



MINISTRY OF DEFENCE

Strategy & Policy Directorate

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MANAGEMENT ARRANGEMENTS FOR THE CONTROL OF LEGIONELLA (INCLUDING HOT AND COLD WATER SYSTEMS AND COOLING TOWERS)

Practitioner Guide 07/10

Health & Safety

Document Aim:

The aim of this document is to provide outline guidance to all those within the MOD who are responsible for the control of legionella in cooling towers, hot & cold water systems on the defence estate.

Document Synopsis:

This document provides guidance for all parts of the MOD Estate involving work activity and or premises where water is used or stored and where there is a means of creating and transmitting water droplets, and thereby causing a reasonably foreseeable risk of Legionellosis.



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Related Documents

e.g. Other JSP leaflets, etc	JSP 375, Vol 2, Leaflet 19
e.g. Other practitioner guides	
e.g. EBMS Processes	

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Foreword

This Practitioner Guide is published by Defence Estates for application across all areas of MOD and the Armed Forces and has been revised to reflect changes in legislation and or MOD policy. The Guide is mandated for use on all Defence Estates let contracts.

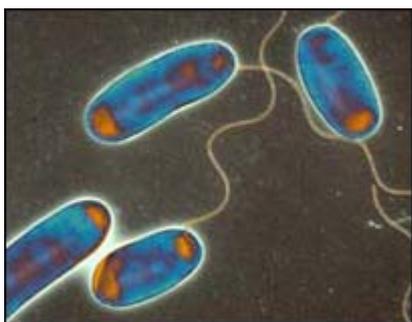
1. SCOPE

1.1 This document provides guidance for all parts of the MOD Estate involving work activities and/or premises where water is used or stored and where there is a means of creating and transmitting water droplets, and thereby causing a reasonably foreseeable risk of Legionellosis.

2. INTRODUCTION

2.1 Legionnaires' disease is a potentially fatal form of pneumonia which can affect anybody, but which principally affects those who are susceptible because of age, illness, immuno-suppression, 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.

2.2 The incubation period ranges between two and ten days and usually begins with a headache, muscular pain and a general feeling of being unwell. These symptoms are followed by high fever and shaking chills. Nausea, vomiting and diarrhoea may occur. On the second or third day dry coughing develops and is often accompanied by breathing difficulties. Effective treatment may be achieved by the use of antibiotics particularly if this is done in the early stages of the infection.



Legionella Bacterium

2.3 Infection is attributed to inhaling legionellae, either in water droplets which are small enough to penetrate deeply into the lung, or in droplet nuclei (the particles left after the water has evaporated). Legionellae are common in natural sources of water such as rivers, ponds and can also be found in water supplies but at a level which would not be deemed a risk to health. They may enter man-made systems or water services, where they can multiply under certain conditions and, if there is a means of creating and transmitting water droplets, people in the vicinity may be at risk. Most cases and outbreaks of Legionellosis have been attributed to water services in buildings, cooling towers and whirlpool spas. Other sources have been identified in foreign outbreaks including a humidification system, industrial coolants and respiratory therapy equipment.

3. SUSCEPTIBLE WATER SYSTEMS

3.1 Although not an exhaustive list, the following systems present a potential risk for exposure to the legionella bacteria:

- a. Cooling towers.
- b. Evaporative condensers.

- c. Hot and cold water services.
- d. Showers and or emergency showers.
- e. Eye wash sprays.
- f. Sprinklers and hose reel systems.
- g. Lathes and machine tool coolant systems.
- h. Spa baths and pools in which warm water is deliberately agitated and re-circulated.
- i. Vehicle wash systems.
- j. Fountains and water features.
- k. Dental equipment.
- l. Fire hose reels.

4. KEY PERSONNEL – ROLES AND RESPONSIBILITIES

4.1 HEAD OF ESTABLISHMENT

4.1.1 The Commanding Officer / Head of Establishment (CO/HoE) shall undertake the duties of the “Duty Holder” as defined in L8¹ and appoint a person to take day-to-day responsibility for controlling any identified risk from legionella bacteria; This person shall be hereafter referred to as the “Responsible Person”, and shall be appointed, in accordance with L8 para 39.

4.1.2 Having made the appointment the Co/HoE is to have in place a suitable and sufficient monitoring regime to ensure that their responsibilities are being **discharged**.

4.2 DUTY HOLDER

4.2.1 The Duty Holder shall have access to competent advice/assistance about the risks of exposure to legionella in the water systems present on the premises and the necessary control measures. Contractors or consultants can be employed to implement the necessary controls to prevent the proliferation of legionella bacteria, but the responsible person shall ensure they are competent to undertake the tasks required.

4.2.2 CO/HoE’s shall make reasonable enquires to satisfy themselves as to the competency of contractors in the area of work before entering into contracts for the treatment, monitoring and cleaning of water systems or other aspects of water treatment and control.

Note: The necessary competency checks will have already been carried out by DE/Regional Prime Contract staff for DE let and managed contracts.

4.2.3 The roles and responsibilities of CO/HoE as the Duty Holder are that they shall:

- a. Ensure that a Legionella Management Plan (LMP) is prepared and implemented for the Establishment.
- b. Ensure that the LMP is reviewed at regular intervals and ensure that its effectiveness is monitored and is maintained up to date.

¹ Approved Code of Practice Legionnaires’ disease “The Control of Legionella Bacteria in Water systems”

- c. Ensure appropriate checks are made of any organisation undertaking work related to the LMP to establish that they are competent to undertake such works.
- d. Ensure that risk assessments and written schemes² are undertaken for water systems under his control.
- e. Receive reports and advice from the “Responsible Person” with regard to areas at risk of legionella, and act accordingly.
- f. For the management of water systems that fall within the remit of a Regional Prime Contract (RPC), formally appoint the Site Estate Team Leader (SETL) as the “Responsible Person” and require the SETL to take managerial responsibility.
- g. For the management of water systems outside the remit of a RPC, formally appoint a ‘Responsible Person’ from within their management structure.
- h. For the management of water systems ensure that records are kept for at least 5 years to identify occupancy of each room and that any ‘little used outlets’ are flushed not less than once per week. Where it is difficult to carry out weekly flushing, the stagnant and potentially contaminated water from within the shower/tap and associated dead-leg needs to be purged to drain before the appliance is used. It is important that safe procedures are established and implemented to ensure that flushing is carried out with the minimum production of aerosols.
- i. Have in place suitable and sufficient monitoring regimes to ensure that the responsibilities of the ‘Responsible Person’ are being discharged.

4.3 RESPONSIBLE PERSON

4.3.1 The Responsible Person shall have sufficient authority to act on behalf of the Duty Holder, will be competent and possess sufficient knowledge of the installation to ensure that all operational procedures are carried out in a timely and effective manner.

4.3.2 The Responsible Person shall ensure that a suitable and sufficient assessment is conducted in order to identify and assess the risk of exposure to legionella from work activities and water systems on the premises under the control of the CO/HoE, and any necessary precautionary measures required to reduce the risk of exposure to as low as reasonably practicable.

4.3.3 The Responsible Person is to undertake such checks as is necessary to ensure that organisations such as water treatment companies or consultants together with MOD staff are competent and suitably trained, and have the necessary equipment to enable them to carry out their duties in a safe and proper manner.

4.3.4 The Responsible Person shall:

- a. Assist the CO/HOE in developing the establishments Legionella Management Plan.
- b. Formally appoint the Maintenance Management Organisation (MMO) as the ‘Competent Person’ in accordance with L8 para 41
- c. Ensure that the MMO puts in place suitable Site Management Arrangements in relation to the management of legionella and develops, maintains and updates such arrangements.

² L8 Approved Code of Practice Legionnaires’ disease - Control of Legionella Bacteria in Water systems

- d. Ensure that the MMO undertakes risk assessments and from the results of findings of the risk assessment, develop written schemes of work for all hot and cold water systems on those assets which are within scope of the MMO and ensures that these are continuously maintained and updated.
- e. Advise the MMO of any new builds requiring future assessment and maintenance.
- f. Receive reports and competent advice from MMO with regard to the management of legionella and action accordingly.
- g. Ensure that anyone undertaking work related to the management of legionella is competent to undertake such tasks.
- h. Ensure that responsibilities and lines of communication between on-site parties are established correctly and clearly laid down.

4.4 COMPETENT PERSON

4.4.1 The MMO as the Competent Person shall be responsible for:

- a. The preparation of detailed legionella risk assessments for all water systems to include schematic plans and a listing of the legionella risks.
- b. Implementing the Site Management Arrangements for the control of Legionella.
- c. Ensure that all works on water systems under their control are carried out in accordance with the requirements of L8.
- d. The preparation of written schemes of work arising from the risk assessments identifying adequate and robust control measures.
- e. Undertaking a regime of sampling and analysis of all water outlets in accordance with L8.
- f. Putting into place maintenance regimes to implement the controls to prevent the proliferation of legionella bacteria.
- g. Keeping and maintaining adequate records and undertaking regular reviews and updating records and control systems.
- h. Informing the Responsible Person of any new water or modified systems that require a legionella risk assessment, undertaking such risk assessments and adding it to or amending the Legionella Risk Assessment List.
- i. Making recommendations to the Responsible Person (and any designated technical advisor) for actions required on legionella related issues including:
 - (a) Advising on the need to amend testing and sampling processes or additional surveying based on risk assessment.
 - (b) Following the discovery of Action Levels of legionella bacteria, take action in accordance with L8.
 - (c) The identification and implementation with regard to the training needs of those persons under their control.

4.5 EMPLOYEES

4.5.1 All water system operators and maintenance staff shall ensure that they maintain their competence and shall take reasonable care of themselves and conduct their duties safely by following the instructions and training provided either by their employer or the MOD.

5. COMPETENCIES (INFORMATION, INSTRUCTION AND TRAINING)

5.1 Those who are appointed to carry out the control measures and strategies shall be appropriately informed, instructed and trained and have their suitability for the appointment assessed. They shall be trained to a standard which ensures that tasks are carried out in a technically safe and competent manner. The level of competence required is dependent on the needs of the situation and the nature of the risks involved. To maintain competence periodic refresher training shall be provided and records maintained of all training undertaken. Although training is an essential element of competence, experience, knowledge and other personal qualities are needed for them to undertake their role safely.

5.2 All personnel required to assess risk and apply controls shall be competent, adequately trained and aware of their responsibilities. Water system operatives and maintenance staff shall also undertake suitable training to ensure that their tasks are conducted in a technically competent manner.

Those employees required to undertake the responsible person role shall attend an appropriate training course eg Legionellosis -The Role of the Responsible Person Course (1 day course)

5.3 Refresher training shall be provided at intervals not exceeding two years. If there is a significant change/modification to the system or written schemes, appropriate training shall be provided immediately with adequate supervisory support.

6. BUILDING SERVICES

6.1 In the majority of Establishments the control of legionella in cooling towers and hot and cold water services will be managed by a MMO. In these cases the "Responsible Person" will need to ensure that adequate communication chains are established and the appropriate control measures applied. The procedures applied to building services are identified in L8.

7. RECORD KEEPING - THE RESPONSIBLE PERSON

7.1 The Responsible Person shall ensure that appropriate records are kept, including:

- a. Details of the persons responsible for managing, conducting the risk assessments and implementing a written scheme.
- b. The significant findings of the risk assessments and any remedial action taken in the form of an action plan.
- c. The written scheme required for controlling the risk to exposure and details of its implementation.
- d. The dates and results of any monitoring, inspections, tests or checks carried out, including information as to whether the system is in operation or not.
- e. Calibration certification of temperature measurement equipment used.
- f. Any amendments to the Competent Persons Site Management Arrangements

7.2 The above mentioned records shall be retained for a minimum of five years.

8. THE RISK ASSESSMENT PROCESS

8.1 The risk assessment shall take into consideration all parts of the water system³ and identify any areas which have the potential to harbour Legionella bacteria and provide suitable conditions for the bacteria to proliferate. It shall also identify the need for an assessment of risk from exposure to legionella with any activities and associated water systems on the premises, including any necessary control measures. The assessment shall include:

- a. Identification and evaluation of potential sources of risk.
- b. The particular means by which exposure to legionella is to be prevented, or
- c. If prevention is not reasonably practicable, the particular means by which the risk of exposure from legionella is to be controlled.

8.2 Where the risk assessment demonstrates that there is no reasonably foreseeable risk or that the risks are insignificant and unlikely to increase, no further assessment or measures are necessary. However, should the situation change, the risk assessment shall be reviewed and any necessary control measures implemented.

8.3 The risk assessment shall be reviewed every two years (as a minimum, L8 para 38) or more frequently if there is reason to believe that the original assessment is no longer valid. Including:

- Changes to the system
- Changes to the building use patterns
- Checks indicate controls are no longer effective

8.3 Details of the control measures deemed necessary to control the risks identified in the risk assessment should be consolidated into a written scheme.

8.4 UNDERTAKING A RISK ASSESSMENT

8.4.1 A number of factors are required to create a risk of exposure to legionella, these include:

- a. The presence of legionella bacteria.
- b. Conditions suitable for multiplication of the organisms to high numbers (e.g. a suitable temperature (20°C to 45°C) and a source of nutrients e.g. sludge, scale, rust, algae and other organic matter).
- c. A means of creating and disseminating breathable droplets (e.g. the aerosol generated by a cooling tower or shower).
- d. Legionnaires' disease is a potentially fatal form of pneumonia which can affect anybody, but which principally affects those who are susceptible because of age, illness, immunosuppression, smoking etc.

8.4.2 The individual nature of each site and system needs to be considered when conducting a risk assessment.

8.4.3 The first step should be to produce a site survey, listing all water systems in use, including a register of all associated plant, pumps, strainers and other relevant items. This

³ Includes hot and cold water also cooling towers

should then be combined with an up-to-date plan(s) showing the layout of the plant or water systems including any sections which may be temporarily out of use.

8.4.4 Once the register of assets and plan(s) has been completed, the parts of the water system that pose a risk can be identified, i.e. where legionella may proliferate and be disseminated throughout the network.

8.4.5 Below is a list of factors that need to be considered when conducting the risk assessment:

- a. The source of the water supply, i.e. mains supply or direct supply from a bore hole.
- b. Possible sources of contamination to the supply water before it reaches the supply point.
- c. The normal plant operating characteristics.
- d. Large storage tanks and their configuration.
- e. Occupancy patterns for living accommodation.
- f. Unusual, but reasonably foreseeable operating conditions, e.g. breakdowns.
- g. Specific risk assessments shall be completed for any processes involving the use of cleaning reagents covered by the Control of Substances Hazardous to Health Regulations (COSHH) or where any procedure might, if adequate precautions were not taken, expose staff to infection.
- h. Appropriate protective clothing and respiratory protection shall be provided.
- i. All affected water outlets shall be labelled during chemical disinfection and warning notices displayed at the entrance to buildings. Appropriate precautions and notices shall be provided during thermal disinfection.
- j. If procedures will involve the interruption of drinking water or the supply of water to sanitary facilities etc. alternate provision shall be made for the staff working in the area.

8.5 A legionella risk assessment flowchart can be found at JSP 375 Vol 2 leaflet 19 Annex A.

9. CONTROL MEASURES

9.1 The risk from exposure to will normally be controlled by implementing measures to prevent the proliferation of legionella bacteria in the system and reduction of exposure to water droplets and aerosol.

9.2 Precautions shall, where appropriate, include the following:

- a. Control of the release of water spray.
- b. Avoidance of water temperatures between 20 °C and 45 °C.
- c. Avoidance of water stagnation and dead ends in pipework.
- d. Maintaining the cleanliness of the system and the water in it.
- e. Only utilising approved materials in the construction and maintenance of the water system.

f. Ensuring that the system is operated correctly, safely and is kept well maintained.

g. Implementing a suitable water treatment regime where appropriate and ensuring it is carried out.

h. Ensuring that a flushing regime is implemented especially when there is transient occupancy.

9.3 If precautions are to remain effective, the condition and performance of the system will need to be monitored. This shall be the responsibility of the Responsible Person who shall ensure that monitoring is undertaken in accordance with the written scheme.

9.4 RECORD KEEPING - CONTROL MEASURES

9.4.1 To ensure that the necessary control measures continue to be applied and that adequate information is available, a record of the assessments, precautionary measures and treatments shall be kept by the MMO.

9.4.2 The following information shall be kept:

- a. Details of the Responsible Person who has been appointed by the Duty Holder for ensuring that all measures required for the Control of Legionella are implemented.
- b. A risk assessment together with a written action plan and control measures.
- c. Plans or schematic drawings of the water system.
- d. Details of the precautionary measures that have been implemented.
- e. Details of any remedial works conducted on the water system and the date of completion.
- f. A log detailing visits by contractors, consultants and other personnel.
- g. Cleaning and disinfecting procedures together with associated reports and certificates.
- h. Water analysis and test reports including routine temperature monitoring for hot & cold water systems.
- i. Cooling tower notification details.
- j. Personnel training records.
- k. The name and position of the person(s), who have responsibilities for implementing the written scheme, what their respective responsibilities are and their lines of communication.
- l. Records showing the current state of the water system.
- m. The signature of the person carrying out the task, or other form of authentication, where appropriate.
- n. List of locations for all Temperature Maintaining Valves (TMV) installed with appropriate temperature records.
- o. Calibration certificates of temperature measurement equipment used.

- p. Action plan for any remedial work identified during the assessment process or inspections.
- q. Records of remedial works carried out are to be recorded for traceability.
- r. Written notification of Little Used Outlets due to change in use/occupancy from HoE.

9.5 MONITORING – Control Measures

9.5.1 Where proliferation potential increases in water samples / temperature trend, action shall be taken. The HoE shall be formally notified and an action plan shall be agreed with all parties and implemented soonest to minimise risk. The HoE shall authorise the relocation of occupants at risk and medical surveillance shall if required be set up until past the incubation period. If a process in a potentially contaminated building is functional effective for the site then guidance shall be sought from the competent person as to temporary safeguards. Monitoring shall be increased and an action plan put in place if the situation gets out of hand or until the situation has been resolved

9.5.2 In order to ensure the continued success of a water treatment programme for cooling towers, both the system and make-up water shall be routinely tested to determine its composition. For the majority of water systems the contracted MMO will conduct this activity

Recommended inspection frequencies for risk systems⁴

Checklist 1: Cooling water installations

System/service	Task	Frequency
Cooling towers and evaporative condensers	Monitor water quality, water use and biocide/chemical use to assess and ensure effectiveness of water treatment regime, including key chemical and microbiological parameters, and observations of internal condition of pond, pack and water	See Table 1
	Central control function, conductivity sensor calibration, blowdown function, uniformity of water distribution, condition of sprays/troughs, eliminators, pack, pond, immersion heater, fans and sound attenuators	Monthly to three monthly, according to risk (See Table 1)
	Clean and disinfect cooling towers/evaporative condensers, make-up tanks and associated systems, including all wetted surfaces, descaling as necessary. Packs shall be removed and cleaned where practicable	Six monthly

Check list 2: Hot and cold water systems

Service	Task	Frequency
Hot water services	Arrange for samples to be taken from hot water calorifiers, in order to note condition of drain water	Annually
	Check temperatures in flow and return at calorifiers	Monthly
	Check water temperature up to one minute to see if it	Monthly

⁴ HSC Approved Code of Practice & Guidance L8

has reached 50 °C in the sentinel taps

	Visual check on internal surfaces of calorifiers for scale and sludge. Check representative taps for temperature as above on a rotational basis	Annually
	Monitoring for Legionella should be take place from the calorifier outlet or the nearest tap to the calorifier outlet plus the return supply to the calorifier or nearest tap to that return supply. Samples should also be taken from the base of the calorifier where drain valves have been fitted. The furthest outlet from the calorifier should also be sampled. Samples may also be required from outlets in areas of particular concern, eg in hospital wards with 'at risk' patients.	Refer to Note below.
Cold water services	Check tank water temperature remote from ball valve and mains temperature at ball valve. Note maximum temperatures recorded by fixed max/min thermometers where fitted	Six monthly
	Check that temperature is below 20 °C after running the water for up to two minutes in the sentinel taps	Monthly
	Visually inspect cold water storage tanks and carry out remedial work where necessary. Check representative taps for temperature as above on a rotational basis	Annually
	Monitoring for Legionella should be take place from the cold water storage tank and the furthest outlet from the tank. Samples may also be required from outlets in areas of particular concern, eg in hospital wards with 'at risk' patients.	Refer to Note below.
Shower heads	Dismantle, clean and descale shower heads and hoses	Quarterly or as necessary
Little-used outlets	Flush through and purge to drain, or purge to drain immediately before use, without release of aerosols	Weekly

NOTE, the complexity of the system will need to be taken into account in determining the appropriate number of Legionella samples to take. For example, if there is more than one ring main present in the building, taps on each ring will need to be sampled. In order to be representative of the system as a whole, samples should be of treated, circulating water and not taken from temporarily stored water, eg at TMV-controlled taps and showers. These may require sampling but this should be determined by risk assessment, eg where such fittings are used in areas where susceptible individuals may be exposed. Apart from annual sampling of calorifier drain, Legionella sampling frequency would be subject to risk assessment.

Checklist 3: Other risk systems

System/service	Task	Frequency
Ultrasonic humidifiers/foggers and water misting systems	If equipment fitted with UV lights, check to ensure effectiveness of lamp (check to see if within working life) and clean filters	Six monthly or according to manufacturer's instructions
	Ensure automatic purge of residual water is functioning	As part of machinery shut down
	Clean and disinfect all wetted parts	As indicated by risk assessment
	Sampling for legionella	As indicated by

Spray humidifiers, air washers and wet scrubbers	Clean and disinfect spray humidifiers/air washers and make-up tanks including all wetted surfaces, descaling as necessary	risk assessment Six monthly
	Confirm the operation of non-chemical water treatment (if present)	Weekly
Water softeners	Clean and disinfect resin and brine tank -check with manufacturer what chemicals can be used to disinfect resin bed	As recommended by manufacturer
Emergency showers and eye wash sprays	Flush through and purge to drain	Six monthly or more frequently if recommended by manufacturers
Sprinkler and hose reel systems	When witnessing tests of sprinkler blow-down and hose reels ensure that there is minimum risk of exposure to aerosols	As directed
Lathe and machine tool coolant systems	Clean and disinfect storage and distribution system	Six monthly
Spa baths	Check niters - sand filters shall be backwashed daily	Daily
	Check water treatment - pools shall be continuously treated with an oxidising biocide	Three times daily
	Clean and disinfect entire system	Weekly
Horticultural misting systems	Clean and disinfect distribution pipework, spray heads and make-up tanks including all wetted surfaces, descaling as necessary	Annually
Dental equipment	Drain down and clean	At the end of each working day
Car/bus washes	Check filtration and treatment system, clean and disinfect system	See manufacturers' instructions
Indoor fountains and water features	Clean and disinfect ponds, spray heads and make-up tanks including all wetted surfaces, descaling as necessary	Interval depending on condition

Table 1

Parameter	Timing	
	Make-Up Water	Cooling Water
Calcium hardness as mg/l CaCO ₃	Monthly	Monthly
Magnesium hardness as mg/l CaCO ₃	Monthly	Monthly
Total hardness as mg/l CaCO ₃	Monthly	Monthly
Total alkalinity as mg/l CaCO ₃	Quarterly	Quarterly
Chloride as mg/l Cl	Monthly	Monthly
Sulphate as mg/l SO ₄	Quarterly	Quarterly
Conductivity µs (Total dissolved solids)	Monthly	Weekly
Suspended Solids mg/l	Quarterly	Quarterly
Inhibitor(s) level mg/l	-	Monthly
Oxidising biocide mg/l	-	Weekly
Temperature °C	-	Quarterly
pH	Quarterly	Weekly
Soluble Iron as mg/l Fe	Quarterly	Quarterly
Total Iron as mg/l Fe	Quarterly	Quarterly
Concentration Factor	-	Monthly
Microbiological Activity	Quarterly	Weekly
Legionella	-	Quarterly

9.5.3 Table 1 contains the typical on-site monitoring checks recommended for good operating practice.

9.5.4 Routine analysis shall be conducted at least monthly.

10. EMPLOYING CONTRACTORS AND CONSULTANTS

10.1 The employment of contractors or consultants does not absolve the:

- CO/HoE of responsibility for ensuring that operational procedures are carried out to the standard required to prevent the proliferation of legionella.
- CO/HoE of satisfying themselves of the competence of the contractors in the area of work before gaining their assistance/service in treating, monitoring and cleaning the water system and other aspects of water treatment and control. The responsible person shall provide assurance that appropriate competency checks have been undertaken
- Contracted MMO for ensuring that they are adequately resourced and have appropriately trained individuals to undertake the role of a competent service provider in support of the Responsible Person.

11. ACTIONS FOLLOWING A CONFIRMED CASE OF LEGIONELLOSIS

11.1 Cases of Legionellosis are reportable under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR). A confirmed case of Legionellosis (i.e. by a GP or medical practitioner's note) shall be reported by the employer in accordance with procedures stated in RIDDOR .

11.2 Where the above applies to a member of staff or contractor working on the Establishment then the incident shall be reported as follows:

- a. On receipt of the GP or medical practitioner's note confirming a case of legionellosis the line manager is to report the incident In accordance with the TLBs accident reporting procedure. The incident shall then be reported in accordance with RIDDOR 1995. RIDDOR Incident Contact Centre Tel 0845 300 9923
- b. Where there is a confirmed case of legionellosis reported to the Establishment H&S/SHEF Advisor, details of where the person works etc. shall be passed to the Duty Holder and Responsible Person and where appropriate the TLB Incident Notification Cell
- c. In all instances where a confirmed case is reported to the Responsible Person the MMO's Health and Safety Representative (i.e. H&S Manager) is to carry out a detailed investigation along with the Establishment H&S Representative and/or CESO where applicable.

11.3 Action to be taken in the event that an outbreak legionellosis is confirmed is contained in L8 appendix 2.

12 INDUSTRY CODE OF CONDUCT:

12.1 An industry 'Code of Conduct' for organisations providing water treatment services has been jointly developed by the British Association of Chemical Specialities (BACS) and the Water Management Society (WMS). Although the Code of Conduct has no legal status, it does provide a degree of assurance about the standards of service that shall be provided to customers. A copy of the Code of Conduct can be obtained from The Water Management Society, Mill House, Tolson's Mill, Fazeley, Tamworth B78 3QB.

13 LEGIONELLA MANAGEMENT PLAN

13.1 The detailed CO/HoE Legionella Management Plan (LMP) will cover MOD, MMO and other site personnel, contractors or 3rd parties working on assets under the control of the CO/HoE. The LMP will include:

- a. The preparation of detailed legionella risk assessments for all water systems to include schematic plans of systems and associated written schemes of work.
- b. Sampling and analysis of water outlets as necessary.
- c. Putting into place maintenance regimes to implement controls to prevent the proliferation of legionella bacteria.
- d. Keeping and maintaining adequate records.
- e. Undertaking regular reviews and updating records and control systems.
- f. Details of the appointment of Responsible Person by the CO/HoE to monitor and audit the implementation of the controls. Example letters are included with the LMP at Annex B.
- g. This is to include the employment of suitably trained and experienced persons to undertake the testing and monitoring.

The Establishments LMP and associated and supporting documentation will be fully developed to comply with:

- a. L8 Approved Code of Practice Legionnaires' disease - Control of Legionella Bacteria in Water systems
- b. The Management of Health and Safety at Work Regulations
- c. The Control of Substance Hazardous to Health Regulations (COSHH)
- d. The Reporting of Incidents, Diseases and Dangerous Occurrences regulations (RIDDOR)
- e. Notification of Cooling Towers and Evaporative Condensers Regulations.
- f. IAC 27 Legionnaires' disease
- g. JSP 375 Volume 2, Leaflet 19 Revised 2010

A "Legionella Management Plan Template" (implemented throughout RPC contracts) is attached at Annex B.

14 DEFINITIONS

Legionnaires' disease	A type of pneumonia caused by bacteria and commonly associated with water systems.
Legionellosis	Term used for infections caused by legionella pneumophila and other similar bacteria
Head of Establishment	The most senior MOD person identified, by the chain of command, as responsible for the site, establishment, base or building.
Commanding Officer	The most senior Service person identified, by the chain of command, as responsible for the site, establishment, base or building.
The Duty Holder	The Head of Establishment (HoE) shall undertake the duties of the "Duty holder".

The Responsible Person	The “Responsible Person” shall be a director or a manager and shall have sufficient authority to act on behalf of the Duty Holder.
The MMO	The organisation responsible for planning, organising and managing the operation, maintenance and repair of equipment and which may include the design and construction of new works.

15 RELATED DOCUMENTS

15.1 Further information can be found in the following publications (it is essential that the latest publication/edition of any document is consulted):

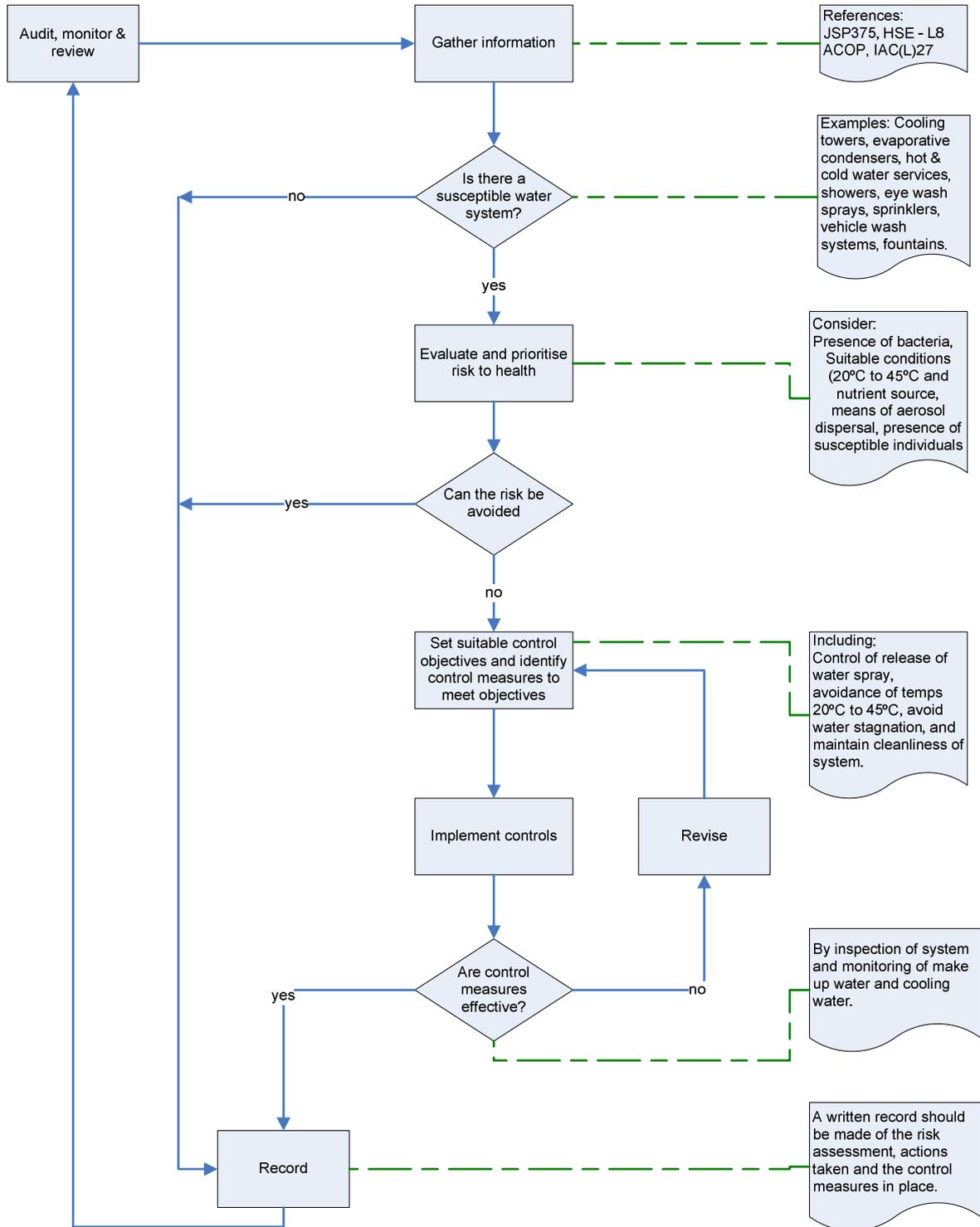
JSP 375 Volume 2:

- a. Leaflet 5 – Substances Hazardous to Health
- b. Leaflet 39 – Health and Safety Risk Assessment
- c. Leaflet 46 – Notifying and Recording of Accidents, Injuries, Diseases and Dangerous Occurrences: Procedures

Guidance and Legislation

- a. “Legionnaires’ disease: The Control of legionella bacteria in water systems.” Health and Safety Commission (HSC) ACOP L8 – Approved Code of Practice & Guidance.
- b. “Legionnaires’ disease: A guide for employers.” HSE guidance note IAC27.
- c. “Minimising the risk of Legionnaires’ disease.” The Chartered Institution of Building Services Engineers, Technical Memorandum TM13

Legionella Risk Management Flow Chart



MANAGEMENT PLAN

FOR

**THE CONTROL OF LEGIONELLA
BACTERIA IN WATER SYSTEMS**

AT

{ESTABLISHMENT}

ISSUE REGISTER

REGISTERED HOLDERS

ISSUE
NUMBER

RECIPIENT

1

2

3

4

5

6

7

8

9

10

AMMENDMENT RECORD

BRIEF DETAILS OF ALL AMENDMENTS ARE INCOPORATED IN THE TABLE BELOW

AMENDMENT NUMBER	PARAGRAPH NUMBER OF TEXT CHANGES, BRIEF SUMMARY OF ALTERATION	NAME AND SIGNATURE	DATE
---------------------	---	-----------------------	------

1

2

3

4

5

1. Approval of Legionella Management Plan

The Legionella Management Plan (LMP) describes the management arrangements which are in place to control the risks of proliferation of Legionella bacteria in water systems at all {Establishment} sites located at {locations} which fall within the scope of the Prime Contract.

This LMP was prepared on behalf of the Duty Holder by {MMO} to comply with the requirements of JSP 375, Volume 2, Leaflet 19 and is subject to periodic review.

APPROVAL AND AUTHORISATION

TITLE: LEGIONELLA MANAGEMENT PLAN FOR THE {ESTABLISHMENT}

ISSUE NUMBER: 1.0

DATED :{ date}

THE CONTENT AND FORMAT OF THIS LEGIONELLA MANAGEMENT PLAN ARE AGREED AND AUTHORISED BY:

Name	
Position	{Duty Holder}
Signed	
Date	

Name	
Position	{Responsible Person}
Signed	
Date	

Name	
Position	{MMO}
Signed	
Date	

2. References

Reference A HSE - Legionnaires Disease - The control of legionella bacteria in water systems - L8.

Reference B JSP 375 - MOD Health and Safety Manual; Leaflet 19 - Control of Legionella (including hot and cold water systems and cooling towers).

3. Introduction

The Approved Code of Practice and Guidance Note entitled '*Legionnaires disease -The control of legionella bacteria in water systems - (L8)*' became effective on the 8th January 2001. L8 gives practical guidance with respect to complying with the Health and Safety at Work Act Control of Substances Hazardous to Health (COSHH) Regulations.

This document forms the Management Plan adopted by The {HoE} in order to comply with the responsibilities to control the proliferation of legionella bacteria in water systems within assets under his control. It **must** be adhered to by all staff, consortium partners (including their Supply Chain) and all persons charged with the responsibility for water systems.

The LMP covers the following key requirements:

- Formalised appointment of a Duty Holder, Responsible Person, and MMO as defined in ACoP L8.
- To undertake detailed risk assessment of all water systems, including production of system schematics.
- Implementation of recommended works and on-going maintenance control regimes from the risk assessments.
- Putting into place a Written Scheme of Inspections & Testing by Competent Persons to monitor and audit that the control measures are effective.
- Alert all stakeholders of any Legionella readings or analysis which justifies the removal of water outlet(s) from use.
- Keeping & retaining adequate testing & inspection records.
- Carrying out regular formal reviews of the Management System and amending inspections & testing regimes as necessary.

4. Roles & Responsibilities

The purpose of this Plan is also to ensure that all Managers are aware of their responsibilities and to provide guidance on the requirements.

Under the terms of Reference B the following appointments have been made:

Duty Holder

The Duty Holder is {HoE}.

For Regional Prime Contract (delete as necessary)

The Duty Holder has delegated the day to day site specific duties to the Site Estate Team Leader (SETL), who is responsible for each of the sites making up the {Establishment}

For Project SLAM PC (delete as necessary)

The Duty Holder has delegated the day to day site specific duties to the Project SLAM, IPT (L,) who is responsible for assets listed in Annex E, i.e., the Listed Demarcations, for the agreed Compliance Period.

Responsible Person

For Regional Prime Contract (delete as necessary)

The Duty Holder has appointed the SETL as the Responsible Person who may delegate his duties as the Responsible Person to the Site Estate Authority Team Member.

Defence Estates on behalf of the Establishment has engaged {MMO} as their competent Contractor for all facilities management activities which are covered by the Regional Prime Contract on the {establishment}. The day to day site specific duties of the Responsible Person will be undertaken by the {MMO site representative, Company}.

For Project SLAM PC (delete as necessary)

The Duty Holder has appointed the Project SLAM IPT(L) as the Responsible Person.

The IPT (L) on behalf of the Establishment has engaged {MMO} as their competent Contractor for all facilities management activities necessary for assets listed in Annex E, i.e., the Listed Demarcations. The day to day site specific duties of the Responsible Person will be undertaken by the {MMO site representative, Company}.

{MMO Site Representative}

The {MMO Site Representative} is to ensure the day to day duties of the Responsible Person for all water systems identified and included within the {MMO} Contract are implemented.

The {MMO Site Representative} has appointed the Planned Maintenance Manager as his deputy along with the Statutory Compliance.

The Planned Maintenance Manager is to assist him in the day to day site specific duties of the Responsible Person.

For Project SLAM PC (delete as necessary)

The {MMO Site Representative, Regional Compliance Manager} is to ensure the day to day duties of the Responsible Person for all water systems identified and included within the {MMO} Contract are implemented.

The {MMO Site Representative} will coordinate with the Building Compliance Manager as his deputy to ensure Compliance.

The Building Compliance Manager is to assist him in the day to day site specific duties as delegated from the Responsible Person to the MMO.

Planned Maintenance Manager

For Regional Prime Contract (delete as necessary)

The PMM is responsible for implementing the Control Measures detailed within the Written Scheme, and for reporting any elevated readings through the {MMO Site representative} up to the Duty Holder via the SETL.

For Project SLAM PC (delete as necessary)

The Regional Compliance Manager is responsible for implementing the Control Measures detailed within the Written Scheme, and for reporting Legionella readings or analysis which justifies the removal of water outlet(s) from use to the agreed Stakeholder listing, including the HoE, RP, DE PFP.

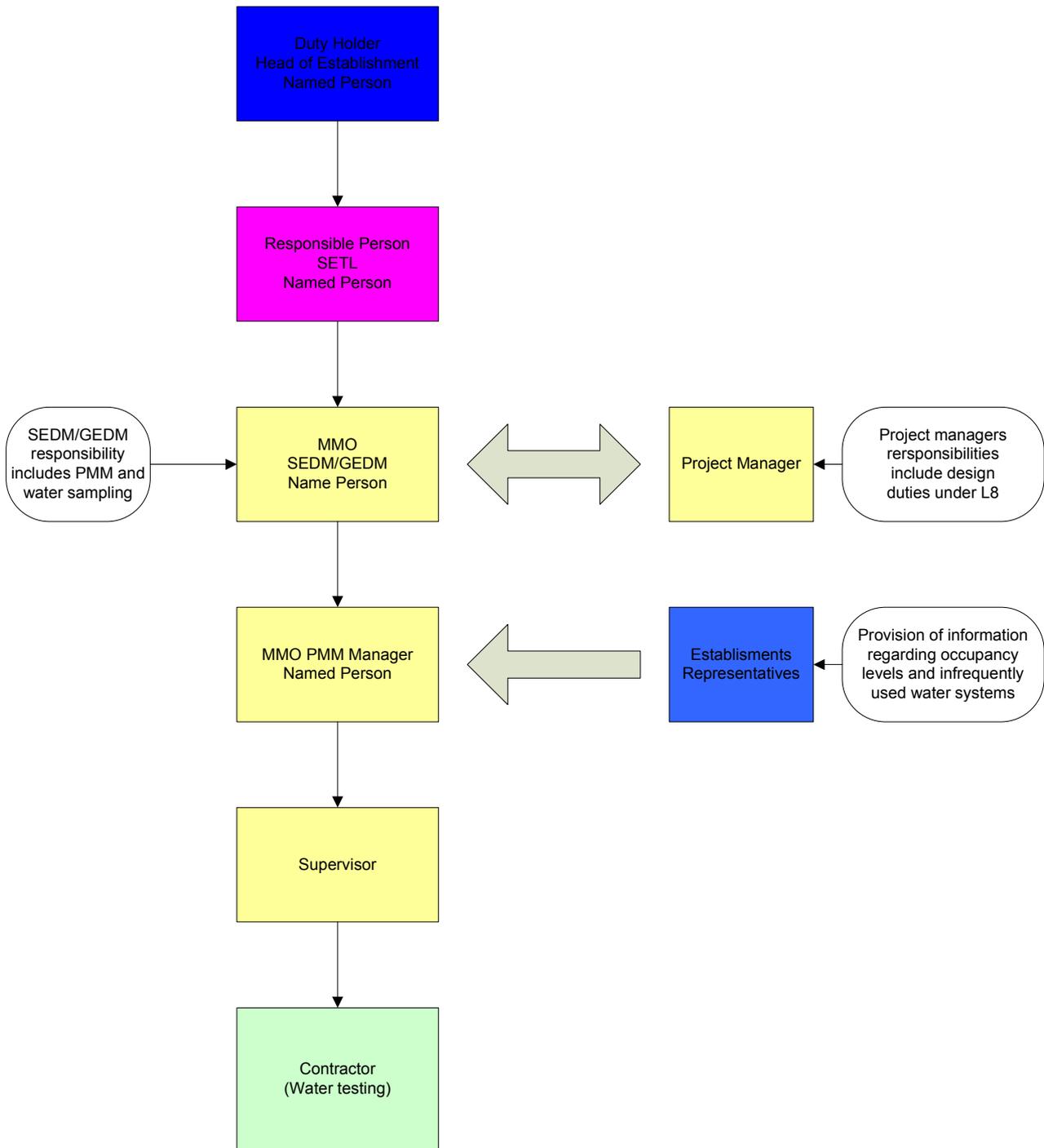
Statutory Compliance Manager

The Statutory Compliance Manager will work with all parties to ensure that the requirements of Reference B (L8) are legally discharged, including timely information regarding elevated readings, and the formal 2 year review of the Control Measures.

Table 4.1 - The L8 Responsibility Chart below details the formal responsibilities and appointments to ensure the requirements of Reference B are met.

More detailed responsibilities for the Formal appointments are detailed in Annex C.

L8 Responsibilities Chart Table 4.1



5. Policy Statement

The {HoE} and the {MMO} accept their responsibility with regard to the effective management of water systems to prevent an outbreak of Legionella on the {Establishment}

We are committed to adhere to the requirements of *Reference A* to design out any parts of the systems, and to control temperatures within the water systems, which could cause proliferation. In addition, all works on and to such systems will be controlled by a formally appointed Manager (L8 Officer), competent in Legionella management.

The Manager of Accommodation Blocks and all other Departmental Managers are responsible for identifying to the MMO via the SETL **all infrequently used** outlets that require flushing through on a weekly basis.

A formal Legionella Risk Assessment will be undertaken for all buildings & systems, and each Assessment will be formally reviewed at a period not exceeding 2 years.

Control measures in the form of remedial works, and on-going monitoring regime (temperature and bacteria count) will be implemented as dictated by the Risk Assessment. Re-testing will always be undertaken following works arising from an elevated reading, and testing frequencies will be continually reviewed according to the results.

The MMO will report any elevated readings through the MMO's Site Delivery Manager along with the proposed remedial to action, who will communicate this to the Duty Holder and Responsible Person.

6. Interface with Non-MMO Contractors

This Management Plan does not cover the day to day management of legionella for works outside of the {MMO} Contract. However it is envisaged that whilst implementing the controls and taking readings etc. there will be instances where unsatisfactory readings may indicate that other parts of the system not under the control of {MMO} are also affected.

Should there be cause for concern regarding any such works or systems, the Responsible Person will be contacted highlighting any perceived deficiencies.

The Responsible Person is to ensure that information between all parties is exchanged in a timely manner to enable them to take the appropriate action and maintain the system so far as is reasonably practicable in a safe condition.

See Annex C for the detailed roles and responsibilities

7. Infrequent & Low Use Water Outlets

Infrequent and low use outlets are parts of a water system that are left unused for continuous periods in excess of 7 calendar days. For example, infrequently used buildings, or, parts of buildings that are unoccupied or well below normal occupation for extended periods.

Water systems in buildings that under normal conditions are left unused for periods in excess of 7 continuous days should have been identified in the Risk Assessment / Written Scheme and therefore weekly flushing will be incorporated into the planned maintenance controls.

For water systems in buildings that are normally in frequent use, but unusual occupancy levels arise (i.e. accommodation buildings during block holiday periods) to such an extent that a significant number of outlets (taps, showers etc) will not be used in any 7 day period, a temporary flushing control regime has to be incorporated to reduce risk.

Heads of Departments within the establishment that control the occupancy levels of buildings must inform the {MMO} where occupancy levels are to significantly drop below normal to prompt weekly flushing of hot and cold water systems.

The {MMO} will maintain a record of any outlets that need to be added or removed from the temporary flushing regime.

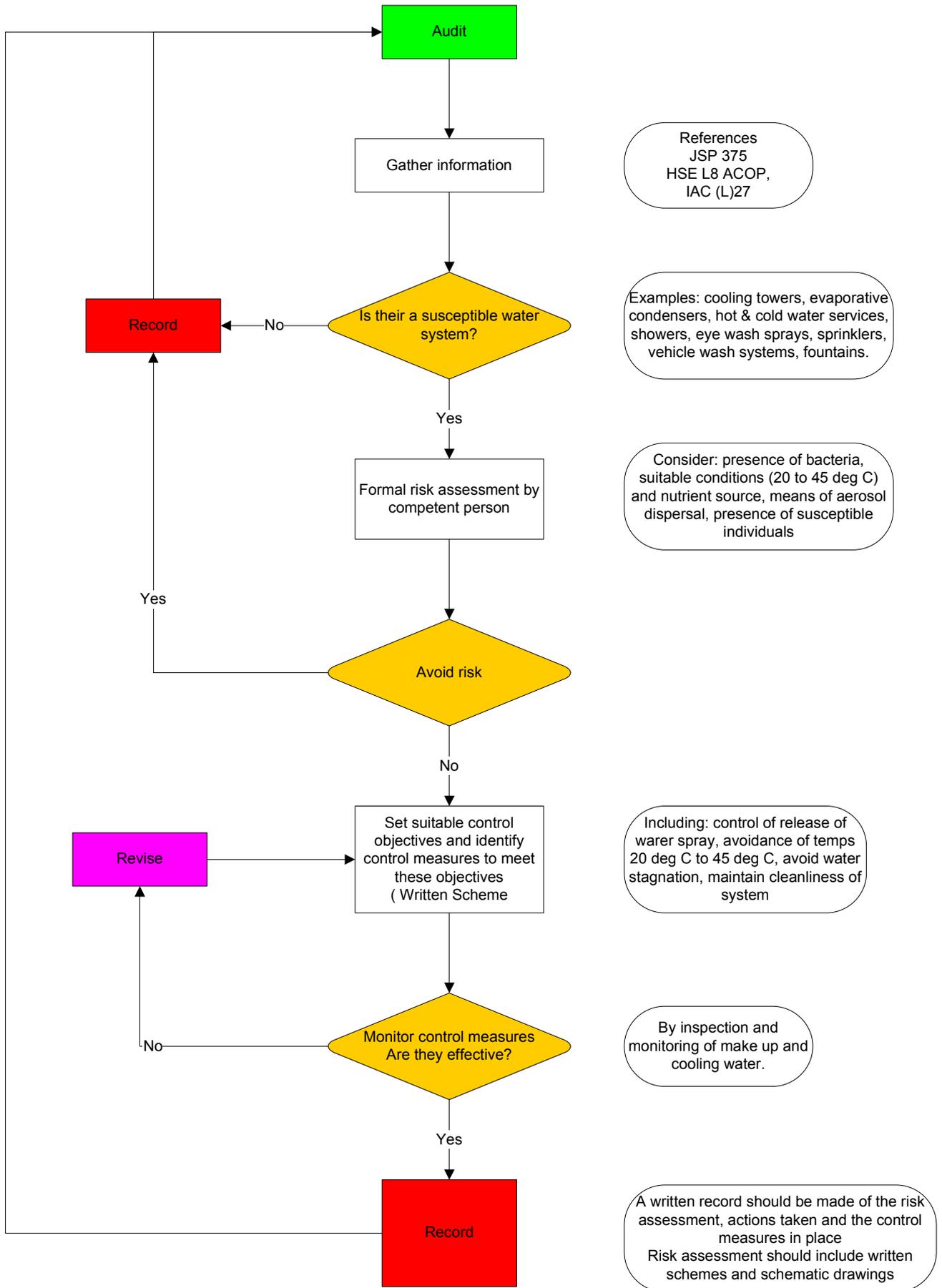
Areas agreed with the Responsible Person that are not within the MMO contract or where there could be joint responsibility for a system it is suggested that areas of demarcation are formally set up and recorded at annex E.

8. Emergency Procedures

8.1 System operating outside of its normal Parameters

In the first instance all cases will to be brought to the attention of the Responsible Person by the {MMO}, who will advise on the immediate actions being undertaken, including the need to shut down the system, evacuate the building, and inform the SHEF Manager. The remedial actions will generally comprise of cleaning and disinfection as detailed in L8, followed by re-testing.

Table 8.1 overleaf details the actions that will be taken by {MMO} following any elevated readings.



8.2 Action in the event of a Legionella outbreak

Full details relating to the action in event of an outbreak is given in Reference A, Appendix 2.

An outbreak is defined by the Public Health Laboratory Service (PHLS) as two or more confirmed cases of Legionellosis occurring in the same locality within a 6 month period.

It is the responsibility of the Proper Officer (appointed by the local authority) for the declaration of an outbreak and implementation of the incident plans to investigate major outbreaks of Legionellosis.

The local authority, CCDC or EHO often with the relevant officer from the enforcing authorities (HSE) may make a site visit.

As part of the outbreak investigation and control, the enforcing authority may:

- Shut down any processes which are capable of generating and disseminating airborne water droplets until sampling procedures and any remedial cleaning or other work has been done. Clearance to restart the system may be required.
- Take water samples before any emergency disinfection is undertaken.
- Request staff health records to discern undiagnosed cases of illness and to help prepare case histories of the people affected.
- Investigate any plant that may be suspected of being involved in the cause of the outbreak. This may involve:
 - tracing pipework runs,
 - scrutiny of operational records,
 - statements from plant operatives and managers, and
 - statements from water treatment contractors or consultants.

If a water system is implicated in an outbreak of Legionnaires' disease, emergency treatment should be carried out as soon as possible as detailed in Reference A.

Any infringements of relevant legislation may be subject to a formal investigation by the appropriate enforcing authority.

On notification by the HSE that a system has been implicated in an outbreak the Responsible Person is to:

Immediately arrange for the {MMO} to carry out remedial actions as specified in Reference A, or as directed by the Enforcing Authority.

- Notify the Duty Holder and the Establishment SHEF Manager.
- Ensure cessation of any work in the area likely to increase the risk of exposure.

The {MMO Site Representative} is to:

- Isolate systems and erect warning notices.
- Advise on remedial actions, and implement remedial works.
- Notify the {MMO} H&S Manager.

The Building Liaison Officer is to:

- Co-operate with the Responsible Person and the {MMO} and arrange evacuation of the building and affected areas if necessary.

The Establishment SHEF Manager and {MMO} H&S Managers are to carry out a joint investigate and report to the Duty Holder and Responsible Person.

9. Actions following a Confirmed Case of Legionellosis

Confirmed Cases of legionellosis are reportable under RIDDOR (Reporting of Injuries, Diseases and Dangerous Occurrences Regulations) 1995. Where a case of legionellosis is confirmed by a Doctor's note the employer will be required to report the incident in accordance with their internal procedures.

Where the above applies to a member of staff or contractor working on a {Establishment} Site then the incident must be reported as follows:

- The Line Manager must report a confirmed case of legionellosis to their employers in accordance with their employer's accident and incident reporting procedure. If a MOD employee, in accordance with MOD policy.
- The Line Manager is to forward a copy of the Doctors note confirming a case of legionella to their HR Department and H&S Manager.
- The Employer is to report to the RIDDOR Incident Contact Centre on receipt of the Doctor's note confirming a case of legionellosis.

Where there is a confirmed case of legionellosis reported to the Establishment H&S Advisor/SHEF, details of where the person works etc. should be passed to the Duty Holder and Responsible Person.

In all instances, where a confirmed case is reported to the Responsible Person / {MMO}, the {MMO} H&S Manager are to carry out a detailed investigation and provide copies of their report to the Duty Holder and Responsible Person in addition to their respective employer.

The Responsible Person is to:

- Where necessary, instruct the {MMO} to carry out the actions described in Section 8 under "System operating outside of its parameters".
- Gather all records associated with the systems where the affected person could have been infected and retain these should there be another confirmed case in the area. See Section 8 of this Plan under 'Action in the event of a Legionella outbreaks'.

10. Record Keeping & Risk Assessment

Accurate and comprehensive records are essential in order to demonstrate that due diligence and reasonable precautions have been put in place in order to avoid non-compliance with the regulations.

All legionella related documents arising from activities controlled by {MMO} will be retained and controlled by the {MMO Site representative} in order to fulfil the above requirements.

The following to be formally recorded:

- Names of people responsible for carrying out various tasks under the Written Scheme
- A Risk Assessment and written scheme of action and control measures
- Plans or schematic drawings of each water system
- Details of precautionary measures carried out including dates and evidence to suggest that these have been carried out correctly
- Remedial work required and carried out including dates
- Log detailing visits by contractors consultants and other personnel

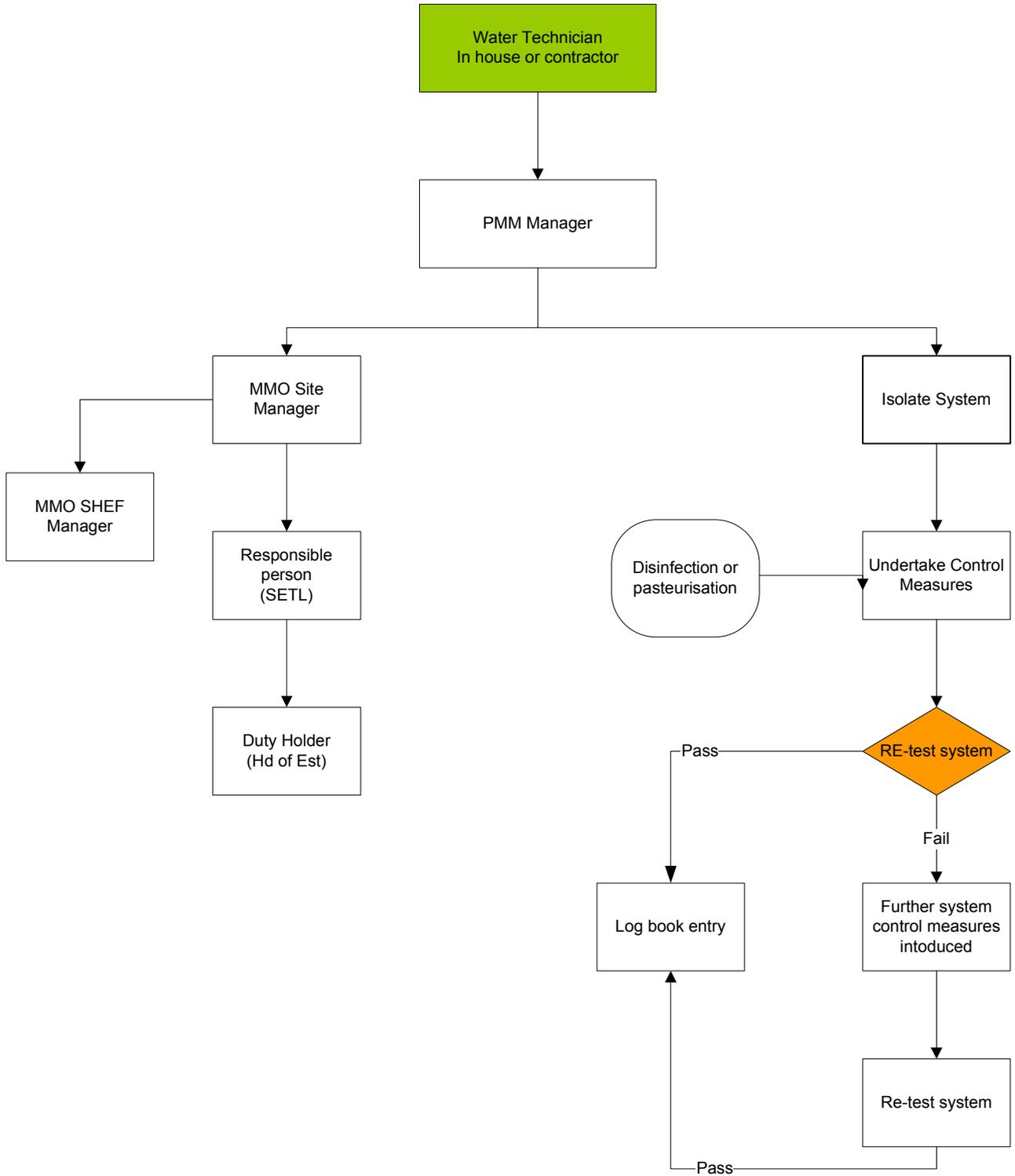
- Cleaning and disinfection
- Results of analysis of water samples
- Training records of personnel
- Name and position of people or persons who have responsibilities for implementing the scheme, their respective responsibilities and their lines of communication
- Current state of operation of the system
- Signature of the person carrying out the work where appropriate
- Calibration certification of temperature measurement equipment used.

Records to be retained for at least five years Day to Day document control - See Annex B.

11. Legionella Risk Assessment Flowchart

Table 11.1 overleaf details the process that {MMO} will follow for undertaking the risk assessment in compliance with L8 and as detailed in MOD Leaflet 19, from JSP 375, Volume 2, Annex A.

Table 11.1



12. Document Review

This document will be reviewed annually, or whenever a change to legislation relating to the control of Legionella is enacted or in response to an incident or other reason to believe it is no longer effective.

Annex A

Named Appointees and Contact Details

Appointment	Name	Telephone Number	Email details
Duty Holder			
Responsible Person			
MMO Site Representative			
PPM Manager			
Compliance Manger			
Direct Delivery Manager			

End of Annex A

Annex B Legionella Document Control Process

The following process will be followed to ensure all documentation related to the control of Legionella in accordance with L8 is correctly recorded and stored for audit purposes:

1. The PPM dockets for all programmed tasks will be generated from the MIS on the scheduled date and issued to the Water Technician or Water Contractor for action.
2. On completion the docket will be filled in along with any associated report sheets, and these will be cross referenced to each other by recording the sheet and docket numbers on each document.
3. The docket and report sheet will be returned to the issuing office for retention and filing in the relevant building logbook /file.
4. Where a docket/report sheet indicates that a temperature etc is out of specification, then this is to be entered on to a non-compliance sheet to be held in a separate file within the office PPM filing system.
5. The non-compliance sheet will have a column to record the remedial works order raised on the MIS to rectify the out of specification asset/system, and also a column to sign this work off as completed once undertaken by the maintenance engineer.
6. If the non-compliance is a previously identified problem e.g. a rectification requirement highlighted in the site risk assessment; then providing there is a programmed remedial action plan in place to undertake the work, the non-compliance sheet can be annotated and signed to that effect.
7. In the event that the non-compliance is judged to be an isolated case e.g. low temperature due to recent draw on the storage vessel etc, then where both the supervisor and water technician agree, the non-compliance can be signed off as no immediate action to be taken but will monitor against next result(s).
8. Where the non-compliance was rectified on the original PPM visit and recorded on the PPM docket, the out of specification occurrence will still be recorded on the non-compliance sheet identifying the PPM docket number and signed off as completed.
9. The recording of the MIS work order number will allow traceability to the work order and any other supporting documentation cross referenced on the completed work order on the MIS system.
10. The non-compliance sheet will be issued to the Responsible Person on a monthly basis for comment and signature of acceptance, and then filed in the non-compliance PPM file; a copy will be left with the {MMO Site Manager} for his records.
11. The building logbooks or equivalent, non-compliance file and a copy of the Legionella risk assessments for the site will all be held in the location of the {MMO} filing system. Access to records etc must be provided if requested to any one who is required to work on water systems.

End of Annex B

Annex C

Detailed Roles and Responsibilities

Head of Establishment

The HoE shall undertake the duties of the 'Duty Holder' and appoint a person/s to take day to day responsibility for controlling any identified risk from Legionella bacteria. Having made the appointment the HoE is to undertake reasonable checks and seek assurances from those appointed that management systems are in place and are being monitored.

Duty Holder

The Duty Holder should have access to competent advice/assistance regarding the risks of exposure to Legionella in the water systems present on the premises and the necessary control measures. Prior to the employment of contractors, organisations should make reasonable enquiries to satisfy themselves of their competency in the area of work before entering into contracts for the treatment, monitoring and cleaning of water systems or other aspects of water treatment and control.

The Duty Holder shall appoint in writing a "Responsible Person" who has sufficient authority to act on behalf of the Duty Holder, be competent and possess knowledge of the installation to ensure that all operational procedures are carried out in a timely and effective manner and to take responsibility for the day to day management of the water systems.

Responsible Person

The Responsible Person is specifically charged with:

- Ensuring that suitable and sufficient risk assessments are in place for all water systems within the Estate and that they are incorporated in to the written schemes of control, implemented and maintained and regularly reviewed.
- Providing advice on Legionella matters to the Duty Holder and Establishment personnel as required.
- Ensuring that all remedial works identified from Legionella surveys and risk assessments are adequately funded and all the works undertaken in timely manner.
- Assess the competence of those undertaking any works on their behalf and provide advice on appropriate training.
- Review and update the Management Plan to take into account changes in legislation and changes in management.
- Routine monitoring of documentation to ensure compliance with L8.
- Ensuring that planned works for which they are responsible take into account the requirements of L8 such that conditions that encourage the proliferation of Legionella do not exist and that the works comply with any water authority local conditions or requirements, and seeking advice where necessary.
- Ensuring that designs take into account the guidelines in L8 and that appropriate test and disinfection certificates are provided by installation contractors.
- Ensuring that consortium partners provide information to the {MMO} on low building occupancy levels which could lead to increased risk of Legionella within infrequently used outlets. Additional temporary control measures can then be applied to these systems.

MMO

The MMO Site Manager is specifically charged with the following duties on behalf of the Responsible Person:

- Ensuring that the risk assessment reviews are carried out & are suitable and sufficient and that written schemes of control are produced.
- Monitoring and ordering surveys etc. from specialist contractors to ensure the Risk Assessment and Written Scheme remains current.
- Providing advice on Legionella matters to the Duty Holder, Responsible Person and Establishment personnel as required.
- Upon receipt of a Legionella Survey Risk Assessment, check for and process any items which require immediate action to be undertaken and prioritise and programme any other remaining remedial works.
- Assess the competence of those undertaking any works on their behalf and provide advice on appropriate training.
- Ensuring that all companies used for Legionella Risk Assessments & surveys have the appropriate insurance and accreditation from certification bodies.
- Review and update the Management Plan to take into account changes in legislation and changes in management structure.
- Routine monitoring of documentation to ensure compliance with L8.
- Ensuring that planned works for which they are responsible take into account the requirements of L8 such that conditions that encourage the proliferation of Legionella do not exist and that the works comply with any water authority local conditions or requirements, and seek advice where necessary.
- Ensuring that new designs take into account the guidelines in L8 and that appropriate test and disinfection certificates are provided by installation contractors.
- Ensuring that the Planned Maintenance Manager carries out weekly flushing of little used outlets as directed by the Responsible Person.
- Liaising with the Responsible Person and building Liaison Officer where remedial works necessitate the removal from service of a system or part of a system.

Planned Maintenance Manager

The Planned Maintenance Manager is specifically charged with:

- Being a point of contact for reports of problems with temperature control /foreign bodies / elevated counts etc. in water systems and arranging requisite remedial action.
- Being responsible for implementing and maintaining log books or equivalent in accordance with BISRIA Application Guides AG19/2000, AG 20/2000, AG 21/2000&AG4/1994.
- Ensuring that each site is compliant with L8, confirm log entries, and to give advice as required.

- Ensuring that all companies used for Legionella works, routine monitoring, testing and sampling are competent and have the appropriate insurance and accreditation from certification bodies.
- Ensuring that all materials and stores used in water systems comply with the WRC Water Fittings & Materials Directory.
- Immediately reporting to the {MMO Site Manager} any problems identified with a system that may necessitate the system or any part of the system being closed down for remedial works.
- Reporting problems found whilst making site visits and ensuring timely remedial work for items classed as high risk are put in hand as soon as possible, with other items deemed as lower risk reported to the {MMO Site Manager}.
- Advising any changes to the water systems to enable the risk assessment / Written Scheme to be updated accordingly.
- Ensuring that planned works take into account the requirements of L8 such that conditions that encourage the proliferation of Legionella do not exist and that the works comply with any water authority local conditions or requirements, seeking advice where necessary.
- Ensuring that flushing regimes for little used outlets are undertaken and records are maintained.

Designers

Designers are to ensure that:

- All new works take into account the requirements of L8 such that conditions that encourage the proliferation of Legionella do not exist, and comply with all water authority local requirements, seeking advice where necessary.
- Materials specified comply with the Water Supply and Fittings Regulations 1999.
- At handover of new works, that the appropriate L8 test and disinfection certificates are provided by the contractors.

General Contractors and sub-contractors

General Contractors and sub-contractors are specifically charged with:

- Ensuring that new works or modifications to existing systems are installed such that conditions that encourage the proliferation of Legionella do not exist and that the Works comply with any water authority local requirements.
- Ensure that all materials used are compliant with the Water Supply and Fittings Regulations 1999.
- Providing certificates of chlorination for modifications / new works as required by the works specification.

End of Annex C

Annex D

Additional guidance extracted from L8 and other best practice

1.0 Codes & Guidance Applicable to Prevention

- HSE - Approved Code of Practice & Guidance Legionnaires Disease '*The Control of Legionella bacteria in water systems*'.
- UK Health Department HTM 2040
- UK Health Department HTM 2070
- DETR Guidance Document to the Water Regulations
- WRC - Water Fittings & Materials Directory
- CIBSE - TM13 2000 - C.o.P Minimising the risk of Legionella
- B.S 6700 Design Specification
- B.S 7592 Method for Legionella Sampling
- B.A.C.S Legionella C.o.P
- The Control of Legionella - A recommended code of conduct for service providers
- IOP Legionella - Good Practice Guide
- BSRIA Guide to Legionellosis
 - Risk Assessment
 - Operation & Maintenance
 - Control Log Book.

2.0 Requirements of the Regulations - Cold Water Systems

Notification - prior to any work on a water system the person or contractor must inform the relevant authority of the works and must receive the appropriate consent.

No person shall:

- a. Install a water fitting to convey or receive water supplied by the undertakers, or alter, disconnect, or use such a water fitting, etc.
- b. Cause, or permit such a water fitting to be installed, disconnected or used; in contravention of any of the provisions of Water Supply Regulations 1999 (Water Fittings).
- c. Use or cause or permit to be connected, a fitting that is damaged or worn, or is likely to cause undue consumption, misuse or contamination of the supplied water.
- d. Undertake erroneous measurement of the supplied water.

3.0 Advisory Annotations

3.1 Storage Cisterns Checklist

- Temperature >20°C - Insulate or prevent heat gain.
- To Water Regulations standards when replaced.
- Lids to be fitted in all cases - suitable material.

- Insect screens to be fitted to overflows and warning pipes.
- Pipe connections to be positioned to allow free circulation (prevent stagnation).
- Where practicable outlets from bottom of cistern.
- Facility to drain down >25mm.
- Facility to clean without disruption to supply.
- Cistern shall be of an appropriate size.
- Measure capacity against usage (drop test).
- Bacteriological sample analysis when required.
- Annual inspection, and if necessary, cleaning.
- Paints and sealants WRC listed.
- Insulation to BS 6700.

3.2 Cold Water Services Checklist:

- Water filters not to have clear castings, cartridge cleansed/changed regularly
- Appropriate back flow protection device to be fitted at each hose reel, wet riser or sprinkler system branch.
- Hose reels to be discharged safely to drain when tested.
- Cold water not to gain more than 2°C above point of entry water temperature.
- If any point of entry water temperature is >25°C, consult water company.
- Water softeners - follow manufacturers recommendations.
- Cold water outlets, mains or stored (within 2 mins of full flow opening) <20°C.
- Dead legs removed and piped through.
- High usage outlets at end of pipe run.
- All suspected infrequently or low use outlets to be disconnected, or run on full flow for 5 minutes weekly (Temp <20°C).
- Booster sets - twin pump - alternate regularly (at least weekly) or remove one pump and keep clean for breakdown purposes.
- Jointing materials, 'O' rings, washers, sealants - WRC listed when replaced.
- Paints, anti-freeze, softening medium, inhibitors, treatment chemical – WRC listed when replaced.
- Insulation to BS 6700 where necessary.
- Check/adjust flows and pressures at outlets to prevent aerosol generation.
- Operate stop valves annually.

3.3 Hot Water System Checklists:

3.31 System Design Parameters Checklist

- Consider local water heater.
- Consider pipe sizing.
- Consider trace heating to maintain temperature.
- Flow temperatures >60°C.
- Minimum temperature anywhere in the circulation pipe work > 50°C.
- All hot water outlets >50°C within 1 minute.
- Flow temperature from calorifier not to fall below 60°C more than twice in 24 hours (and period not to exceed 20 minutes).
- Avoid long dead legs.
- Position high usage outlets at end of run.
- Pipe work from blending valves <2 metres.
- Overall length of pipe work from the spur >5 metres.
- The same restrictions apply to communal blending valves (showers).
- Use fail-safe mixers to avoid scalding.

- Drawn-off points from secondary circulation systems <6 metres.
- Ensure no 'blind' loops on secondary circuit.
- In-line filters to be accessibility - regular maintenance required.
- Every unvented water heater (except for instantaneous, or secondary coil with a capacity not greater than 15 litres) shall:
 - a. be fitted with a temperature control device and either a temperature relief valve or combined temperature and pressure relief valve, and
 - b. be capable of accommodating expansion within the secondary hot water system.
- Pressure gauges on hot water vessels can be a source of contamination.

3.32 Hot Water Service - Operation & Maintenance Checklist

- Check outlet & system usage - remove outlets wherever possible.
- Run low usage outlets weekly until the temperature stabilises.
- Clean and disinfect shower heads and spray tap outlets.
- Shower hoses as well as shower heads to be immersed in 1% disinfection solution.
- Check /adjust flows and pressures to avoid aerosol generations.
- Replace washers, sealants, gaskets with WRC listed items as practicable.
- Circulating twin pumps arrangements - alternate regularly (1-2 days) or remove one pump and keep clean for breakdown purposes.
- Temperature in secondary hot water systems not to exceed 100°C.
- An expansion valve shall be fitted with provision to ensure that water is discharged in a safe & correct manner in the event of a malfunction of the expansion vessel or system.
- Discharges from temperature relieve valves and combined temperature / pressure relief valves shall be made in a safe and conspicuous manner
- No primary circuit vent pipe shall discharge to a cistern containing wholesome water for domestic purposes or for supplying water to a secondary system.
- No vent pipe from a secondary circuit shall terminate over any combined feed and expansion cistern connected to a primary circuit.
- No supply pipe or secondary circuit shall be permanently connected to a closed loop for filling a heating system unless it incorporates an approved backflow prevention device.

3.4 Hot Water Storage Vessels - Operation & Maintenance Checklist

- Storage temperature >60°C.
- Avoid stratification, consider shunt pumps.
- Change vessel design on replacement.
- Couple vessels in parallel.
- Check volume, usage and recovery rates.
- Drained regularly to prevent sludge accumulation.
- Dismantled at least yearly (water/water).
- Occasional pasteurisation (thermal disinfection).
- Check for temperature variations regularly.
- Insulate bottom of vessel.
- Drain facility (25mm min).

- Ensure accessibility for cleaning.
- At least annual inspections, twice yearly in hard water areas.

4.0 Monitoring Guidance

Action levels following Legionella sampling in Hot and Cold Water Systems.

Legionella Bacteria (CPU/Litre)	Action Required
More than 100 But less than 1000	Either: a) a) If only one or two samples are positive, system should be resampled. If a similar count is found again, a review of the control measures and risk (assessment should be carried out to identify any remedial actions (b) If the majority of samples are positive, the system may be colonised, albeit at a low level, with legionella. Disinfection of the system should be considered but an immediate review of control measures and risk assessment should be carried out to identify any other remedial action required.
More than 1000	The system should be resampled and an immediate review of the control measures and risk assessment carried out to identify any remedial actions, including possible disinfection of the system.

Action levels following microbial monitoring for cooling towers

Aerobic count cfu/ml at 30 °c (minimum 48 hours incubation)	Legionella bacteria cfu/litre	Action required
10 000 or less	100 or less	System under control
more than 10 000 and up to 100000	more than 100 and up to 1000	Review programme operation - a review of the control measures and risk assessment should be carried out to identify any remedial actions and the count should be confirmed by immediate resampling.
more than 100 000	more than 1000	Implement corrective action – The system should immediately be re-sampled. it should then be ‘shot dosed’ with an appropriate biocide, as a precaution. the risk assessment and control measures should be reviewed to identify remedial actions.

ANNEX E

LISTED DEMARCATIONS

List all demarcations agreed between other contracts (e.g. Project Aquatrine) or where the establishment has made separate arrangements for flushing little used outlets etc.

Asset Number	Building Description	Detail of Demarcation	Owner

ANNEX F SAMPLE LETTER OF APPOINTMENT OF A RESPONSIBLE PERSON

Dear

LEGIONELLA - APPOINTMENT OF A RESPONSIBLE PERSON

1. As laid down in JSP 375, Vol 2, Leaflet 19, I am required to formally appoint a Responsible Person for the Management of the Legionella risk at the {Establishment}.
2. As you are appointed as the (Organisation) representative with the authority to manage the Legionella risk at {Establishment}, in accordance with the HSE L8 ACoP – Legionnaires disease – Control of Legionella Bacteria in Water Systems. This is to cover those assets for which the Contract is responsible.
3. Please confirm your acceptance in writing, so as to allow me to annotate my Site Management Arrangements accordingly.

Yours sincerely