Expert Water Services

Legionella Risk Assessment

Silkstone Sports Pavillion

Legionella Risk Assessment
14th August 2017

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Site:	**Silkstone Sports Pavilion**
Address:	**Silkstone Recreation Ground Noblethorpe Lane Silkstone Barnsley South Yorkshire**
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Site Contact:	**Karen Canadine**
Date Surveyed:	**14/08/2017**
Surveyed By:	**Gareth Pritchard**
Duty Holder:	**Silkstone Parish Council**
Responsible Person	**Karen Canadine**

Risk Assessor: **Gareth Pritchard** **Signature:**

Date for renewal: **Review Annually**

(Subject to no major building alterations or change of use)

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1 Executive Summary

This report is based on the water source risk assessment carried out **at Silkstone Sports Pavillion** by **Gareth Pritchard** of **Expert Water Services** on **14/08/2017.**

Whilst working on the surveys, **2** water systems within the building were risk assessed. It was noted that the population of the site includes **Susceptible Persons**.

During the Risk Assessment, all aspects of the site, equipment and usage were taken into consideration, and it is Expert Water Services' opinion that this site is a **Low Risk** of legionella contamination due to plant and temperatures **complying** with current regulations as stated in this Risk Assessment.

However, specific attention should be drawn to:

- The amount of uninsulated pipework found throughout the building.

All other aspects were found to be satisfactory

2 Glossary of Terms

Aerosol	A suspension in a gaseous medium of solid particles.
Biofilm	A community of bacteria and other micro-organisms, embedded in a protective layer with entrained debris,
Buffer vessel	A type of storage vessel for hot water that is simply used as a holding tank to increase the storage capacity of the system. It does not heat the water in any way.
Calorifier	An apparatus used for the transfer of heat to water in a vessel by indirect means, the source of heat being contained within a pipe or coil immersed in the water.
Chlorine	An element used in disinfection
Cold Water Service (CWS)	Installation of plant, pipes and fitting in which cold water is stored, distributed and subsequently discharged.
Combination Water Heater	Type of water heater combing a cold water header tank above a hot water cylinder, usually heated by electrical element.
Cooling Tower	An apparatus through which warm water is discharged against an air stream; in doing so part of the water is evaporated to saturate the air and this cools the water. The cooler water is usually pumped to a heat exchanger to be reheated and recycled through the tower.
Crossflow	The ability for water in a tank to enter at one end and exit at the other, usually achieved by opposing the inlet and outlet by 180º.
Deadend	A length of pipe closed at one end through which no water passes.
Deadleg	Pipes leading to a fitting through which water only passes when there is draw-off from the fitting.
Dip Slide(s)	A dip slide is a means of testing the microbial content of liquids. It consists of a plastic carrier bearing a sterile culture medium which can be dipped in the liquid to be sampled. It is then incubated to allow microbial growth. The resulting microbial colonies are estimated by reference to a chart.
Direct Gas Fired Water Heater (DGWH)	Type of water heater incorporating a gas flame to heat the make-up water and an integral storage tank to hold the heated water.
Disinfection	A process which destroys or irreversibly inactivates micro-organisms and reduces their number to a non-hazardous level.
Feed and Expansion (F/E) Tank	A water tank, usually supplied by mains water which supplies top-up water to a heating system
Point of Use (POU) Water Heater	Type of water heater installed exactly at the site where hot water is needed. Usually small capacity and heated by electrical element.

Glossary of Terms (continued)

Rising Main	Where cold water, usually supplied by the local water authority, enters a building.
Sentinel Outlets	For a hot water services - the first and last taps on a recirculating system. For cold water systems (or non-recirculating hot water systems), the nearest and furthest taps from the storage tank. The choice of sentinel taps may also include other taps which are considered to represent a particular risk.
Shunt De-stratification Anti-stratification Pump	A circulation pump fitted to hot water service/plant to overcome the temperature stratification of the stored water.
Sparge (pipe)	A way of creating crossflow in a tank where the inlet and outlet are not opposed, a sparge pipe is attached inside the tank to the outlet fitting and water is subsequently drawn from another area of the tank, ideally 180º from the outlet.
Thermostatic Mixing Valve	Mixing valve installed on hot water systems in which the temperature at the outlet valve is pre-selected and controlled automatically by the valve.
Risk Assessment	Indentifying and assessing the risk from legionellosis from work activities and water sources on premises and determining any necessary precautionary measures.

3 Introduction

The ACoP L8 (Paragraph 19) states that a reasonably foreseeable risk of exposure to Legionella bacteria exists in:

a) water systems incorporating a cooling tower;
b) water systems incorporating an evaporative condenser;
c) hot and cold water services; and other plant and systems containing water which is likely to exceed 20ºC and which may release a spray or aerosol during operation or when being maintained.

This survey was carried out to the terms and references agreed by Expert Water Services (EWS).

EWS have recorded observations that fail to comply with the terms and conditions listed in the following:

- The Approved Code of Practice and Guidance (ACoP L8) – HSE (inc. HSG274 part 2)
- DETR Guidance Document to the Water Regulations
- WRAS Water Regulations Guide
- WRAS Water Fittings and Materials Directory
- BS EN 806 Design Specification
- BS 8558 Design Specification
- BS7592 Method for Legionella Sampling
- IOP Legionella Practice Guide
- The Health and Safety at Work Act 1974
- CIBSE TM 13

A risk factor is allocated to each observation, which are then listed in a ranking order in the recommendations section. The result of any identified risk will include the remedial action required and the timescale for work to be completed.

This risk assessment is focused on establishing whether there is a risk to health and if so, what control measures need to be considered.

Based on this report, a strategy should be prepared for preventing or controlling the perceived risk. This strategy should take into account the varying levels of attention required by the differing risk sources identified within the building.

All recommendations noted during the risk assessment place a responsibility on employers, namely the duty holder and the person who has been allocated the role of responsible person (or their deputy). The duty holder and responsible person(s) should implement a scheme for preventing or controlling the risk of Legionella. The implementation of a logbook monitoring scheme, in conjunction with preventative maintenance and associated record keeping, will meet the requirements set out by the HSE

4 Background to Legionnaires' Disease

Legionnaires' disease is a potentially fatal form of pneumonia which can affect anybody, but principally affects those who are susceptible because of age, illness, immunosuppression, smoking etc. It is caused by the bacterium *Legionella pneumophila* and related bacteria. Legionella bacteria can also cause less serious illnesses, which are not fatal, or permanently debilitating. The collective term used to cover the group of diseases caused by Legionella bacteria is legionellosis.

On average, there are approximately 200-250 reported cases of Legionnaires' disease each year in the United Kingdom (UK). It is thought, however, that the total number of cases of the disease may be generally underestimated and that up to 20% of all pneumonias may be a result of Legionella bacteria.

About half of all cases are associated with travel abroad. Infections that originate in the UK are often sporadic, for which no source of infection is traced. However, clusters of cases also occur and outbreaks have been associated with cooling tower systems and hot and cold water systems in factories, hotels, hospitals and other establishments.

The most common cause of Legionella is the inhalation of water droplets/vapour, which contains the bacteria. It is therefore imperative that the system(s) that could be colonised by Legionella, and have the potential to create water droplets/vapour, should be identified and graded with an appropriate risk level.

Water droplets are normally created in various ways such as spraying, bubbling and following impact onto hard surfaces. Large drops may be reduced to vapour by further impact or evaporation. The smaller particles can persist for long periods and will be carried on air currents.

5 Asset Summary

Silkstone Sports Pavillion is a modern, purpose-built two-storey sports pavilion in the Barnsley suburb of Silkstone which is used by various sporting and community groups. The site has various WC/wash facilities (including showers) and a small kitchenette.

The site is used by a diverse clientele, which includes Legionella susceptible groups.

The property consists of the following:

Number	Details	Comments
2	Calorifiers	
19	Showers	
1	Bibtap	External wall near garage
7	WCs	
2	Urinals	
1	Sinks	
9	WHBs	

Whenever possible a full and comprehensive asset survey of the observable water systems will be given, with data and sampling results from nominated outlets to present an overview of the site. This report cannot include items that are unobservable or not disclosed to the EWS risk assessor. This asset survey should not therefore be considered a totally accurate inventory of all the plant and pipework on site. The report does aim to be as thorough and comprehensive as possible.

6 Assessing the Risk

Bacteriological Testing

During the Risk Assessment Total Viable Count (TVC) dip slides are taken when required for each system and sentinel outlets. These are then incubated at 35ºC for 48 hours and the amount of bacterial growth is assessed. The results are given as:

NR	=	No Risk
10^2	=	Low Risk
10^3	=	Medium Risk
10^4	=	High Risk
10^5	=	Very High Risk

It should be noted that TVC counts do not test specifically for Legionella bacteria but are taken as an indication that conditions are suitable for harbouring bacteria.

Systems

For the purpose of this Risk Assessment 'a system' is defined as *'a water supply system, with plant, equipment and fittings, where the water is subject to conditions that will change the nature of the water from its initial wholesome state (Fluid category 1) to a state that could represent a health hazard'.*

Each system will be assessed in relation to the factors that are required to create a risk of acquiring legionellosis (ACoP L8, paragraph 32)

(a) The presence of Legionella bacteria. Due to the treatment processes involved at the water utility it is presumed that the Legionella bacteria could be present in all domestic water systems. The complexity and costs involved in Legionella testing mean that it is recommended that the followings factors (b, c & d) are minimized or eradicated, and that any high risks ratings (>10^4) arising from bacteriological testing are acted upon appropriately.

In all other cases it is recommend Legionella testing be carried out:

- in water systems treated with biocides where storage and distribution temperatures are reduced from those recommended in ACoP L8.
- in systems where control levels of the treatment (e.g. temperature, biocide levels) are not being constantly achieved.
- when an outbreak is suspected or has been identified.

b) Hot water systems present the greatest risk in environments which allow the proliferation of Legionella. Therefore, if temperature is to be used as a means of controlling Legionella, it is recommended that all stored hot water units store water at a temperature of at least 60ºC. Water should be distributed so that it reaches a temperature of at least 50ºC within one minute at all outlets. When operating with a circulating loop, water should achieve a constant return temperature of at least 50ºC.

c) In cold water systems it is recommended that stored cold water temperatures be kept below 20ºC and delivered at a temperature of below 20ºC within two minutes at all outlets. The volume of water stored should also be minimized (it should not normally be greater than one day's water use), so as to minimize the build up of a source of nutrients e.g. sludge, scale, rust, algae and other organic matter

Assessing the Risk (Continued)

d) A means of creating and disseminating breathable droplets, e.g. the aerosol generated by a cooling tower or shower – a primary objective of Legionella control should be to avoid creating a spray or aerosol. Where this is impracticable, the risk may be controlled by minimizing the release of droplets and by ensuring water conditions which prevent the proliferation of Legionella bacteria.

e) The presence (and numbers) of people who may be exposed, especially in premises where occupants are particularly vulnerable. Studies show that certain groups of people are known to be at higher risk of contracting Legionnaires' disease. Men for example appear more susceptible than women, as do smokers, alcoholics, diabetics and those with cancer or chronic respiratory or kidney disease. However, for the purpose of this risk assessment recommendations will be given to eradicate the potential risks for all person(s) entering the premises.

Risk Ratings

In order to gain an overall picture of the risks associated with varied types of premises, each system will be given a specific risk rating. The specific risks will then be given in more detail in the recommendations section of this report, with viable solutions to help eradicate or control the possible risk.

Although the individual nature of the each site will be taken into account, the following guidelines can be given to suggest a suitable timeframe to implement effective control measures.

HIGH RISK	Remedial works should be implemented as soon as possible, preferably immediately, to avoid possible Legionella proliferation.
MEDIUM RISK	Not more than 6 months, although this depends on nature of risk. Seek advice from Risk Assessor and/or Technician.
LOW RISK	No action required at this time.

7 Identification of Systems

Rising Mains Inlet (in garage area).

The **Rising Mains supplies cold water services to the building, the sprinkler connection on the cricket field and make-up water to calorifiers 1&2.**

Nearest Sentinel Outlet		**Furthest Sentinel Outlet 1**	
Location and Type	Workshop/garage bibtap	Location and Type	1st floor kitchenette sink
Water Temperature After 2 minutes	17.5ºC	Water Temperature After 2 minutes	17.6ºC
Frequency Of Use	High	Frequency Of Use	High
Condition Of Outlet	Good	Condition Of Outlet	Good
Sample Taken	No	Sample Taken	No
Sample Taken	No		
Furthest Sentinel Outlet 2			
Location and Type	GF gents' WC WHB		
Water Temperature After 2 minutes	17.6ºC		
Frequency Of Use	High		
Condition Of Outlet	Good		
Sample Taken	No		
Sample Taken	No		

System Concerns:

- None

During the Risk Assessment, all aspects of the make-up, usage and outlets served by this system were taken into consideration and it is our opinion that the system is of **Low Risk** due to:

- The compliant temperature and the high turn over of cold water.

Calorifier 1.

The calorifier is located in **the garage/workshop area** fed from the **rising mains.**.

The unit is a vertical design and is heated by **boiler and 2x immersions.**

The system provides hot water down services to **all hot water outlets in the building (linked to cal 2).**

Water Heater Details		**Inlets and Outlets**	
Dimensions / Nominal mm	1630x550	Size Materials of Supply Pipework	22mm copper
Capacity (Approx Litres)	350	Supply Valve Condition	Yes - good
Construction	Steel/ plastic	Size Materials of Flow Pipework	22mm copper
Heat Source	Gas flame	Size Materials of Return Pipework	15mm copper
Thermostat Temperature Setting	unknown	Outlet Valved	Yes
Anti Stratification Pump	No	Size of Drain Valve Operational	N/a
Timer Fitted	No		
System Pumped / Gravity	Pumped		
Insulation Type Thickness & Condition	Pre- insulated satisfactory		

On Site Testing	
Temperature of Flow °C	61ºC
Temperate of Return °C	60.5ºC
Temperature at Bottom of Unit	Unable to test
Sample Taken	No

Visual Inspection	
Condition of Water from Drain Valve	Unable to test
Corrosion Present on Unit	No

Calorifier 1 (continued)

Nearest Sentinel Outlet 1		Furthest Sentinel Outlet	
Location and Type	GF gents' WC WHB	Location and Type	1st floor kitchenette sink
Water Temperature After 1 minute	61ºC	Water Temperature After 1 minute	60.6ºC
Frequency Of Use	High	Frequency Of Use	High
Condition Of Outlet	Good	Condition Of Outlet	Good
Sample Taken	No	Sample Taken	No

The combi boiler was assessed externally in relation to ACoP L8 standards and the following non-conformities were recorded (the unit could not be assessed internally):

- None

Additional System Concerns:

- uninsulated pipework

During the Risk Assessment all aspects of the make-up, usage and outlets served by this system were taken into consideration and it is our opinion that the system is of **Low Risk** due to:

- The compliant temperatures of the unit and the high turn over of water.

Calorifier 2.

The calorifier is located in **the garage/workshop area** fed from the **rising mains.**.

The unit is a vertical design and is heated by **boiler and 2x immersions.**

The system provides hot water down services to **all hot water outlets in the building (linked to cal 1).**

Water Heater Details		**Inlets and Outlets**	
Dimensions / Nominal mm	1630x550	Size Materials of Supply Pipework	22mm copper
Capacity (Approx Litres)	350	Supply Valve Condition	Yes - good
Construction	Steel/ plastic	Size Materials of Flow Pipework	22mm copper
Heat Source	Gas flame	Size Materials of Return Pipework	15mm copper
Thermostat Temperature Setting	unknown	Outlet Valved	Yes
Anti Stratification Pump	No	Size of Drain Valve Operational	N/a
Timer Fitted	No		
System Pumped / Gravity	Pumped		
Insulation Type Thickness & Condition	Pre- insulated satisfactory		

On Site Testing	
Temperature of Flow °C	61.0ºC
Temperate of Return °C	60.5ºC
Temperature at Bottom of Unit	Unable to test
Sample Taken	No

Visual Inspection	
Condition of Water from Drain Valve	Unable to test
Corrosion Present on Unit	No

Calorifier 2 (continued)

Nearest Sentinel Outlet 1		Furthest Sentinel Outlet	
Location and Type	GF gents' WC WHB	Location and Type	1st floor kitchenette sink
Water Temperature After 1 minute	61ºC	Water Temperature After 1 minute	60.6ºC
Frequency Of Use	High	Frequency Of Use	High
Condition Of Outlet	Good	Condition Of Outlet	Good
Sample Taken	No	Sample Taken	No

The combi boiler was assessed externally in relation to ACoP L8 standards and the following non-conformities were recorded (the unit could not be assessed internally):

- None

Additional System Concerns:

- uninsulated pipework

During the Risk Assessment all aspects of the make-up, usage and outlets served by this system were taken into consideration and it is our opinion that the system is of **Low Risk** due to:

- The compliant temperatures of the unit and the high turn over of water.

8 Aerosols

Showers	Location	Fed By
	X4 1ST FLOOR CHANGING ROOM 1	**Mains & cals 1&2**
	X4 1ST FLOOR CHANGING ROOM 2	**Mains & cals 1&2**
	X5 G/FLOOR CHANGING ROOM 1	**Mains & cals 1&2**
	X5 G/FLOOR CHANGING ROOM 2	**Mains & cals 1&2**
	X1 G/FLOOR REF'S CHANGING ROOM	**Mains & cals 1&2**

9 Dead End Pipe Work

NONE FOUND

10 Dead leg, Unused/Little Used Outlets.

NONE FOUND

11 Water Samples.

NOT REQUESTED – NOT REQUIRED

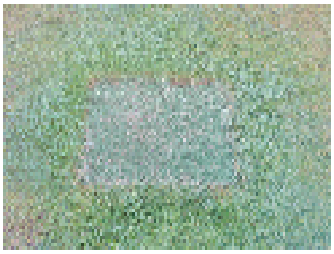
12 Additional Photographs

Photo	Details	Reason For Photo
	1st floor disabled WC WHB	Reference only
	1st floor disabled WC WC	Reference only
	1st floor kitchenette sink	Reference only
	Typical example of uninsulated pipework	Reference only
	Typical changing room TMV (for showers)	Reference only

	Typical changing area WC and WHB setup	Reference only
	Typical changing area WC and WHB setup	Reference only
	Typical changing room TMV (for showers)	Reference only
	Ref's changing area WHB	Reference only
	GF gents' WC area urinals	Reference only

	GF gents' WC area WHBs	Reference only
	Insulated pipework in garage	Reference only
	Secondary return pump for calorifiers	Reference only
	Insulated pipework in garage	Reference only
	Pressure reducing valve to cal 2	Reference only

	Pressure reducing valve to cal 1	Reference only
	Incoming mains in garage	Reference only
	Boiler in garage	Reference only
	Filling loop to heating system in garage	Leave disconnected when not in use
	Outside tap	Reference only

	Sprinkler connection (under piece of turf)	Reference only
	Rear view of building	Reference only
	Side view of building	Reference only

13 Recommendations

For ease of reference, all recommendations and non-compliance throughout this document have been summarised in this section but should be read in conjunction with all observations and assessments stated throughout the risk assessment.

All hot and cold water systems must be operated and maintained in a safe and correct manner and adequate precautionary measures must be taken against the risk of Legionella where it is reasonably practicable.

Prioritisation of Recommendations	Risk
De-scaling of outlets. • De-scale all outlets where required Give priority to those that generate an aerosol i.e. spray taps and showers.	**Low** Site monitored by EWS
Appointment of managerial structure. • There is a requirement to appoint and name a managerial structure (duty holder and responsible person).	**Low** Lines of responsibility put in place with the presentation of this document
Implement managerial procedures. • Managerial procedures are required to include a control and monitoring scheme to monitor the risk and update the risk assessment where required.	**Low** Lines of responsibility put in place with the presentation of this document - Site monitored by EWS
Water temperature checks. • Temperatures of hot and cold water systems required to be checked monthly to ensure they are discharging at the correct temperatures.	**Low** Site monitored by EWS
Heater monitoring • Ensure that the 2 calorifiers continue to generate heat at 60°C throughout the course of the day. Systems require attention when monitoring highlights continuous underachievement.	**Low** Site monitored by EWS
Flushing regime • Carry out a flushing regime during low occupancy periods of over one week and keep records.	**Low** As Required
Water draw off points • For water draw-off points not used for periods exceeding 1 week, a flushing regime needs to be implemented.	**Low** As Required
Review of Risk Assessment • A review of this risk assessment and the control and monitoring procedures should take place annually to ensure all procedures are currently adequate.	**Low** Yearly

Thermostatic mixing valves • Ensure that all thermostatic mixing valves comply with current regulations and discharge water at correct temperatures in line with the building's management/maintenance schedule. It is recommended that all TMVs be serviced annually, including dismantling/descaling/disinfection.	**Low** As Required

14 Further Actions

This risk assessment was carried out in order to identify and assess potential sources of risk from the domestic and secondary water systems located associated within this establishment. All aspects have been detailed and located in their relevant sections of the report.

The assessment of risks must be used as guidance for the ongoing scheme for the control of Legionella bacteria. A regime of precautionary measures, inspections and testing (as outlined in ACoP L8) should be prepared for the site in a logbook format and this must be operated in conjunction with the ongoing planned maintenance.

It is recommended that the assessment be reviewed every two years or whenever there is a reason to believe that the original assessment may no longer be valid due to circumstances such as physical changes to systems, failure of control measures etc.

A review of the assessment should be considered where there has been a change to any of the systems originally assessed to pose a risk and to other water systems, which may cause them to pose a higher risk.

A review should also be undertaken if there is change in the use of the premises or activities undertaken, which might have a bearing on system operations and occupant's susceptibility. A review should also be considered when new information becomes available and if monitoring checks indicate that control regimes may no longer be effective.

Depending on the level of change, the review of assessment may be more specific than general and whichever is the case, the findings should be recorded formally and any changes to existing practices and control measures should be undertaken if appropriate.

The person appointed managerially responsible for the establishment must also take responsibility for deciding whether it may be appropriate to review an assessment. The ongoing auditing and monitoring of the systems conditions and operation of control procedures is undertaken by an independent body, any situation requiring re-assessment should be reported to the responsible person by them.

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