information must confirm experience of network distribution activities according to the units required. • Details of any vocational qualifications etc. relevant to the activities covered. • Other supporting information: witness testimonies or other testimonials.
• Experience & working knowledge of the assessment and quality assurance processes.	• Copy assessor qualification certificates. • For assessor-candidates, details of the induction they have received for their assessor award. • For experienced assessors, confirmation of assessor experience on previous related qualifications or units.
• Thorough understanding of the content of the Level 3 Diploma in Water Network - Distribution, and the ability to interpret it and offer advice on assessment-related matters.	• Confirmation of familiarity with the qualification content. • For experienced assessors, confirmation of assessor experience on previous related qualifications or units. • Confirmation of involvement in standardisation process, assessment team meetings etc within centre. • If applicable, details of involvement with the qualification development process for the Level 3 Diploma in Water Network - Distribution.
• High level of interpersonal and communication skills.	• CV details confirming use of interpersonal skills etc. • For experienced trainers or assessors, confirmation of previous training or assessment activity. • Details of any qualifications covering communications skills (e.g. Key Skills or Functional Skills qualifications; qualifications or units covering soft skills – e.g. units from Management or Customer Service qualifications etc.).
• Commitment to CPD for the assessor role and to maintain currency of knowledge and experience in network distribution activities.	• Assessor licence application – details of how currency will be maintained. • Details (as part of CV or application information) of participation in industry groups, consultations, etc., relating to network distribution. • Details of involvement in centre staff development programmes, as per centre application.

Internal quality assurers (IQAs)

Internal quality assurer qualifications

In order to quality assure the Level 3 Diploma in Water Network - Distribution, an IQA must have relevant occupational expertise, and must hold one of the following qualifications:

- Level 4 Award in the Internal Quality Assurance of Assessment Process and Practice, or
- Level 4 Certificate in Leading the Internal Quality Assurance of Assessment Processes and Practice, or
- Conducting Internal Quality Assurance of the Assessment Process (V1), or
- D34 – Co-ordinate the Assessment Process.

CABWI does not require internal quality assurers who hold earlier versions of the IQA qualifications to undertake the current versions, based on later national occupational standards. However, IQAs must ensure that they are aware of current assessment and quality assurance practice, and must ensure that they review their skills, knowledge and understanding of assessment and quality assurance processes and practice regularly, and undertake relevant CPD. This activity may be undertaken in conjunction with the assessment centre(s) where the IQA works.

IQA-candidates

IQA-candidates are individuals who meet the occupational expertise requirements to internally quality assure the qualification, but who do not yet hold an IQA qualification.

They may apply to CABWI for an IQA-candidate licence, for a maximum period of 18 months, while they undertake their internal quality assurer/IQA qualification. All quality assurance decisions taken by IQA-candidates must be countersigned by a fully qualified IQA who is also approved to quality assure the same unit(s).

IQA-candidates working on the Level 3 Diploma in Water Network - Distribution must be working towards one of the following IQA qualifications:

- Level 4 Award in the Internal Quality Assurance of Assessment Process and Practice, or
- Level 4 Certificate in Leading the Internal Quality Assurance of Assessment Processes and Practice.

These are the two current quality assurance qualifications, developed as part of the Training, Assessment and Quality Assurance (TAQA) suite of qualifications.[2]

When seeking approval from CABWI, IQA-candidates may be required to provide confirmation of the assessment centre where they are registered to take their IQA qualification, and when they expect to complete the qualification.

[2] The required qualifications for internal quality assurers may be updated during the lifetime of this qualification. CABWI can provide confirmation of the current requirements on request.

Occupational expertise and IQA requirements

Any IQA or IQA-candidate who wishes to quality assure the Level 3 Diploma in Water Network - Distribution must also show that they can meet the criteria listed in the table below (the column on the right provides examples of evidence against the requirements: please note that these are suggestions, and the lists are not exhaustive).

Internal quality assurer criteria	Potential sources of evidence
• Comprehensive understanding of the areas they are internally quality assuring. • Up-to-date knowledge and relevant technical/industrial experience in the areas they are quality assuring. (The experience must be not more than 5 years old, and at a level relevant to their IQA role and the level of the award.) • Qualification-specific occupational knowledge and experience that is at least at the same level as the qualification and/or unit(s) that they are quality assuring.	• CV confirming occupational experience relating to those unit(s)/qualification(s) for which approval is required - through an industry operational role and/or delivering operational training, assessment or quality assurance in activities covered by the unit(s) required. • Details of any vocational qualifications etc. relevant to the activities covered. • Other supporting information: witness testimonies or other testimonials.
• Experience & working knowledge of the assessment and quality assurance processes. *(Please note: it is desirable, though not mandatory, for IQAs working on this qualification to hold an assessor qualification.)*	• Copy IQA qualification certificates. • Copy assessor certificates, if qualified assessors. • For IQA-candidates, details of the induction they have received for their IQA award. • For experienced IQAs, confirmation of internal quality assurance experience on previous related qualifications or units.
• Thorough understanding of the content of the Level 3 Diploma in Water Network - Distribution, and the ability to interpret it and offer advice on assessment-related matters.	• For experienced IQAs, confirmation of experience on previous related qualifications or units. • Confirmation of involvement in standardisation process, assessment team meetings etc within centre. • If applicable, details of involvement with the qualification development process for the Level 3 Diploma in Water Network - Distribution.
• High level of interpersonal and communication skills.	• CV details confirming use of interpersonal skills etc. • For experienced trainers, assessors or IQAs, confirmation of previous training, assessment or IQA activity. • Details of any qualifications covering communications skills (e.g. Key Skills or Functional Skills qualifications; qualifications or units covering soft skills – e.g. units from Management or

Internal quality assurer criteria	Potential sources of evidence
	Customer Service qualifications etc.)..
• Commitment to CPD for the IQA role and to maintain currency of knowledge and experience in network distribution activities.	• IQA licence application – details of how currency will be maintained. • Details of involvement in centre staff development programmes, as per centre application.
• Sufficient authority to carry out the IQA role at any centre where they are working – irrespective of whether they are a direct or contracted employee of the assessment centre.	• Endorsement of the CABWI IQA application by a manager at the assessment centre where they are working. • Organisation and/or team charts showing roles, responsibilities and authority of assessment and quality assurance team members. • For experienced IQAs, evidence of managing assessors within the team, dissemination and completion of agreed actions, etc. • Evidence of involvement in and contribution to centre standardisation activity and meetings.

2.3 Independent assessment

Independent assessment is a quality control measure that is used to minimise any potential vested interest that an assessor could have in the outcome of a learner's assessments.

Centres seeking approval to deliver the Level 3 Diploma in Water Network - Distribution must ensure that:

- assessors do not assess any learner for whom they have line management responsibility, and
- assessors do not assess any learner for any unit on which they have been involved in training that learner.

In cases where the centre's assessment team cannot meet the above criteria, an alternative method of independent assessment will be agreed with the centre.

CABWI's assessor application form includes two questions that ask if they will be training learners and if they will be assessing people who report directly to them. If the assessor answers *'YES'* to the training-related question, CABWI reserves the right to contact the centre co-ordinator to obtain further information, as follows:

If training learners*:*

- *To what extent will the assessor be training learners?*
- *Are they the only assessor, or does the centre have other assessors?*
- *Which units will the assessor be assessing?*
- *When did the applicant train the learners and when will they be assessing them?*

On receipt of this information, CABWI will agree an alternative quality assurance procedure with the centre and their EQA, details of which will be kept on file. Each case is judged on an individual basis, according to: the detail provided; whether there are other significant risk factors at the centre that could affect the integrity of delivery; and whether there is any scope for the centre to work towards meeting the independent assessment requirements in the future.

Other independent assessment measures, as discussed and agreed with the external quality assurer, could include (but are not limited to):

- additional IQA sampling
- requiring additional EQA visits to monitor the situation
- requiring the centre to arrange for the separation of training and assessment wherever possible (e.g. through having dedicated assessors and trainers, resources permitting.)

CABWI's EQAs will monitor the implementation of independent assessment during quality assurance visits, and will highlight any areas for improvement through the action planning section of their EQA Visit Report by agreement with the centre.

Please note: It is vital that the centre informs CABWI if it cannot meet the independent assessment requirement for the Level 3 Diploma in Water Network - Distribution, or if it becomes unable to meet these requirements after approval. If the requirements are found not to have been met during EQA monitoring, and the centre has not agreed an alternative quality assurance procedure with CABWI, this can impact upon learner certification, leading to a requirement for re-assessment of the learners affected or other remedial action.

3. QUALIFICATION DELIVERY

3.1 Pre-registration learner requirements

There are no entry requirements for this qualification. However, as there is a requirement for learners to provide evidence from workplace activities, the learner must have access to the work environment and tasks that allow them to complete the qualification.

3.2 Assessment methodology

Assessment for the Level 3 Diploma in Water Network - Distribution will be conducted using a portfolio of evidence. CABWI has produced documentation to support the recording of evidence and questions and answers which can be used to support assessment. Knowledge can be assessed using an "open book" approach but assessors are expected to ensure that the learner understands their answers fully be exploring their depth of understanding using additional questions which can be devised by the assessor. This additional questioning should be recorded by the assessor and mapped to the assessment criteria covered.

3.3 Recording assessments

Assessment for this qualification is via a portfolio of evidence. As there is a large amount of knowledge which need to be evidenced CABWI will provide questions and an indication of the expected coverage of the answers.

3.4 Internal quality assurance

The Level 3 Diploma in Water Network - Distribution must be internally quality assured in line with CABWI's centre recognition criteria and the specific qualification requirements. If the centre has experience of delivering similar or related qualifications, through CABWI or another awarding body, it is likely that the current internal quality assurance systems can also be used for the Level 3 Diploma in Water Network - Distribution, although the external quality assurer will need to review the systems as part of the centre recognition process.

Internal quality assurers are expected to:

- manage the operation of assessment within their centres
- support assessors
- quality assure assessors' work (including observing assessments taking place), according to the centre's IQA sampling strategy and specific plans for the quality assurance of this qualification
- ensure that the qualification requirements are applied consistently by the assessment team and across all learners at the centre, including participation in standardisation activities
- manage the qualification delivery process.

The types of records that EQAs review to verify internal quality assurance activities include (but are not limited to):

- IQA sampling strategy (the document that the IQA uses to determine what s/he will sample over time: this must take a risk-based approach)

- more detailed IQA sampling plans (they will be informed by the IQA sampling strategy, but may be modified over time, and in line with identified risks, familiarity with the qualification, learner numbers etc.)
- evidence of interim and summative sampling of assessments (to cover the full delivery process across all units that the assessment team delivers)
- IQA reports on work sampled, which **must** include a proportion of IQA observation reports, confirming that they have watched assessments (observations and/or meetings) taking place over time. The IQA records must also include, over time, sampling of the work of all assessors working on the qualification and all units covered at the centre.
- evidence of team meetings and standardisation exercises (while not relating to the IQA role alone, it is usual for the IQA to lead meetings and standardisation exercises, etc.).

It is likely that one of the internal quality assurers at the centre will act as the main point of contact with the EQA and the awarding body for policy issues relating to delivery of this qualification, disseminate the detail of EQA reports, and ensure that actions are implemented.

3.5 External quality assurance and post-approval monitoring

Once the centre has been approved, the external quality assurer will start to plan and discuss quality assurance and monitoring activity with the team. Typically, a centre will receive at least two external quality assurance visits per year, but CABWI reserves the right to recommend additional visits, depending upon the centre's circumstances. The most common reasons for additional visits include, but are not limited to:

- high learner numbers and activity levels (including where a centre offers a wide variety of CABWI qualifications)
- to monitor completion of action points that must be resolved within specific timescales
- if there is a risk to the centre's qualification delivery or quality assurance systems (e.g. insufficient assessors, a high proportion of newly-qualified assessors or IQAs, etc.)
- to approve the centre to deliver new qualifications.

The centre may also request additional visits or EQA activity such as remote sampling of assessment materials, either for a review of learners' evidence and assessment records (usually prior to self-certification – 'direct claims' – status being granted), to add further units or awards to the existing centre licence, to review completion of agreed actions, or to discuss any aspect of scheme delivery.

The EQA monitors all aspects of assessment and quality assurance activity. This will include observation of assessments taking place, on site or at the centre. Over time, the EQA will seek to monitor the work of all assessors and IQAs at the centre, review the systems against current qualifications requirements and CABWI's centre recognition criteria, and provide feedback on the centre's activities.

An EQA report is produced after each quality assurance visit or activity, and sent to CABWI. Over time, CABWI will monitor the centre's progress and completion of actions agreed with the awarding body, to ensure that robust qualification delivery and quality assurance systems are in place.

In order for CABWI to ensure that quality assurance activity is conducted effectively and within appropriate timescales, it is important that centres provide the external quality assurer with as much information as possible about planned activity, and the location of cohorts of learners. This allows the EQA to schedule quality assurance with the centre so that relevant monitoring activity can be undertaken at a rate and within timescales that meet, as far as possible, the centre's activity levels and commitments to learners, clients and regulatory or funding bodies. If a centre does not advise the EQA of their forthcoming activity, and quality assurance activities cannot be planned in advance, there is a risk that EQA activities may be delayed, which can impact upon the timescales for issuing certificates.

External quality assurance activity may take place between visits to centres, either through remote sampling of learners' portfolios or other assessment records, and/or correspondence with centre personnel (e.g. to confirm completion of action points, circulate records of team meetings or standardisation activity, etc.). This type of activity will usually be agreed between the EQA and the centre, and/or the CABWI office.

Details of the fees that CABWI charges in relation to external quality assurance and qualifications activity are available via the CABWI office and on the CABWI website.

Certification

The centre may apply for learner certification either on a unit-by-unit basis or when the learner has completed sufficient units for a full qualification. (Please ensure that certificates are claimed within 12 months of the final date of assessment for any unit, to confirm the learners' currency.)

Direct claims status

Direct claims status (DCS) may be recommended by the EQA, when s/he is satisfied that the systems and processes for delivering the qualification are robust and are operating in accordance with the scheme requirements. Self-certification status can be recommended for full qualifications or individual units, according to the centre's circumstances, and it will be granted only when the EQA has had chance to review the centre's systems and qualification delivery in operation.

Please be aware that, if a centre without direct claims status submits claims before the EQA has authorised them, the request will be referred to the EQA, which could delay certificate issue.

Direct claims status is kept under review by the awarding body, and can be suspended or withdrawn for a particular qualification, or suite of qualifications, in the event that issues are identified that cause a risk to the centre's qualifications delivery.

4. CABWI LEVEL 3 DIPLOMA IN WATER NETWORK - DISTRIBUTION: UNIT REQUIREMENTS

This section outlines the requirements for each unit in the Level 3 Diploma in Water Network - Distribution. The assessment guidance and requirements covered in Section 3 above apply across the full qualification, and most of this information is not repeated in the unit-specific notes that follow. Assessors should be aware of the general requirements covered in Section 3, and also of any specific requirements relating to the delivery of individual units.

Each unit includes learning outcomes and assessment criteria. The 'Terms and definitions' sections provide detail of the scope of terms used in the assessment criteria, and additional notes may be provided, where applicable, on the assessment and/or evidence requirements for each unit.

Evidence produced by learners in the workplace may cover more than one Assessment Criterion or unit and it is therefore desirable for centres to use a holistic approach to assessment. Evidence should be mapped within the portfolio to the criteria and units to which it applies.

Water Treatment and Networks – Regulation and Compliance (H/615/5329)			
Level	3	CABWI Unit Ref	3101
Credit Value	2	Guided learning hours	14

Unit purpose and aim

This unit is designed to allow the learner to develop and demonstrate their knowledge and understanding of the activities of the Water regulatory bodies. The learner will be able to identify and describe the core functions and duties laid down by regulatory frameworks. This unit is designed to allow the learner to develop awareness and understanding on how the key regulatory bodies discharge their duties and administer the water industry. This unit is designed to allow the learner to develop a basic awareness and understanding of the direct and indirect impact of the regulation on water companies, customers and other stakeholders.

References to **Water Supply** in this unit cover the operational activities associated with the collection, storage, treatment and distribution of water.

Learning Outcome 1: Understand the UK water supply regulatory framework

Assessment criteria – *the learner can:*

1.1 explain why a regulatory environment is important in relation to the performance of the water industry

1.2 explain the functions of the key **water industry regulators**

1.3 explain the functions of the **key stakeholders with influence**

1.4 explain the purpose of the **main legislation** and the regulations which support legislation in relation to water supply

1.5 describe the main areas of operational activity which could directly impact on the **protection of the environment**

Learning Outcome 2: Understand regulatory performance measures

Assessment criteria – *the learner can:*

2.1 outline the main provisions of the **regulatory framework** and reporting mechanisms

2.2 explain the purpose of the current performance monitoring mechanism (e.g. service incentive mechanism)

2.3 explain why the current performance monitoring mechanism is important to regulation

2.4 describe the importance of customer contact in regulation

Learning Outcome 3: Understand how regulation impacts the operational activities within a water company

Assessment criteria – *the learner can:*

3.1 outline the **main provisions** of the water quality regulations relating to quality standards for drinking water

3.2 explain the importance of compliance with **regulatory measures**

3.3 explain the consequences of non-compliance with regulatory measures for water companies

Learning Outcome 4: Understand the hygiene regulations and requirements governing water operations

Assessment criteria – *the learner can:*

4.1 outline the provisions of the main water **hygiene requirements** governing water operations

4.2 describe the hygienic **working practices** used in the water industry

4.3 explain how the requirements of the national water hygiene (blue) card scheme impact upon operational activity

Learning Outcome 5: Understand the health and safety regulations

Assessment criteria – *the learner can:*

5.1 outline the main provisions of the Health & Safety at Work Act

5.2 explain the purpose of **Health & Safety Regulations** and guidance that form part of the Health & Safety at Work Act

Terms and Definitions

Some terms, used in the assessment criteria, cover a range of situations, as follows:

1. **Water Industry Regulators** in 1.2 above includes all of the following:
   - (a) OFWAT –The Water Services Regulation Authority - Economic regulator of the Water Sector in England and Wales
   - (b) Environmental protection agencies such as EA – Environment Agency and Natural Resources Wales
   - (c) DWI – Drinking Water Inspectorate

2. **Key Stakeholders with influence** in 1.3 includes all of the following
   - (a) DEFRA – Department for Environment, Food and Rural Affairs
   - (b) CCW – Consumer Council for Water (sits under OFWAT)
   - (c) HSE – Health and Safety Executive

Terms and Definitions

(d) Local Authority (Planning, Environmental Health)
(e) CPNI Centre for the Protection of National Infrastructure

3. **Main legislation** in 1.4 above includes both:
   (a) Water Industry Act
   (b) Water Quality Regulations

4. Areas which impact on the **protection of the environment** in 1.5 above include all of the following:
   (a) Prevention of pollution
   (b) Use of approved materials
   (c) Control and movement of waste
   (d) Abstraction licences and compensation discharges

5. **Regulatory framework** in 2.1 above includes all of the following:
   (a) Financial/Economic
   (b) Customer Experience
   (c) Environmental
   (d) Water Quality
   (e) Health & Safety

6. **Main provisions** of Water Quality Regulations in 3.1 includes all of the following:
   (a) Microbiological standards
   (b) Health based chemical standards
   (c) Additional monitoring parameters
   (d) Other pathogenic organisms

7. **Regulatory measures** in 3.2 above includes all of the following:
   (a) Key Performance Indicators
   (b) Compliance standards
   (c) Regulatory reporting

8. **Hygiene requirements** in 4.1 above includes all of the following:
   (a) Company hygiene policies
   (b) National Water Hygiene scheme

9. **Working practices** in 4.2 above includes all of the following:
   (a) Approved hygiene scheme
   (b) Restricted operations
   (c) Personal hygiene and identification of potential sources of contamination
   (d) Health screening
   (e) Prevention of Contamination
   (f) Disinfection

10. **Health & Safety Regulations and guidance** in 5.2 above includes at least 10 of the following:
    (a) Management of Health and Safety at Work Regulations (MHSWR)

Terms and Definitions

(b) DSEAR Regs
(c) Construction (Design and Management) Regs
(d) Confined Spaces Regs
(e) Work at Height Regs
(f) Control of Asbestos Regs
(g) COSHH Regs
(h) COMAH Regs
(i) Chlorine Handling (HSG 40)
(j) Chemicals - Transport of Chemicals (CDG) Regs, Information and Packaging, Classification and Labelling
(k) Fire Safety
(l) Noise at Work Regs
(m) Manual Handling Operations Regs
(n) Risk Assessment (Management of Health and Safety at Work Regulations (MHSWR)
(o) Regulations supporting the New Roads and Street Works Act (NRSWA)

Assessment Requirements

This unit is knowledge only – all assessment tools used by centres must be approved by the EQA

Water Treatment and Networks – Science and Applied Mathematics (Y/615/5330)			
Level	3	CABWI Unit Ref	3102
Credit Value	5	Guided learning hours	28

Unit purpose and aim

This unit is designed to allow the learner to develop and demonstrate their understanding and application of the maths used in the design and operation of water industry assets. This will include the application of: approximation methods, arithmetic, algebra, geometry. Also the analysis and presentation of data with graphs and statistics. This unit is designed to allow the learner to develop an understanding of chemical and biological characteristics of water. Learners will gain an understanding of how these characteristics affect operational processes and will develop an understanding of the parameters required to measure and evaluate the performance of water assets.

Learning Outcome 1: Understand mathematical techniques commonly used in Water Supply and Treatment

Assessment criteria – *the learner can:*

1.1 explain how **common measurements** are used within the water industry

1.2 undertake a range of typical **water industry calculations** using appropriate methods

1.3 undertake a range of **methods** to interpret, analyse and present water industry data

Learning Outcome 2: Understand the chemical and physical characteristics of water

Assessment criteria – *the learner can:*

2.1 describe the basic **chemical characteristics** of water

2.2 describe the basic **physical characteristics** of water

2.3 explain the measurement of the **variables** used to monitor the quality of water

2.4 explain the differences between **chemical compounds, mixtures, solutions, suspensions and colloids**

2.5 explain **hydraulic principles** used in the water industry

Learning Outcome 3: Understand the microbiological characteristics of water

Assessment criteria – *the learner can:*

3.1 explain water quality issues relating to different types of **micro-organisms** found in the water environment

3.2 explain the health risks associated with common **waterborne pathogens**

Learning Outcome 4: Understand the environmental impact of the water industry

Assessment criteria – *the learner can:*

4.1 describe the **sources of water contamination**

4.2 explain the implications of water contamination on the environment and to public health

4.3 explain how information from **indicators** is used to monitor environmental impact and provide protection in relation to water industry activity

Terms and Definitions

Some terms, used in the assessment criteria, cover a range of situations, as follows:

1. **Common measurements** in 1.1 above includes all of the following:
   - (a) areas - m^2
   - (b) volumes - m^3
   - (c) flow rates - litres/second, m^3/hour, megalitres/day
   - (d) concentrations - mg/litre µg/litre
   - (e) dosing rates - mg/litre
   - (f) retention times - seconds, minutes, hours

2. **Water industry calculations** in 1.2 above includes all of the following:
   - (a) areas
   - (b) volumes
   - (c) flow rates
   - (d) concentrations
   - (e) dosing rates
   - (f) retention times

3. **Methods** in 1.3 and 1.4 above includes all of the following:
   - (a) statistics
     - i. range
     - ii. median
     - iii. mode
     - iv. mean
   - (b) graphs
   - (c) charts
   - (d) spreadsheets

Terms and Definitions

4. **Chemical characteristics** of water in 2.1 above includes all of the following:
   (a) elements
   (b) atoms
   (c) molecules
   (d) chemical bonding

5. **Physical characteristics** of water in 2.2 above includes all of the following :
   (a) solids, liquids, gasses
   (b) boiling point
   (c) freezing point
   (d) effect of temperature on density
   (e) mass density
   (f) solutions
   (g) temperature and dissolved oxygen concentration

6. **Variables** in 2.3 above includes all of the following:
   (a) Ct value
   (b) concentration
   (c) pH
   (d) temperature
   (e) decay rate

7. **Chemical compounds, mixtures, solutions, suspensions and colloids** in 2.4 above includes all of the following:
   (a) water
   (b) salts
   (c) acids
   (d) bases
   (e) solubility
   (f) oxidation & reduction

8. **Hydraulic principles** in 2.5 above includes all of the following:
   (a) pressure/head
   (b) continuity equation
   (c) flow in closed conduits
   (d) flow in open channels
   (e) frictional losses

9. Types of **micro-organisms** in 3.1 above includes all of the following:
   (a) indicator bacteria e.g. coliforms
   (b) pathogens
   (c) protozoa

10. **Waterborne pathogens** in 3.2 above includes all of the following:
   (a) e. coli (escherichia coli)
   (b) enterococci

Terms and Definitions

(c) cryptosporidium
(d) giardia
(e) leptospira
(f) campylobacter

11. **Sources** of water contamination in 4.1 above includes all of the following:
    (a) river water
    (b) raw water
    (c) treated water (flushing, discharges to the environment)
    (d) sewage
    (e) sewage effluents
    (f) agricultural activity
    (g) industrial activity

12. **Indicators** used to measure and monitor environmental impact and protection in 4.3 above includes all of the following:
    (a) pH
    (b) BOD
    (c) COD
    (d) chlorine residual
    (e) suspended solids
    (f) wildlife
    (g) wildlife habitats

Assessment Requirements

This unit is knowledge only – all assessment tools used by centres must be approved by the EQA

Water Networks – Customer Service (F/615/5354)			
Level	3	CABWI Unit Ref	3202
Credit Value	6	Guided learning hours	35

Unit purpose and aim

This unit allows the learner to develop their knowledge and identify the skills required to deal with internal and external customers in the course of their work. It requires the learner to develop an understanding of effective customer communications and decision making skills in relation to the water network.

All practical activities should be carried out in line with safe working practices, fully compliant with company policy and relevant Health & Safety legislation.

Learning Outcome 1: Understand customer enquiries

Assessment criteria – *the learner can:*

1.1 describe the organisational requirements for dealing with customer queries and complaints
1.2 describe six ways to engage with the different types of **customer** and provide them with a positive experience
1.3 explain what process to follow to ensure understanding of an enquiry from a customer's perspective
1.4 describe six factors that might contribute to the cause of an enquiry
1.5 explain the company's processes for transferring customer enquiries to others including keeping the customer informed

Learning Outcome 2: Deal with customer enquiries

Assessment criteria – *the learner can:*

2.1 respond to different types of customer queries in accordance with company policy
2.2 respond to different types of customer complaints in accordance with company policy
2.3 gather information to establish why a customer has raised a concern
2.4 transfer customer enquiries to relevant others and keep the customer informed

Learning Outcome 3: Understand how to resolve customer concerns and issues

Assessment criteria – *the learner can:*

3.1 describe the sources of information available relating to the water company's **legal obligations**

3.2 describe the process used to confirm the customer understands the information provided and actions that will be taken to resolve an enquiry

3.3 describe the factors which should be considered to ensure the information provided is seen to be supportive

3.4 describe the organisational process for recording relevant information regarding enquiries and resultant actions

Learning Outcome 4: Resolve customer concerns and issues

Assessment criteria – *the learner can:*

4.1 find and pass on specific information to assist the customer with the enquiry

4.2 take action to avoid offense or escalation of a situation

4.3 record specific information provided to customers to assist with different types of customer enquiries

Learning Outcome 5: Understand how to address and resolve customers' water distribution related enquiries

Assessment criteria – *the learner can:*

5.1 describe the sources of information available to help formulate responses to enquiries

5.2 explain the operational policies and procedures that are available to assist in resolving customer enquiries

5.3 describe the process which should be used to confirm the customer understands the information relating to operational procedures which have been provided and actions that will be taken to resolve the enquiry

5.4 describe the factors that might result in a need to transfer or escalate the enquiry to others

5.5 describe the **key information** required to escalate or transfer an activity for others to resolve an enquiry

5.6 explain the process to be followed when the original course of action does not resolve the problem

Learning Outcome 6: Address and resolve customers' water distribution related enquiries

Assessment criteria – *the learner can:*

6.1 locate **additional information** and pass it on to customers
6.2 locate specific company policies and procedures relating to a customer enquiry
6.3 track the resolution of a customer concern through to completion
6.4 pass on **key information** to customers to help resolve a problem

Learning Outcome 7: Understand performance measures and targets relation to water supply

Assessment criteria – *the learner can:*

7.1 describe how performance measures and targets applied within your own water company relate to standards of customer service
7.2 explain service failures which may lead to customer complaints to water companies
7.3 describe the types of wanted and unwanted contacts from customers

Learning Outcome 8: Use performance measures and targets relation to water supply

Assessment criteria – *the learner can:*

8.1 record how performance measures and targets have influenced operational activities
8.2 contribute to identifying the root cause of customer complaints

Terms and Definitions

Some terms, used in the assessment criteria, cover a range of situations, as follows:

1. **Customers** in 1.2 above includes all of the following:
   (a) those with additional needs
   (b) challenging customers
   (c) customers with specific expectations (this could include restrictive entry procedures and availability for access.)
   (d) commercial and industrial customers

2. **Enquiries** in 1.4 above includes at least six of the following:
   (a) complaints
   (b) general enquiries on services provided by the company
   (c) advice on water regulations
   (d) reports for insurance purposes (in case of water damage/seepage)
   (e) network performance (including water quality, water flow rates, water supply, water pressure)

Terms and Definitions

(f) service standards
(g) leakage on customer's premises (customer side leakage policy)
(h) seepage of water into customer premises
(i) costs
(j) supply location and ownership
(k) metering
(l) property damage
(m) employee behaviour
(n) new and replacement supplies
(o) lead replacement policy

3. **Legal Obligations** in 3.1 above includes all of the following:
   (a) service levels
   (b) response times
   (c) notices
   (d) compensation payments
   (e) Water Supply (Water Fittings) Regulations \ Scottish Water Bylaws

4. **Additional information** in 6.1 above includes at least 5 of the following:
   (a) colleagues and supervisors
   (b) company IT system
   (c) records and data
   (d) previous reports
   (e) external sources
   (f) regulatory and legislative requirements
   (g) company specific policies and procedures
   (h) other utilities

5. **Key information** in 5.5 and 6.4 includes all of the following:
   (a) network performance
   (b) leakage reporting
   (c) water quality

Assessment Requirements

For the knowledge elements of this unit all assessment tools used by centres must be approved by the EQA.

Simulation is acceptable for Learning outcomes 2,4, 6 and 8. This must be agreed in advance with the EQA.

36Water Network Distribution – Water Quality and Hygiene (J/615/5355)			
Level	3	CABWI Unit Ref	3203
Credit Value	8	Guided learning hours	52

Unit purpose and aim

This unit allows the learner to develop a sound knowledge and understanding of water quality parameters and hygienic working practices. The learner will be familiar with the requirements and recommendations of statutory regulation, Codes of Practice, reports, organisational instructions and hygiene policies. They will understand the changes in water quality during Networks Distribution processes. They will also develop an awareness of sound water quality and operational hygiene practices as they relate to all types of work carried out on water supply and network systems. Public health is of paramount importance requiring extensive knowledge in order to quickly analyse problems and implement effective solutions.

All practical activities should be carried out in line with safe working practices, fully compliant with company policy and relevant Health & Safety legislation.

Learning Outcome 1: Understand water quality regulations

Assessment criteria – *the learner can:*

1.1 describe the roles of the **regulatory organisations** and their interest in water quality and regulation
1.2 explain the key provisions of legislation in respect to water quality
1.3 explain the key provisions of the **Water Quality Regulations**
1.4 describe the **enforcement methods** used by regulators to enforce water quality regulations
1.5 explain the **methods** water companies can use to respond to water quality infringements
1.6 explain the regulations regarding private water supplies

Learning Outcome 2: Understand why water is treated and disinfected

Assessment criteria – *the learner can:*

2.1 describe the sources of **common pollutants** found in water
2.2 explain the purpose of disinfection within water supply
2.3 explain how water borne diseases contaminate the water system
2.4 outline the infections which are caused by **groups of micro-organisms** that cause waterborne diseases
2.5 explain the **disinfection processes** used to treat water in water networks

Learning Outcome 3: Understand how water quality is controlled and maintained

Assessment criteria – *the learner can:*

3.1 explain how the drinking water quality regulations define "wholesomeness" of water quality using **key water quality variables**

3.2 describe the **sources** of water quality data

3.3 explain the **factors** that can impact on water quality during distribution

3.4 describe the **interventions** that can be made to control changes in water quality

3.5 describe common **water quality incidents** that can arise

3.6 explain how water companies **respond** to water quality incidents

3.7 explain the **methods** used to communicate water usage notices to consumers and how effective these methods are

3.8 explain the **issues** that can arise with water companies' responses to water quality complaints and incidents

Learning Outcome 4: Understand hygienic working practices in the water industry

Assessment criteria – *the learner can:*

4.1 outline the main **hygiene requirements** governing water operations

4.2 describe the purpose of water company mains hygiene policies

4.3 explain the **types of mains hygiene policies and procedures** found in water companies

4.4 explain how **resources and equipment** are used to comply with water hygiene policies

Learning Outcome 5: Undertake water quality sampling and hygienic practices

Assessment criteria – *the learner can:*

5.1 take a customer tap sample following a taste and odour complaint and record the laboratory results

5.2 take a customer tap sample following a mains repair complaint and record the laboratory results

5.3 take a statutory service reservoir sample and record the laboratory results

5.4 refresh a water main with twice its volume of water

5.5 make a disinfectant spray contact solution containing a minimum of 1000mg/l of free chlorine

5.6 explain the content of company procedures for new water mains and services commissioning explain the content of company procedures for tankers and bowsers commissioning

5.7 explain the content of company procedures for water mains and service repairs

Terms and Definitions

Some terms, used in the assessment criteria, cover a range of situations, as follows:

1. **Regulatory organisations** in 1.1 above includes all of the following:
   (a) Drinking Water Inspectorate (DWI)
   (b) OFWAT
   (c) Local authority (public health and environmental health)
   (d) Consumer Council for Water

2. **Water Quality Regulations** in 1.3 above includes all of the following:
   (a) wholesome water
   (b) water supply zones
   (c) regulatory monitoring
   (d) Outcome Delivery Incentive (ODI)
   (e) enforcement
   (f) self-regulation
   (g) licence to operate
   (h) licensed operators.

3. **Enforcement methods** in 1.4 above includes all of the following:
   (a) fines
   (b) imprisonment
   (c) enforcement actions
   (d) notification of incidents and infringements
   (e) audits
   (f) public reporting
   (g) reputation

4. **Methods** in 1.5 above includes all of the following:
   (a) reporting to the regulators
   (b) water quality processes
   (c) audits
   (d) re-sampling
   (e) actions

5. **common pollutants** in 2.1 above include at least 8 of the following:
   (a) algae
   (b) organics
   (c) inorganics
   (d) chemicals
   (e) bacteria
   (f) water borne diseases
   (g) metals
   (h) pesticides
   (i) herbicides
   (j) solid matter

Terms and Definitions

(k) cryptosporidium
(l) indicator organisms

6. **Groups of micro-organisms** and the infections they cause in 2.4 includes all three groups and must cover:

Bacterial Infections (at least 4)
(a) cholera
(b) typhoid fever
(c) salmonellosis
(d) shigellosis
(e) campylobacteriosis
(f) legionellosis (legionnaires' disease)
(g) leptospirosis (weil's disease)
(h) enteropathogenic escherichia coli

Viral Infections (at least 2)
(i) poliomyelitis
(j) hepatitis
(k) gastroenteritis

Protozoan Infections (at least 2)
(l) giardiasis
(m) amoebic dysentery
(n) cryptosporidiosis

7. **Disinfection processes** in 2.5 includes all of the following:
(a) simple chlorination
(b) breakpoint chlorination
(c) super chlorination
(d) chloramination
(e) chlorine dioxide
(f) ozone
(g) ultraviolet light

8. **Key water quality variables** in 3.1 above include all of the following:
(a) chlorine
(b) indicator organisms
(c) bacteria
(d) iron
(e) aluminium
(f) manganese
(g) turbidity
(h) lead

Terms and Definitions

9. **Sources** of water quality data in 3.2 above include all of the following:
   (a) sampling (regulatory and non-regulatory)
   (b) complaints
   (c) company systems
   (d) telemetry
   (e) SCADA

10. **Factors** that impact on water quality in 3.3 above include all of the following:
   (a) water age
   (b) deposits in mains
   (c) asset condition
   (d) ingress
   (e) capital work
   (f) domestic plumbing
   (g) valve operations
   (h) rezoning

11. **Interventions** to control changes in water quality in 3.4 above include at least 7 of the following:
   (a) mains cleaning
   (b) rehab
   (c) service reservoir cleaning and inspection
   (d) turnover in service reservoirs
   (e) lead pipe replacement
   (f) flushing
   (g) risk assessments
   (h) controlled valve operations
   (i) rezone
   (j) secondary disinfection
   (k) phosphate dosing

12. **Water quality incidents** in 3.5 above include all of the following:
   (a) no water
   (b) discoloured water
   (c) taste and odour
   (d) poor pressure
   (e) white water
   (f) sickness
   (g) bursts
   (h) flooding

13. **Respond** to water quality incidents in 3.6 include all of the following:
   (a) boil water advice
   (b) communication
   (c) rezone
   (d) flushing

Terms and Definitions

(e) optimise secondary disinfection
(f) alternative supplies
(g) sampling
(h) change operation of pumps & service reservoirs
(i) change in source water

14. **Methods** used to communicate Water Usage Notices in 3.7 include all of the following:
(a) advice letters
(b) leaflet drops
(c) media publicity
(d) tannoy announcements
(e) social media

15. **Issues** with the response in 3.7 above include at least 6 of the following:
(a) company complaint policy
(b) compensation costs
(c) capital programme for treatment works and network improvement
(d) timescales
(e) standards of service
(f) speed of response
(g) impact elsewhere on network
(h) health and safety
(i) demand on network
(j) resource availability

16. **Hygiene requirements** in 4.1 above includes all of the following:
(a) local authority
(b) Drinking Water Inspectorate (DWI)
(c) National Water Hygiene Scheme

17. **Types of mains hygiene policies and procedures** in 4.3 above include at least 8 of the following:
(a) chlorination
(b) chloramination
(c) de-chlorination
(d) disinfection
(e) sampling
(f) mains repair
(g) rehab
(h) new mains
(i) robotic cleaning
(j) restricted operations
(k) contractors
(l) alternative supplies equipment
(m) approved materials
(n) site cleanliness
(o) tools

Terms and Definitions

18. **Resources and equipment** in 4.4 above include all of the following:
    (a) de-chlorination chemicals
    (b) disinfection sprays
    (c) alternative supplies
    (d) contractors
    (e) samplers
    (f) tools

Assessment Requirements

For the knowledge elements of this unit all assessment tools used by centres must be approved by the EQA.

Water Network – Materials and Components (R/615/5357)			
Level	3	CABWI Unit Ref	3205
Credit Value	9	Guided learning hours	63

Unit purpose and aim

This unit will also provide a sound knowledge of the physical characteristics and working principles of a Water Distribution Network. The unit will cover the use of Water Quality & Pressure Zones, Service Reservoirs and Towers, Pumps & Boosters, Trunk Mains and District Metered Areas (DMA) assets and the factors that influence their use on the network. This unit will also describe the methods used in joining and repair of different pipe materials and their components.

This unit will provide an opportunity for the learner to develop their understanding and awareness of the personal skills required for successful water distribution management in water industry operations.

Learning Outcome 1: Understand the Water Distribution Network

Assessment criteria – *the learner can:*

1.1 describe the principal components and purpose of the **physical characteristics** of a water distribution network

1.2 explain the configuration of water network assets with reference to zones and boundaries

1.3 explain the main considerations when defining zones and boundaries

Learning Outcome 2: Understand Service Reservoirs and Water Towers

Assessment criteria – *the learner can:*

2.1 explain the functions of service reservoirs and water towers

2.2 describe the **materials** used in service reservoir and water tower construction

2.3 explain the purpose of the **component parts** of reservoirs, towers, pipes and ancillaries

2.4 explain the **factors** which affect the selection, design and installation of service reservoirs and water towers

2.5 explain the **terminology** used in service reservoir and water tower design and operation

Learning Outcome 3: Understand Pumps and Boosters

Assessment criteria – *the learner can:*

3.1 explain the different **types of pumps** and their primary uses in water networks

3.2 explain the terminology used to describe **pump configuration and performance characteristics**

3.3 explain the purpose of the booster and pump station **ancillaries and equipment** used in water networks

3.4 explain the **factors** which affect the selection and installation of pumps and boosters

Learning Outcome 4: Understand Trunk Mains

Assessment criteria – *the learner can:*

4.1 explain the purpose and characteristics of the **main components** of a trunk main network

4.2 explain the benefits and possible disadvantages of each component

4.3 describe the three types of **trunk main flow meters** and their function

Learning Outcome 5: Understand District Metered Areas (DMAs)

Assessment criteria – *the learner can:*

5.1 explain the purpose the main **components of a DMA** water network

5.2 explain the use of pressure control in the DMA network

5.3 explain the benefits and possible disadvantages of using pressure control in DMAs

Learning Outcome 6: Understand different pipe materials

Assessment criteria – *the learner can:*

6.1 explain the properties and functions of the different **types of water pipes** used in water networks

6.2 explain the benefits and possible disadvantages of using each pipe type

6.3 explain the **factors** which affect the selection and installation of pipes in the water network

6.4 describe the methods used in **joining and repairing** different pipe materials and their components

Terms and Definitions

Some terms, used in the assessment criteria, cover a range of situations, as follows:

1. **Physical characteristics** in 1.1 above includes all of the following:
   (a) water quality zones
   (b) pressure zones
   (c) service reservoirs and towers
   (d) pumps & boosters
   (e) trunk mains (or transmission mains)
   (f) district metered areas (DMAs)
   (g) domestic customers
   (h) commercial customers
   (i) industrial customers

2. **Materials** used in 2.2 above includes all of the following:
   (a) brick and stone
   (b) reinforced concrete
   (c) steel
   (d) glass reinforced plastic (GRP)

3. **Component parts** in 2.3 above includes all of the following:
   (a) telemetry outstation
   (b) access lids
   (c) security devices
   (d) sample taps
   (e) ball valves
   (f) level transducers
   (g) pressure sustaining valves
   (h) actuated valves
   (i) non-return valves
   (j) flow meters
   (k) gate valves
   (l) inlet pipe
   (m) outlet pipe
   (n) overflow
   (o) washout
   (p) sump

4. **Factors** in 2.4 above includes all of the following:
   (a) cost
   (b) location of supply source
   (c) location of demand requirement
   (d) topography
   (e) power requirement
   (f) storage requirement
   (g) demand requirement
   (h) turnover requirement

Terms and Definitions

5. **Terminology** used in 2.5 above includes all of the following:
   (a) top water level (TWL)
   (b) bottom water level (BWL)
   (c) capacity
   (d) throughput
   (e) drawdown

6. **Different types of pumps** in 3.1 above includes all of the following:
   (a) axial flow
   (b) centrifugal
   (c) positive displacement

7. **Pump configuration and performance characteristics** in 3.2 above includes all of the following:
   (a) pump curves
   (b) fixed and variable speed
   (c) series and parallel groupings
   (d) pressure control
   (e) start /stop surge

8. **Ancillaries and equipment** in 3.3 above includes all of the following:
   (a) power supply
   (b) control panel
   (c) telemetry outstation
   (d) pressure transducers
   (e) surge vessels
   (f) non-return valves
   (g) flow meters
   (h) gate valves

9. **Factors** that affect selection in 3.4 above includes all of the following:
   (a) cost
   (b) location
   (c) power supply
   (d) supply capability
   (e) demand requirement
   (f) suction pressure available
   (g) delivery pressure requirement

10. **Main components** in 4.1 above includes all of the following:
   (a) large gate valves
   (b) butterfly valves
   (c) flow meters
   (d) non-return valves
   (e) washouts
   (f) air valves

(g) actuated valves
(h) pressure sustaining valves
(i) pressure reducing valves
(j) pipe bridges including (slam shut valves)

11. **Trunk main flow meters** in 4.3 above includes all of the following:
(a) electromagnetic
(b) ultrasonic
(c) insertion

12. **Components of a DMA** in 5.1 above includes all of the following:
(a) pressure reducing valves
(b) flow meters
(c) strainers
(d) sluice valves
(e) hydrants & washouts
(f) boundary boxes
(g) boundary stop taps
(h) customer meters
(i) critical monitoring points
(j) average zonal pressure points

13. **Types of water pipes** in 6.1 and 6.2 above includes all of the following:
(a) cast iron
(b) spun iron
(c) ductile iron
(d) steel
(e) asbestos cement
(f) glass reinforced plastic (GRP)
(g) PVC
(h) polyethylene
(i) lead
(j) copper
(k) barrier pipe
(l) lined mains

14. **Factors** which affect the selection and installation of pipes in 6.3 above includes all of the following:
(a) cost of pipe material
(b) installation costs
(c) pressure rating
(d) ground conditions
(e) traffic loadings
(f) contaminated ground
(g) aggressive ground

Terms and Definitions

15. **Joining and Repairing** different pipe materials in 6.4 above includes all of the following:

Joining:

(a) butt fusion
(b) electro-fusion
(c) spigot & socket
(d) bolted flanges
(e) clamps

Repairing:

(f) under pressure
(g) wraparound collars
(h) encapsulating collars
(i) valve repack
(j) welded patches

Assessment Requirements

This unit is knowledge only – all assessment tools used by centres must be approved by the EQA

Water Network – Operation of Service Reservoirs, Pumps and Trunk Mains (Y/615/5358)			
Level	3	CABWI Unit Ref	3206
Credit Value	7	Guided learning hours	42

Unit purpose and aim

A continuous supply of wholesome drinking water is a fundamental expectation for Customers and Regulators. This unit is designed to allow the learner to develop and demonstrate their knowledge and understanding of how the effective operation of Service Reservoirs, Pumps and Trunk Mains is an essential function in the delivery of Water Company, Customer and Regulator expectations.

Furthermore, this unit will provide an opportunity for the learner to develop their understanding and awareness of the personal skills required for successful water distribution management in water industry operations. It includes the role of giving information and advice about the relevant legislation and its application. It includes dealings with the public, contractors, and colleagues. The learner should understand how to apply a wide range of communication and presentation skills in order to restore continuous supplies to customers.

All practical activities should be carried out in line with safe working practices, fully compliant with company policy and relevant Health & Safety legislation.

Learning Outcome 1: Understand the use of remote monitoring and control of strategic networks

Assessment criteria – *the learner can:*

1.1 explain the **strategic assets** found in water networks
1.2 explain the security risks, precautions required and processes used for **strategic assets**
1.3 describe the **practical applications** for using telemetry in water networks
1.4 Explain the **components of telemetry and control** systems used in the water industry
1.5 explain the benefits of using the SCADA System (Supervisory Control and Data Acquisition) in water networks

Learning Outcome 2:	Understand the regulatory requirements and processes for Reservoir Cleaning and Inspection

Assessment criteria – *the learner can:*

2.1 describe the requirements of the flood and water management act and reservoirs act (as amended) with regards to service reservoirs

2.2 describe the **risks** that could affect the integrity of treated water stored in service reservoirs

2.3 describe how to safely remove a service reservoir for cleaning whilst maintaining supplies to customers

2.4 describe the process of service reservoir cleaning

2.5 describe how to undertake a **routine service reservoir inspection**

2.6 describe the recommissioning process for safely returning a reservoir back to normal service

2.7 explain the requirements for **statutory service reservoir inspections**

Learning Outcome 3:	Undertake the regulatory requirements and processes for Reservoir Cleaning and Inspection

Assessment criteria – *the learner can:*

3.1 contribute to routine service reservoir inspections and

3.2 contribute to safely draining down a service reservoir prior to cleaning

3.3 contribute to safely recommissioning a reservoir back to normal service

Learning Outcome 4:	Understand the maintenance requirements for non-infrastructure assets

Assessment criteria – *the learner can:*

4.1 explain the **non-infrastructure assets** found in water networks.

4.2 describe potential risks and hazards when working around power equipment.

4.3 explain the safety protocols used to mitigate potential risks and hazards when working around power equipment.

4.4 explain the importance of conducting a risk assessment prior to working around power equipment

4.5 describe how to conduct a risk assessment to enable working around power equipment

4.6 describe safety protection features on equipment control panels

4.7 explain the requirements of **routine observation and monitoring** of non-infrastructure assets

4.8 explain the requirements of **planned maintenance** of non-infrastructure assets

Learning Outcome 5:	Understand the processes associated with Energy Management of pumped systems

Assessment criteria – *the learner can:*

5.1 explain the relevance of the Carbon Reduction Commitment (CRC) Energy Efficiency Scheme to the water industry
5.2 describe the **factors** that affect energy efficiency in pumping assets
5.3 describe the impact of energy tariffs in the operation of water networks
5.4 describe the strategies used to optimise energy efficiency in networks operations
5.5 explain the importance of reducing energy demand during "Energy Triad" periods

Learning Outcome 6:	Understand the principles of risk assessment and contingency planning

Assessment criteria – *the learner can:*

6.1 explain the **requirements** of a Water Safety Plan (WSP) and what they are used for
6.2 describe the need to identify assets into risk categories
6.3 explain the need for contingency planning in the event of issues or loss of a strategic network or asset
6.4 explain why it's important to conduct a risk assessment prior to changes to the strategic water network
6.5 describe how to conduct a risk assessment for a proposed change to the strategic water network
6.6 describe the steps required to safely isolate a section of strategic network
6.7 describe the steps required to safely reinstate a section of strategic network

Learning Outcome 7:	Undertake risk assessment and contingency planning

Assessment criteria – *the learner can:*

7.1 complete separate risk assessments for operations on two different assets.
7.2 complete a planned trunk main walk /survey

Learning Outcome 8:	Understand principles of effective valve management

Assessment criteria – *the learner can:*

8.1 describe the **reasons** for valving operations on the water trunk (or transmission) network.
8.2 explain the **problems** that could be caused from poor valving technique or procedures
8.3 explain the term "transient pressure" and how it affects the network
8.4 describe the steps required to safely isolate a section of trunk network
8.5 describe the steps required to safely reinstate a section of trunk network
8.6 explain the **hazards** associated with valving operations

Learning Outcome 9: Undertake valve management

Assessment criteria – *the learner can:*

9.1 open and close a valve or hydrant on the network or dedicated test facility

9.2 complete separate valving operations on two different assets

Terms and Definitions

Some terms, used in the assessment criteria, cover a range of situations, as follows:

1. **Strategic Assets** in water networks in 1.1 and 1.2 above includes all of the following:
   (a) water treatment sources
   (b) service reservoirs
   (c) pumping stations
   (d) trunk mains over 12" in urban areas
   (e) trunk mains over 9" in rural areas
   (f) all ancillaries associated with the above

2. **Practical applications** of telemetry in 1.3 above includes all of the following:
   (a) remote monitoring of key assets status
   (b) remote control of key assets
   (c) monitoring of site security

3. **Components of telemetry and control** systems in 1.4 above includes at least 5 of the following:
   (a) instrumentation and sensors
   (b) measurement
   (c) The SCADA system (Supervisory Control and Data Acquisition)
   (d) telemetry data acquisition PLCs (Programmable Logic Controller)
   (e) communication network
   (f) field instrumentation
   (g) system configurations
   (h) HMIs (human machine interface)

4. **Flood and Water Management Act i**n 2.1 above includes all of the following:
   (a) registration
   (b) inspection
   (c) flood plan
   (d) incidents

5. **Reservoirs Act (as amended)** in 2.1 above includes all of the following:
   (a) inspection
   (b) water levels
   (c) supervision

Terms and Definitions

6. **Risks** to the integrity of the treated water in 2.2 above includes all of the following:
   (a) ingress of water through roofs
   (b) entry of water though vertical wall joints
   (c) entry of water though floor joints
   (d) security breach at access hatches
   (e) sediments
   (f) short circuiting
   (g) loss of disinfection process

7. **Routine Service Reservoir inspections** in 2.5 above includes all of the following:
   (a) weather condition
   (b) water level recording
   (c) visual alignment of embankment
   (d) condition of structures
   (e) visual inspection of signs, fences, walls, sample taps, drains and other parts of the reservoir

8. **Statutory Service Reservoir inspections** in 2.7 above includes all of the following:
   (a) reservoir capacity (size of reservoir capacity included in statutory inspections)
   (b) inspection
   (c) observations
   (d) record keeping
   (e) enforcing authority

9. **Non-infrastructure assets** in 4.1 includes all of the following:
   (a) pumps and boosters
   (b) surge vessels
   (c) motorised valves
   (d) pressure control valves (including PRV's & PSV's)
   (e) flow measuring devices
   (f) disinfection equipment
   (g) telemetry equipment

10. **Routine observation and monitoring** in 4.7 includes all of the following: (demonstrate at least 4)
   (a) leakage
   (b) surface damage and corrosion
   (c) security breaches and evidence of third party tamper
   (d) cavitation
   (e) noise, vibration and overheating
   (f) pumps run times and changeovers

11. **Planned maintenance** in 4.8 above includes all of the following:
   (a) manufactures requirements
   (b) risk based reliability centred maintenance (RCM) schedules
   (c) tasks undertaken by qualified electrical, mechanical and instrumentation technicians

Terms and Definitions

12. **Factors** that affect energy efficiency in 5.2 above includes all of the following:
    (a) demand profile
    (b) leakage
    (c) pump lift
    (d) pump efficiency
    (e) head loss

13. **Requirements of a Water Safety Plan in 6.1 above includes all of the following:**
    (a) hazard assessment
    (b) risk assessment
    (c) control measures
    (d) monitoring of control measures
    (e) management procedures
    (f) validation monitoring
    (g) supporting systems such as quality control, standard operating procedures and training programmes
    (h) documentation

14. **Assets** in 7.1 and 9.2 above includes two of the following:
    (a) service reservoir
    (b) booster station
    (c) trunk main

15. **Reasons** for valving in 8.1 above includes all of the following:
    (a) control the flow of water (e.g. zonal)
    (b) control the pressure of water to protect our network (e.g. PRV's)
    (c) allow measurement of specific areas in order to help target leakage (e.g. Water Resource Zone boundary valves)
    (d) allow maintenance on our network (e.g. mains shuts)

16. **Problems** from poor valving operations in 8.2 above includes all of the following:
    (a) poor or no water supplies to our customers
    (b) discolouration to the water supply
    (c) damage to company and customer pipework
    (d) increased leakage
    (e) compensation payments to customers
    (f) prosecutions and fines from regulators
    (g) damage to reputation and brand

17. **Hazards associated with valving operations in 8.6 above includes all of the following:**
    (a) manual handling
    (b) road traffic whilst working in highway
    (c) slips trips and falls
    (d) cuts and punctures
    (e) harmful substances
    (f) unsafe behaviours

Assessment Requirements

For the knowledge elements of this unit all assessment tools used by centres must be approved by the EQA.

Where possible the evidence for Learning outcomes 3 and 9 should be naturally arising from the work environment. Simulation is acceptable by prior arrangement with the EQA if it is not possible for the learner to gather this evidence.

Water Network – Operation of District Metered Areas (D/615/5359)			
Level	3	CABWI Unit Ref	3207
Credit Value	8	Guided learning hours	63

Unit purpose and aim

A continuous supply of wholesome drinking water is a fundamental expectation for Customers and Regulators. This unit is designed to allow the learner to develop and demonstrate their knowledge and understanding of how the effective operation of District Metered Areas (DMAs) is an essential function in the delivery of Water Company, Customer and Regulator expectations.

Furthermore, this unit will provide an opportunity for the learner to develop their understanding and awareness of the personal skills required for successful water distribution management in water industry operations. It includes the role of giving information and advice about the relevant legislation and its application. It includes dealings with the public, contractors, and colleagues. The learner should understand how to apply a wide range of communication and presentation skills in order to restore continuous supplies to customers.

All practical activities should be carried out in line with safe working practices, fully compliant with company policy and relevant Health & Safety legislation.

Learning Outcome 1: Understand the recording and management of the low pressure register

Assessment criteria – *the learner can:*

1.1 describe the **statutory requirements** for minimum levels of service to customers
1.2 outline company procedures relating to levels of service to customers
1.3 explain the **data capture** requirements for pressure recording for levels of service
1.4 describe the low pressure register and how it is used in the company
1.5 explain how the low pressure register can impact on company Outcome Delivery Incentives (ODIs)

Learning Outcome 2: Undertake the recording and management of the low pressure register

Assessment criteria – *the learner can:*

2.1 undertake pressure surveys of critical customers within DMAs and provide the logged data in a suitable format

Learning Outcome 3: Understand pressure management techniques

Assessment criteria – *the learner can:*

3.1 describe the **pressure management techniques** used in water networks
3.2 explain when pressure management **typically takes place** in water networks
3.3 explain the benefits of pressure management in a distribution system
3.4 give two examples of problems that can arise from pressure management schemes
3.5 explain the different types of **pressure reducing valves** and their benefits

Learning Outcome 4: Undertake pressure management techniques

Assessment criteria – *the learner can:*

4.1 carry out pressure management activity using **pressure management techniques**
4.2 deal with problems that have arisen from pressure management schemes
4.3 conduct a risk assessment for a proposed change to the pressure in the network

Learning Outcome 5: Understand how to make changes to the water networks

Assessment criteria – *the learner can:*

5.1 explain the importance of conducting a risk assessment prior to changes in pressure to the network
5.2 explain how to make a planned change to customers supply pressure
5.3 describe how to design a rezone between two DMAs of different pressures
5.4 explain how to reduce pressures within a DMA whilst minimising customer conflict
5.5 explain how to ensure changes to the network are within required levels of service parameters
5.6 describe the **considerations** when making any changes to the network
5.7 explain the processes of ensuring records are updated with permanent changes to the network

Learning Outcome 6: Undertake changes to the water networks

Assessment criteria – *the learner can:*

6.1 design rezones between two DMAs of different pressures
6.2 undertake risk assessments for changes to the water network
6.3 alter pressures within a DMA whilst minimising customer conflict
6.4 update records after permanent changes to the network have been undertaken

Learning Outcome 7:	Understand techniques used in leakage location and network performance analysis

Assessment criteria – *the learner can:*

7.1 explain the selection and deployment of **acoustic and non-acoustic techniques** to detect leakage
7.2 explain how to identify water company leaks from ground, surface water and other private supplies
7.3 describe the use of meters and sub metering in leakage detection
7.4 explain the use of step tests in leakage detection
7.5 explain the use of permanent and temporary acoustic loggers in leakage detection
7.6 describe the factors that affect leak sounds
7.7 describe the use of sounding surveys in leakage detection
7.8 explain the use of a leak noise correlators in both leakage detection and leakage location
7.9 describe the use of equipment in leakage location (pinpointing)
7.10 describe the use of gas injection techniques
7.11 describe the techniques used in trunk main and reservoir leakage

Learning Outcome 8:	Undertake leakage location and network performance analysis

Assessment criteria – *the learner can:*

8.1 select acoustic techniques to locate leakage
8.2 find leaks using three different acoustic techniques
8.3 identify water showing as not being mains water in the system

Learning Outcome 9:	Understand the management of customer side leakage

Assessment criteria – *the learner can:*

9.1 explain the relevance of the Water Supply (Water Fittings) Regulations to customer consumption
9.2 describe the general responsibilities of each section of service pipes
9.3 explain the duties under Section 73 of the Water Industry Act 1991 for owners of premises
9.4 describe Water Company's powers under Section 75 of the Water Industry Act 1991
9.5 explain the **enforcement options** available to water companies

Learning Outcome 10:	Undertake the management of customer side leakage

Assessment criteria – *the learner can:*

10.1 issue Section 75 Waste notices to customers

Learning Outcome 11:	Understand effective valve management

Assessment criteria – *the learner can:*

11.1 describe the different types of **valving operations** carried out on the network
11.2 explain the problems that could be caused from **poor valving techniques or procedures**
11.3 explain the term "transient pressure" and how it affects the network
11.4 describe the steps required to safely isolate a section of DMA network
11.5 describe the steps required to safely reinstate a section of DMA network
11.6 explain the **hazards** associated with valving operations

Learning Outcome 12:	Undertake effective valve management

Assessment criteria – *the learner can:*

12.1 open and close a valve or hydrant on the Network or dedicated test facility using the correct method
12.2 undertake valving operations for a burst main repair

Learning Outcome 13:	Understand the location and avoidance of underground apparatus

Assessment criteria – *the learner can:*

13.1 explain the need for tracing mains and services
13.2 describe the **techniques** used to trace metallic pipes
13.3 describe the **techniques** used to trace non-metallic pipes
13.4 describe the **techniques** used to trace other utility apparatus such as cables

Learning Outcome 14:	Undertake the location and avoidance of underground apparatus

Assessment criteria – *the learner can:*

14.1 trace metallic pipes using tracing equipment
14.2 trace non-metallic pipes using tracing equipment
14.3 identify underground cables using third party records
14.4 trace underground cables using tracing equipment

Terms and Definitions

Some terms, used in the assessment criteria, cover a range of situations, as follows:

1. **Statutory requirements** in 1.1 above include both:
   (a) Water Industry Act 1991
   (b) Guaranteed Standards Scheme

2. **Data capture** in 1.3 above includes all of the following:
   (a) pressure management valve inlet & outlet pressures
   (b) Average Zone Night Pressure (AZNP)
   (c) critical customer monitoring points
   (d) levels of service (DG2) register

3. **Pressure management techniques** in 3.1 and 4.1 above includes all of the following:
   (a) rezones
   (b) changes to pumping regimes
   (c) use of pressure reduction valves
   (d) use of pressure sustaining valves
   (e) mains rehabilitation
   (f) mains renewal

4. **Pressure measurement** typically takes place in 3.2 above includes all of the following:
   (a) general monitoring of the distribution system
   (b) specific monitoring at critical points (levels of service)
   (c) particular consumer problems of inadequate pressure
   (d) co-ordination with particular flow tests e.g. new housing estates, high rise flats, industrial consumers, firefighting installations

5. **Pressure reducing valves** in 3.5 above includes all of the following:
   (a) fixed outlet
   (b) timed modulation
   (c) flow modulation

6. **Considerations** when making changes in 5.7 above includes all of the following:
   (a) management of the change
   (b) gathering of data
   (c) flow of information
   (d) impact on customer pressure and flow
   (e) GSSS impact
   (f) impact on SIM (or the current equivalent)
   (g) updating of records

7. **Acoustic and non-acoustic location techniques** in 7.1 above includes all of (a to f) plus any one of the others:
   (a) step tests
   (b) acoustic loggers
   (c) correlation

Terms and Definitions

(d) listening sticks
(e) ground microphones
(f) drop tests
(g) gas detection
(h) ground radar
(i) thermal imaging
(j) in pipe acoustic technology

8. **Enforcement options** in 9.5 above includes all of the following:
   (a) separate supply
   (b) common supply
   (c) supply pipe in highway
   (d) enforced repair

9. **Valving operations** in 11.1 above includes all of the following:
   (a) control the flow of water to our customers (e.g. Zonal)
   (b) control the pressure of water to protect our network (e.g. PRVs)
   (c) allow measurement of specific areas in order to help target leakage (e.g. DMA boundary valves)
   (d) allow maintenance on our network (e.g. mains shuts)
   (e) allow the authorities such as the fire and rescue service access to water (e.g. fire hydrants)

10. **Poor valving technique in 11.2 above includes all of the following:**
   (a) poor or no water supplies to our customers
   (b) discolouration to the water supply
   (c) damage to company and customer pipework
   (d) increased leakage
   (e) compensation payments to customers
   (f) prosecutions and fines from regulators
   (g) damage to reputation and brand

11. **Hazards** when conducting valving operations in 11.6 above includes all of the following:
   (a) manual handling
   (b) road traffic whilst working in highway
   (c) slips trips and falls
   (d) cuts and punctures
   (e) harmful substances
   (f) unsafe behaviours

12. **Techniques** used to trace in 13.1, 13.2 and 13.3 include all of the following:
   (a) sonde
   (b) vibration devices
   (c) ground penetrating radar
   (d) cat & genny
   (e) dowsing

Assessment Requirements

For the knowledge elements of this unit all assessment tools used by centres must be approved by the EQA.

Unless otherwise stated at least three examples should be provided for each Assessment Criterion in Learning Outcomes 2, 4, 6, 8, 10, 12 and 14.

Simulation is permitted for Learning Outcome 4 by prior arrangement with the EQA.

Water Network Distribution – Supply Interruptions (D/615/5362)			
Level	3	CABWI Unit Ref	3209
Credit Value	6	Guided learning hours	42

Unit purpose and aim

A continuous supply of wholesome drinking water is a fundamental expectation for customers. This unit is designed to allow the learner to develop and demonstrate their knowledge and understanding of Managing Supply Interruption processes and its importance in an overall Networks operational strategy.

Furthermore, this unit will provide an opportunity for the learner to develop their understanding and awareness of the personal skills required for successful water distribution management in water industry operations. It includes the role of giving information and advice about the relevant legislation and its application. It includes dealings with the public, contractors, and colleagues. The learner should understand how to apply a wide range of communication and presentation skills in order to restore continuous supplies to customers.

All practical activities should be carried out in line with safe working practices, fully compliant with company policy and relevant Health & Safety legislation.

Learning Outcome 1: Understand the recording and measuring of Supply Interruption Events

Assessment criteria – *the learner can:*

1.1 describe the **statutory requirements** for minimum levels of service to customers
1.2 define the term "Supply Interruption Event"
1.3 define the terms "planned interruptions and "unplanned interruptions" to supply
1.4 explain the significance of planned and unplanned interruptions to supply
1.5 explain how Supply Interruption Events are measured and reported
1.6 outline your key company procedures relating to Supply Interruption Events
1.7 explain how and why **pressure data** needs to be captured for supply interruption events
1.8 explain the impact on company Outcome Delivery Incentives due to Supply Interruption Events

Learning Outcome 2: Undertake the recording and measuring of Supply Interruption Events

Assessment criteria – *the learner can:*

2.1 capture time based pressure data relevant to Supply Interruption events

Learning Outcome 3: Understand the process of maintaining a piped supply

Assessment criteria – *the learner can:*

3.1 explain the escalation process in triggering Supply Interruption Events
3.2 describe the options available to water companies in providing a **replacement water supply** directly into the mains system
3.3 describe the **enabling works** that facilitate the replacement supplies
3.4 explain the identification and safe use of "fast fill" facilities to provide an alternative supply
3.5 describe the disinfection and sampling requirements in providing a replacement water supply via an overland bypass, power bowser and tanker

Learning Outcome 4: Maintain a piped supply

Assessment criteria – *the learner can:*

4.1 escalate issues that lead to supply interruption events
4.2 specify enabling works to facilitate an alternative supply
4.3 disinfect a water bowser or tanker to enable an alternative supply
4.4 support a tanker or bowser deployment
4.5 undertake a rezone to enable an alternative supply
4.6 set up a temporary overland feed to enable an alternative supply

Learning Outcome 5: Understand the provision of a replacement Water Supply

Assessment criteria – *the learner can:*

5.1 define the term "replacement water supply"
5.2 describe the water company's responsibility for issuing **warning advice** to customers about their water supply
5.3 describe the different **types of warning notices**
5.4 describe the minimum water provision that water companies must provide to customers if the piped supply fails
5.5 describe the options available to water companies in providing a **replacement water supply**
5.6 explain the disinfection and sampling requirements in providing a replacement water supply via a tanker, bowser or pillow tank
5.7 explain the requirements and best practice methods used in informing customers of replacement water supplies

Learning Outcome 6: Undertake the provision of a replacement Water Supply

Assessment criteria – *the learner can:*

6.1 communicate to sensitive or special needs customers during supply interruption events

6.2 issue bottled water to properties affected by a supply Interruption event

6.3 deliver water quality notices to customers

Learning Outcome 7: Understand compensation entitlements for loss of water supply

Assessment criteria – *the learner can:*

7.1 describe the compensation arrangements for supply interruptions in your company

7.2 explain how DMA supply pressures are affected during drawdown and refill conditions

7.3 explain the importance and application of accurately recording individual property minutes for Supply Interruption Events

Terms and Definitions

Some terms, used in the assessment criteria, cover a range of situations, as follows:

1. **Statutory requirements** in 1.1 above include both below:
   (a) Water Industry Act 1991
   (b) Guaranteed Service Standards Scheme

2. **Pressure data** in 1.7 above includes both below:
   (a) critical customer monitoring points
   (b) low point pressure data

3. **Replacement water supply** in 3.2 above includes all of the following:
   (a) rezone
   (b) overland bypass
   (c) power bowser
   (d) pumped tanker supply directly into service reservoir
   (e) pumped tanker supply directly into mains system

4. **Enabling works** in 3.3 above includes all of the following:
   (a) rezoning
   (b) line stops
   (c) under pressure installation of valves and hydrants
   (d) installation of through bore hydrants
   (e) use of overland bypasses

Terms and Definitions

5. **Warning advice** issued to customers in 5.2 above includes all of the following:
   (a) that the supply has been interrupted or cut off
   (b) where to get an alternative supply
   (c) the time by when the supply will be restored
   (d) the phone number from which you can get further information

6. **Types of warning notices** in 5.3 above includes all of the following:
   (a) Boil Water Advice (BWA)
   (b) Do Not Drink (DND)
   (c) Do Not Use (DNU)

7. **Replacement water supply** in 5.5 above includes 3 of the following:
   (a) bottled water
   (b) static water bowsers
   (c) pillow tanks
   (d) mobile water tankers

Assessment Requirements

For the knowledge elements of this unit all assessment tools used by centres must be approved by the EQA.

Water Network Distribution – Water Supply (Water Fittings) Regulations (L/615/5356)			
Level	3	CABWI Unit Ref	3204
Credit Value	8	Guided learning hours	52

Unit purpose and aim

This unit is designed to allow the learner to develop their knowledge and understanding of the Water Supply (Water Fittings) Regulations and their application in inspections of systems.

The learner will understand how to undertake inspection of systems and take the actions necessary to secure compliance.

All practical activities should be carried out in line with safe working practices, fully compliant with company policy and relevant Health & Safety legislation.

Learning Outcome 1: Understand hot and cold water systems

Assessment criteria – *the learner can:*

1.1 explain the **main regulatory requirements** for safety provisions relating to hot and cold water systems
1.2 describe the **main regulatory requirements** for pipe sizing, water discharge rates and water temperatures
1.3 describe the **main regulatory requirements** for the provision of stop, servicing and drain valves
1.4 explain the circumstances where pressure testing is necessary
1.5 describe methods of pressure testing available
1.6 describe the circumstances where disinfection of systems is necessary
1.7 explain how disinfection of systems should be carried out
1.8 describe the regulatory requirements for accommodating expansion of volumes of hot water
1.9 explain the consequences of non-compliance with regulations on the water supply

Learning Outcome 2: Understand the requirements for fittings and materials used in water systems

Assessment criteria – *the learner can:*

2.1 explain the criteria for the approval of water fittings and their mode of installation
2.2 explain the **regulatory requirements** relating to materials and fittings
2.3 explain the regulatory requirements for the flushing of WCs and urinals

Learning Outcome 2:	Understand the requirements for fittings and materials used in water systems

2.4 explain the regulatory requirements relating to the provision, sizing and discharge positions of overflows and warning pipes
2.5 explain the regulatory requirements relating to the provision of drinking water in premises
2.6 explain the regulatory requirements relating to washing machines, dishwashers and other water using appliances

Learning Outcome 3:	Understand how backflow and contamination can occur and be prevented

Assessment criteria – *the learner can:*

3.1 define the Fluid Categories 1-5 and the level of risk in relation to each category
3.2 explain the regulatory requirements for the installation of mechanical and non-mechanical contamination prevention devices
3.3 explain the regulatory requirements relating to reclaimed water systems
3.4 explain the regulatory requirements for "point of use protection"
3.5 explain how back flow can occur
3.6 describe the actions which can be taken to prevent backflow

Learning Outcome 4:	Understand how to provide information and advice regarding the Water Supply (Water Fittings) Regulations

Assessment criteria – *the learner can:*

4.1 explain the main provisions of the Water Supply (Water Fittings) Regulations
4.2 explain the key objectives of the Water Fittings Regulations and their legal standing
4.3 explain the different options available for water undertakers to secure compliance
4.4 explain the consequences of non-compliance with the regulations
4.5 explain the regulatory requirements for the notification of work by approved and non-approved contractors
4.6 explain the regulatory requirements regarding commissioning of systems
4.7 describe the different sources of information and support available to those seeking to ensure compliance

Learning Outcome 5:	Understand how to identify and inspect systems for compliance with the water regulations

Assessment criteria – *the learner can:*

5.1 identify the **key components** of water systems
5.2 explain the purpose of the **key components** of water systems
5.3 describe four different **types of systems** using diagrams
5.4 identify different types of operational fittings
5.5 explain the purpose of different types of **operational fittings**

Learning Outcome 5: Understand how to identify and inspect systems for compliance with the water regulations

5.6 explain how to inspect **operational fittings** within the system to ensure they are fit for purpose and positioned correctly

5.7 describe how to record and report the outcomes of inspections and detail any contraventions identified

5.8 explain when follow up activities will take place and how this would be communicated to all interested parties

Learning Outcome 6: Undertake Water Systems Testing and Inspections

Assessment criteria – *the learner can:*

6.1 identify different breeches of the Water Fittings Regulations as part of an inspection

6.2 undertake flow and pressure tests and record the results

6.3 identify a need for system disinfection

6.4 identify problems with the location and accessibility of water fittings

6.5 identify problems through damage or freezing caused by the lack of protection to water fittings

6.6 identify **contraventions** of Water Supply (Water Fitting) Regulations

6.7 recommend preventative methods or the installation of devices suitable for protection against contamination by the various fluid categories

6.8 issue compliance notices

6.9 provide advice for approved and non-approved contractors

6.10 check a new system against company and regulatory requirements

6.11 undertake and report on water systems inspections at domestic premises

6.12 undertake and report on formal water systems inspections on a Fluid Category 4 or above at commercial premises

6.13 complete follow up activities after an inspection

Terms and Definitions

Some terms, used in the assessment criteria, cover a range of situations, as follows:

1. **Main regulatory requirements** in 1.1, 1.2 and 1.3 above includes all of the following:
   - (a) safety
   - (b) maintenance
   - (c) water contamination
   - (d) temperature
   - (e) flow & pressure

2. **Regulatory requirements** in 2.2 above includes all of the following:
   - (a) location and accessibility of control devices
   - (b) prevention of damage to apparatus

Terms and Definitions

(c) environmental factors
(d) drinking water
(e) overflows
(f) urinals and WCs
(g) appliances

3. **Key components** in 5.1 and 5.2 above includes all of the following:
   (a) storage vessels
   (b) points of use
   (c) hot and cold pipe work
   (d) heating devices
   (e) operational valves

4. **Types of Systems** in 5.3 above includes two hot and two cold from the following:
   (a) direct cold
   (b) indirect cold
   (c) direct hot
   (d) indirect hot
   (e) instantaneous hot
   (f) unvented hot

5. **Operational fittings** in 5.4, 5.5 and 5.6 above includes all of the following:
   (a) stop valves
   (b) servicing valves
   (c) drain valves
   (d) float operated valves

6. **Contraventions of Water Supply (Water Fitting) Regulations** in 6.6 to include all of following areas:
   (a) WC's and urinals
   (b) overflow pipes
   (c) drinking water supply
   (d) domestic appliances that use water

Assessment Requirements

For the knowledge elements of this unit all assessment tools used by centres must be approved by the EQA.

Unless otherwise stated at least three examples should be provided for each assessment criterion in learning outcome 6.

In assessment criteria 6.11 and 6.12 at least one of the reports must contain evidence of contraventions.

Assessment Requirements

Simulation may be acceptable for Learning Outcome 6 by prior agreement with the EQA.

Water Network – Asset Management (R/615/5360)			
Level	3	CABWI Unit Ref	3208
Credit Value	4	Guided learning hours	21

Unit purpose and aim

The water industry relies on a high proportion of physical infrastructure and non-infrastructure assets. This is a complex mix of assets of varying materials and asset lifespans. The key objective is maintaining service to customers. Assets are often remote or out-of-sight, underground, difficult to inspect, maintain or assess condition. Asset Management is the management of physical assets - their selection, operation, maintenance, inspection and renewal. Asset Management is key in determining the operational performance and profitability of industries that operate assets as part of their core business.

This unit will provide an opportunity for the learner to develop their understanding and awareness of the skills required for water treatment asset management relating to water industry operations.

Learning Outcome 1: Understand the principles of Asset Lifecycles and Asset Management Systems

Assessment criteria – *the learner can:*

1.1 define the term "Asset Management" from a water industry focus

1.2 explain how Asset Management determines the operational performance and profitability of the water industry

1.3 explain the **lifecycle** of Asset Management Projects

1.4 describe the tangibles and intangibles that relate to **Asset Management decisions**

1.5 describe the key **Asset Management Systems** used in the water industry

Learning Outcome 2: Understand how water industry assets are financed

Assessment criteria – *the learner can:*

2.1 explain the components of **Operating Expenditure** (Opex).

2.2 explain how this is used to finance operations and maintenance activities.

2.3 explain the components of **Capital Expenditure** (Capex).

2.4 explain how this is used to finance renewal and improvement activities.

2.5 explain how the principle of **TOTEX** impacts asset management planning decisions.

2.6 explain how infrastructure and non-infrastructure assets are **depreciated** in the water industry.

Learning Outcome 3: Understand the factors associated with poor performing infrastructure and non-infrastructure assets

Assessment criteria – *the learner can:*

3.1 describe the **conditions** that can influence the performance of water assets
3.2 explain how the **performance of assets** are categorised for rehabilitation or replacement options
3.3 explain the importance of maintain good hydraulic capacity in water assets
3.4 explain how ground conditions can influence the performance of pipeline materials
3.5 explain how the performance of infrastructure assets are categorised for rehabilitation or replacement options
3.6 describe the processes for determining the structural integrity of **underground assets**

Learning Outcome 4: Understand the principles and selection of new mains, mains renewal and rehabilitation techniques

Assessment criteria – *the learner can:*

4.1 describe the methods of water mains and services **cleaning**
4.2 explain how to select the appropriate mains and services cleaning technique
4.3 describe the methods of water mains and services **rehabilitation**
4.4 explain how to select the appropriate mains and services rehabilitation technique
4.5 describe the methods of water mains and services **new installations and renewals**
4.6 explain how to select the appropriate mains and service installation or renewal technique

Terms and Definitions

Some terms, used in the assessment criteria, cover a range of situations, as follows:

1. **Lifecycle** of Asset Management Projects in 1.3 above includes all of the following:
   (a) strategy & planning
   (b) financing & procurement
   (c) design & build
   (d) commission & handover
   (e) operate & maintain
   (f) replace & decommission

2. **Asset Management decisions** in 1.4 above includes at least 7 of the following:
   (a) asset performance
   (b) asset condition
   (c) asset serviceability
   (d) asset life
   (e) asset operating costs
   (f) asset replacement/improvement costs
   (g) asset disposal
   (h) investment strategy/long term asset management plan

Terms and Definitions

(i) whole life costs
(j) return on investment
(k) legislation and regulation
(l) regulatory targets
(m) company reputation
(n) customer satisfaction
(o) Capex versus Opex expenditure and Totex considerations

3. **Asset Management Systems** in 1.5 above includes all of the following:
   (a) Publicly Available Specification (PAS) 55:2008
   (b) ISO 55000:2014
   (c) Failure Modes Effects and Criticality Analysis (FMECA)

4. **Operating Expenditure** in 2.1 above includes at least 5 of the following:
   (a) employment
   (b) power/energy
   (c) chemicals
   (d) materials
   (e) operating/maintenance contracts
   (f) consumables
   (g) rents/leases
   (h) waste disposal
   (i) licencing
   (j) transport

5. **Capital Expenditure** in 2.3 above includes at least 2 of the following:
   (a) asset construction/maintenance/improvement
   (b) asset commissioning
   (c) asset disposal
   (d) acquisition

6. **TOTEX** in 2.5 above includes at least 4 of the following:
   (a) whole life/lifetime cost
   (b) Capex/Opex options for achievement of outputs
   (c) Totex targets
   (d) innovation
   (e) productivity
   (f) cost
   (g) risk
   (h) performance
   (i) efficiency

7. **Depreciated** in 2.6 includes all of the following:
   (a) Infrastructure Renewals Charge (IRC)
   (b) Infrastructure Renewals Expenditure (IRE)

Terms and Definitions

8. **Conditions** that can influence asset performance in 3.1 above includes at least 5 of the following:
   (a) hydraulic capacity
   (b) internal and external pipe condition
   (c) corrosion of metallic pipes
   (d) ground conditions
   (e) bursts and leakage
   (f) discoloured water
   (g) water quality
   (h) structural integrity
   (i) ingress

9. **Performance of assets** are categorised in 3.2 above includes all of the following:
   (a) water quality
   (b) burst frequency
   (c) hydraulic capacity

10. **Underground assets** in 3.6 above includes all of the following:
   (a) service reservoirs
   (b) trunk mains
   (c) distribution mains

11. **Cleaning** in 4.1 above includes all of the following:
   (a) flushing
   (b) air scouring
   (c) swabbing
   (d) ice pigging
   (e) conventional pigging

12. **Rehabilitation** in 4.3 above includes all of the following:
   (a) scraping and relining
   (b) epoxy resins coatings
   (c) P.E. lining (non-structural and semi-structural)

13. **New installations and renewals** in 4.5 above includes all of the following:
   (a) insertion or slip lining
   (b) moling
   (c) pipe bursting
   (d) open cut
   (e) service pipe replacement

Assessment Requirements

This unit is knowledge only – all assessment tools used by centres must be approved by the EQA

Water Network – Leakage Detection and Location (H/615/5363)			
Level	3	CABWI Unit Ref	3303
Credit Value	3	Guided learning hours	14

Unit purpose and aim

This unit is designed to allow the learner to develop and demonstrate their knowledge and understanding of leakage location methods, technique selection and asset tracing methods used. Furthermore, this unit will provide an opportunity for the learner to develop their understanding and awareness of the personal skills required for successful reduction of leakage and optimisation of resources in water industry operations. It includes the role of giving information and advice about the relevant legislation and its application. It includes dealings with the public, contractors, and colleagues. The learner should understand how to apply a wide range of communication and presentation skills in order to manage leakage reduction effectively.

All practical activities should be carried out in line with safe working practices, fully compliant with company policy and relevant Health & Safety legislation.

Learning Outcome 1: Understand techniques used in leakage detection and network performance analysis

Assessment criteria – *the learner can:*

1.1 explain the selection and deployment of **acoustic and non-acoustic techniques** to detect leakage
1.2 describe how to identify water company leaks from ground / surface water and private supplies
1.3 describe the use of meters and sub metering in leakage detection
1.4 explain the use of step tests in leakage detection
1.5 explain the use of permanent and temporary acoustic loggers in leakage detection
1.6 describe the factors that affect leak sounds
1.7 describe the use of sounding surveys in leakage detection
1.8 explain the use of leak noise correlators in both leakage detection and leakage location
1.9 describe the use of equipment in leakage location (pinpointing)
1.10 describe the use of gas injection techniques
1.11 describe the techniques used in trunk main and reservoir leakage

Learning Outcome 2:	Undertake techniques used in leakage detection and network performance analysis

Assessment criteria – *the learner can:*

2.1 Select and use non-acoustic techniques to support leakage investigation
2.2 Select and use acoustic techniques to investigate suspected leakage
2.3 Find leaks using acoustic techniques
2.4 Undertake step tests
2.5 Undertake acoustic logger deployments
2.6 Undertake sounding surveys
2.7 Identify water showing as not being mains water

Learning Outcome 3:	Understand how to prepare and prioritise leak location activities

Assessment criteria – *the learner can:*

3.1 explain the **factors** that determine the priority of leakage location activity
3.2 explain how to **target** potential leakage location activity

Learning Outcome 4:	Undertake the preparation and prioritisation of leak location activities

Assessment criteria – *the learner can:*

4.1 gather DMA data prior to leakage detection activities
4.2 prioritise leakage detection activity
4.3 plan leakage detection and location activity to find leakage in a DMA
4.4 undertake physical checks in different DMAs prior to leakage detection activities

Learning Outcome 5:	Understand the location and avoidance of underground apparatus

Assessment criteria – *the learner can:*

5.1 explain the need for tracing mains and services
5.2 describe the **techniques** and their limitations when used to trace metallic & non-metallic pipes and cables

Learning Outcome 6: Undertake the location and avoidance of underground apparatus

Assessment criteria – *the learner can:*

6.1 trace metallic pipes using tracing equipment
6.2 trace non-metallic pipes using tracing equipment
6.3 identify underground cables using third party records
6.4 trace underground cables using tracing equipment

Learning Outcome 7: Understand the management of customer side leakage

Assessment criteria – *the learner can:*

7.1 explain the relevance of the Water Supply (Water Fittings) Regulations with regards to customer consumption
7.2 describe the general responsibilities for each section of service pipes
7.3 explain the duties under Section 73 of the Water Industry Act 1991 for owners of premises
7.4 describe water company's powers under Section 75 of the Water Industry Act 1991
7.5 explain the **enforcement options** available to water companies

Learning Outcome 8: Manage customer side leakage

Assessment criteria – *the learner can:*

8.1 issue Section 75 Waste notices to customers

Learning Outcome 9: Understand the management of customer side leakage

Assessment criteria – *the learner can:*

9.1 describe where leaks occur on water pipes
9.2 describe where leaks occur on water fittings
9.3 explain the type of **repair methods** used when fixing leaks
9.4 explain the benefits of selecting certain **repair methods** for different types of pipe materials and fittings
9.5 explain the significance of supply interruptions targets
9.6 explain the importance of non-disruptive repairs

Learning Outcome 10: Recommend repair processes for leakage repair

Assessment criteria – *the learner can:*

10.1 contribute to a positive Supply Interruptions outcome

10.2 make reasoned recommendations for a non-disruptive repair activity to a water main or service

10.3 make reasoned recommendations for a non-disruptive repair activity to a water fitting

Terms and Definitions

Some terms, used in the assessment criteria, cover a range of situations, as follows:

1. **Acoustic and non-acoustic location techniques** in 1.1 above includes all of the following:
   - (a) step tests
   - (b) acoustic loggers
   - (c) correlation
   - (d) listening sticks
   - (e) ground microphones
   - (f) drop tests
   - (g) gas detection
   - (h) ground radar
   - (i) thermal imaging
   - (j) in pipe acoustic technology

2. **Factors** that determine the priority of leakage location activity in 3.3 above includes all of the following:
   - (a) amount of leakage
   - (b) customer impact
   - (c) historical
   - (d) asset condition
   - (e) high pressure
   - (f) environmental
   - (g) ground conditions
   - (h) traffic loading
   - (i) third party activity

3. **Target** a leakage location campaign in 3.1 above includes all the following areas:
   - (a) reservoir leakage
   - (b) trunk main leakage
   - (c) DMA leakage
   - (d) private supply leakage

Terms and Definitions

4. **Techniques** used to trace in 5.2, 5.3 and 5.4 include all of the following:
   (a) sonde (non-metallic)
   (b) vibration devices (non-metallic)
   (c) ground penetrating radar (non-metallic, metallic)
   (d) cat & genny (metallic)
   (e) dowsing (everything)

5. **Enforcement options** in 7.5 in relation to all of the following:
   (a) separate supply
   (b) common supply
   (c) supply pipe in highway
   (d) enforced repair

6. **Repair methods** in 9.3 and 9.4 above includes three of the following:
   (a) cut out and piece through
   (b) split and encapsulating collars
   (c) repack valve
   (d) weld steel

Assessment Requirements

For the knowledge elements of this unit all assessment tools used by centres must be approved by the EQA.

All practical activities should be demonstrated on a minimum of 3 occasions in different District Metered Areas (DMAs)