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**PREFACE**

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**Risk Assessment Consultant:** Mr Chris Wilson MWM Society

**Date of Assessment:** 7th June 2010

**Date of Review:** June 2012

## INTRODUCTION

This report relates to a water source Risk Assessment carried out by Mr Chris Wilson of Freeston Water Treatment Ltd on the 7<sup>th</sup> June 2010 on behalf of Hampshire County Council. The survey was carried out at Oak Lodge School, Roman Road, Dibden Purlieu, Hampshire SO45 4RQ. During the course of the survey water systems within the properties were risk assessed. These sources were chosen as being fully representative of the overall domestic water systems and outlets within the buildings.

**I was informed that the new Design Technology Room is leased from Applemore College and all maintenance, risk assessments etc are their responsibility and not that of Oak Lodge School and therefore it was not surveyed for this report.**

The survey and Risk Assessment were undertaken in order to comply with the Health and Safety Executive requirements on the control and prevention of Legionellosis. The Risk Assessment has been carried out in accordance with ACoP L8 - The control of Legionella bacteria in water systems (Approved Code of Practice and Guidance).

The survey has been limited to the terms of reference agreed between Hampshire County Council and Freeston Water Treatment Ltd. Observations relating to system conditions and other factors applicable to the requirements of L8 have been recorded during the survey and specific references are made to compliance with these documents in the Observations section of the report.

A Summary of Recommendations concludes the report. ACoP L8 places responsibility on employers and others to prepare a scheme for preventing or controlling the risk from Legionellosis. Adoption of a monitoring scheme in conjunction with a regime of preventative maintenance and associated record keeping will meet these requirements.

## BACKGROUND TO LEGIONELLA

Legionella is the bacterium that causes Legionnaires disease. Of this bacterium, Legionella pneumophila is the species most commonly associated with disease outbreaks. Legionnaire's disease is identified as a pneumonia type of infection of the lower respiratory tract. The infection is most commonly acquired by the inhalation of airborne droplets or particles containing viable Legionella. Exposure to Legionella can also cause a short feverish illness without pneumonia known as Pontiac Fever.

Research indicates that Legionella can occur in hot and cold water services.

Sediment, scale, and organic materials present in water systems, can provide nutrients and give protection for Legionella. Legionella has been shown to colonise certain types of water fittings, pipe work and materials used in the construction of water systems.

The formation of bio films within water systems is undesirable and may also provide harbourage and favourable conditions for Legionella growth. Legionella is most likely to proliferate in water systems that have a temperature between 20°C and 50°C. Human blood temperature of approximately 37°C is the most ideal temperature for proliferation. Stagnant water within the above temperature range appears to provide the ideal conditions for proliferation of Legionella.

Once a risk has been identified and assessed, a scheme should be prepared for preventing or controlling it. The risk is heightened when conditions are not monitored and control of the system is lost, thereby allowing Legionella to proliferate.

Legionella will survive at temperatures below 20°C but is considered to be in a dormant state with no growth activity. The bacterium does not survive temperatures maintained consistently at 60°C or above.

## ASSESSMENT OF RISK

### The Legionella risk

Legionnaire's disease is most commonly caused by the inhalation of water droplets contaminated with the Legionella bacteria. It is therefore important that systems susceptible to colonisation by Legionella and which incorporate a potential means for creating and disseminating water droplets should be identified and the risk they present assessed.

The assessment must be completed for routine system operation and also for circumstances such as breakdown, abnormal operation, commissioning or other unusual circumstances.

Risk assessment categories:-

- A) The potential for the formation of droplets.
- B) The condition of the water.
- C) Water temperature.
- D) The water turnover rate.
- E) The susceptibility of persons exposed to droplets.
- F) The population density exposed to droplets.

In undertaking the Risk Assessment and drawing up precautions, particular attention must be paid to situations where the population exposed contains a relatively high number of people susceptible to Legionella, due to their age and in many cases poor health.

#### Risk Assessment Review

The Risk Assessment should be reviewed every 2 years as stated in the HSE's ACoP L8 or otherwise for any of the reasons below:-

- 1) Changes are made to plant or water systems or its use.
- 2) Changes are made to building use in which the water system is installed.
- 3) New information about risks or control measures becomes available.
- 4) Results of checks indicate that control measures are no longer effective.

## OBSERVATIONS

General and specific observations on the systems made during the course of the survey are recorded and the more general requirements of L8 are commented where applicable, although references are made to compliance with the requirements of L8.

Compliance with ACoP L8 may be classified into two distinct categories:

- a) Management Procedures - The management procedures, which have been implemented, to ensure that all control measures, record keeping and monitoring are adequate and effective.
- b) Systems Conditions - The physical conditions of the water systems in the building must be considered when assessing the risk from Legionellosis.

This report therefore addresses the above categories. A general overview of existing Management Procedures is included and followed by comprehensive observations of the Systems Conditions as seen during the course of the survey.

## General Management Compliance

ACoP L8 para 23 - Identify Sources of Risk

### Observations

The assessments are detailed in the relevant section of this report.

## General Management Compliance

ACoP L8 para's 39, 53 and 66 - Prepare a Scheme for Preventing or Controlling the Risk - Implement and Manage Precautions - Maintain Records

### Observations

A regime of repair and breakdown maintenance should be implemented for the buildings at Oak Lodge School for all of the water services and systems. Procedures and records for the various maintenance activities must be documented and the Written Scheme recommendations be implemented in order to control Legionellosis. The precautions taken must be documented within an operational logbook.

### Further Action Required

A Logbook should be prepared and records kept within it, as outlined in our recommendations.

The logbook, documentation and operation should be audited on a periodic basis in order to ensure that the system conditions and precautionary procedures are being carried out satisfactorily.



The precise procedures relating to the precautionary measures, i.e. cleaning of water cistern systems and calorifiers together with start up and shut down procedures for calorifiers, should be maintained within the logbook system and updated as required. The details of persons who are trained and competent to undertake the works should also be recorded in the logbook along with details of the training undertaken. This also applies to specialist contractors who may undertake part of these duties.

**The Risk Assessment report relates to observations made and information supplied at the time of the survey. Every effort has been made to examine as much of the water system as possible although some areas, such as pipe work beneath floors or behind walls would not have been inspected due to restricted access.**

## SITE SURVEY

A responsible person should be appointed to take day-to-day responsibility for the Written Scheme.

If the assessment shows that there is a reasonably foreseeable risk and it is reasonably practicable to prevent exposure or control the risk from exposure, the person on whom the statutory duty falls (see paragraph 23) should appoint a person or persons to take managerial responsibility and to provide supervision for the implementation of precautions. (Paragraph 39 HSE's ACoP L8)

**It appears that there is no dedicated water systems logbook in place or monthly temperature monitoring of the hot and cold outlets or calorifier being carried out. I would recommend a logbook be produced along with a written scheme and temperature monitoring be commenced as soon as is practicable.**

System Reference	Oak Lodge School
Location	Site Buildings
Method	Visual Assessment and Temperature Profiling

## HOT WATER STORAGE

Hot water storage at Oak Lodge School is by two calorifiers. The Calorifier No. 1 is located within the main boiler Room. The calorifier was manufactured by Rycroft (Calorifiers) Ltd. It is of a steel construction and is indirectly heated by an internal coil from the heating boilers. It has fibre type insulation under a metal outer casing. There is a return system fitted to the calorifier that has a two circulating pumps which at the time of the survey they both appeared to be working correctly when switched over. I was informed that the pumps are alternated monthly but this will now be carried out weekly. I was informed by maintenance staff that the calorifier is fed from the mains cold water supply. I would recommend that the calorifier be purged to drain to check the water quality on at least a six monthly period and recorded within a water systems logbook when carried out, I was informed that it is unknown if this is being carried out. There is an old temperature gauge on the calorifier but not on the hot return pipe work. I would recommend that new temperature gauges are fitted to the flow and return pipework for monthly temperature monitoring to be carried out.

L8 recommends that calorifiers are checked internally for scale and sludge on an annual basis. I was informed that it is unknown if this is being carried out.

**L8 recommends hot water storage to be 60.0°C and the return to be maintained at 50.0°C at all times.**

**The temperature of the stored water within the calorifier at the time of the survey was:-**

Calorifier No 1	Storage	62.0°C	Satisfactory
Calorifier No 1	Return	27.8°C	Not Satisfactory

The return temperature is too low and this must be investigated further. Firstly I would recommend that the calorifier is adjusted to increase the temperature. Secondly, much of the domestic pipe work is uninsulated and this is likely to be contributing to the problem and should be rectified. Further investigation should be carried out if adjusting the calorifier and insulating the pipes does not fully rectify the problem.

Calorifier No 2 is located within Room 34 and supplies all the hot outlets within Room 34 and Room 87. The calorifier was manufactured by Heatrae Sadia. It is of a copper construction and is directly heated by one electrical element. It has fibre type insulation under a metal outer casing which is damaged in places and should be repaired. The calorifier is fed from the mains cold water system and there is no return system fitted. I would recommend that the calorifier be purged to drain to check the water quality on at least a six monthly period and recorded within a water systems logbook when carried out, I was informed that it is unknown if this is being carried out. There is no temperature gauge on this unit and I would recommend that one is fitted to the flow pipework for monthly temperature monitoring to be carried out.

L8 recommends that calorifiers are checked internally for scale and sludge on an annual basis. I was informed that it is unknown if this is being carried out.

L8 recommends hot water storage to be 60.0°C and the return to be maintained at 50.0°C at all times.

The temperature of the stored water within the calorifier at the time of the survey was:-

Calorifier No. 2	Storage	64.6°C	Satisfactory
Calorifier No. 2	Return		No Return Fitted

## PHOTOGRAPHS

### Main Boiler Room

Calorifier No. 1.



### Room 34

Calorifier No. 2.



## COLD WATER STORAGE

Domestic cold water storage at Oak Lodge School consists of one domestic cold water storage cistern located at height on the roof. At the time of the survey there was found to be no safe access to this vessel.

**I would recommend that safe access is made available for maintenance, cleaning and disinfecting and for a risk assessment to be carried out as soon as is practicable.**

I was informed by maintenance staff that it is believed that this cistern only now feeds the first floor boys toilets. If this is the case then the cistern is likely to be over capacity and taking it out of service and converting the boy's toilet outlets to mains cold water should be considered. It must be ensured that no dead legs are created when this work is carried out.

### Roof

Cold water storage cistern housing.



## DOMESTIC WATER DISTRIBUTION

Domestic water services should operate at temperatures that prevent the proliferation of Legionella. L8 specifies that hot water should be stored at no less than 60°C and distributed at no less than 50°C, obtainable at user outlets within one minute of opening. Cold water should be stored and distributed at no more than 20°C.

Domestic hot water within Oak Lodge School distributes from two calorifiers. Calorifier No. 1 is located within the Boiler Room and supplies the following Rooms:-

- First Floor - All Rooms
- Ground Floor - Food Technology
- Ground Floor - Disabled Shower Room
- Ground Floor - Staff Room
- Ground Floor - Staff Female Toilets
- Ground Floor - Staff Male Toilets
- Ground Floor - Kitchen Toilet
- Ground Floor - Main Kitchen
- Ground Floor - Boys Shower Room
- Ground Floor - Boys Toilets
- Ground Floor - Girls Toilets
- Ground Floor - Laundry

Calorifier No. 2 is located within Room 34 and supplies the hot outlets in Room 34 and Room 87 only. The Oakmore Centre and the Office Kitchen have electric local water heaters. The Office kitchen water heater also supplies the Medical Room.

Domestic cold water within Oak Lodge School is supplied by one cold water storage cistern located on the roof. I was informed by maintenance staff that it only feeds the first floor boys toilets.

Mains cold water within Oak Lodge School supplies the domestic cold water storage cistern, the main school heating boilers and all cold outlets and appliances with the exception of the first floor boy's toilets.

In all areas of distribution and use, inspection, test and measurement was undertaken at representative positions in order to evaluate conditions and areas of potential risk.



At the time of the survey (within one minute) these hot water outlets within the buildings were recorded as follows:-

<b>Oak Lodge School</b>	
<b>Hot Water Outlet Temperatures</b>	
<b>Oakmore Centre</b> Girls Toilet Wash Basin	<b>38.5°C Not Satisfactory</b>
<b>Main Building</b> First Floor Girls Toilets Wash Basin	52.3°C Inlet to TMV Satisfactory 38.6°C TMV Outlet Satisfactory
<b>Main Building</b> Ground Floor Office Kitchen Sink	<b>26.2°C Not Satisfactory</b>
<b>Main Building</b> Ground Floor Staff Female Toilets Wash Basin	50.5°C Inlet to TMV Satisfactory 38.5°C TMV Outlet Satisfactory
<b>Main Building</b> Ground Floor Kitchen Toilets Wash Basin	55.1°C Satisfactory
<b>Main Building</b> Ground Floor Boys Toilets Wash Basin	<b>38.5°C Inlet to TMV Not Satisfactory</b> 34.2°C TMV Outlet Satisfactory

L8 recommends that the hot water should achieve 50°C, obtainable at user outlets within one minute of opening.

TMV's (Thermostatic Mixing Valves) are fitted to ensure that the water temperature at hot water outlets does not exceed 43°C and scald users.

The hot water supplying the TMV's should be 50°C at the TMV inlet as recommended in L8.

At the time of the survey (within two minutes) the cold water outlets within the buildings were as follows:

<b>Oak Lodge School</b>	
<b>Cold Water Outlet Temperatures</b>	
<b>Oakmore Centre</b> Girls Toilet Wash Basin	15.5°C Satisfactory
<b>Main Building</b> First Floor Girls Toilets Wash Basin	15.7°C Satisfactory
<b>Main Building</b> Ground Floor Office Kitchen Sink	16.1°C Satisfactory
<b>Main Building</b> Ground Floor Staff Female Toilets Wash Basin	16.3°C Satisfactory
<b>Main Building</b> Ground Floor Kitchen Toilets Wash Basin	16.3°C Satisfactory
<b>Main Building</b> Ground Floor Boys Toilets Wash Basin	18.0°C Satisfactory

L8 recommends cold water should be stored and distributed at no more than 20°C.

## GENERAL

- Thermostatic Mixing Valves (TMV's) are fitted in many areas of Oak Lodge School; these valves should be serviced and maintained to the manufacturers recommendations. I was informed that this is not being carried out.
- Infrequently used outlets are ideal areas for the proliferation of bacteria. Areas where the outlets are not used at least on a weekly basis should be removed or put on a weekly flushing regime (without creating an aerosol) and recorded. I was informed that flushing is currently only being done at the end of the school holidays and I would recommend that it is carried out weekly.
- Dead leg pipework are ideal areas for the proliferation of bacteria and should be removed or put on a twice weekly flushing regime (without creating an aerosol) and recorded. No dead legs were found on site.
- The shower heads and hoses must be cleaned and disinfected quarterly and recorded when carried out as recommended in L8. The records show that this is carried out approximately every six weeks.
- It is unknown when Legionella or bacteriological samples were last taken and I would recommend that this is carried out if temperatures fall outside of the limits as detailed in L8.
- There is a filter on the drinking water cooler and it should be ensured that this is cleaned / replaced in-line with the manufacturer's recommendations.
- Monthly temperature monitoring of the calorifier and hot and cold outlets is not being carried out and I would recommend that this is commenced as soon as is practicable.



## RECORDS

It is recommended that a water quality log book be produced for the site to include records of weekly, monthly, quarterly, six monthly and annual procedures. These should be carried out as recommended in this Risk Assessment.

Details of the responsibilities they hold should be included together with items listed as follows:

Maintenance carried out on water systems

Cleaning and disinfection of water cisterns

Inspection of water storage cisterns

Monthly temperature monitoring

Flushing of infrequently used outlets

Annual inspections of calorifiers

Purging of calorifiers

Faults and defects to be recorded

Audit sheet for inspections of the logbook and dated when completed

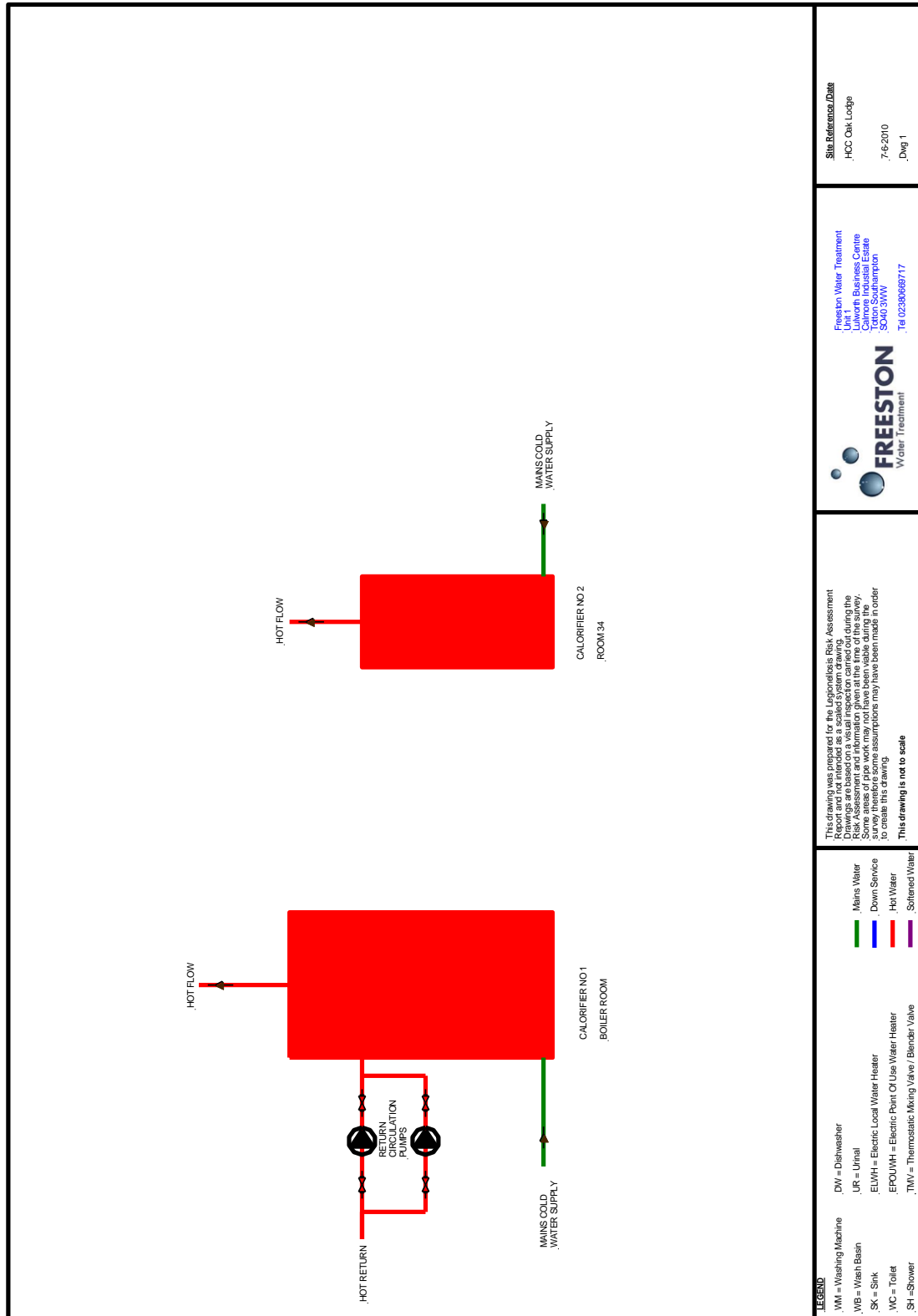
All of the above should be included in the water systems logbook and signed for when completed.

## ADDITIONAL PHOTOGRAPHS

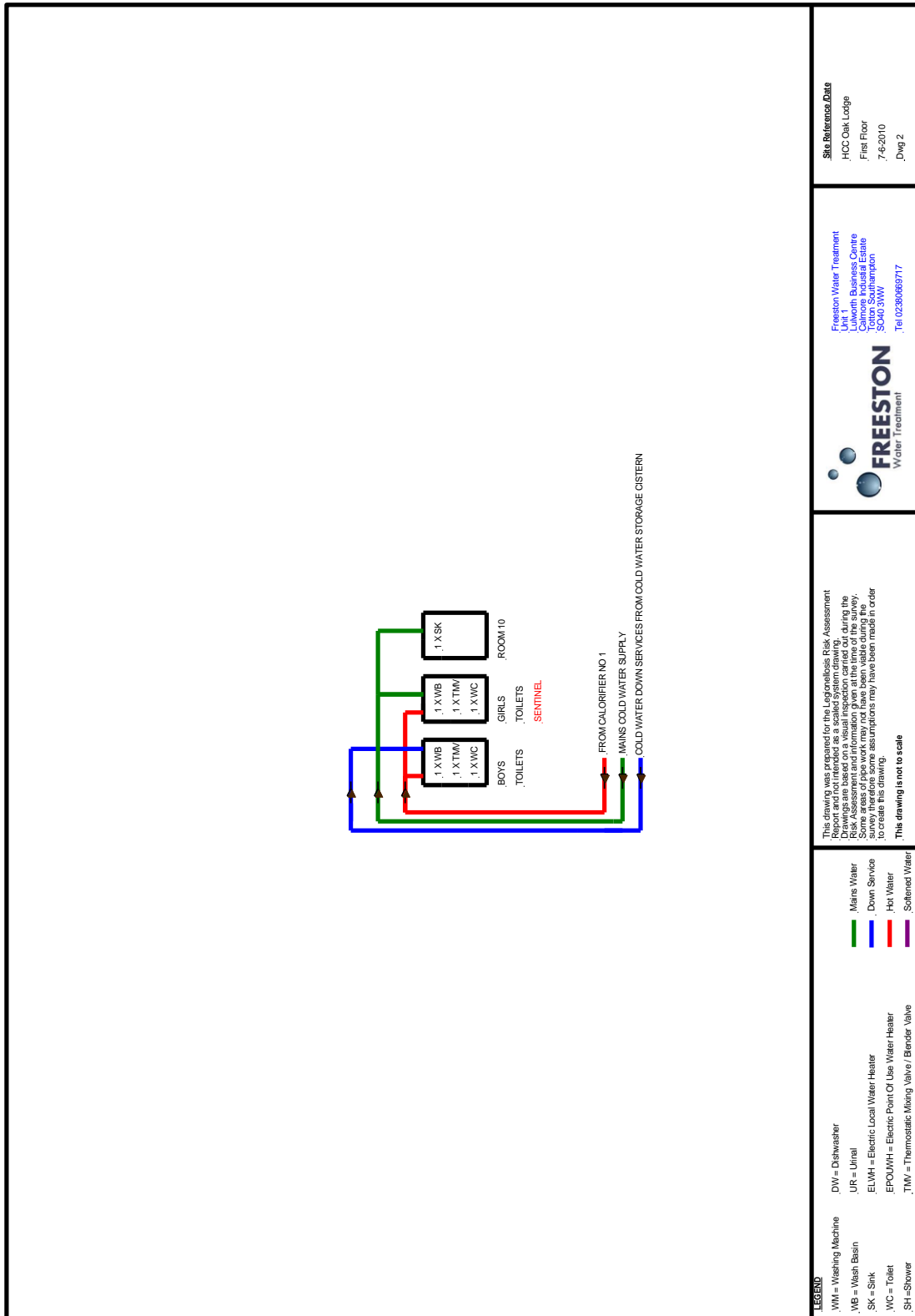
Filter on the drinking water cooler.



DRAWINGS



<p><b>LEGEND</b></p> <p>WM = Washing Machine WB = Wash Basin SK = Sink WC = Toilet SH = Shower</p> <p>DW = Dishwasher UR = Urinal ELWH = Electric Local Water Heater EPOWH = Electric Point Of Use Water Heater TMV = Thermostatic Mixing Valve / Blender Valve</p>	<p>Mains Water (Green line) Down Service (Blue line) Hot Water (Red line) Softened Water (Purple line)</p>	<p>This drawing was prepared for the Legionellosis Risk Assessment. Drawings are based on a visual inspection carried out during the Risk Assessment and information given at the time of the survey. The survey team hereby makes some assumptions may have been made in order to create this drawing. <b>This drawing is not to scale.</b></p>	<p><b>FREESTON</b> Water Treatment</p> <p>Freeston Water Treatment Unit 3 Lulworth Business Centre Lulworth Road Totton Southampton SO40 3WW Tel 0238066777</p>	<p>Site Reference/Date HCC Oak Lodge 7-6-2010 Dwg 1</p>
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**Site Reference Data**  
HCC Oak Lodge  
First Floor  
7-6-2010  
Dwg 2

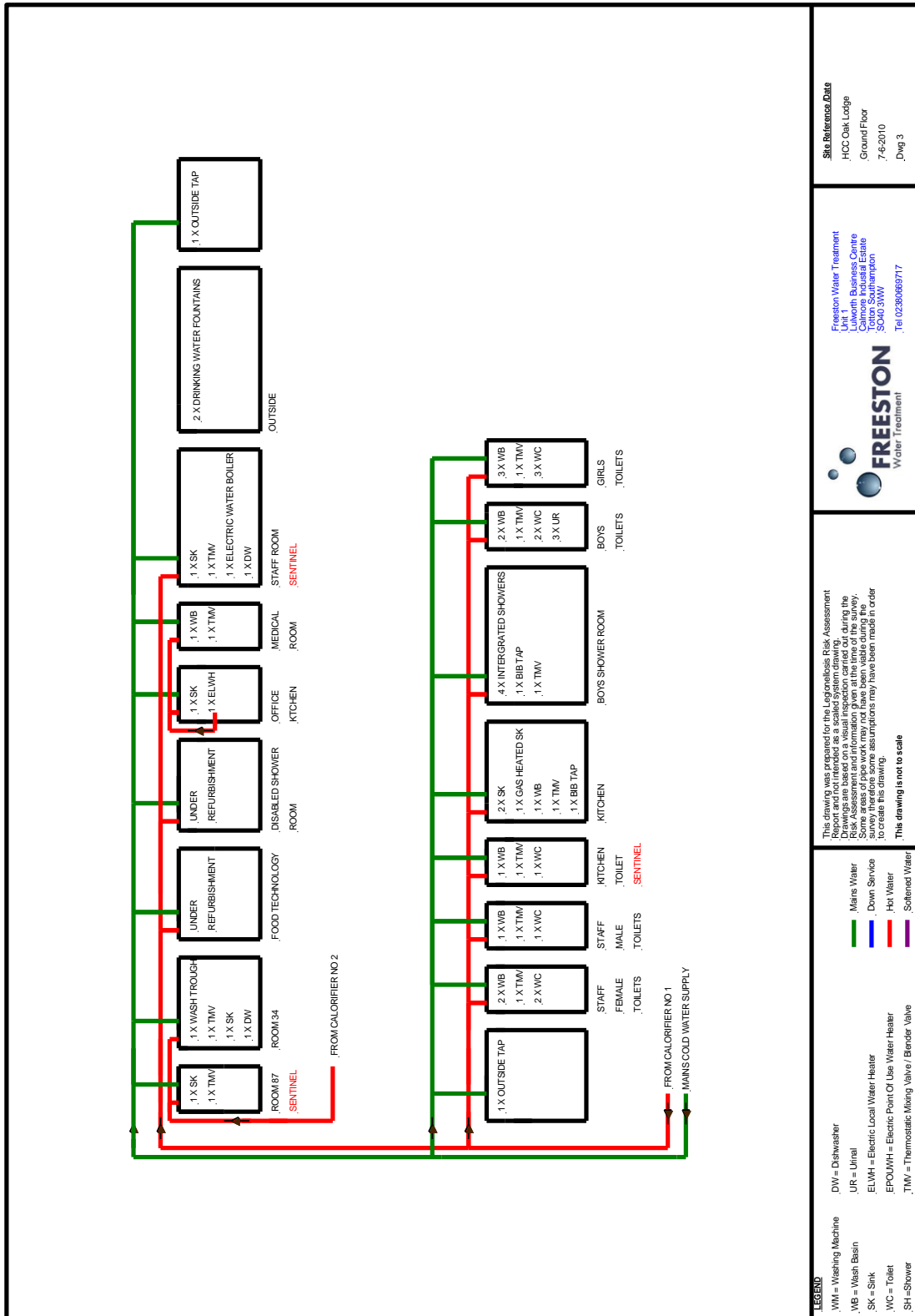
Freston Water Treatment  
Unit 1  
Luwth Business Centre  
Luwth Estate  
Totton Southampton  
SO40 3WV  
Tel: 02380688777

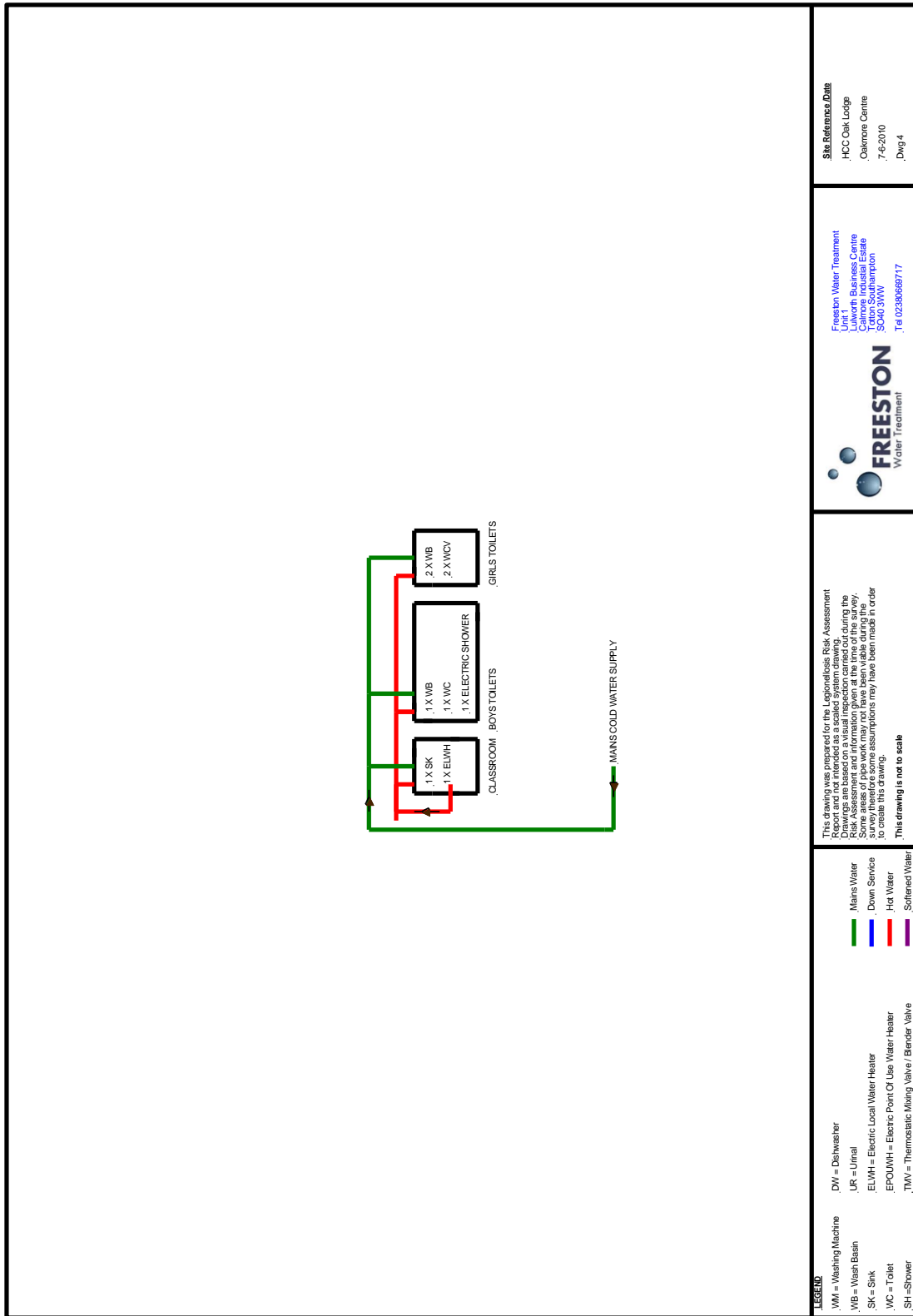
This drawing was prepared for the Legionellosis Risk Assessment. The drawings are based on a visual inspection carried out during the Risk Assessment and information given at the time of the survey. It is not intended to be a detailed engineering drawing and therefore some assumptions may have been made in order to create this drawing.  
**This drawing is not to scale**

**LEGEND**

.WM = Washing Machine	.DW = Dishwasher	.MWS = Mains Water
.WB = Wash Basin	.UR = Urinal	.DS = Down Service
.SK = Sink	.ELWH = Electric Local Water Heater	.HW = Hot Water
.WC = Toilet	.EPOUMH = Electric Point Of Use Water Heater	.SW = Softened Water
.SH = Shower	.TMV = Thermosatic Mixing Valve / Blendr Valve	







**LEGEND**  
MM = Washing Machine  
WB = Wash Basin  
SK = Sink  
WC = Toilet  
SH = Shower  
DW = Dishwasher  
UR = Urinal  
ELWH = Electric Local Water Heater  
EPOUWH = Electric Point Of Use Water Heater  
TMV = Thermosatic Mixing Valve / Barndor Valve

Green = Mains Water  
Blue = Down Service  
Red = Hot Water  
Purple = Softened Water

This drawing was prepared for the Legionellosis Risk Assessment...  
This drawing is not to scale

**FRESTON**  
Water Treatment  
Freston Water Treatment  
Unit 1  
Lutworth Business Centre  
Carnons Industrial Estate  
Southampton  
SO40 3WV  
Tel: 02380668717

**Site Reference/Date**  
HCC Oak Lodge  
Oakmore Centre  
7-6-2010  
Dwg 4

**WRITTEN SCHEME**

	<b>Task</b>		<b>Frequency</b>
1	Prepare site logbook for the Site.		<b>ASAP</b>
2	Flush infrequently used outlets.		<b>Weekly</b>
3	Record hot water calorifier flow and return temperatures.		<b>Monthly</b>
4	Record cold water outlet temperatures.		<b>Monthly</b>
5	Record hot water outlet temperatures.		<b>Monthly</b>
6	Record cold water cistern temperatures.		<b>Six Monthly</b>
7	Clean and descale shower head and hoses.		<b>Quarterly</b>
8	Purge hot water calorifier to drain and record.		<b>Six Monthly</b>
9	Inspect, clean and disinfect cold water storage cistern if required.		<b>Annually</b>
10	Internally inspect hot water calorifier annually and descale if required.		<b>Annually</b>

## REMEDIAL RECOMMENDATIONS

### Legionella Risk Category Key

1 = Insignificant risk.

2 = Controlled risk monitoring is being carried out maintain this standard.

3 = Risk is controlled, but deteriorating conditions could increase risk.

4 = Potential hazards identified.

5 = Risk Uncontrolled.

Site Reference/ Address	Remedial/Recommendations	Priority	Date Actioned	Signature
<u>Hot Water Storage &amp; System</u> HCC Oak Lodge School	Commence monthly temperature monitoring of the domestic hot water systems; sentinel outlets. Record within a logbook.	5		
	Commence monthly temperature monitoring of the hot water calorifier flow water temperature. Record within a logbook.	5		
	Purge calorifiers to drain on at least a six monthly basis and record when carried out.	3		
	If access allows, visually inspect the calorifiers internally for scale and sludge on an annual basis.	3		
	Adjust Calorifier No. 1 to achieve a minimum storage temperature of 60°C and a minimum return temperature of 50°C.	5		
	Adjust electric local water heaters to achieve a minimum of 50°C at the hot outlet or inlet to TMV within one minute.	5		
	Fit temperature gauges to flow and return pipes on Calorifier No. 1.	3		
	Fit temperature gauges to return pipe on Calorifier No. 2.	3		

Site Reference/ Address	Remedial/Recommendations	Priority	Date Actioned	Signature
<u>Cold Water Storage</u> HCC Oak Lodge School	Commence monthly temperature monitoring of the domestic cold water systems; sentinel outlets. Record within a logbook.	5		
	Make safe access available to the cold water storage cistern.	5		
	Clean and disinfect the cold water storage cistern as soon as is practicable. Inspect annually and repeat if required.	5		

Site Reference/ Address	Remedial/Recommendations	Priority	Date Actioned	Signature
<u>Distribution</u> HCC Oak Lodge School	Ensure that the return circulation pumps on Calorifier No. 2 are alternated in operation weekly	5		
	I would recommend Bacteriological and Legionella water samples be taken if the temperatures fall out of the recommended limits.	5		
	Commence <b>weekly</b> flushing of any low use outlets etc and record when carried out.	5		
	Clean and descale showerheads at least quarterly. Record when carried out.	2		
	Ensure all domestic hot and cold pipe work is insulated within the building.	4		