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PREFACE

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Date of Assessment: **2nd December 2013**

Date of Review: **December 2015**

INTRODUCTION

This report relates to a water source Risk Assessment Review carried out by Mr Chris Wilson of Freeston Water Treatment Ltd of the Risk Assessment carried out by Mr Peter Smith on the 29th January 2007 and Mr Chris Wilson (both of Freeston Water Treatment Ltd) on the 22nd November 2007 on behalf of Marina Developments Ltd.

The First Risk Assessment Review was carried out by Mr Chris Wilson of Freeston Water Treatment Ltd on the 26th September 2011.

This Second Risk Assessment Review was carried out by Mr Chris Wilson of Freeston Water Treatment Limited on the 2nd December 2013 at Ocean Village Marina, Channel Way, Southampton, Hampshire SO14 5QF.

During the course of the survey water sources within the buildings were assessed for risk. These sources were chosen as being fully representative of the overall domestic water systems and outlets within this building.

The Review of Recommendations highlighted in the previous Risk Assessment were undertaken in order to comply with the Health and Safety Executive requirements on the control and prevention of Legionellosis. This Review has been carried out in accordance with ACoP L8 'The control of Legionella bacteria in water systems' (APPROVED CODE OF PRACTICE & GUIDANCE) and BS 8580 (RISK ASSESSMENTS FOR LEGIONELLA CONTROL-CODE OF PRACTICE).

The Review has been limited to the terms of reference agreed between Marina Developments Limited 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 the ACoP in the Observations section of the report.

A recommendations section 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 and investigations indicate that the occurrence of Legionella contamination is greatest in water cooling towers, evaporative condensers, hot and cold water services, water spray humidifiers, air washers, spa baths and pools where water is agitated and re-circulated. The contamination from a cooling water tower will cover a far larger area than any other likely source.

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, pipework and materials used in the construction of water systems. The presence of these materials may provide nutrients for Legionella and make eradication difficult. Other organisms in water systems such as bacteria, amoeba and algae can provide a suitable habitat and nutrients in which Legionella can survive and multiply.

The formation of biofilms within water systems is undesirable and may also provide harbourage and favourable conditions for Legionella growth. The presence of Legionella in biofilms and in enclosures within protozoa may protect the organisms from any remedial measure employed to eradicate the bacterium.

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.

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.

For water samples collected and returned to the laboratory, Legionella pneumophila is recovered by propagation of the organism on a specially supplemented nutrient growth medium. Such samples are normally then incubated at around 37°C. It may take up to 7 days for colonies of Legionella to appear. Legionella can be recognised by visual examination of the colonies followed by a number of laboratory techniques to identify species and serogroup.

ASSESSMENT OF RISK

Rationale

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. ACoP L8 requires this identification and assessment.

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

Once the assessment has been completed, a strategy can be prepared for preventing or controlling the risk. The strategy will be based on a sound knowledge of the varying levels of attention required by the differing risk sources within the building.

The assessment takes account of:

A) The potential for 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.

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

In undertaking the Risk Assessment and drawing up precautions, particular attention must be paid to situations where:

1) The population exposed contains a relatively high number of people susceptible to Legionella, for example in Hospitals and Nursing Homes.

2) The density of population is high and therefore the number of people at potential risk is high.

The Risk Assessment should be reviewed whenever there is reason to believe that the original assessment may no longer be valid and ideally an annual review of all sources should be undertaken. The original assessment may be compromised if:

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.

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. The scheme should be implemented together with a planned preventative maintenance schedule in line with that contained within the general recommendations section of this report. This will meet the requirements of the ACoP.

REVIEW OF RISK ASSESSMENT AND OBSERVATIONS

The Review was commissioned in order to identify and assess the risk of Legionellosis from the water sources on the premises using the previous Risk Assessment. General and specific observations on the systems made during the course of the Survey are also recorded and the more general requirements of L8 are also commented on where applicable.

The specific observations made in this Review, together with the most recent Risk Assessment should be read in conjunction with the practices and procedures detailed in the recommendations section and also with ACoP 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 Survey was commissioned in order to identify and assess sources of risk from the water storage and distribution systems in the premises and this Review highlights the remedial works and recommendations from that Report.

Further Action

Following receipt of the Review, all recommendations and remedial work should be carried out at the earliest opportunity.

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 operational on the site for all of the water services and systems. Direct labour and contract staff should undertake the work. Procedures and records for the various maintenance activities must be documented and the particular procedures relative to the control of Legionellosis are documented within an operational logbook.

Further Action Required

A written scheme for preventing or controlling the risks from Legionellosis identified in the Risk Assessment must be drawn up to maintain and provide a monitoring function for the relevant equipment and water systems.

A written scheme contained within the logbook must be implemented and monitored in order to meet the requirements of ACoP L8.

A logbook system will meet the requirement for maintaining records of precautions implemented. The logbook documentation should include:

- Definition of Management responsibilities.
- Description of systems and inclusion of available system schematic drawings and plans.
- A record of Risk Assessment.
- Details of system operation relevant to controlling the risk.
- The precautions to be implemented.
- System inspection and check procedures.
- All details of precautions carried out including checks, inspections, cleaning and disinfection.

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 logbook should contain simple schematic diagrams of the domestic hot and cold water systems indicating the areas of storage and areas of distribution. This information may already be available in the building record drawing systems but for ease of reference simple line diagrams should be considered for the logbook.

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 log book system and updated as required. The details of persons who are trained and competent to undertake the works should also be recorded in the log with details of the training undertaken. This also applies to specialist contractors who may undertake part of these duties.

The operating logbook document should state the details of the persons appointed as being responsible for the operational policy and management of precautions regarding control of Legionellosis on the site. The responsibilities should be clearly set out and lines of communication defined. Any specialist water treatment company providing a service on site and persons responsible for any auditing of the system operation and documentation should also be defined within the structure.

The present precautionary measures and maintenance activities should continue and the measures should be reviewed on an ongoing basis dependant on feedback on systems conditions and updated knowledge on the control of Legionella bacteria.

Consideration should be given to the inclusion of periodic water quality tests in order to monitor and record changes in local water conditions i.e. cold water from storage cisterns, calorifiers and associated outlets.

This Review relates to observations made and information supplied from the existing Risk Assessment together with information supplied by others.

The following observations and recommendation were made in the 2011 Risk Assessment Review.

Adjust TMV's outlet temperatures to between 39^{o}C and 43^{o}C.

I was informed that this has been carried out.

TMV's to be serviced and maintained as per manufacturer's recommendations.

This has not been carried out.

Insulation on pipe work in office area calorifier room to be replaced.

This has been carried out.

Continue to clean and disinfect all showerheads quarterly. Record when carried out.

This has been not carried out since 2011.

Locate the electric local water feature that supplies the Disabled Toilet wash basin within the Southside berth Holders facilities

This has not been carried out.

Water features and ponds in Marina complex to be cleared of algae, sediment and debris on an annual basis. Fit adequate disinfection systems eg Ultra violet and filtration system to ponds if cascade and fountain are to be brought back into service.

The ponds have now been completely drained and I was informed that they are not likely to be re-instated. If they are re-instated the recommendation remains.

I would recommend bacteriological and legionella water samples be taken if temperatures fall outside the required limits.

This has not been carried out.

Continue temperature monitoring of the domestic cold water system and record in logbook.

This has been carried out.

I would recommend that temperature monitoring and flushing of the pontoon hoses is carried out as regularly as needed to keep the water temperature to below 20°C.

This has not been carried out.

Weekly flushing of all low use infrequently used facilities showers, wash down hose reels etc. and record when carried out. Especially in winter months when facilities are not used.

This has not been carried out.

If access allows, visually inspect the calorifiers internally for scale and sludge on an annual basis.

I was informed that this has not been carried out.

Continue temperature monitoring of the domestic hot water system and record in logbook.

This has been carried out.

Fit temperature gauges to the flow (and return where fitted) pipe work on hot water calorifiers for monthly temperature monitoring.

This has been carried out.

Purge all calorifiers to drain annually and record when carried out.

I was informed that this has not been carried out.

Ensure all calorifiers are adjusted to store hot water at a minimum of **60^{o}C** and return is a minimum of **50^{o}C** or more at all times.

This has not been carried out on the Southside calorifiers but the Northside Calorifier temperatures are now satisfactory.

A dedicated water systems logbook is in place and some Legionella management is being carried out and recorded.

System Reference	Ocean Village Marina
Location	Various Areas on Site
Method	Visual Assessment and Temperature Profiling

COLD WATER STORAGE

There were no cold water storage tanks at Ocean Village Marina all services were provided from the mains water services in all buildings.

HOT WATER STORAGE

Hot water storage within Ocean Village Marina Office consists of one directly heated vertical calorifier located in the room between both sets of toilets.

Hot water storage within Ocean Village Southside Berth holders facilities consists of two directly heated vertical calorifiers located in the first floor Boiler Room in the female facilities.

The Marina Office calorifier is a gas fired unit with factory fitted insulation under the outer metal casing. The calorifier is supplied directly from the mains water services via a pressure reducer and is fitted with a return system and is fitted with one circulating/return pump. There are temperature gauges fitted to the flow and return pipe work for the monthly monitoring of water temperatures.

The calorifier is fitted with a drain valve; this should be purged to drain on at least an annual basis and recorded when carried out. I was informed that this is not being carried out.

If access allows, the calorifier should be inspected internally for sludge and scale on an annual basis. I was informed that this is not being carried out.

This calorifier serves all hot water outlets within the ladies, gents and accessible toilets.

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

Marina Office Calorifier Storage	**62.9^{o}C**	**Satisfactory**
Marina Office Calorifier Return	**53.0^{o}C**	**Satisfactory**

ACoP L8 recommends hot water should be stored at a minimum of 60^{o}C at all times. The return temperature should be maintained at a minimum of 50^{o}C or more at all times.

The Southside Berth Holder Facilities calorifiers are two Megaflo units with factory fitted insulation under the outer plastic casings and directly heated by four electrical elements each. The calorifiers are supplied directly from the mains water services via pressure reducers and have no return system or circulation pump.

There are temperature gauges fitted to the flow pipe work for the monthly monitoring of water temperatures.

Both calorifiers are fitted with drain valves; these should be purged to drain on at least an annual basis and recorded when carried out. I was informed that this is not being carried out.

If access allows, the calorifiers should be inspected internally for sludge and scale on an annual basis. I was informed that this is not being carried out.

The calorifiers serve the showers only within the male (Calorifier No. 1) and female (Calorifier No. 2) facilities.

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

Southside Berth Holders Calorifier No 1	Storage	47.6°C	Not Satisfactory
Southside Berth Holders Calorifier No 1	Return		No return system fitted
Southside Berth Holders Calorifier No 2	Storage	48.0°C	Not Satisfactory
Southside Berth Holders Calorifier No 2	Return		No return system fitted

ACoP L8 recommends hot water should be stored at a minimum of 60°C at all times. I would recommend the calorifiers be adjusted as soon as is practicable to achieve these temperatures.

There was also a local water heater located within the Marina Office Kitchen, the Dock Office (on pontoon) and the male and female toilets within the Southside Berth Holders Facilities. The water heaters store a very small amount of hot water and are supplied directly from the mains water services.

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 storage within Ocean Village Marina Office Block distributes from one hot water calorifier located in the room between the ladies and gents toilets. This calorifier serves all hot water outlets within the ladies, gents and accessible toilets.

Domestic hot water within The Southside Berth Holder Facilities distributes from two calorifiers located within the Boiler Room within the Female Facilities. The calorifier serves the showers only within the male and female toilets.

Domestic hot water within the Marina Office Kitchen, the Dock Office (on pontoon) and the male and female toilets within the Southside Berth Holders Facilities distributes from electric local water heaters.

Mains cold water within Ocean Village Marina serves all three calorifiers, all cold water outlets, appliances and the electric local water heaters on site.

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:-

Marina Office	
Gents Toilet Wash Basin	**62.8°C Satisfactory**
Ladies Toilet Wash Basin	**62.0°C Satisfactory**
Kitchen Sink	**Water Heater** **57.7°C Satisfactory**
Dock Office (on Pontoon)	
Kitchen Sink	**Water Heater** **53.3°C Satisfactory**
Southside Berth Holders Facilities	
Cleaners Room in **Female Toilets Sink**	**Water Heater** **No Access**
Female Toilets Wash Basin	**Water Heater** **41.9°C Not Satisfactory**
Male Toilets Wash Basin	**Water Heater** **43.5°C Not Satisfactory**
Disabled Toilet Wash Basin	**46.1°C Inlet to TMV Not Satisfactory** **35.8°C TMV Outlet Not Satisfactory** **Water Heater not located**

ACoP 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 (and ideally should not be less than 39°C). The hot water supplying the TMV's should be 50°C at the TMV inlet as recommended in ACoP L8.

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

Marina Office	
Gents Toilet Wash Basin	**10.5°C Satisfactory**
Ladies Toilet Wash Basin	**10.5°C Satisfactory**
Kitchen Sink	**10.7°C Satisfactory**

Dock Office (on Pontoon)	
Kitchen Sink	**8.3°C Satisfactory**

Southside Berth Holders Facilities	
Cleaners Room in Female Toilets Sink	**No Access**
Female Toilets Wash Basin	**11.6°C Satisfactory**
Male Toilets Wash Basin	**9.3°C Satisfactory**
Disabled Toilet Wash Basin	**11.9°C Satisfactory**

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

GENERAL

- The wash basin in the Southside Berth Holders Disabled Toilet is supplied by an electric local water heater which could not be located, this should be investigated further.

- The Pontoon hose reels are supplied by a blue UPVC type plastic water hose that is run along the side of the pontoons. This is un-insulated and I would expect the water temperature in the summer to exceed the recommend maximum of 20.0°C, as outlined in L8. I would recommend that temperature monitoring and flushing of the hose is carried out as regularly as needed to keep the water temperature to below 20.0°C.

- If the ponds and fountains are re-instated then I would recommend that adequate disinfection systems (eg ultra violet lights and filters) are installed to kill any legionella bacteria within the ponds and the ponds be cleaned regularly along with water samples taken periodically.

- All showerheads should be cleaned/descaled and disinfected on a quarterly basis or as necessary and recorded in a water system logbook. I would recommend showerheads be removed when flushing to prevent the creation of aerosols.

RECORDS

A logbook is being used on this site but not all practices are being recorded.

Details of the following should be included:

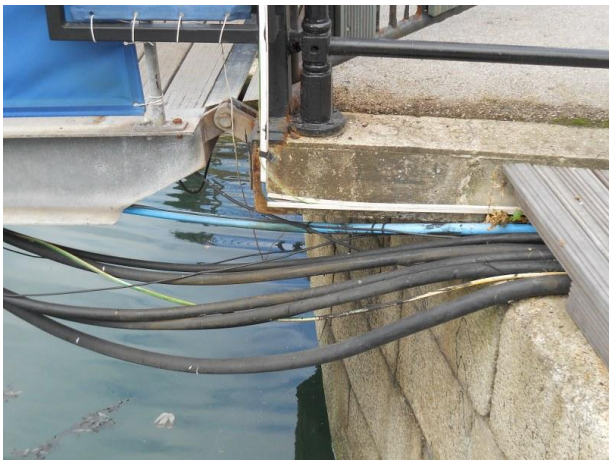
- Maintenance carried out on water systems.
- Monthly temperature monitoring.
- Flushing of infrequently used outlets (weekly).
- Annual inspections of calorifiers.
- Purging of calorifiers.
- Changing/cleaning of inline filters.
- Faults and defects to be recorded.
- Audit sheet for inspections of the logbook and dated when completed.

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

ADDITIONAL PHOTOGRAPHS

Northside Pontoon

Uninsulated water hose.



SUMMARY OF RECOMMENDATIONS

For ease of reference the actions and recommendations made throughout this report are summarised in this section. They should read in conjunction with the preceding observations section.

LEGIONELLA RISK CATEGORY KEY

1 = Insignificant risk.

2 = Controlled risk.

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

4 = Potential hazards identified, but uncertain about risk.

5 = Risk Uncontrolled

Site Reference/ Address	Remedial/Recommendations	Priority	Date Actioned	Signature
Hot Water Storage Ocean Village Marina	Ensure that the two Southside calorifiers are adjusted to store hot water at a minimum of **60°C** or more at all times.	**5**		
	Purge all calorifiers to drain annually and record when carried out.	**4**		
	If access allows, visually inspect all calorifiers internally for scale and sludge on an annual basis.	**4**		
Distribution Ocean Village Marina	Ensure weekly flushing of all low use infrequently used facilities, showers, wash down hose reels etc is carried out and record within the logbook. Especially in winter months when facilities are not used.	**5**		
	I would recommend that temperature monitoring and flushing of the pontoon hoses is carried out as regularly as needed to keep the water temperature to below 20°C.	**5**		
	I would recommend bacteriological and legionella water samples be taken if temperatures fall outside the required limits.	**5**		

Site Reference/ Address	Remedial/Recommendations	Priority	Date Actioned	Signature
	Fit adequate disinfection systems eg ultra violet and filtration system to ponds if cascade and fountain are to be brought back into service.	**5**		
	Locate the electric local water feature that supplies the disabled toilet wash basin within the Southside berth holders facilities.	**5**		
	Clean and disinfect all showerheads quarterly, or if necessary. Record within the logbook when carried out.	**4**		
	TMV's to be serviced and maintained as per manufacturer's recommendations.	**3**		
	Adjust TMV's outlet temperatures to between 39^{o}C and 43^{o}C.	**5**		
	A Written Scheme should be prepared to ensure that all necessary controls are maintained, monitored and remain effective. BS8580 states – 'Note - The Risk Assessment does not involve the preparation of the written scheme but rather provides information that is critical to the preparation'.	**5**		

Site Reference/ Address	Remedial/Recommendations	Priority	Date Actioned	Signature
	Ensure that all on-site personnel who carry out Legionella management are competent and adequately trained in Legionella management.	**5**		
	Ensure electric local water heaters (but not instantaneous electric water heaters) achieve a minimum of **50°C** within one minute at the outlet.	**5**		