Domestic Services Risk Assessment & Written Scheme for the Control and Prevention of Legionellosis

Carried out at

Tendering District Council
Clacton Leisure Centre
Vista Road, Clacton-on-Sea
Essex, CO15 6DB

Date of Assessment: 20th January 2022

Date Review Due: **Regularly and where the existing assessment may no longer be Valid - See page 8.**

Assessment No: 12717CS

REPORT	SIGNATURE	NAME	DATE
Prepared & checked by:	C Simmons	Craig Simmons	03/02/2022
Reviewed by	D Icke	Daniel Icke	03/02/2022

Legionella Risk Assessment Survey Report

This report was carried out in accordance with the Approved Code of Practice issued by the Health & Safety Executive and should be read in conjunction with the Site Logbook and written scheme for the prevention of legionella.

Survey and report carried out by - ***Craig Simmons of Beacon Water Treatments Ltd***

This Risk Assessment was carried out by Craig Simmons, of Beacon Water Treatments Ltd, who has over 13 years' relevant experience with water related building services and who holds a City & Guilds in Legionella Risk Assessments both domestic and cooling systems and holds various other water hygiene related disciplines. A copy of the certificates awarded are available from Beacon Water Treatments Ltd on request.

This risk assessment will highlight any significant risks that the consultant feels are relevant for the control of Legionella Bacteria at this site – Namely **Clacton Leisure Centre.**

Due to operational circumstances and the design of the water system, not all pipework could be fully traced, however, pipework was seen to be well installed and followed predictable pathways and as such we have confidently presumed some pipework runs.

While carrying out this survey all efforts have been made to identify any deadlegs on site and any low used areas.

All temperatures obtained in this report are relevant only to the date of the survey (20th January 2022). All temperatures obtained during the survey were taken prior to TMV's (where fitted). Temperatures have also obtained from subordinate return loops where found.

A simple asset register has been created to highlight all areas assessed within the survey. any such areas.

Executive Summary	
Site Name	Clacton Leisure Centre Vista Road Clacton-on-Sea Essex CO15 6DB
Site Contacts	Daniel Kerridge
Period of Use	Monday 6:30am–9:30pm Tuesday 6:30am–9:30pm Wednesday 6:30am–9:30pm Thursday 6:30am–9:30pm Friday 6:30am–9pm Saturday 7:30am–5:30pm Sunday 7:30am–5:30pm
Approximate number of occupants	Various dependent on usage
Site/Building Description	Clacton Leisure Centre is a large multipurpose building situated near to the town centre of Clacton. The building is set out over a large footprint – there is a swimming pool, spa area, large sports hall, gymnasium and changing facilities on site. Domestic water services are split into three areas: **Wet Side – This area has been refurbished in 2021** Domestic water outlets include poolside showers, toilet facilities with hand basins, the employee's staffroom, first aid room with sink and poolside bib taps. Cold water services are predominantly supplied from a single cold water storage tank located on the roof. Some outlets are mains fed (bib taps and staffroom cold tap). Hot water is suppled from a large single calorifier located in the pool plant room. **Spa area – Area refurbishment underway.** On the ground floor there is a hydro-spa, spa side showers (hot & cold), steam room, salt room (associated plant). First Floor – the first floor is the location of the male and female dry changing rooms including toilet facilities and showers, there are also disabled changing facilities and a cleaner's room with butler sink. The first floor is the location of the gym which has drinking water fountains supplied from the mains cold water.

	Cold water services are supplied from a singe cold water storage tank via a booster set. Hot water is from a single calorifier located in the first floor plant room. **Dry Area (Sports Hall)** Domestic water outlets include male, female & disabled changing facilities with toilets and showers and other toilet facilities. Cold water is supplied from cold water storage tanks located on the roof. Hot water is supplied from a single (large) calorifier located in the external plant room. **Kitchen/Café & Treatment Rooms** **Kitchen/Café –** Domestic outlets include prep sinks, wash up sinks, dishwasher, and hand basins. The café counter has a coffee machine. **Treatment Rooms –** There are three treatment rooms, each room has a single hand basin. Cold water to these areas is direct from the mains cold water services. Hot water is supplied from a single unvented water heater located in the roof space above the kitchen. ***Note: since the last LRA (2017) there have been refurbishments and plant changes on site – all existing schematics are now incorrect. A new schematic plan will be included within this LRA.***
Areas Assessed	All Plant Rooms Domestic hot and cold water services throughout
Areas Excluded	None
Areas/Items of Concern outside of the scope of the legionella risk assessment	None noted

Site Water Systems Overview

Type of System / Component	Present Y/N	Details
Cooling towers / evaporative condensers	N	
Cold water mains supply to site	Y	3 Locations: MCW 1 Café/Kitchen MCW 2 Wet Side – Boiler Room MCW 3 Spa Pool Plant Room
Other water supply to site – borehole etc.	N	
Cold water storage tanks (CWST)	Y	1 x CWST – Wet Side Roof 1 x CWST – Spa Side/Gym Change 1 x CWST – Sports Hall Change 1 x Non-domestic Tank – Pool Plant Room 1 x Break Tank – Pool Chemical Store
Calorifiers / Plate Heat Exchangers (PHE)	Y	1 x Calorifier Wet Side Plant Room 1 x Calorifier Dry Side Plant Room 1 x Calorifier Sports Hall Plant Room 1 x Calorifier above kitchen
Point-of-use / local electric water heaters/Combi Boilers	Y	
Showers	y	Throughout site – See Asset Register
Taps/outlets incorporating spray fittings	N	
Water softening plant	Y	Salt Spray Plant Room
Air Handling Units (with cooling coils)	N	
Air humidification plant	N	
Water features	N	
Closed heating systems	Y	Boilers Located in Plant Rooms
Closed chilled systems	N	
Other water systems	N	

Legionella Control Management - Responsibilities

Responsibility	Name/Role	Contact Details
Duty Holder ***Person to whom the statutory duty for legionella falls***	**Ian Davidson** **Chief Executive**	**01255 686007**
Nominated Responsible Person ***Nominated by the Duty Holder with overall responsibility for legionella control***	**Marcus Poston** **Sports Facilities Manager**	**01255 686548**
Deputy Responsible Person ***Deputy for the Responsible Person***	**Daniel Kerridge** **Operations Manager**	**01255 686696**
Engineering Site Maintenance ***Responsible for site weekly checks***	**Harry Whitehead** **Jack Payne** **Duty Officer**	**01255 686142** **01255 686705**
Deputy Engineering Site Maintenance ***Responsible for site weekly checks***	**Amanda Furbank** **Shellie Wiggins** **Georgie Whittick** **Acting Duty Officer**	**01255 686713** **01255 686712**
Water Treatment Service Engineer	**Mark Watts** **Beacon Water Treatment**	**01993 410066**
Water Treatment Contractor	**Beacon Water Treatment**	**01993 410066**

Info Box (ACoP L8 Section 51)

The dutyholder should specifically appoint a competent person or persons to take day-to-day responsibility for controlling any identified risk from legionella bacteria, known as the 'responsible person'. It is important for the appointed responsible person to have *sufficient authority, competence, and knowledge of the installation* to ensure that all operational procedures are carried out effectively and in a timely way. Those specifically appointed to implement the control measures and strategies should be suitably informed, instructed and trained and their suitability assessed. They must be properly trained to a level that ensures tasks are carried out in a safe, technically competent manner; and receive regular refresher training. Keep records of all initial and refresher training. If a dutyholder is self-employed or a member of a partnership, and is competent, they may appoint themselves. The appointed responsible person should have a clear understanding of their role and the overall health and safety management structure and policy in the organisation. See *Managing for health and safety at work* for further guidance

Legionella Control Management - Training

Are up-to-date training records present for personnel assigned responsibility for Legionella Management and Control?	
Responsible Person	Yes
Deputy Responsible Person	Yes
On-site personnel	Yes
External Contractors	Available from Beacon Water Treatments Ltd
Is there a training matrix in place to regularly review training requirements?	Yes
Are the competency of external contractors' subject to regular audits?	Yes
Do assigned personnel demonstrate competence in conducting their assigned responsibilities?	
Responsible Person	Yes
Deputy Responsible Person	Yes
On-site personnel	Yes
External Contractors	Records available from Beacon Water Treatments Ltd

Info Box (ACoP L8 Section 52)

The dutyholder should also ensure that all employees involved in work that may expose an employee or other person to legionella are given suitable and sufficient information, instruction, and training. This includes information, instruction, and training on the significant findings of the risk assessment and the appropriate precautions and actions they need to take to safeguard themselves and others. This should be reviewed and updated whenever significant changes are made to the type of work carried out or methods used. Training is an essential element of an employee's capability to carry out work safely, but it is not the only factor: instructions, experience, knowledge, and other personal qualities are also relevant to perform a task safely.

City & Guilds

CERTIFICATE OF UNIT CREDIT TOWARDS

The Frontline Skills Framework - Utilities (5831) - Legionella

is awarded to
Craig Alan Simmons

who attended
Develop Training Ltd

and was successful in the following module

Risk Assessment of Water Systems in Buildings (Cooling Towers and Hot and Cold Water Systems) — Pass

Awarded 10 September 2013 100913/5831-54/023703P/CL/8067/M/22/07/71

5500866048/1170

Sir John Arnitt, CBE FREng FCGI
Chairman
The City and Guilds of London Institute

Chris Jones
Director-General
The City and Guilds of London Institute

The City and Guilds of London Institute founded 1878 and incorporated by Royal Charter 1900.
The City & Guilds Group comprises City & Guilds and ILM.

This is to certify that

Mr Craig Simmons

of

Beacon Water Treatments Ltd

has completed a one day training course on

HTM 04-01 Water Hygiene Training: Managing & Controlling Risk of Waterborne Pathogens in Healthcare Water Systems

Subjects covered include:

Key Legislation & Guidance
Waterborne Pathogens & Clinical Consequences
Risk Assessing for Water Hygiene
Control of Water Hygiene
Monitoring of Water Hygiene

WMSoc ACCREDITED

The following level was attained at the end-of-day assessment

Merit

Signed _____

WMS The Water Management Society

City & Guilds ACCREDITED

CPD Units 6 Hours

Date: 22/04/2021

Certificate Number: 7079
C&G Enrolment Number: CLN5652

The Water Management Society recommends that training is refreshed at least every 3 years

The Water Management Society Limited, 6 Sir Robert Peel Mill Building, Fazeley, Tamworth, Staffordshire, B78 3QD. Telephone: 01827 289558 www.wmsoc.org.uk

This is to certify that

Mr Craig Simmons

of

Beacon Water Treatments Ltd

has completed a one day training course on

Legionella Risk Assessment In Cooling Systems

Subjects covered include:

Competence
Requirements of L8, including requirements of the Duty Holder and Responsible Person
Types and design of cooling towers and evaporative condensers
Variations in these systems and how they can impact on risk and their assessment
The assessment of water treatment programmes and what to look for when assessments are carried out
The condition survey
The written scheme

WMSoc ACCREDITED

The following level was attained at the end-of-day assessment

Pass

Signed _____

WMS The Water Management Society

City & Guilds ACCREDITED

CPD Units 6 Hours

Date: 16/06/2021

Certificate Number: 7222
C&G Enrolment Number: CLN5652

The Water Management Society recommends that training is refreshed at least every 3 years

The Water Management Society Limited, 6 Sir Robert Peel Mill Building, Fazeley, Tamworth, Staffordshire, B78 3QD. Telephone: 01827 289558 www.wmsoc.org.uk

isac
INDUSTRIAL SAFETY ADVISORY CENTRE

THIS IS A CERTIFICATE AWARDED TO

AMANDA FURBANK

ON SUCCESSFULLY COMPLETING
LEGIONELLA AWARENESS FOR
APPOINTED PEOPLE
A COURSE APPROVED AND VALIDATED BY
ISAC (UK) LTD

G M HORNBY
MANAGING DIRECTOR
ISAC (UK) LTD

A J A SAMMUT
TECHNICAL DIRECTOR
ISAC (UK) LTD

iosh

THE WATER MANAGEMENT SOCIETY

DATE: 21ST OCTOBER 2021

CERT No: 00599

This is a certificate awarded to

Daniel Kerridge

on successfully completing

Legionella Management for Responsible Persons Refresher

a course approved and validated by the

Institution of Occupational Safety and Health

in association with

ISAC (UK) LTD
Approved Centre: 2790

Signed on behalf of IOSH

Vanessa Howard-Wicks
Chief Executive

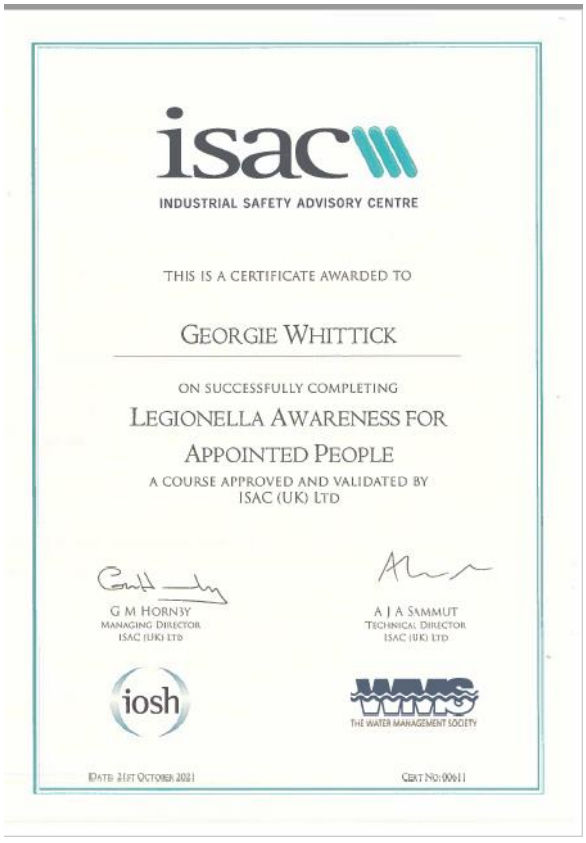
Course Organiser

iosh

Date: 22 September 2021

Cert No: 5036

Possession of this certificate does not confer exemption from accredited qualifications which lead to membership of IOSH.



isac
INDUSTRIAL SAFETY ADVISORY CENTRE

THIS IS A CERTIFICATE AWARDED TO

GEORGIE WHITTICK

ON SUCCESSFULLY COMPLETING
LEGIONELLA AWARENESS FOR
APPOINTED PEOPLE
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ISAC (UK) LTD

G M HORNBY
MANAGING DIRECTOR
ISAC (UK) LTD

A J A SAMMUT
TECHNICAL DIRECTOR
ISAC (UK) LTD

iosh

THE WATER MANAGEMENT SOCIETY

DATE: 21ST OCTOBER 2021

CERT NO: 00611

isac
INDUSTRIAL SAFETY ADVISORY CENTRE

THIS IS A CERTIFICATE AWARDED TO

HARRY WHITEHEAD

ON SUCCESSFULLY COMPLETING
LEGIONELLA AWARENESS FOR
APPOINTED PEOPLE
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ISAC (UK) LTD

G M HORNBY
MANAGING DIRECTOR
ISAC (UK) LTD

A J A SAMMUT
TECHNICAL DIRECTOR
ISAC (UK) LTD

iosh

THE WATER MANAGEMENT SOCIETY

DATE: 21ST OCTOBER 2021

CERT No: 00613

This is a certificate awarded to

Kieran Charles

on successfully completing

Legionella Management for Responsible Persons Refresher

a course approved and validated by the

Institution of Occupational Safety and Health

in association with

ISAC (UK) LTD
Approved Centre: 2790

Signed on behalf of IOSH

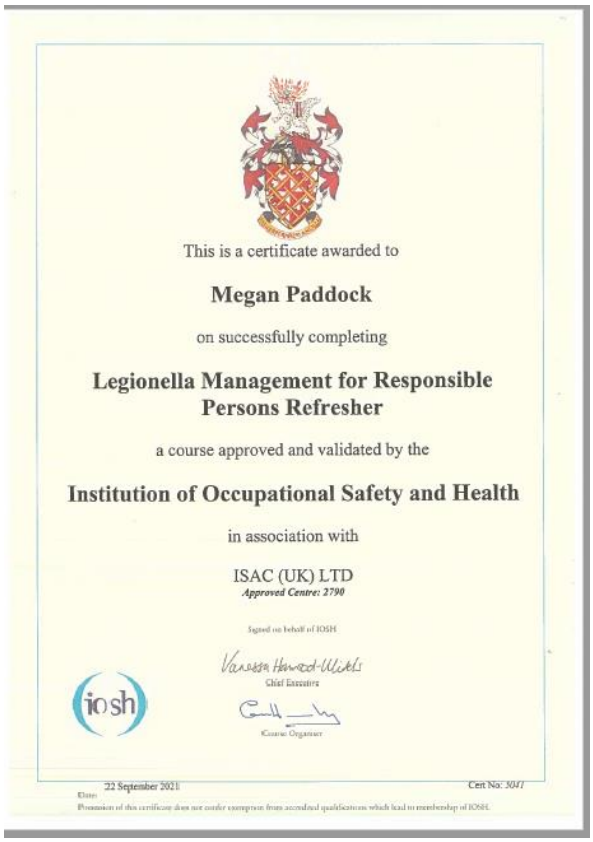
Vanessa Harwood-Wicks
Chief Executive

Course Organiser

22 September 2021
Date:

Cert No: 5032

Possession of this certificate does not confer exemption from accredited qualifications which lead to membership of IOSH.



This is a certificate awarded to

Megan Paddock

on successfully completing

Legionella Management for Responsible Persons Refresher

a course approved and validated by the

Institution of Occupational Safety and Health

in association with

ISAC (UK) LTD
Approved Centre: 2790

Signed on behalf of IOSH

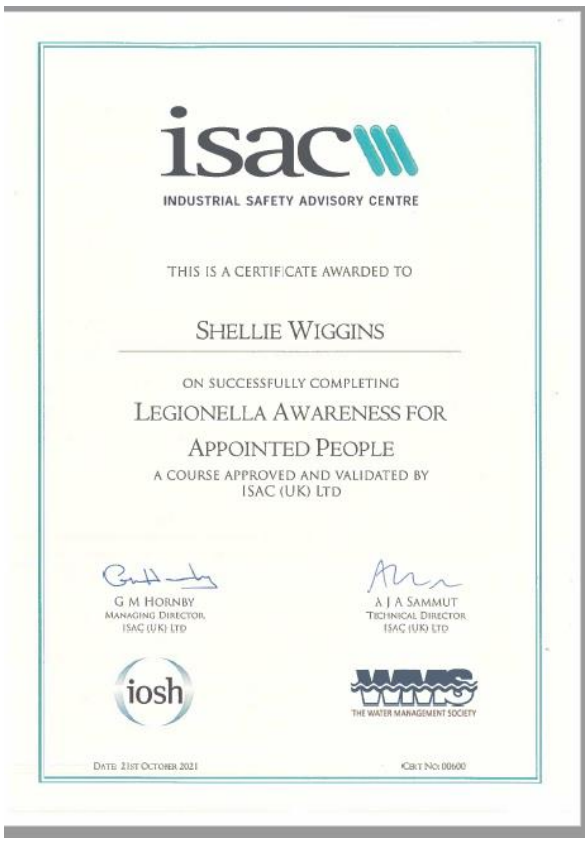
Vanessa Harwood-Wicks
Chief Executive

Course Organiser

22 September 2021
Date:

Cert No: 5041

Possession of this certificate does not confer exemption from accredited qualifications which lead to membership of IOSH.



INDUSTRIAL SAFETY ADVISORY CENTRE

THIS IS A CERTIFICATE AWARDED TO

SHELLIE WIGGINS

ON SUCCESSFULLY COMPLETING

LEGIONELLA AWARENESS FOR APPOINTED PEOPLE

A COURSE APPROVED AND VALIDATED BY ISAC (UK) LTD

G M HORNBY
MANAGING DIRECTOR, ISAC (UK) LTD

A J A SAMMUT
TECHNICAL DIRECTOR ISAC (UK) LTD

THE WATER MANAGEMENT SOCIETY

DATE 21ST OCTOBER 2021

CERT NO: 00600

Legionella Control Planned Preventative Maintenance (PPM)Tasks - General

Are PPM tasks undertaken?	Yes	**Are PPM tasks suitable for controlling the Legionella risk?**	Yes
Responsibility of conducting the PPM tasks.	Site Operatives	**How are PPM tasks recorded / documented?**	Site Logbook
Do PPM task records clearly define when task was conducted & by whom?	Yes	**Are fault management procedures clearly defined?**	Yes – any faults are dealt with by the site management team in house
Are equipment calibration certificates present?	Yes – Available from Beacon Water Upon Request	**Are historical PPM task records present (at least the last 5 years)?**	Yes

Legionella Control Planned Preventative Maintenance (PPM)Tasks - General

Water Services System	Task	Current frequency	Records present	By Whom
Distribution	Flushing of infrequently used outlets / dead legs	Weekly	Yes	**Site Team**
Distribution	Temperature monitoring of hot & cold sentinel outlets	Monthly	Yes	**Site Team**
Distribution	Temperature monitoring of hot and cold representative outlets	Monthly	Yes	**Site Team**
Calorifiers (hot water cylinders)	Temperature monitoring of the flow and return (where applicable)	Monthly	Yes	**Site Team**
Calorifiers (hot water cylinders)	General inspection (including internal inspection or drain flush if applicable)	Annually	Yes	**Beacon Water Treatments**
Point of Use water Heaters	Temperature monitoring of flow	N/A		
Cistern Water Heaters	General inspection (including internal inspection of cold feed section)	N/A		
Cold Water storage Tanks	General inspection	Yes	Quarterly	**Site Team**
Cold Water storage Tanks	Clean & Disinfection	Yes	As Required	**Site Team**
Showerheads & Kitchen Pot Spray	General inspection, clean/descale & disinfection	Yes	Quarterly	**Site Team**
Comments & Actions Required:				

Assessment of Risk

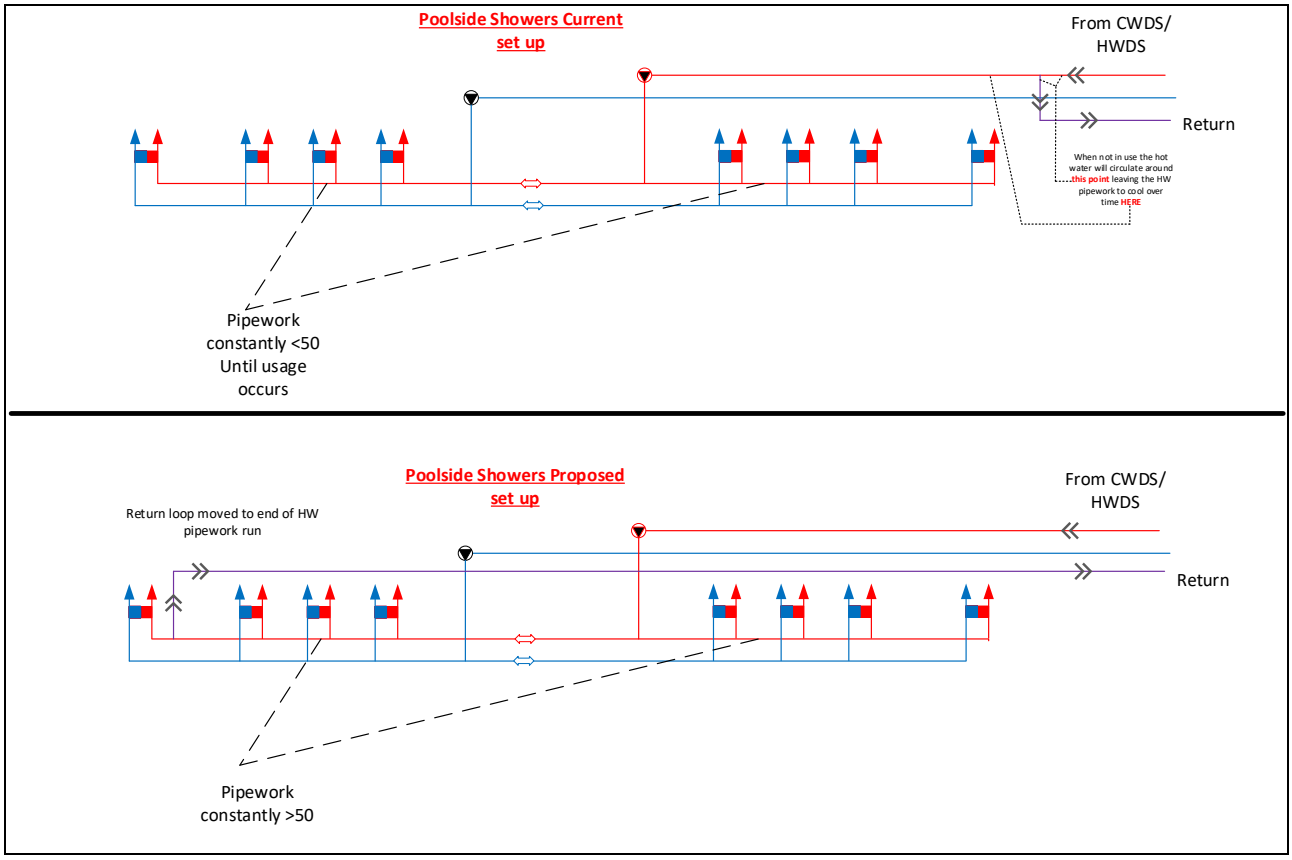
RISK potential	Result
Is there a previous legionella risk assessment on site – can it be reviewed	LRA Carried out by CARTER 2017
Are there schematic drawings/O&M drawings of the domestic water systems on site – can they be reviewed	Yes – With 2017 LRA (requires updating – included with this LRA) Exact pipework routing unknown – Consult O/M drawings.
Is there a site specific written scheme present	Yes
Have all of the remedial actions from the previous LRA been completed and signed off	Yes
Has an outbreak or case of legionellosis been identified as having been caused by inhalation of water from the system?	No records
Is there a history of legionella being found in the system?	Yes – remedial actions carried out in response to failures.
Are susceptible people using services, e.g., hospital, nursing home or accessible to the general public?	Possibly
Is there a low turnover of water: excessive storage, vacant areas, and little used outlets?	Yes – Treatment Rooms unused
Are there complex system(s)?	No
Are there old system(s)?	No
Does the system have history of little or no maintenance?	The domestic system is under constant maintenance as required by site staff & beacon water treatments.
Has a lower risk system been considered	N/A
Comments & Actions Req:	

Legionella Issues

Wet Side HWS – at the time of the survey it was noted that the return pump was no operating correctly and the entire return loop of this system was dormant. Because of the faulty circulation pump there were several issues occurring on site; hot water was taking up to 5 minutes to reach far reaching outlets including showers. Due to this issue water was sitting in the hot pipework at 30-40^{o}C which is a favourable temperature for legionella growth in water systems. Water in the circulation (return) loop was also at temperatures favourable to legionella growth and while the circulation pump was not operational was stagnating in the pipework. This led to several incidences of legionella bacteria being present in the water system.

It should also be noted that this areas (Wet Side) has had a complete refurbishment and upgrade of the domestic water system. it was noted that local hot water pumps had been installed at the sinks in the toilet area and also the showers – it is my opinion that the reason for installation of such pumps was carried out due to poor hot water pressure [in my thoughts due to the faulty circulation pump]. I believe that no investigation was carried out by the installers of the operation of the circulation pump. ***This issue has now been addressed by site; it was discovered that there was an airlock in the hot water return. site have assured me (and presented evidence) that the return loop is now operational and at >50^{o}C which is sufficient to control legionella growth.***

It was also noted that the booster pumps have been installed after the return loop on the pipework (see diagram). As such these pumps although able to draw hot water from the supply loop would not compensate for the lack of circulation. Also, it is my opinion that the return loop (**in the shower area**) has been installed incorrectly (see diagram) and as such creates a large deadleg where warm water could stagnate and potentially allow bacterial growth. It is recommended that the return pipework is altered to allow a complete circulation loop and avoid potential bacterial growth (**remedial action 1**).



Remedial Action List

The classification of Risk in this Assessment has been applied using the following criteria illustrated in the table below.

Inherent Risk - The amount of risk that exists in the absence of controls. In other words, before an organization implements any countermeasures at all, the risk they face is inherent risk.

Residual Risk - The risk that remains after controls are accounted for. It's the risk that remains after your organization has taken proper precautions.

	Inherent Risk	Action
0	Advisory	Advisory or no action required
1	Slight risk under exceptional operating conditions	Consider risk reduction methods, provide warning notices if considered feasible. Carry out recommendations within 6 - 12 month period.
2	Slight risk under normal operating conditions	Consider risk reduction methods. 3 - 6-month action plan.
3	Serious risk	Consider more radical reduction measures such as design changes to reduce risk and/or Written Scheme application ASAP
4	Danger to health	System to be closed until completion of risk reduction measures.

	Residual Risk	Action
0	Advisory	Advisory or no further action required
1	Slight risk under exceptional operating conditions	Consider risk reduction methods, provide warning notices if considered feasible. Carry out recommendations within 6 - 12 month period.
2	Slight risk under normal operating conditions	Consider risk reduction methods. 3 - 6-month action plan.
3	Serious risk	Consider more radical reduction measures such as design changes to reduce risk and/or Written Scheme application ASAP
4	Danger to health	System to be closed until completion of risk reduction measures.

Remedial Actions & Recommendations						
N°	**Inherent Risk**	**Risk Rating**	**Time Frame**	**Action Required**	**Residual Risk Rating**	**Signed Off Date & Signature**
1	**Wet Side Showers – Circulation** Due to the location of the return loop, there is a risk that hot water will sit in pipework throughout the hot manifold of the showers, if the water cools to 20-45°C (which could happen through lack of usage or overnight) there is a risk of legionella growth.	**1**	**3 Months**	Consider (where possible) moving the return pipework loop to the very end shower (SH8) to ensure that hot water is fully circulated through the hot manifold (see diagram pg.14	**0**	
2/3	**Limescale Building Up – Wet Side First Aid Room, gym change sinks & dry side sinks** Limescale is building up on the kitchen taps. Limescale will act as a growth medium and source of nutrition for legionella bacteria. Contamination risk.	**1**	**3 Months** **Ongoing**	Ensure all scaled outlets are cleaned. Inspect outlets frequently and clean/de-scale as required.	**0**	
4	**Gym Accessible Change Shower Head** The shower head has deteriorated, and the rubber is beginning to erode, limescale is building up. Legionella bacteria will readily grow in these conditions	**2**	**<3 Months**	Replace the shower head with a new unit.	**0**	

Risk Assessment Review Interval

If the risk assessment concludes there is no reasonably foreseeable risk or the risks are insignificant and are managed properly to comply with the law, the assessment is complete. Although no further action may be required at this stage, existing controls must be maintained. The assessment of risk is an ongoing process and not merely a paper exercise. Dutyholders should arrange to review the assessment regularly and specifically when there is reason to suspect it is no longer valid. An indication of when to review the assessment and what to consider should be recorded and this may result from, eg:

- a change to the water system or its use;
- a change to the use of the building where the system is installed;
- new information available about risks or control measures;
- the results of checks indicating that control measures are no longer effective;
- changes to key personnel;
- a case of legionnaires' disease/legionellosis associated with the system.

Scope of The Risk Assessment and Systems to Be Covered

This Risk Assessment covers the domestic water systems on site

This report will not indicate any matters beyond the scope of the legionella risk assessment.

The assessment aims to establish the risk of legionellosis, legionella growth and proliferation within the systems highlighted below using the following guidance documents as points of reference:

HSE Approved Code of Practice & Guidance: Legionnaires' Disease – The control of legionella bacteria in water systems L8.

Legionnaires' Disease: Technical Guidance – HSG274 Part 2: The control of legionella bacteria in hot and cold water systems, Part 3: The control of legionella bacteria in other risk systems.

BS 8580-1:2019 Water quality. Risk assessments for Legionella control. Code of practice British Standards Institution

The Water Regulations Guide. Water Regulations Advisory Scheme (WRAS); 2nd edition (1 Sept. 2000).

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Risk Assessment and Written Scheme Index

1.0 Introduction

Legionellosis and Legionella Bacteria

Legionella was the name given to the genus of bacteria that caused the original outbreak of legionnaires disease. The species was named *legionella pneumophila* as the first identified outbreak infected American legionnaires at a conference in a hotel in America. Over 35 other species have been identified since. It has been established that this species is most associated with the outbreaks of the disease and can be considered particularly virulent as a pathogen. Other groups of *legionellae pneumophila* and certain other species of *legionellae* can cause pneumonic disease.

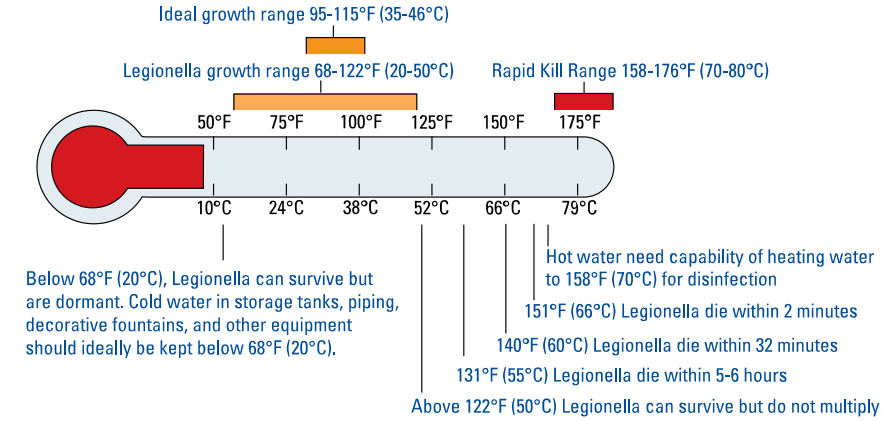
Legionellosis is a collective term for diseases caused by legionella bacteria including the most serious legionnaires' disease, as well as the similar but less serious conditions of Pontiac fever and Lochgoilhead fever. Legionnaires' disease is a potentially fatal form of pneumonia, and everyone is susceptible to infection. The risk increases with age, but some people are at higher risk, e.g., people over 45, smokers and heavy drinkers, people suffering from chronic respiratory or kidney disease, diabetes, lung and heart disease or anyone with an impaired immune system.

The bacterium *Legionella pneumophila* and related bacteria are common in natural water sources such as rivers, lakes and reservoirs, but usually in low numbers. They may also be found in purpose-built water systems, such as cooling towers, evaporative condensers, hot and cold-water systems, and spa pools. If conditions are favourable, the bacteria may multiply, increasing the risks of legionnaires' disease, and it is therefore important to control the risks by introducing appropriate measures.

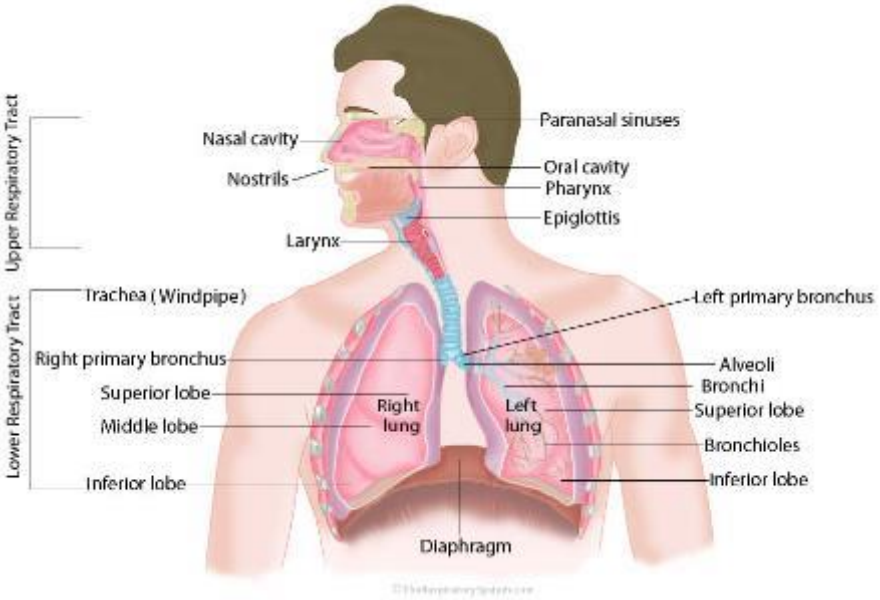
Legionella in Air and Water Systems

The diagram below illustrates the range of temperatures within which Legionella survives and thrives. This chart also indicates the approximate temperature range of several common systems and types of equipment. Spas, showers, and cooling towers happen to fall exactly within the optimum growth range of Legionella. It can also be seen that evaporative coolers, cooling coils and cold-water systems should operate outside the temperature range needed for Legionella proliferation.

Legionella Growth Chart



The typical infection route is via inhalation of infected water droplets containing high levels of legionella pneumophila bacteria.



Therefore, any water system that generates an aerosol spray (e.g., showers, spray taps, spa pools) could pose a transmission risk if it were to be colonised by legionella bacteria.

A typical Legionellosis infection requires the following chain of events to occur:

1. Legionella bacteria enter the water system in low quantities via the mains water supply

2. Water system conditions permit the bacteria to proliferate due to temperatures between 20 & 50°C, stagnation, and nutrients etc.

3. An aerosol spray is produced to facilitate transmission of infected water droplets into the lungs.

4. A susceptible or high-risk person is exposed to and inhales the infected aerosol spray.

1.1 Details of Audit

Site:	TDC – Clacton Leisure Centre
Contact:	Daniel Kerridge
Tel. No.	01255 686688
Auditor:	Craig Simmons
Audit Date:	20th January 2022

Audit No.	12717CS

1.2 Risk Assessment Methodology & Objectives

- **Background to L8**

- **Planning a Legionella Risk Assessment**

- **Methodology**

The following actions are required to comply with the ACOP to identify and assess the risk of legionellosis from systems which are susceptible to colonisation by legionella bacteria, and from which infected water droplets can be inhaled by exposed persons (risk systems).

- The risk systems are to be identified
- Previous risk assessments are to be reviewed
- Schematic drawings of these systems are to be available
- The condition of system water and accessible equipment is to be determined
- The contribution to risk made by the design and construction of the system and equipment is to be evaluated
- The maintenance history of the system is to be determined and past problems investigated
- Monitoring records for the systems are to be examined, and significant deviations from acceptable operating conditions investigated
- The ability of management to maintain control of legionellosis is to be assessed
- The competence of staff to control the risk of legionellosis is to be assessed

Figures 1 and 2 provide an overview of the methodology for the creation and review of risk assessments (RA) as described in this report.

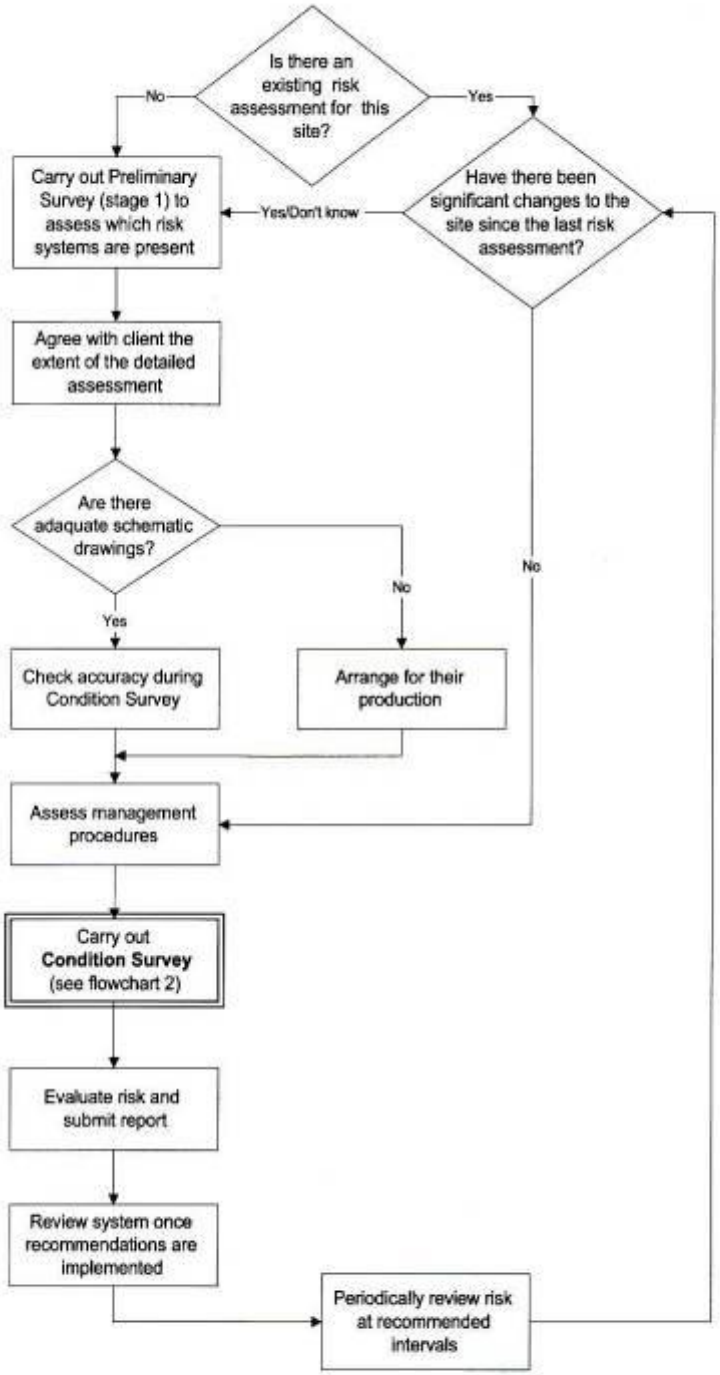

Is there an existing risk assessment for this site?
No
Yes
Carry out Preliminary Survey (stage 1) to assess which risk systems are present
Yes/Don't know
Have there been significant changes to the site since the last risk assessment?
Agree with client the extent of the detailed assessment
Are there adaquate schematic drawings?
No
Yes
No
Check accuracy during Condition Survey
Arrange for their production
Assess management procedures
Carry out **Condition Survey** (see flowchart 2)
Evaluate risk and submit report
Review system once recommendations are implemented
Periodically review risk at recommended intervals

Fig. 1

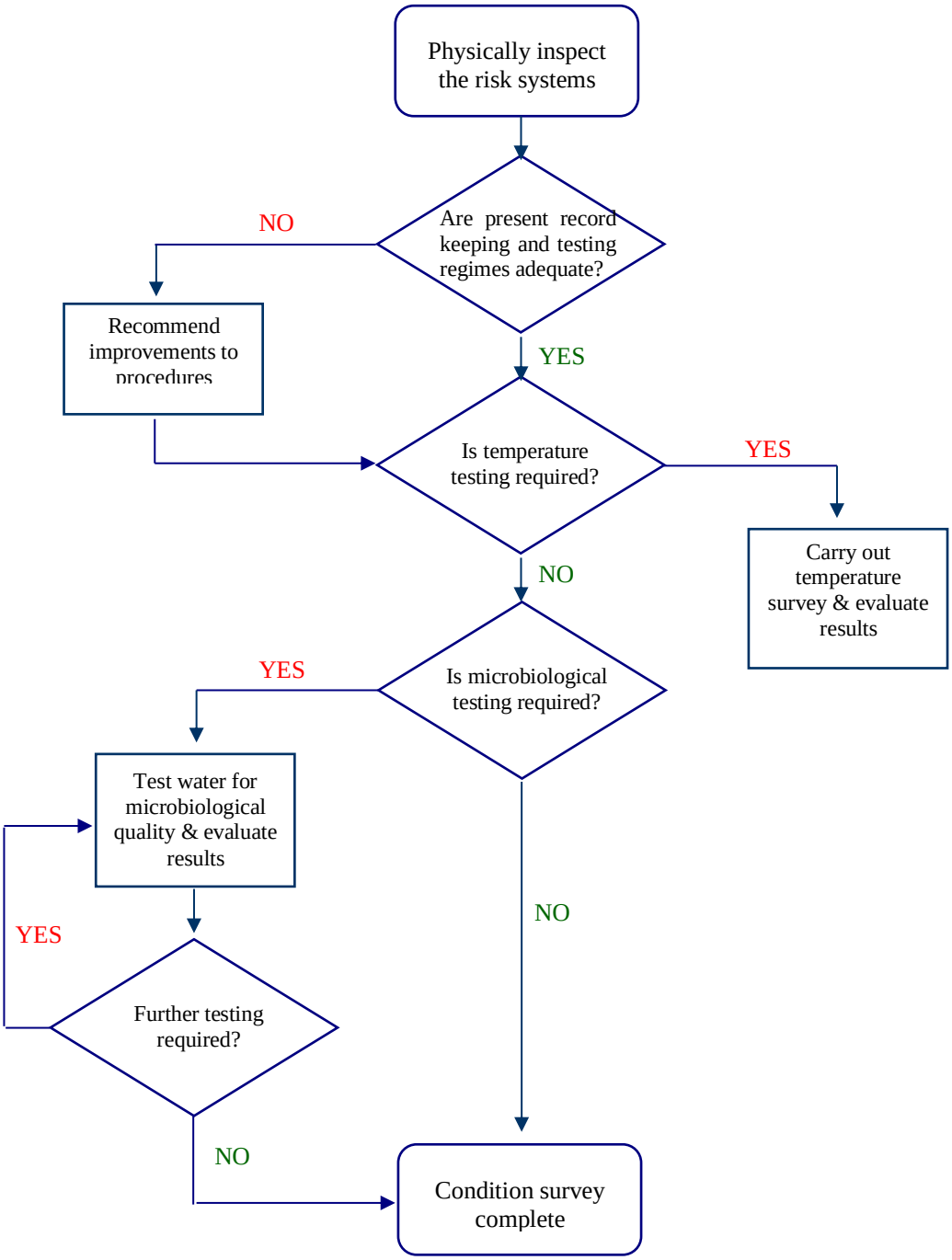

Physically inspect the risk systems
Are present record keeping and testing regimes adequate?
NO
Recommend improvements to procedures
YES
Is temperature testing required?
YES
Carry out temperature survey & evaluate results
NO
Is microbiological testing required?
YES
Test water for microbiological quality & evaluate results
YES
Further testing required?
NO
NO
Condition survey complete

Fig. 2

1.3 Audit Objectives

The objective of this audit is to complete a Risk Assessment in compliance with the Health & Safety Executive *Approved Code of Practice for the control of Legionella bacteria in water systems L8 (2013) and BS 8580-1:2019*

The provision of this assessment does not remove the duties of the client in respect of health and safety as enshrined in the *Health & Safety at Work Act 1974*, or the specific regulations, codes of practice and advisory documents produced by the Health and Safety Executive.

These include:

- *Control of Substances Hazardous to Health Regulations 2002*
- *Workplace (Health, Safety & Welfare) Regulations 1992*
- *Legionnaire's Disease: The control of Legionella bacteria in water systems L8, 2013*
- *Water Regulations 2000*
- *BS8558:2011*
- *BS 8580-1:2019 Water quality. Risk assessments for Legionella control. Code of practice British Standards Institution*

The Secretary of State, Department of Environment, Transport and Regions under the terms of the Water Industry Act 1991 has made Regulations in respect to water installations within premises in England and Wales to prevent the waste, misuse, undue consumption, and contamination of water supplied by a water undertaker. This specifically includes:

The Water Industry Act 1991 Section 73
If any person who is the owner or occupier of any premise to which a supply of water is provided by a water undertaker intentionally or negligently causes or suffers any water fitting for which he is responsible to be or remain so out of order, so in need of repair or so constructed or adapted, or to be so used

(a) that water in a water main or other pipe of a water undertaker, or a pipe connected with such a water main or pipe, is or is likely to be contaminated by the return of any substance from those premises to that main or pipe.

(b) that water that has been supplied by the undertaker to those premises is or is likely to be contaminated before it is used; or

(c) that water so supplied is or is likely to be wasted or, having regard to the purpose for which it is supplied, misused, or unduly consumed,

that person shall be guilty of an offence and liable on summary conviction, to a fine not exceeding level 3 on the standard scale.

This assessment sets out to identify all risks by physical inspection of pipework and fittings, which are accessible without the need to remove ductwork etc. by all practicable means. Information may also be sought from staff working on site.

The aim of this document is to outline and to place on record a descriptive indication of the extent of various water services that may be present on this site, and to assess the risk of proliferation and dissemination of legionella species into the atmosphere.

Every endeavour has been made to locate all sources of risk however we do not guarantee that this has been achieved. Certain parts of water systems, such as pipework, may be difficult to identify in respect of service carried, or access to parts of water systems may be limited.

1.4 The Need to Review Risk Assessments

Periodic Risk Reviews

Risk assessments should be reviewed regularly and when:

- Significant changes have been made to a system, e.g., remedial works have been implemented
- Significant changes have occurred in the way a system is being used, e.g., a formerly fully occupied building is now only partially occupied
- Changes have been made to the management and/or maintenance of the system, e.g. 6 months after a new maintenance company has been appointed
- The results of checks indicate that control measures are no longer effective
- A case of legionnaires' disease or legionellosis is associated with the system
- There is new information about risks or control measures

If there is doubt as to what changes should trigger a risk assessment, a programme of annual reviews or audits should be considered.

Note

The responsible person nominated (see Chain of Responsibility) must ensure that a legionella risk assessment is in place and that it is up to date. ***The assessment must be formally reviewed every two years or when the system has had substantial alterations****. Beacon Water Treatments Ltd can offer this service if required. It is the responsibility of the client to ensure that all relevant risk assessments are up to date and reviewed/renewed as required.*

2.0 Summary

The assessment was carried out at the request of ***Tendering District Council – Sports & Leisure*** and is provided as a requirement for compliance with the Approved Code of Practice: The prevention or control of legionellosis (including legionnaire's disease).

The ACOP applies to the risk of legionellosis in circumstances where the Health and Safety at Work etc. Act 1974 applies and gives guidance on the requirements of this Act and the Control of Substances Hazardous to Health 1994 regarding the risk of legionellosis.

Areas considered within the assessment were:

i) Mains water supply
ii) Cold supply and distribution
iii) Hot water supply and distribution
iv) Miscellaneous water supply and distribution

Photographs were taken as a record of conditions recorded at the time of the assessment and incorporated into the narrative.

The assessment is based upon information gathered from visual inspections at the site, together with inspection of site records and maintenance documentation. Drawings and notes relate only to visible pipework, fittings and equipment and some hidden pipework routes and connections have been assumed.

3.0 Introduction

Tendering District Council – Sports & Leisure having noted their responsibilities under the Health and Safety at Work Act 1974 have commissioned this audit (Risk Assessment) to comply with the Health & Safety Executive *Approved Code of Practice for the control of Legionella bacteria in water systems L8 2013 & HSG274*.

Craig Simmons (Legionella Consultant) of **Beacon Water Treatments Ltd** carried out the assessment survey on 20th January 2022.

This Risk Assessment is coupled with a Written Scheme for the prevention and control of Legionellosis and uses the following documents as points of reference:

- HSE Approved Code of Practice & Guidance: Legionnaire's Disease – The control of legionella bacteria in water systems L8 and HSG274 technical guidance.
- BS 8580-1:2019 Water quality. Risk assessments for Legionella control. Code of practice British Standards Institution
- Chartered Institute of Building Service Engineers (CIBSE) Technical Memorandum TM13
- British Standards Institution BS8558:2011
- Water Supply (Fittings) Regulations 1999
- Workplace (Health, Safety and Welfare) Regulations 1992
- British Association of Chemical Specialities Code of Practice
- Code of Conduct for Service Providers (BACS & WMS)

3.1 Overview of the Approved Code of Practice L8 & HSG274

The Code of Practice (ACOP L8) in conjunction with the new technical guidance HSG 274 gives practical guidance in respect of sections 2,3,4 and 6 of the Health & Safety at Work Act and regulations 6,7,8,9, and 12 of the Control of Substances Hazardous to Health Regulations 1999 (COSHH) regarding the risk from exposure to legionella bacteria and guidance on the relevant parts of the Management of Health & Safety at Work Regulations 1999.

The advice and guidance contained within the ACOP, if followed, provides clarification of responsibilities placed upon owners and operators of water systems which are deemed to present a Legionella risk.

The ACOP document has legal status. It is important that any control measures taken by the operator are AT LEAST as good as those laid down in this document. Compliance with the law is an essential part of management responsibility.

Legionella was the name given to the genus of bacteria that caused the original outbreak of legionnaires disease. The species was named *l. pneumophila,* at least 37 species have been identified since. It has been established that this species is most associated with the outbreaks of the disease and can be considered particularly virulent as a pathogen. Other groups of *legionellae pneumophila* and certain other species of *legionella* can cause pneumonia.

There are a variety of systems available to supply hot and cold-water services. It has been the case in the recent past that legionnaire's disease was more prevalent in such systems than in cooling towers, but this has improved in recent times. However, such systems still present a foreseeable risk.

Most people have a natural defence system against illness, but several factors increase susceptibility to Legionellosis: Age, sex (males over 50), smoking, existing lung problems or other chronic illness.

It is recommended that records of management operations to control the risk including temperature checks, maintenance, repair, and modification are kept and that they are available for periodic inspection.

3.2 Mains Cold Water Service

There are three mains cold water inlets on site. each inlet provides mains cold water for that particular area of site.

General Information	Risk Comment
Asset number	MCWS – 01
Location of source	Main Kitchen
MCW Supplies	Kitchen Outlets, Kitchen Calorifier, Treatment Room CWS
Source of water	Town Mains
Material of construction	Alkathene to Copper 28mm
Insulation type	FFFG
Are dead ends present	No
Is unused equipment connected	No
Is scale present on tap outlets	No
Is there a water softener	No
Are spray taps present	No
Are strainers fitted	No
Are point of use heaters fitted	No
Are unvented water heaters fitted	Yes
Temperatures	
Furthest sentinel point location	Treatment room 1
Furthest sentinel point temperature	8.0°C
Nearest sentinel point location	Kitchen Sink
Nearest sentinel point temperature	7.2°C
Comments/Actions Required:	
Overall risk rating	**0**

General Information	Risk Comment
Asset number	MCWS – 02
Location of source	Wet-side Plant Room
MCW Supplies	Wet Side Cold Water Tanks, Pool Make Up Tank, Poolside Bib Taps
Source of water	Town Mains
Material of construction	Copper
Insulation type	FFFG
Are dead ends present	No
Is unused equipment connected	No
Is scale present on tap outlets	No
Is there a water softener	No
Are spray taps present	No
Are strainers fitted	No
Are point of use heaters fitted	No
Are unvented water heaters fitted	Yes
Temperatures	
Furthest sentinel point location	Poolside Bib Tap
Furthest sentinel point temperature	11.0^{o}C
Nearest sentinel point location	Pool Plant Room Sink
Nearest sentinel point temperature	7.2^{o}C
Comments/Actions Required:	
Overall risk rating	**0**

General Information	Risk Comment
Asset number	MCWS – 03
Location of source	Spa Pool Plant Room
MCW Supplies	Spa area (steam plant, Salt Plant, Water Fountains) & CWST's
Source of water	Town Mains
Material of construction	Copper 42mm
Insulation type	FFFG
Are dead ends present	No
Is unused equipment connected	No
Is scale present on tap outlets	No
Is there a water softener	Yes – Salt Spa
Are spray taps present	No
Are strainers fitted	No
Are point of use heaters fitted	No
Are unvented water heaters fitted	Yes
Temperatures	
Furthest sentinel point location	N/A
Furthest sentinel point temperature	N/A
Nearest sentinel point location	CWST inlet
Nearest sentinel point temperature	9.2^{o}C
Comments/Actions Required:	
Overall risk rating	**0**

3.3 Cold Water Storage Tanks

Cold water storage tanks in themselves, present a low legionella risk in general terms. However, where the tanked water supplies other plant that have a high-risk factor (e.g., cooling towers, showers etc) the potential risk of such tanks is much higher.

Poor control over the water temperature and condition of the stored water plus the condition of the tank itself may lead to very small levels of legionella bacteria colonising the tank and, therefore, producing a possible source for the bacteria to infect other water services downstream.

Basic Tank Requirements

- Tanks should be clean and free from corrosion, scaling, silting and other debris or contamination that may provide a breeding ground for micro-organisms including legionella

- Tanks should be fitted with lids that are vented. These vents should be fitted with rodent/insect screens.

- Where possible, expansion pipes from calorifiers should not be returned to cold water storage tanks (if they are, care should be taken to seal their entrance into the tank to prevent the ingress of dirt or other contamination)

- Overflow and warning pipes should be fitted with rodent screens.

- Tanks should be well insulated to prevent elevated stored water temperatures. Stored water temperatures should ideally be maintained at less than 20^{o}C, to prevent the proliferation of micro-organisms including legionella.

- Locating the tank services and make-up pipes on the same side of the tank should be avoided, as this may lead to water stagnation at the other end of the tank. If there is a possibility of water stagnation occurring, a sparge pipe should be fitted to the services pipe.

- Tanks should be labelled clearly for easy identification.

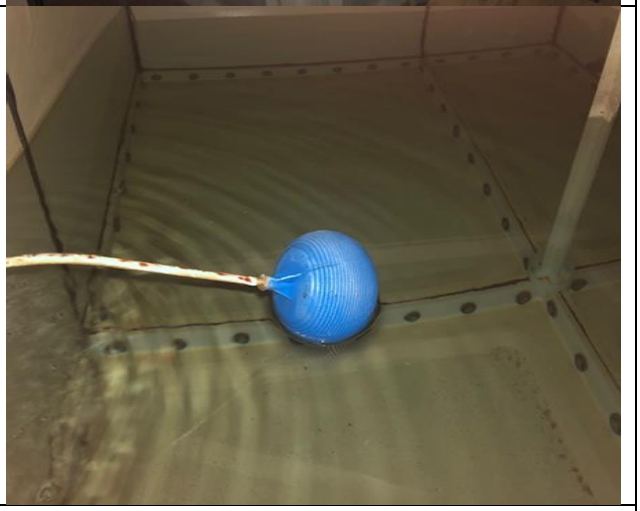
System Descriptions - Cold Water Storage Tanks (Domestic)

Tank title/asset number	CWST 1
Location	Roof Area Wet Side
Size (m) / volume (m^3)	2000 litres
Materials of construction	GRP
External Photograph of Tank	
Internal Photograph of Tank	
Source of water supply to tank	MCW
Process served by tanked water	Cold water Down Services & Calorifier
Is tank easily and safely accessible	Yes
Configuration	Single Tank
If split or duplex, is flow balanced	N/A
Corrosion of internal surfaces	N/A
Deposits on internal surfaces	Light
Flow patterns correct	Yes
Stagnation evident	No
Tank insulation condition	Built in insulation
Distribution insulation condition	Good

Overflow screen fitted	Yes
If no o/f screen – indicate size required and in line or end of line	N/A
Warning pipe fitted	N/A
Lid condition and fit	Good
If no lid – dimensions required	N/A
Lid vent fitted with screen	Yes
Temperature remote from valve - °C	13.4°C
Temperature inlet - °C	11.5°C
Ambient temperature tank room - °C	10.0°C
Date of last clean and disinfection	November 2021
Date of last inspection	January 2022
Inlet & Outlet Opposed	Yes
Hot water services vent returns to cold water storage tank	No
Details for re-routing vent: dimensions, length	N/A
Drain size and location	Not Seen
Make-up size and location	28mm - Top
Services size and location	42mm base
Tank clearly labelled	Yes
Tank nearest sentinel - location & temp °C	Wet Side Toilet Sink 14.0°C
Tank furthest sentinel - location & temp °C	Poolside First Aid Room 14.5°C
Non-compliances with Water Fittings (Water Supply) Regulations 1999/Water Bylaws 2000, Scotland	
Comments/actions required	
Overall Risk Rating	**0**

Tank title/asset number	CWST 2&3
Location	External to Spa Plant Room
Size (m) / volume (m^3)	2000 litres
Materials of construction	GRP
External Photograph of Tank	
Internal Photograph of Tank	
Source of water supply to tank	MCW
Process served by tanked water	Boosted Cold Water & Calorifier – CWS to Gym Change & WC's
Is tank easily and safely accessible	Yes
Configuration	2 x Tanks linked at outlets (1 x tank left drained for cleanout purposes)
If split or duplex, is flow balanced	Yes
Corrosion of internal surfaces	N/A
Deposits on internal surfaces	None
Flow patterns correct	Yes
Stagnation evident	No
Tank insulation condition	Built in insulation
Distribution insulation condition	Good

Overflow screen fitted	Yes
If no o/f screen – indicate size required and in line or end of line	N/A
Warning pipe fitted	N/A
Lid condition and fit	Good
If no lid – dimensions required	N/A
Lid vent fitted with screen	Yes - CWST 2 lid vent broken, awaiting replacement
Temperature remote from valve - °C	9.0°C
Temperature inlet - °C	9.0°C
Ambient temperature tank room - °C	5°C – External air temp
Date of last clean and disinfection	November 2021
Date of last inspection	January 2022
Inlet & Outlet Opposed	Yes
Hot water services vent returns to cold water storage tank	No
Details for re-routing vent: dimensions, length	N/A
Drain size and location	Not Seen
Make-up size and location	28mm - Top
Services size and location	42mm base
Tank clearly labelled	Yes
Tank nearest sentinel - location & temp °C	Male Gym Change WC 9.0°C
Tank furthest sentinel - location & temp °C	1st Floor Cleaner 9.0°C
Non-compliances with Water Fittings (Water Supply) Regulations 1999/Water Bylaws 2000, Scotland	
Comments/actions required	Replace Broken Lid Vent (Beacon to complete)
Overall Risk Rating	**0**

Tank title/asset number	CWST 4
Location	Main Stairwell leading from Reception to 1st Floor (within ceiling void)
Size (m) / volume (m^3)	3000 litres
Materials of construction	GRP
External Photograph of Tank	
Internal Photograph of Tank	
Source of water supply to tank	MCW
Process served by tanked water	Down Cold Water Services & Calorifier – Dry Side
Is tank easily and safely accessible	Yes
Configuration	Single Tank
If split or duplex, is flow balanced	N/A
Corrosion of internal surfaces	N/A
Deposits on internal surfaces	None
Flow patterns correct	Yes
Stagnation evident	No
Tank insulation condition	Built in insulation
Distribution insulation condition	Good

Overflow screen fitted	Yes
If no o/f screen – indicate size required and in line or end of line	N/A
Warning pipe fitted	N/A
Lid condition and fit	Good
If no lid – dimensions required	N/A
Lid vent fitted with screen	Yes
Temperature remote from valve - °C	13.0°C
Temperature inlet - °C	11.0°C
Ambient temperature tank room - °C	14°C
Date of last clean and disinfection	November 2021
Date of last inspection	January 2022
Inlet & Outlet Opposed	Yes
Hot water services vent returns to cold water storage tank	No
Details for re-routing vent: dimensions, length	N/A
Drain size and location	Not Seen
Make-up size and location	28mm - Top
Services size and location	42mm base
Tank clearly labelled	Yes
Tank nearest sentinel - location & temp °C	Male Dry Change WC 15.0°C
Tank furthest sentinel - location & temp °C	Female Dry Change WC 15.0°C
Non-compliances with Water Fittings (Water Supply) Regulations 1999/Water Bylaws 2000, Scotland	
Comments/actions required	
Overall Risk Rating	**0**

System Descriptions - Cold Water Storage Tanks (Non - Domestic)

There are two non-domestic tanks in the main pool plant area.

Tank title/asset number	Pool Make-Up Tank
Location	Main Pool Plant Room
Size (m) / volume (m^3)	1500litres
Materials of construction	GRP
External Photograph of Tank	
Internal Photograph of Tank	
Source of water supply to tank	MCW
Process served by tanked water	Main Pool Top Up
Is tank easily and safely accessible	Yes
Configuration	Single Tank
If split or duplex, is flow balanced	N/A
Corrosion of internal surfaces	N/A
Deposits on internal surfaces	None
Flow patterns correct	Yes
Stagnation evident	No
Tank insulation condition	Built in insulation
Distribution insulation condition	Good

Overflow screen fitted	Yes
If no o/f screen – indicate size required and in line or end of line	N/A
Warning pipe fitted	N/A
Lid condition and fit	Good
If no lid – dimensions required	N/A
Lid vent fitted with screen	Yes
Temperature remote from valve - °C	10.0°C
Temperature inlet - °C	9.0°C
Ambient temperature tank room - °C	14°C
Date of last clean and disinfection	N/A
Date of last inspection	N/A
Inlet & Outlet Opposed	Yes
Hot water services vent returns to cold water storage tank	No
Details for re-routing vent: dimensions, length	N/A
Drain size and location	Not Seen
Make-up size and location	28mm - Top
Services size and location	28mm base
Tank clearly labelled	Yes
Tank nearest sentinel - location & temp °C	N/A Pool Top Up
Tank furthest sentinel - location & temp °C	
Non-compliances with Water Fittings (Water Supply) Regulations 1999/Water Bylaws 2000, Scotland	
Comments/actions required	
Overall Risk Rating	**0**

Tank title/asset number	Pool Chemical Break Tank
Location	Acid Store Pool Plant
Size (m) / volume (m^3)	240 litres
Materials of construction	Plastic
External Photograph of Tank	
Internal Photograph of Tank	
Source of water supply to tank	MCW
Process served by tanked water	Chemical Tank Pool
Is tank easily and safely accessible	Yes
Configuration	Single Tank
If split or duplex, is flow balanced	N/A
Corrosion of internal surfaces	N/A
Deposits on internal surfaces	None
Flow patterns correct	Yes
Stagnation evident	No
Tank insulation condition	None
Distribution insulation condition	N/A

Overflow screen fitted	Yes
If no o/f screen – indicate size required and in line or end of line	N/A
Warning pipe fitted	N/A
Lid condition and fit	Good
If no lid – dimensions required	N/A
Lid vent fitted with screen	Yes
Temperature remote from valve - °C	N/A Chemical Break Tank
Temperature inlet - °C	
Ambient temperature tank room - °C	
Date of last clean and disinfection	
Date of last inspection	
Inlet & Outlet Opposed	N/A Pumped
Hot water services vent returns to cold water storage tank	No
Details for re-routing vent: dimensions, length	N/A
Drain size and location	Not Seen
Make-up size and location	22mm - Top
Services size and location	35mm base
Tank clearly labelled	Yes
Tank nearest sentinel - location & temp °C	N/A Break Tank
Tank furthest sentinel - location & temp °C	
Non-compliances with Water Fittings (Water Supply) Regulations 1999/Water Bylaws 2000, Scotland	
Comments/actions required	
Overall Risk Rating	**0**

3.4 Hot Water Services

Hot Water Generators – General Risk Potential

Due to storage temperatures and water usage, calorifiers and water heaters can be a major source of proliferation of legionella bacteria. The temperature and the internal condition of the heater play a significant part in the prevention of bacterial growth.

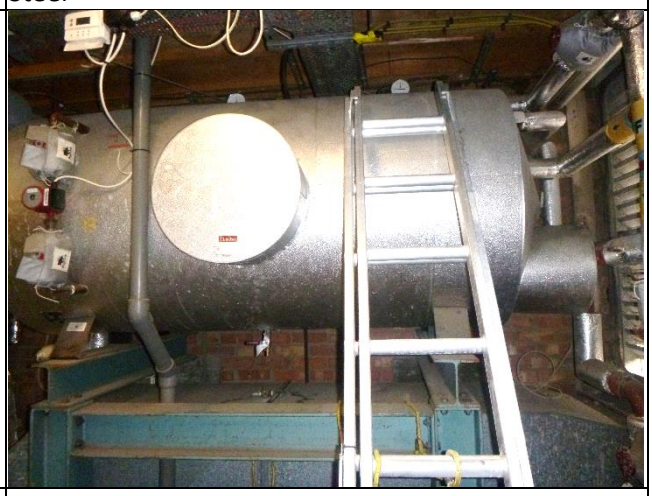
Many calorifiers have a temperature gradient between the top and the bottom of the calorifier. At the top of the calorifier the temperature of the water may be in excess of 50^{o}C and at the bottom below 20^{o}C. This means that there will be locations within the calorifier where the water temperature is suitable for the proliferation of many types of micro-organisms, including legionella. In these cases, a de-stratification pump should be fitted between the top and bottom of the calorifier. This pump should be run on a timer for at least one hour each day, at a time of low water usage and in conjunction with the primary heat source.

In locations where hot water is distributed over a large area, a well-designed recirculation system ensures that the temperature of the hot water within the whole system is maintained at a satisfactory temperature. In this type of system, the temperature of the hot water within the calorifier should be high enough to supply water at 60^{o}C with water returning to the calorifier is at a temperature in excess of 50^{o}C.

Locally mounted electric water heaters and electric instant heat showers are very good alternative ways of providing hot water within a building. As these units store little or no water there is very little risk of the proliferation of legionella, especially when supplied, as in most cases they are, by mains water. However, these units should be maintained according to the manufacturer's recommendations to ensure safe and efficient operation.

System Descriptions - Hot Water Generators

CAL 1 Wet Side Plant Room – at the time of the survey it was noted that the return pump was no operating correctly and the entire return loop of this system was dormant. Because of the faulty circulation pump there were several issues occurring on site; hot water was taking up to 5 minutes to reach far reaching outlets including showers. Due to this issue water was sitting in the hot pipework at 30-40^{o}C which is a favourable temperature for legionella growth in water systems. Water in the circulation (return) loop was also at temperatures favourable to legionella growth and while the circulation pump was not operational was stagnating in the pipework. This led to several incidences of legionella bacteria being present in the water system.

Hot water generator title/asset number	CAL 1			
Location	Wet Side – Pool Plant Room			
Stored water Volume	Approx. 1000 litres			
Materials of construction	Steel			
Photograph of Hot Water Storage Vessel				
Accessible inspection hatch	Yes			
Vessel supplied from	TCWS			
Vessel Feeds	Wet Side Showers/Wc's			
Accessible drain fitted on lowest point	Yes			
Heat source	LTHW			
Vessel insulation condition	Good			
Distribution insulation condition	Good			
Expansion type	Vent to drain via tundish			
If pressure vessel fitted, can diaphragm be cleaned	N/A			
HWS recirculation pump fitted	Yes			
Timed destratification pump fitted	Yes			
Immersion temperature gauges fitted	Flow - Yes	Storage - No	Ret – Yes	
Temperature ^{o}C (Digital thermometer with surface probe)	62.0	>62.0	35* 54	
Nearest Sentinel Point Temperature	Wet Side WC – Pre TMV 52.0*			
Furthest Sentinel Point Temperature	Poolside First Aid Room/Float Store 42.0*			
Comments: - *Circulation pump faulty at the time of the survey – now repaired and working sufficiently.				
Overall Risk Rating	**No Action**			

Hot water generator title/asset number	CAL 2			
Location	Gym/Sauna 1st Floor Plant Room			
Stored water Volume	Approx. 400 litres			
Materials of construction	S/Steel			
Photograph of Hot Water Storage Vessel				
Accessible inspection hatch	Yes			
Vessel supplied from	BCWS			
Vessel Feeds	Spa Showers/Gym Changing & WC's			
Accessible drain fitted on lowest point	Yes			
Heat source	LTHW			
Vessel insulation condition	Good			
Distribution insulation condition	Good			
Expansion type	Vent to drain via tundish			
If pressure vessel fitted, can diaphragm be cleaned	Yes			
HWS recirculation pump fitted	Yes			
Timed destratification pump fitted	Yes			
Immersion temperature gauges fitted	Flow - Yes	Storage - No	Ret – Yes	
Temperature °C (Digital thermometer with surface probe)	70.0	>70.0	65.0	
Nearest Sentinel Point Temperature	1st Floor Cleaner 70°C			
Furthest Sentinel Point Temperature	Spa Showers (pre TMV) 68.2°C			
Comments: - Storage Gauge reads >80°C – actual storage 70°C ensure temp readings are taken from flow pipe to remove confusion.				
Overall Risk Rating	**LOW Risk - See comment**			

Hot water generator title/asset number	CAL 3			
Location	Dry Side Ext plant Room			
Stored water Volume	Approx. 1000 litres			
Materials of construction	Steel			
Photograph of Hot Water Storage Vessel				
Accessible inspection hatch	Yes			
Vessel supplied from	TCWS			
Vessel Feeds	Dry Side Changing Facilities			
Accessible drain fitted on lowest point	Yes			
Heat source	LTHW			
Vessel insulation condition	Good			
Distribution insulation condition	Good			
Expansion type	Vent to drain via tundish			
If pressure vessel fitted, can diaphragm be cleaned	Yes			
HWS recirculation pump fitted	Yes			
Timed destratification pump fitted	Yes			
Immersion temperature gauges fitted	Flow - Yes	Storage - No	Ret – Yes	
Temperature °C (Digital thermometer with surface probe)	61.0	>61.0	55.0	
Nearest Sentinel Point Temperature	Dry Male Change Pre TMV 68.3°C			
Furthest Sentinel Point Temperature				
Comments: -				
Overall Risk Rating	**None**			

Hot water generator title/asset number	CAL 4			
Location	Kitchen Roof Space			
Stored water Volume	Approx. 220 litres			
Materials of construction	Steel			
Photograph of Hot Water Storage Vessel				
Accessible inspection hatch	Yes			
Vessel supplied from	TCWS			
Vessel Feeds	Kitchen & Treatment Rooms			
Accessible drain fitted on lowest point	Yes			
Heat source	LTHW			
Vessel insulation condition	Good			
Distribution insulation condition	Good			
Expansion type	Vent to drain via tundish			
If pressure vessel fitted, can diaphragm be cleaned	Yes			
HWS recirculation pump fitted	Yes			
Timed destratification pump fitted	Yes			
Immersion temperature gauges fitted	Flow - Yes	Storage - No	Ret – Yes	
Temperature °C (Digital thermometer with surface probe)	62.0	>62.0	58.0	
Nearest Sentinel Point Temperature	Kitchen Wash Up Sink 61.3°C			
Furthest Sentinel Point Temperature	Treatment Room 1 60.7°C			
Comments: -				
Overall Risk Rating	**None**			

A single POU is located in the G/F Staffroom. Low storage volume POU water heaters are those that store no more than 15 litres of hot water (see Figure 2.2). These systems generally heat water to a set point that is often variable via a simple dial on the unit. These systems deliver a small volume of stored hot water before they need to be left to recover and bring the temperatures back to the set point. Water heaters should store HW at >50°C to reduce the risk of legionella growth.

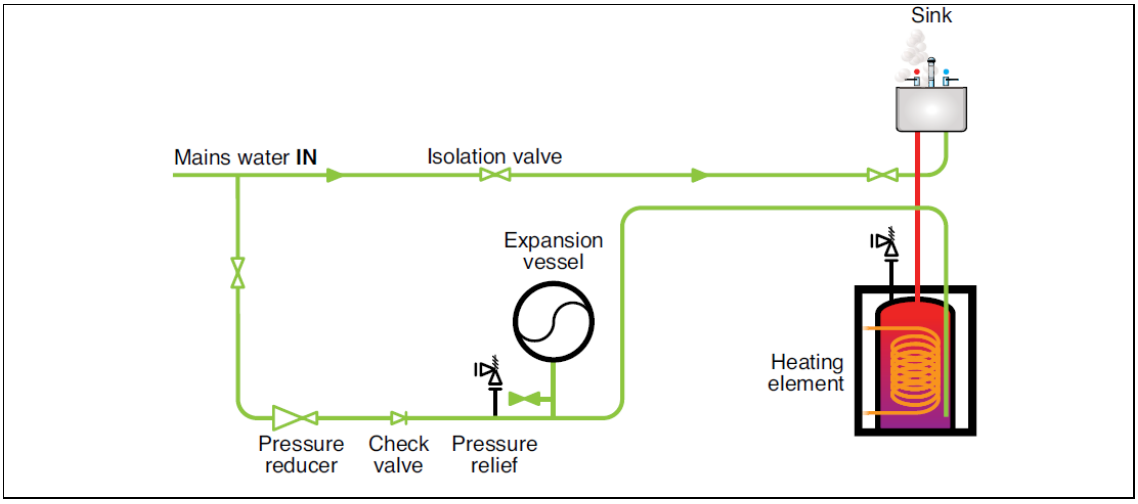


Figure 2.2 Low storage volume POU water heater

POU Staffroom

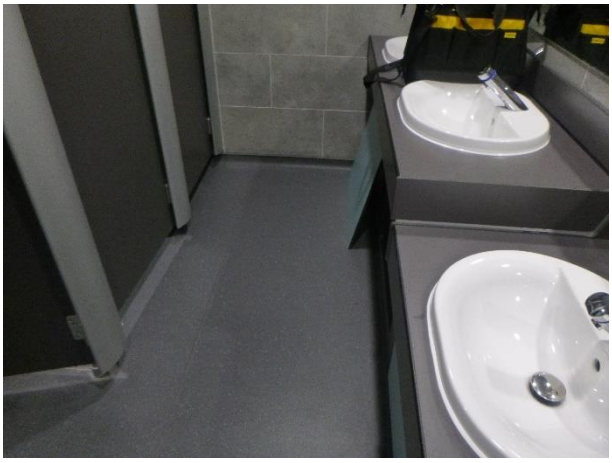
3.5 Domestic Outlets

Wet Side - Outlets in this area are mostly new due to the recent refurbishment. The taps were scale free and operational with exception of the staffroom and first aid room sink which had a build-up of limescale on the taps. Limescale can provide an ideal environment for legionella and other bacteria and as such should be removed (**remedial action 2 refers**)

Cold water outlet temperatures were measured at <20°C well within the two minute recommended time.

However, hot water temperatures (**at the time of the survey**) were slow to reach the recommended >50°C (1 minute) and in one case did not reach over 50 degrees – First Aid Sink. This was due to a circulation pump issue which has now been addressed – site have assured me that all hot water temperatures exceed >50°C well within 1 minute.

Scaled Outlet (Staffroom)



Typical Toilet Sinks

Spa/Gym Side - Outlets were found to be in fair condition in line with their age, most of the tap outlets had a degree of limescale build-up. Limescale can provide an ideal environment for legionella and other bacteria and as such should be removed (**remedial action 2 refers**)

Cold water temperatures reached <20°C well within the recommended 2 minutes flushing time temperatures were stable at around 8-12°C.

Hot water temperatures were found to be sufficiently above the recommended >50°C to control legionella growth, well within one minute of flushing.

Limescale Building Up

Dry Side - Outlets were found to be in fair condition in line with their age, most of the tap outlets had a degree of limescale build-up. Limescale can provide an ideal environment for legionella and other bacteria and as such should be removed (**remedial action 2 refers**)

Cold water temperatures reached <20°C well within the recommended 2 minutes flushing time temperatures were stable at around 8-12°C.

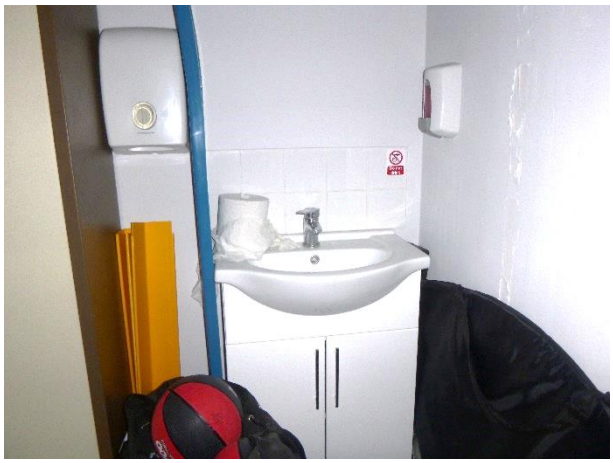
Hot water temperatures were found to be sufficiently above the recommended >50°C to control legionella growth, well within one minute of flushing.

Kitchen & Therapy Rooms – The kitchen outlets were found to be in good condition and are well used. Outlets had light scaling but nothing too serious.

The Therapy Rooms are no longer in use. Each room (3) has a single hand basin.

Cold water temperatures reached <20°C well within the recommended 2 minutes flushing time temperatures were stable at around 8-12°C.

Hot water temperatures were found to be sufficiently above the recommended >50°C to control legionella growth, well within one minute of flushing.



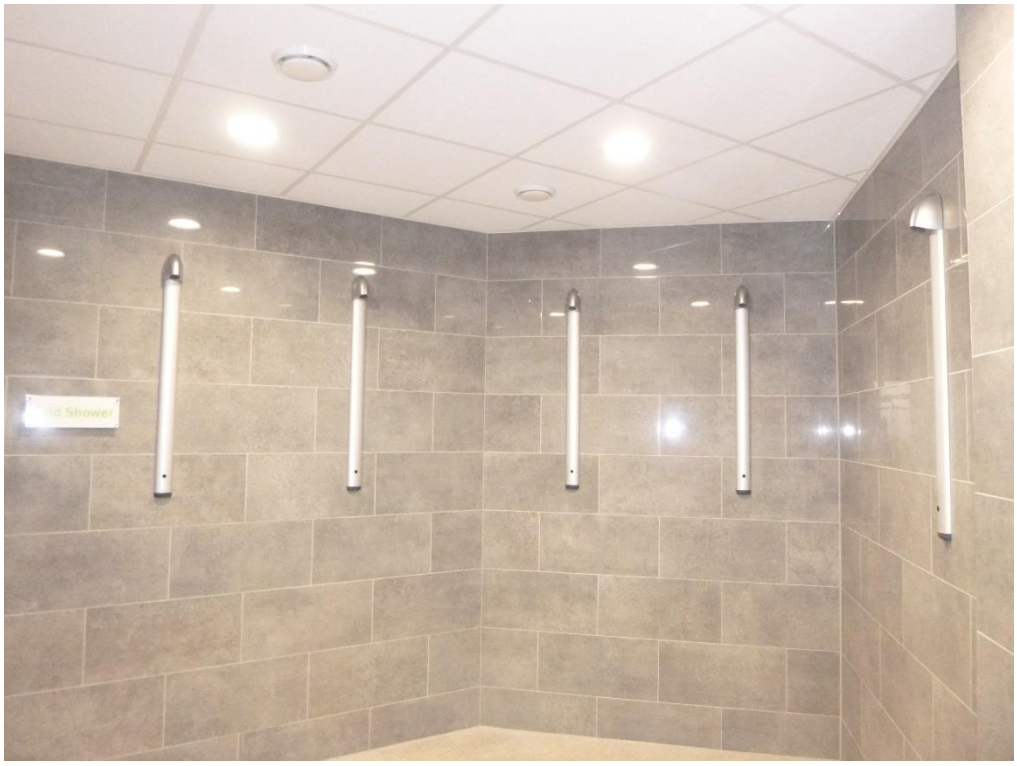
3.6 Showers

Showers can be found in all three areas of the site. All showers are well used and were found to be operational at the time of the survey. Showers in both the dry side changing and gym changing are showing signs of age with scaling to the shower body and heads which will need to be removed with acid to prevent legionella growth. (**Remedial action 3**).

Shower I.D

General Information	Risk Comment	Risk
State the Location of the shower/s	Wet Side – Pool Side	**0**
State Number of Showers	8	**0**
Is this an emergency shower/s	No	**0**
Is the shower/s Electric, Thermostatic or Mixer Controlled?	TMV Controlled (8 x TMV)	**0**
State the cold water supply source to the shower/s	Tank Cold Water	**0**
State the hot water supply source to the shower/s	Domestic HWS	**0**
Is the shower-head/s clean & free from scale or mould	Yes (New)	**0**
Is the shower/s regularly used	Yes	**0**
Is there a single blender control serving several showers	No	**0**
Is the showerhead/s regularly cleaned & disinfected	Yes	**0**
Mixer Inlet Temp Cold	<9.0°C	**0**
Mixer Inlet Temp Hot	N/A	**0**
Outlet Temp	37 - 39	**0**
Overall Risk	**0**	

General Information	Risk Comment	Risk
State the Location of the shower/s	Sauna Showers	0
State Number of Showers	4 + 1 Cold	0
Is this an emergency shower/s	No	0
Is the shower/s Electric, Thermostatic or Mixer Controlled?	TMV	0
State the cold water supply source to the shower/s	Cold water Storage Tank (Boosted)	0
State the hot water supply source to the shower/s	Domestic HWS	0
Is the shower-head/s clean & free from scale or mould	Yes	0
Is the shower/s regularly used	Yes	0
Is there a single blender control serving several showers	No	0
Is the showerhead/s regularly cleaned & disinfected	Yes	0
Mixer Inlet Temp Cold	9.5°C	0
Mixer Inlet Temp Hot	61.9°C	0
Outlet Temp	~38°C	0
Overall Risk	**0**	



General Information	Risk Comment	Risk
State the Location of the shower/s	Gym Male Change 1st Floor	**0**
State Number of Showers	10	**0**
Is this an emergency shower/s	No	**0**
Is the shower/s Electric, Thermostatic or Mixer Controlled?	TMV	**0**
State the cold water supply source to the shower/s	Cold water Storage Tank (Boosted)	**0**
State the hot water supply source to the shower/s	Domestic HWS	**0**
Is the shower-head/s clean & free from scale or mould	No - scale around shower rose and body	**2**
Is the shower/s regularly used	Yes	**0**
Is there a single blender control serving several showers	No	**0**
Is the showerhead/s regularly cleaned & disinfected	Yes	**0**
Mixer Inlet Temp Cold	9.5°C	**0**
Mixer Inlet Temp Hot	61.9°C	**0**
Outlet Temp	~38°C	**0**
Overall Risk	**2**	

- ***Gym female showers same as male – area occupied, not entered.***

General Information	Risk Comment	Risk
State the Location of the shower/s	Gym Accessible Change	0
State Number of Showers	1	0
Is this an emergency shower/s	No	0
Is the shower/s Electric, Thermostatic or Mixer Controlled?	TMV	0
State the cold water supply source to the shower/s	Cold water Storage Tank	0
State the hot water supply source to the shower/s	Domestic HWS	0
Is the shower-head/s clean & free from scale or mould	Shower Head is deteriorated and requires replacing	2
Is the shower/s regularly used	Yes	0
Is there a single blender control serving several showers	No	0
Is the showerhead/s regularly cleaned & disinfected	Yes	0
Mixer Inlet Temp Cold	9.9°C	0
Mixer Inlet Temp Hot	59.6°C	0
Outlet Temp	38°C	0
Overall Risk	**2**	

It is recommended that the disabled shower head is replaced to prevent legionella taking hold (**remedial action 4**).

General Information	Risk Comment	Risk
State the Location of the shower/s	Dry-side Male Change	0
State Number of Showers	5	0
Is this an emergency shower/s	No	0
Is the shower/s Electric, Thermostatic or Mixer Controlled?	TMV	0
State the cold water supply source to the shower/s	Cold water Storage Tank (Boosted)	0
State the hot water supply source to the shower/s	Domestic HWS	0
Is the shower-head/s clean & free from scale or mould	No - scale around shower rose and body	2
Is the shower/s regularly used	Yes	0
Is there a single blender control serving several showers	No	0
Is the showerhead/s regularly cleaned & disinfected	Yes	0
Mixer Inlet Temp Cold	10.3°C	0
Mixer Inlet Temp Hot	55.6°C	0
Outlet Temp	~38°C	0
Overall Risk	**2**	

- ***Dry Side female showers same as male – area occupied, not entered.***

3.7 Deadlegs/Dead-Ends

A deadleg is defined as an outlet that is no longer in use but remains live and as such is flushable.

A dead end is defined as pipework that is no longer in use but remains live and is capped off.

Deadlegs/Ends will contain stagnant water which will provide ideal conditions for legionella growth. Legionella bacteria can then enter the water system and infect many parts of the water system.

No significant deadlegs were found during the risk assessment.

Any deadlegs found during maintenance works must be removed with all associated pipework cut back to its source.

3.8 Low Used Outlets

Site operatives carry out weekly flushing of low used outlets. Records of all low used outlet flushing can be found in the logbook.

The only low used areas identified were the treatment rooms – all outlets are flushed weekly with records in the logbook.

3.9 Miscellaneous Items

Chlorine Dioxide Unit

There is a chlorine dioxide unit supplying the domestic water system for the wet side changing facilities. The unit is located in the wet side cleaning storeroom. The unit supplies the make up to the wet side storage tank which in turn supplies the wet side water outlets. Site carry out regular testing of CLo2 and record the readings in the logbook. Beacon Water Treatments are responsible for the regular service visits.

At the time of the survey the CLo2 reading in the storage tank was at 0.2 mg/l. by the time this reaches the outlets it has further diluted to 0.1mg/l. Establishing and maintaining a chlorine dioxide residual (as total oxidant) of 0.1– 0.5 mg/l at an outlet is usually sufficient to control legionella in the system

4.0 ASSET REGISTER & TEMPERATURES – as of 20/01/2022

LOCATION	PLANT ITEMS						TEMPERATURE RECORD (˚C)			
	TOILET	URINAL	SINK/ BASIN	SHOWER	OTHERS	SPRAY FITTINGS	HOT	MIXED (TMV)	COLD	SATISFACTORY (Y/N)
Wet Side										
Changing Toilet 1	4		3		HW Pump/CW Pump/TMV x 3	N	49.2	40.7	11.0	N
Changing Toilet 2	3		3		HW Pump/CW Pump/TMV x 3	N	48.1	39.8	11.0	N
Accessible Change	1		1		TMV Tap	N	47.9	36.3	11.9	N
Poolside Showers				8	HW Pump/CW Pump/TMV x 8	Y	50.4 (slow)	37-38	14.1	Y
Plant Room			1		Bib Taps (flushed weekly)	N	56.8		10.3	Y
Pool Perimeter					Bib Taps x 2	N			9.4	Y
First Aid/Float Store			1			N	42.4 (slow)		12.6	N
COMMENTS	Temperature issues rectified since LRA completed – all temps now satisfactory									

LOCATION	PLANT ITEMS						TEMPERATURE RECORD (˚C)			
	TOILET	URINAL	SINK/ BASIN	SHOWER	OTHERS	SPRAY FITTINGS	HOT	MIXED (TMV)	COLD	SATISFACTORY (Y/N)
Spa/Gym Side										
Spa Side Showers				5		Y	68.2	38-39	10.0	Y
Spa Side					Water Fountain	N			Chilled	Y
1st floor Cleaner			1			N	70.0		10.4	Y
Male change	5		4	10	TMV's	Y		WHB 39,40,40,40 SHW 36.9-38.3	11.9	Y
Female Change	**Not Entered in Use**									
Accessible WC	1		1			N	70.3	38.7		Y
Accessible Change	1		1	1		Y	69.9	39.3 WHB 37.2 SHW	11.5	Y
Gym					Water Fountain	N			7.6	Y
COMMENTS	Temperature issues rectified since LRA									

LOCATION	PLANT ITEMS						TEMPERATURE RECORD (˚C)			
	TOILET	URINAL	SINK/ BASIN	SHOWER	OTHERS	SPRAY FITTINGS	HOT	MIXED (TMV)	COLD	SATISFACTORY (Y/N)
Dry Side										
Female Change	**Not Entered**									
Male Change	3		3	6	TMV's	Y	58.9	41.2 WHB 38-39 SHW	10.3	Y
Accessible Change	1		1	1	TMV's	Y	59.0	39.0 WHB 37.2 SHW	11.5	Y
Reception Area					Coffee Machine	N				
Café Kitchen			2		Dishwasher	N	58.0		9.1	Y
Café Counter			1		Coffee Machine	N	57.9		9.1	Y
Treatment Room 1			1			N	56.3		10.0	Y
Treatment Room 2			1			N	56.4		9.9	Y
Treatment Room 3			1			N	56.4		10.2	Y
COMMENTS										

Appendix 1

Requirements for Maintenance & Monitoring of Risk Systems as per HSG274 technical guidance for Domestic Systems

Service	Action to take	Frequency
Calorifiers	Inspect calorifier internally by removing the inspection hatch or using a boroscope and clean by draining the vessel. The frequency of inspection and cleaning should be subject to the findings and increased or decreased based on conditions recorded	Annually, or as indicated by the rate of fouling
	Where there is no inspection hatch, purge any debris in the base of the calorifier to a suitable drain Collect the initial flush from the base of hot water heaters to inspect clarity, quantity of debris, and temperature	Annually, but may be increased as indicated by the risk assessment or result of inspection findings
	Check calorifier flow temperatures (thermostat settings should modulate as close to 60 °C as practicable without going below 60 °C) Check calorifier return temperatures (not below 50 °C, in healthcare premises not below 55 °C)	Monthly
Hot water services	For non-circulating systems: take temperatures at sentinel points (nearest outlet, furthest outlet and long branches to outlets) to confirm they are at a minimum of 50 °C within one minute (55 °C in healthcare premises)	Monthly
	For circulating systems: take temperatures at return legs of principal loops (sentinel points) to confirm they are at a minimum of 50 °C (55 °C in healthcare premises). Temperature measurements may be taken on the surface of metallic pipework	Monthly
	For circulating systems: take temperatures at return legs of subordinate loops, temperature measurements can be taken on the surface of pipes, but where this is not practicable, the temperature of water from the last outlet on each loop may be measured and this should be greater than 50 °C within one minute of running (55 °C in healthcare premises). If the temperature rise is slow, it should be confirmed that the outlet is on a long leg and not that the flow and return has failed in that local area	Quarterly (ideally on a rolling monthly rota)
	All HWS systems: take temperatures at a representative selection of other points (intermediate outlets of single pipe systems and tertiary loops in circulating systems) to confirm they are at a minimum of 50 °C (55 °C in healthcare premises) to create a temperature profile of the whole system over a defined time period	Representative selection of other sentinel outlets considered on a rotational basis to ensure the whole system is reaching satisfactory temperatures for legionella control
POU water heaters (no greater than 15 litres)	Check water temperatures to confirm the heater operates at 50–60 °C (55 °C in healthcare premises) or check the installation has a high turnover	Monthly–six monthly, or as indicated by the risk assessment

Combination water heaters	Inspect the integral cold water header tanks as part of the cold water storage tank inspection regime, clean and disinfect as necessary. If evidence shows that the unit regularly overflows hot water into the integral cold water header tank, instigate a temperature monitoring regime to determine the frequency and take precautionary measures as determined by the findings of this monitoring regime	Annually
	Check water temperatures at an outlet to confirm the heater operates at 55–60 °C	Monthly
Cold water tanks	Inspect cold water storage tanks and carry out remedial work where necessary	Annually
	Check the tank water temperature remote from the ball valve and the incoming mains temperature. Record the maximum temperatures of the stored and supply water recorded by fixed maximum/minimum thermometers where fitted	Annually (Summer) or as indicated by the temperature profiling
Cold water services	Check temperatures at sentinel taps (typically those nearest to and furthest from the cold tank, but may also include other key locations on long branches to zones or floor levels). These outlets should be below 20 °C within two minutes of running the cold tap. To identify any local heat gain, which might not be apparent after one minute, observe the thermometer reading during flushing	Monthly
	Take temperatures at a representative selection of other points to confirm they are below 20 °C to create a temperature profile of the whole system over a defined time period. Peak temperatures or any temperatures that are slow to fall should be an indicator of a localised problem	Representative selection of other sentinel outlets considered on a rotational basis to ensure the whole system is reaching satisfactory temperatures for legionella control
	Check thermal insulation to ensure it is intact and consider weatherproofing where components are exposed to the outdoor environment	Annually
Showers and spray taps	Dismantle, clean and descale removable parts, heads, inserts and hoses where fitted	Quarterly or as indicated by the rate of fouling or other risk factors, eg areas with high risk patients
POU filters	Record the service start date and lifespan or end date and replace filters as recommended by the manufacturer (0.2 µm membrane POU filters should be used primarily as a temporary control measure while a permanent safe engineering solution is developed, although long-term use of such filters may be needed in some healthcare situations)	According to manufacturer's guidelines
Base exchange softeners	Visually check the salt levels and top up salt, if required. Undertake a hardness check to confirm operation of the softener	Weekly, but depends on the size of the vessel and the rate of salt consumption
	Service and disinfect	Annually, or according to manufacturer's guidelines

Multiple use filters	Backwash and regenerate as specified by the manufacturer	According to manufacturer's guidelines
Infrequently used outlets	Consideration should be given to removing infrequently used showers, taps and any associated equipment that uses water. If removed, any redundant supply pipework should be cut back as far as possible to a common supply (eg to the recirculating pipework or the pipework supplying a more frequently used upstream fitting) but preferably by removing the feeding 'T' Infrequently used equipment within a water system (ie not used for a period equal to or greater than seven days) should be included on the flushing regime Flush the outlets until the temperature at the outlet stabilises and is comparable to supply water and purge to drain Regularly use the outlets to minimise the risk from microbial growth in the peripheral parts of the water system, sustain and log this procedure once started For high risk populations, eg healthcare and care homes, more frequent flushing may be required as indicated by the risk assessment	Weekly, or as indicated by the risk assessment
TMVs	Risk assess whether the TMV fitting is required, and if not, remove Where needed, inspect, clean, descale and disinfect any strainers or filters associated with TMVs To maintain protection against scald risk, TMVs require regular routine maintenance carried out by competent persons in accordance with the manufacturer's instructions. There is further information in paragraphs 2.152– 2.168	Annually or on a frequency defined by the risk assessment, taking account of any manufacturer's recommendations
Expansion vessels	Where practical, flush through and purge to drain	Monthly–six monthly, as indicated by the risk assessment

Glossary & Abbreviations

Aerosol	A suspension in a gaseous medium of liquid particles with negligible falling velocity
Biofilm	A layer of micro-organisms contained in a matrix (slime layer), which forms on surfaces in contact with water.
Calorifier	Instantaneous Electric Water Heater
Dead Leg	A length of pipe which is closed at one end through which no water passes.
Fire Hose Reels	A permanent water supply for use in the event of a fire.
Legionella	The name given to the genus of bacteria that caused the original outbreak of legionnaires disease.
Legionnaire's Disease	A form of pneumonia caused by legionella bacteria.
L. pneumophila	One of the organisms that cause Legionnaire's Disease.
Legionellosis	Any illness caused by exposure to legionella.
Outlet	Tap (hot, cold or mixer) or shower head.
Sero group	A subgroup of the main species of Legionella
Sentinel	Sentinel taps are nominated outlets that are deemed to give representative temperature readings; these are usually the nearest and the furthest tap from the main water supply.
Vending Machines	Any vending machines referred to within the risk assessment are the type that dispense water (hot or cold) for the purpose of providing drinks for members of staff. These are usually mains fed.
Water Softeners	Generally, a water softener can be used in most applications for the purpose of reducing the hardness of the water supply to prevent the build-up of scale.

ACOP	Approved Code of Practice
CWDS	Cold Water Down Service (fed from domestic cistern/tank)
CWS	Cold Water System, Mains Cold Water
DWS	Domestic Water System
HWS	Hot Water System
HSE	Health and Safety Executive
L8	Approved Code of Practice and Guidance "legionnaires disease – the control of legionella bacteria in water systems" (L8) which came into effect on 8th January 2001 (issued by the HSC)
LRA	Legionella Risk Assessment
LTHW	Low Temperature Hot Water
PPM	Parts per million. This is a measure of dissolved substances and is numerically equivalent to milligrams per litre (mg/l) with respect to water.
TMV	Thermostatic Mixer Valve
TVC's	Total Viable Counts: total number of culturable bacteria in a given water sample (measured in cfu/ml) cultured at 22ºC and/or 37ºC. This test does not specifically identify Legionella.
WHB, WC	Wash Hand Basin, Water Closet