**EMAP – 35 CONTROL OF LEGIONELLA BACTERIA IN WATER SYSTEM**

**Issue No:** G  
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<table>
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<tr>
<th>Original Document Prepared by:</th>
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<tbody>
<tr>
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## Amendments

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<tr>
<td>First Document Draft</td>
<td>A</td>
<td>April 2015</td>
<td>S. Metcalfe</td>
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<td>Comments from M Sheppard</td>
<td>B</td>
<td>May 2015</td>
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<td>S. Metcalfe</td>
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<tr>
<td>Comment from HSD, Staff updates, and general review</td>
<td>F</td>
<td>Nov 2016</td>
<td>S. Metcalfe</td>
</tr>
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<td>J. Martin</td>
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Introduction

The regulations, and supporting regulatory guidance, associated with the control of legionella place clear expectations on how legionella will be managed. Within QMUL this will largely be managed by Estates and Facilities. However, schools, institutes and directorates (SI&D) may also have duties under this policy.

1.0 General Arrangements

1.1 Purpose
This Management Arrangements and Procedure document (EMAP-35) has been prepared for QMUL Estates & Facilities (Infrastructure & Maintenance) department to ensure that the risk of exposure to Legionella Bacteria is controlled and managed effectively as far as reasonably practicable, through the adoption of the control and management principles identified in the H.S.E. Approved Code of Practice and Guidance L8 – “The control of legionella bacteria in water systems“

1.2 Legislation, Codes of Practice and Guidance
COSHH Regulations require that the risks from all hazardous substances including biological agents are controlled by a framework of control measures. The Approved Code of Practice (ACoP) L8 “Legionnaires’ Disease – The control of legionella bacteria in water systems” 4th Edition published 2013 provides employers (and others as defined) that framework of guidance to control the risk of Legionellosis. Technical Guidance is provided by HSE in the form of publications HSG274: Part 1 / Part 2 / Part 3.

1.3 Scope

1.3.1 QMUL Properties
These procedures shall apply to all hot and cold water storage and distribution systems contained within QMUL owned and operated properties.

1.3.2 Non QMUL Properties
Certain building properties are owned and operated by other Third Parties. QMUL shall not be responsible for the control and management of water systems within these buildings but will request a copy of the up to date Legionella Risk Assessment and request evidence that recommendations/actions have been followed up. The list below is a non-exhaustive list summary of such buildings

- Lincoln’s Inn Field
- West Smithfield Library
- Scape
- Aspire Point
1.3.3 QMUL Department
This EMAP shall apply to both Estates and Facilities managed areas and those managed by Schools and other departments.

1.4 Managerial Responsibilities

1.4.1 Duty Holder
The legal responsibility for the management of legionella is with the senior management of QMUL as the employer, and this duty shall be undertaken by the college Principal and advised by the Director of Estates & Facilities and Capital Development.

1.4.2 Deputy Duty Holder
To ensure that the risk from legionella bacteria are suitably controlled and managed with appropriate resources, the Assistant Director of Estates & Facilities (Infrastructure & Maintenance) is appointed as the post of deputy duty holder and shall ensure systems and procedures are in place to facilitate a safe system of work.

Responsibilities:
- To formally appoint in writing, the Responsible and Deputy Responsible Persons to take day-to-day responsibility for the management and control of legionella.
- To ensure that the management and control arrangements implemented to manage the risk from Legionella bacteria are audited/reviewed regularly by an external auditor.

1.4.3 Responsible Person
The Responsible Person should have status & sufficient authority, competence & knowledge of the water system installation’s to ensure that all operational procedures and precautionary measures are being carried out in a timely & effective manner; this duty shall be undertaken by the Campus Maintenance Managers.

Responsibilities:
- To assume the day-to-day responsibility for the management and control of any identified risk from legionella bacteria in the water systems managed and operated by Estates & Facilities.
- To arrange for Legionella Risk Assessments to be carried out as and when significant changes to water systems are undertaken or after adverse incidents.
- To ensure this written scheme is followed, and all recommendations from the legionella risk assessments, and ongoing monitoring/inspection programme are followed/addressed within the appointed timescales.
- To deliver monthly reports on water management log books using the checklist in Appendix 6.4 and file these into J:\EAF Health and Safety\Water Management\Log Book Audits.
- Reports delivered to monthly water management meetings.
- All building log books to be inspected over a 12 month period. To forward all training records of staff under their control to Directorate Support.
• To deliver, or arrange delivery of, legionella based tool box talks bi-annual to staff under their control
• To ensure all contractors have been inducted and briefed in regards to works/alterations to water systems
• To communicate with stakeholders prior to contractors site attendance
• To escalate any non-compliant issues, including positive sample results immediately to the Deputy Duty Holder and the Competent person

1.4.4 Deputy Responsible Person
The Deputy Responsible Person should have similar status & sufficient authority, competence & knowledge of water system installations to that of the Responsible Person to ensure that all operational procedures and measures continue to be carried out, as and when the Responsible Person is absent from QMUL; this duty shall be undertaken by a campus manager as appointed by the Assistant Director of Estates & Facilities (Infrastructure & Maintenance)

1.4.5 Competent Person
The compliance manager Estates and Facilities (Infrastructure and Maintenance)
Responsibilities:
• Ensure that Legionella Risk Assessments are conducted for all domestic water systems and are to include schematic plans and a list of the legionella risks and required actions
• Undertaking formal audits, inspections and reviews of the management scheme, and issuing reports to the Responsible Person.
• Providing professional advice and water scheme proposals on new and refurbishment projects that are in compliance with the ACoP L8.
• Undertake spot check inspections
• Arranging external audit

1.4.6 Capital Projects
Responsibilities
• To fully engage with the senior engineer, campus manager and compliance manager prior to instruction of any works likely to cause disturbance and or modification to domestic water systems.
• To utilise our incumbent Water PPM contractor for all due diligence sampling
• To utilise our incumbent water treatment PPM contractor to conduct all chlorination’s and or disinfections
• To ensure that schematics are updated following any works and that this is undertaken by our legionella risk assessment consultant
• To complete the project process checklist prior to any works on the domestic water system that will result in significant change.
- Comply in full with the requirements of EMAP 42 Project Handover Arrangements

1.4.7 External Specialist Service Providers

PPM Contractors Responsibilities:

- Delivery of the PPM to ensure that control measures as set out in Section 3 of this document and in accordance with ACoP L8. See appendix Summary of responsibilities
- Undertaking a regime of sampling and analysis of all water outlets in accordance with ACoP L8.
- Report and record all non-compliant issues to the Responsible Person
- Assist with the implementation of monitoring and control measures identified in the risk assessments.
- Undertaking specified cleaning and disinfection regimes as required by predefined programme schedules or as a result of a specific request.

1.4.8 Specialist Water Management Contractor

Responsibilities:

- Providing professional advice on the management and control of water systems.
- Provide Water Risk Assessment

1.4.9 Authorising Engineer (Water)

Responsibilities:

- Assist in writing or reviewing procedural documentation policies and EMAP and to ensure these are sufficient and/or supersede our obligations in regards to HSG274 Part 1 / Part 2 / Part 3
- Ensure our emergency/contingency and action plans are sufficient and/or supersede our obligations in regards to HSG274 Part 1 / Part 2 / Part 3
- Assist with Audit of record keeping in with HSG274 prt2 and provide a written report with recommendations upon request
- Assist with the procurement specification, competency checks etc for relevant 3rd party contractors
- Advise/approve high risk activity Risk assessments and Method Statements
- Providing support and training to Queen Mary Staff
- Reporting any areas of non-compliance to the Assistant Director of Estates & Facilities (Infrastructure and Maintenance)
- Undertake competence assessments for all QMUL staff identified with responsibilities for legionella control
- To attend the strategic water management Committee meetings as requested
1.4.10 Head of Health and Safety (EAF)

Responsibilities:

- Determining the adequacy of the Estates and Facilities control of Legionella arrangements; including the asset & checklists, adequacy of training provision, risk assessments and policies.
- Providing training on control of Legionella where requested by Estates and Facilities Managers.

1.4.11 Health and Safety Directorate

Responsibilities:

- Provide advice and guidance on legislative changes and best practice and, where necessary, provide expert advice to the Estates and Facilities Directorate.

1.4.12 Non estates areas and Laboratories

Responsibilities:

- Identify and record little used outlets locations
- Report number of and location of little used outlets to the local Campus Manager
- To conduct and record weekly flushing of all little used outlets and send copy of flushing records to the local Campus Manager example of flushing record below
  Flushing SOP Appendix 6.9
- To identify outlets no longer required and inform the local Campus Manager to agree/arrange removal

<table>
<thead>
<tr>
<th>Outlet location</th>
<th>Flushed for 5 minutes Y/N</th>
<th>Any Other Issues</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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2.0 Management Procedures

2.1 Identification and Assessment of Any Source of Risk

A suitable and sufficient assessment for the risk of exposure to legionella bacteria shall be undertaken for all water systems owned and operated by QMUL and any necessary precautionary measures shall be identified.

The Competent Person shall appoint competent Water Hygiene Specialists to undertake a suitable and sufficient risk assessment of a specific water system and to produce the final report identifying any areas of potential risk and the associated written scheme of control measures.
Reference shall be made to Paragraphs 28–47 of the ACoP L8, that define the requirements for the identification and assessment of the risk.

2.1.1 New Water Installations
All new water system installations shall be subject to, prior to first occupancy by building users, a comprehensive Risk Assessment.

- For Extensive Modifications – a new Legionella Risk Assessment to be undertaken.
- For Minor Modifications to existing water installations – record the modification undertaken in the buildings and arrange for the information to be available for the next schedule review of the system risk assessment.

2.1.2 Review of Risk Assessments
The Responsible Person shall ensure that risk assessments are reviewed regularly (at least every two years) and in any case whenever there is reason to believe that the original risk assessment to be no longer valid or where alterations to the water system have been carried out.

The responsible person shall ensure that all required actions/recommendations from LRAs are attended to within the timescales advised and or passed back to the deputy duty holder for further action.

2.1.3 Validity
All risk assessments shall be retained throughout the period for which they remain current. In any case all written documentation shall be kept for a minimum of five years. Master copies of LRAs shall be filed onto the EAF J drive J:\Infrastructure & Maintenance\Health & Safety and Statutory Compliance Records\Compliance\Legionella & Water Management\LRAs

2.1.4 Management reporting Structure
See appendix 6.5

2.2 Procedure to Minimise the Risk from Exposure to Legionella
Estates & Facilities shall implement a written scheme of measures that will assist with controlling the risk from exposure. The written scheme shall include;

- An up-to-date building site/system plan.
- The correct and safe operational maintenance procedures.
- A schedule of monitoring checks and the frequency of such checks.
- Pre-defined precautions to reduce the risk.
- Monthly inspection of logbooks by the responsible person
- Monthly water management meetings to present logbooks for inspection, to discuss issues or support required
## 3.0 Operational Procedures

### 3.1 Minimum Control Measures

In accordance with the recommendations made within the HSG274: Part 2, EAF shall require the implementation of the following control measures to be undertaken by the Competent Person / appointed Service Provider see appendix

<table>
<thead>
<tr>
<th>System</th>
<th>Frequency</th>
<th>Item</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hot Water</td>
<td>Monthly</td>
<td>Sentinel Points</td>
<td>Check that the time to reach at least 50°C is less than 1 minute at the sentinel point + 10% of other outlets. Results and observations to be recorded in the logbook and works to be raised on the CAFM system</td>
</tr>
<tr>
<td></td>
<td>Anniversary</td>
<td>Representative Points on a rotational basis</td>
<td>Check that the time to reach at least 50°C is less than 1 minute at the sentinel point. Results and observations to be recorded in the logbook and works to be raised on the CAFM system</td>
</tr>
<tr>
<td>Cold Water</td>
<td>Monthly</td>
<td>Sentinel Points</td>
<td>Check that the time to reach 20°C or below is within 2 minutes at the sentinel point + 10% of other outlets. Results and observations to be recorded in the logbook and works to be raised on the CAFM system</td>
</tr>
<tr>
<td></td>
<td>Anniversary</td>
<td>Representative Points on a</td>
<td>Check that the time to reach 20°C or below is within 2 minutes at the sentinel point.</td>
</tr>
</tbody>
</table>

Little Used Outlets

Assess usage and remove outlet if not required and modify pipework appropriately.

Flush the outlet, generating a little aerosol as possible until the temperature stabilises at the input water temperature, record this temperature. Note, the hot water should reach the required temperature within 1 minute and the cold within 2 minutes of flushing. Results and observations to be recorded in the logbook and works to be raised on the CAFM systems.
<table>
<thead>
<tr>
<th>System</th>
<th>Frequency</th>
<th>Item</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>rotational basis</td>
<td>Storage Calorifiers</td>
<td>Results and observations to be recorded in the logbook and works to be raised on the CAFM system</td>
</tr>
<tr>
<td>Hot Water Storage</td>
<td>Monthly</td>
<td>Storage Calorifiers</td>
<td>Check water flow and return temperatures are in the range 50°C to 60°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Results and observations to be recorded in the logbook and works to be raised on the CAFM system</td>
</tr>
<tr>
<td></td>
<td>Annually</td>
<td>Storage Calorifiers</td>
<td>Take sample from drain outlet and note condition of drain water.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Drain contents and visually check internal surfaces for scale and sludge; clean and disinfect as necessary.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Results and observations to be recorded in the logbook and works to be raised on the CAFM system</td>
</tr>
<tr>
<td>Cold Water Storage</td>
<td>Six Monthly (Winter / Summer)</td>
<td>Storage Tank</td>
<td>Check and record incoming mains cold water temperature.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Check and record tank water temperature remote from the ball valve is less than 20°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Results and observations to be recorded in the logbook and works to be raised on the CAFM system</td>
</tr>
<tr>
<td></td>
<td>Annually</td>
<td>Storage Tank</td>
<td>Visual inspection of water tank to check on physical condition and cleanliness of stored water.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Carry out cleaning/disinfection/remedial works where necessary.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Results and observations to be recorded in the logbook and works to be raised on the CAFM system</td>
</tr>
<tr>
<td>Shower Heads</td>
<td>Quarterly or as necessary</td>
<td>Heads and Hoses</td>
<td>Dismantle, clean, descale and disinfect all parts and supply hoses</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Results and observations to be recorded in the logbook</td>
</tr>
<tr>
<td>System</td>
<td>Frequency</td>
<td>Item</td>
<td>Task</td>
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<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>Thermostatic Mixing Valve</td>
<td>Monthly</td>
<td>Representative TMV on a rotational basis</td>
<td>Check that the time to reach respective temperatures in the hot and cold supply pipe to the TMV. Results and observations to be recorded in the logbook and works to be raised on the CAFM system.</td>
</tr>
<tr>
<td></td>
<td>Annually</td>
<td>TMV</td>
<td>Inspect, clean, descale and disinfect strainers or filters. Routine maintenance and servicing in accordance with manufacturer’s instructions. Results and observations to be recorded in the logbook and works to be raised on the CAFM system.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>System</th>
<th>Frequency</th>
<th>Item</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency Showers</td>
<td>Six</td>
<td>Shower Heads</td>
<td>Under controlled conditions, flush through and purge to drain. Results and observations to be recorded in the logbook.</td>
</tr>
<tr>
<td></td>
<td>Monthly</td>
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<td></td>
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</table>

### 3.2 Little Used Outlets / Dead-legs

Little used outlets / dead-legs are to be identified and to be taken out of use if they cannot be justified to remain.

The identification of little used outlets and flushing regime as well as outlets no longer required in laboratories and offices remains the responsibility of the relevant school/department including record keeping. Records shall be made available for inspection of the Estates responsible person.

If removed, connecting pipework shall be cut back to nearest through branch so that no dead leg is left containing static water.

Where little used outlets / dead-legs are to be retained, a planned programme of frequent flushing and temperature measurements shall be used to manage any potential risk.

1. Ensure that the system/outlet can be flushed safely and in a tidy manner into an appropriate drain.

2. Ensure that the purging of water from outlets does not create an unnecessary amount of aerosol at least no more than would be created when outlet is operated normally.

3. Ensure that splash back is minimised, where practicable, by placing a sponge or another material capable of absorbing some of the force of the water against the surface of the appliance.
4. Purge the hot and the cold or the mixed water in turn for a minimum of 2 minutes or for a period of time necessary to draw water from the outlet at temperatures exhibited throughout the rest of the system.

5. Where eyewash showers need to be flushed, it is important to ensure that, where practicable, the showerhead is removed in order to reduce the potential of aerosol production. Where the head is fixed, exposure to the aerosol produced must be minimised. One method that can be employed in this situation is the use of a transparent plastic bag, fixed around the showerhead, with one corner pierced to allow partial discharge of water.

### 3.3 Water Treatment Regime

Estates & Facilities implement a temperature regime within its hot and cold water systems as to avoid storing or distributing water in the temperature range that favours bacterial growth i.e. 20°C to 45°C.

- Cold Water systems shall be designed to maintain stored water temperatures below 20°C throughout the year.
- Cold Water supplies shall be designed and operated to reach 20°C or below within 2 minutes of outlet operation.
- Hot Water systems shall be designed and operated to maintain stored water at 60°C and returning water temperatures shall be 50°C or above.
- Hot Water systems shall be designed and operated so that draw-off temperatures above 50°C are obtained within one minute.

Where there is an increased risk of scalding to susceptible people, the installation of localised thermostatic mixing valves shall reduce the hot water temperature at the outlet.

Where the above controls cannot be implemented, the guidance of the Authorising Engineer (Water) MUST be requested.

### 3.4 Cleaning and Disinfection

#### 3.4.1 Storage Tanks

All water storage systems shall be monitored and their physical condition visually inspected to ensure that storage systems and the water contained within them is clean and wholesome. A standardised programme of visual inspections shall be carried out by Competent Persons. All results shall be recorded along with inspection date in the Water Hygiene Logbook.

#### 3.4.2 Flushing

Every new water service, storage cistern, distribution pipework, hot water cylinder or other appliance shall be thoroughly flushed and disinfected before taken into first use.
Where a water system is not brought into immediate normal operational usage following its commissioning stage and is not regularly flushed afterwards, the system shall be disinfected before bringing into general use.

3.4.3 Sampling of systems
Only the contracted water treatment contractor or the legionella risk assessment consultant should undertake analytical water sampling.

3.4.4 Chemical Disinfection
Hot and cold water systems shall be chemically disinfected to the requirements of BS6700 by a specialist Water Treatment Company as and when required.

Method statements and risk assessments are to be submitted by the Water Treatment Company before proceeding with the disinfection procedure.

Chemical disinfection shall take place following:
- Completion of a new water system installation
- Where major extension or alterations have been carried out to a water system
- Where new underground pipework has been installed that supplies water
- Where it is suspected that contamination may have occurred
- Where a building system has not been in regular use and prior to re-occupancy

All chemicals used in disinfection process shall be those listed in the Drinking Water Inspectorates list of approved substances.

3.4.5 Thermal Disinfection
Hot water systems can be thermally disinfected by raising the temperature of the whole of the Calorifier contents and circulating this water throughout the system for at least 1 hour.

To be effective the temperature of the stored water at the Calorifier should be high enough to ensure that the temperatures at all draw-off taps and appliances does not fall below 60°C for the 1 hour period.

The risk of scalding needs to be considered and particular care should be taken to ensure that water systems are not inadvertently used until the thermal disinfection process is complete and the water temperatures have dropped to their normal operating levels.

Appropriate method statements and risk assessments are to be submitted and approved by Responsible Person before proceeding with any thermal disinfection procedure.

Chemical Disinfection is to be undertaken in preference to Thermal Disinfection.
3.4.6 Documentation
The responsible person shall ensure that a water management logbook is provided for each building and that the logbook accurately records the assets and controls measures required for each individual building via a tabulated system, where an asset, service or documentation isn’t relevant or filed elsewhere the section must have information explaining this.

The logbook shall contain.

- Responsible persons flowchart
- Copy of LRA recommendations (Reference to location if not within)
- Schematics
- Audit and inspection log
- Action and defects diary
- Works diary
- PPM contract scope/SLA (Reference to location if not within)
- Training records (Reference to location if not within)
- COSHH data
- Risk assessments and method statements for all PPM tasks
- Tab for each of the required PPMs
- Samples

3.4.7 Permanent System Dosing
Permanent dosing of water systems should only be considered where temperature and flushing are unable to provide clear sampling results.

Where permanent dosing of a buildings water system is to be implemented advice must be sought via the Authorising Engineer in regards to the type of disinfection and control regime and written permission must also be obtained from the Deputy Duty holder.

Stakeholders must also be consulted in regards to any equipment that may be affected by such dosing.

Monitoring
Once implemented daily checks at the sentinel outlets for the first week following installation of the disinfection units must be conducted. If no issues are noted during the daily checks then move to weekly checks for a further 3 week period. If no issues are noted during this time again, then conduct monthly checks.

4.0 Training and Competence
All operatives tasked with the servicing and maintenance of hot and cold water distribution systems shall be provided with adequate information about the risks of Legionella and be instructed in how to minimise the risks, on what precautions need to be taken and to understand what are the dangers and consequences of not maintaining water systems.

Training courses shall be provided via specialist consultants, and/or water treatment companies as appropriate, and to ensure that all operatives from the Duty Holder down remain up-to-date with current requirements and legislation.
4.1 Training Records
Records will be maintained of all personnel training indicating their name, the date and duration of training and a description of the training undertaken.
Details on all training delivered should be forwarded to Directorate Support for file.

4.2 Tool Box Talks
Toolbox talks shall be arranged by the Campus Maintenance Manager and delegated for delivery by a competent person or supervisor and are in addition to formal training for those engaged to undertake works on water systems. This is to ensure any reported issues are investigated and causes identified and rectified as promptly as possible
Tool box talks attendance sheets should be forwarded to the Head of Health and Safety (Estates & Facilities) for file.

4.3 Other sources of information
- EMAP 22 Maintenance and Minor Works – Contractors Safety Rules & Procedures
- EMAP 42 Project Handover Arrangements
- HSG 274 Parts 1, 2 & 3
- L8 the control of legionella bacteria in water systems
- The Control of Substances Hazardous to Health Regulations 2002 (COSHH)
- The Health and Safety at Work etc Act 1974 (the HSW Act)

5.0 Adverse Incident Management

5.1 Definition
An adverse incident shall be defined as:
- Any occurring incident which had the potential to significantly increase the risk of Legionellosis from a water system as a result of system malfunction, i.e. physical damage, contamination, procedural failure etc.
- A microbiological sample result which exceeds the HSG274 guidance levels
- A case, or suspected case of Legionellosis that has been attributed, though not necessarily confirmed, to have been caused by a water system.
5.2 Procedure in event of an Adverse Incident

5.2.1 Action Plan in Cases of a System Malfunction
The Responsible Person shall be informed of the nature of the system malfunction and the affected building, indicating the specific system involved. The Responsible Person will implement a review of the control procedures to identify any remedial actions necessary to prevent the situation reoccurring.

5.2.2 Action Plan in Cases of Exceptional Microbiological Sample
Where sampling and testing of water systems identifies the presence of exceptional levels of microbiological growth, then the Responsible Person shall be informed of the sample result and the affected building and the system involved. Immediate action must then be taken by the Responsible Person in the case of a report of legionella >1000 cfu/l The Responsible Person will inform the Duty Holder or Deputy Duty Holder of the affected building(s) indicating the area(s) where Legionella bacteria was isolated and the affected outlet(s) and all such outlets shall be isolated from the community they serve by means of physical isolation, warning notices, barriers and/or tape and the affected part(s). In accordance with the HSG274:Part 2, Table 2.2 action levels, the affected part(s) of the water system must be drained, cleaned, flushed and sterilised where advised for by the Specialist Water Treatment Company using Sodium Hypochlorite solution (50 ppm). The Responsible Person will implement an immediate review of the control procedures to identify any remedial actions necessary to prevent the situation reoccurring. The outlet(s) that sampled positively must be re-sampled and left unused until demonstrated free of Legionella bacteria.

See appendix 6.1 for legionella positive action flowchart for precise escalation and action details.

5.2.3 Action Plan in Case of Suspected/Diagnosed Outbreak of Legionnaires Disease
If QMUL is suspected of being implicated in an outbreak of Legionnaire’s Disease, the responsible person shall immediately inform the Duty Holder or Deputy Duty Holder (Assistant Director of Estates & Facilities) of the suspected/diagnosed outbreak of Legionnaires Disease.

Legionnaires Disease is notifiable under the Health Protection (Notification) Regulations 2010 in England. An outbreak is defined as two or more confirmed cases of Legionellosis closely linked in time (weeks rather than months) and where there is evidence of a common source of infection. If a university water system is implicated in an outbreak of Legionnaire’s Disease, emergency treatment of that system shall be carried out as soon as possible under the direction of the appointed deputy Duty Holder.

The Duty Holder or Deputy Duty Holder shall ensure the full co-operation with any investigation of building systems on campus.
60 Appendices

6.1 Positive Legionella Flow Chart >1000cfu/l

- Positive Legionella Sample >1000 cfu/l
- Responsible Person or Deputy Responsible person
- Raise Ivanti Ticket
- Update Logbook defects section
- Consult Authorising Engineer (AE)
- Create incident report on My Safety
- Deputy Duty Holder
- Duty Holder
- Inform HSO Director

Decision:
- YES: Close incident report on My Safety, Close Ivanti Ticket, Sign off Logbook defects section, Provide written report for duty holder following conclusion
- NO: Corrective action completed and system restored as safe
6.2 Positive Legionella <1000cfu/l
### EMAP – 35 CONTROL OF LEGIONELLA BACTERIA IN WATER SYSTEM

#### 6.3 Task Register

<table>
<thead>
<tr>
<th>System</th>
<th>Responsibility</th>
<th>QMUL</th>
<th>Water Treatment Contractor</th>
<th>LRA Consultant</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Overview</strong></td>
<td>Implement and update EMAP 35</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Carry out a detailed audit to determine responsible persons compliance with ACOP L8 and EMAP 35</td>
<td></td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>Develop a programme of remedial action to eliminate non-conformances</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Manage, monitor and Implement PPM in accordance with ACOP L8 and EMAP 35</td>
<td></td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>Use a water treatment programme to control the risk of scale and corrosion in the systems</td>
<td></td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td><strong>Cold Water Storage Tanks</strong></td>
<td>Record temperature</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Visual inspections of conditions</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Monitor microbiological conditions as required</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Clean and disinfect as identified within LRA or on advice from AE (Water)</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cold and Hot Water Services</strong></td>
<td>Monthly monitoring of sentinel tap temperatures, representative and others to ensure that every tap is monitored every year for each hot and cold water system</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Monitor microbiological conditions as required</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Clean and descale outlets as necessary</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Quarterly disinfect and descale of showerheads and spray outlets</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Identify and record little used outlets</td>
<td>✔</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>Weekly flush including temperature checks of little used outlets</td>
<td>✔</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td><strong>Calorifiers</strong></td>
<td>Record flow and return temperatures</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Blow down base drain point</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Carry out an Annual visual check of internal surfaces for scale and sludge, if accessible</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Internal clean or descale, if accessible</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Management and Records</strong></td>
<td>Provide technical support to site personnel</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Provide monthly technical site visits to manage water treatment program</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Attend site review meetings as arranged</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Provide suitable logbooks</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Provide suitable logbook storage</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Update relevant sections of the water management Logbooks</td>
<td>✔</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>Maintain records for contractor responsibilities</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Provide site training on logbook</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Conduct and record a monthly logbook inspection</td>
<td>✔</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>Annual audit of logbook</td>
<td>✔</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>Report all defects or non-compliant temperatures to the EAF helpdesk</td>
<td>✔</td>
<td></td>
<td>✔</td>
</tr>
</tbody>
</table>
### Water Risk Assessments

- Carry out a comprehensive site risk assessment
- Carry out annual review and an action plan
- Carry out new assessment as required

<table>
<thead>
<tr>
<th>Water Risk Assessments</th>
<th>✓</th>
<th>✓</th>
</tr>
</thead>
</table>

### Training

- Ensure all duty holders and responsible persons have received training
- Ensure all key operatives receive legionella awareness training, which is refreshed annually
- Deliver tool box talks on legionella related topics bi-annually

<table>
<thead>
<tr>
<th>Training</th>
<th>✓</th>
<th>✓</th>
</tr>
</thead>
</table>
6.4 Log Book Checklist

Water Management Log Book Checklist – Insert Building

<table>
<thead>
<tr>
<th>No</th>
<th>Action</th>
</tr>
</thead>
</table>
| 1  | Confirm the names/contact details within the management section of the logbook are correct YES/NO (delete accordingly)  
If No, detail amends required; |
| 2  | Confirm the date of the last legionella risk assessment (LRA) provided for this building ________________  
Were schematics provided with the LRA? YES/NO (delete accordingly)  
Are the schematics accurate? YES/NO (delete accordingly) |
| 3  | Confirm the number of recommendations made in the LRA ________________  
Provide a status update on;  
Completed recommendations ________________  
On-going recommendations ________________  
Not started recommendations ________________  
Recommendations overdue for resolution ________________ |
| 4  | Has there been significant works undertaken since the LRA was issued? YES/NO (delete accordingly)  
If yes, has the LRA been reviewed? YES/NO (delete accordingly)  
Have there been any areas which have had a change in usage? YES/NO (delete accordingly)  
If yes, how has this impacted on the control regime?  
If yes, were the works carried out by a member of the Thames Approved Plumbing Scheme (TAPS)?  
If yes, have TAPS certificates been issued and filed? |
| 5  | Have any bacterial samples been taken in the last 6 months? YES/NO (delete accordingly)  
If yes, confirm who took the samples, from where and what was being tested eg legionella, TVC etc?  
Were any out of specification samples returned? YES/NO (delete accordingly)  
If yes, confirm remedial actions taken; |
| 6  | Have there been any non-compliant temperatures recorded on the hot and cold distribution system in the last 6 months? YES/NO (delete accordingly)  
If yes, confirm remedial actions taken; |
| 7  | Confirm the date of the last Hot Water Storage Vessel Inspection ________________  
Was this an internal inspection or checking the colour of the water via the drain off valve? (Strike through the option not used)  
Have inspections or an LRA recommended either a thermal or chemical disinfection? YES/NO (delete accordingly)  
If yes, confirm date this took place ________________  
Have there been any non-compliant temperatures recorded from the flow and return to the hot water storage vessels in the last 6 months? YES/NO (delete accordingly)  
If yes, confirm remedial actions taken; |
<table>
<thead>
<tr>
<th>Step</th>
<th>Task Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Confirm the date of the last Cold Water Storage Tank Inspection. If yes, confirm date this took place, and by whom. Have there been any non-compliant temperatures recorded in the cold water tank in the last 6 months?</td>
</tr>
<tr>
<td>9</td>
<td>Confirm the number of showers identified within the building. Confirm the last date of shower head clean and descale. Are all showers in regular use?</td>
</tr>
<tr>
<td>10</td>
<td>Confirm the number of thermostatic mixer valves (TMV's) identified within the building. Confirm the last date of TMV servicing, descale &amp; disinfection. Are all TMV's achieving compliant temperatures?</td>
</tr>
<tr>
<td>11</td>
<td>Have all infrequently used outlets been identified? Confirm the date when the list of infrequently used outlets was reviewed. Provide details where flushing is undertaken by non-EAF staff eg lab managers. Detail why infrequently used outlets on the flushing regime for in excess of 3 months have not been removed.</td>
</tr>
<tr>
<td>12</td>
<td>Provide dates when staff last attended legionella awareness training. Confirm when the last Legionella Tool Box Talk was delivered, who delivered and what aspects were covered?</td>
</tr>
<tr>
<td>13</td>
<td>In your opinion is the system operating correctly as detailed with HSG 274 Parts 2 &amp; 3? If no, what areas require addressing?</td>
</tr>
</tbody>
</table>

I confirm that all information referenced in the above checklist is present within the water management logbook.

Name (Please Print) ___________________________
Signature ____________________________________
Date _______________
6.5 Management Reporting Structure

- **Monthly Water Management Meetings**
  - Responsible person, competent person and PPM contractor

- **Bi Monthly (8 weeks) Operational H&S Meeting**
  - Deputy Duty Holder, Responsible persons, competent person, head of H&S (E&F)

- **Quarterly Water Management Meetings**
  - Contracts manager, competent person and PPM contractor, head of H&S (E&F)

- **Senior Management Team**
  - Duty Holder, Director of Estates, Facilities and Capital Development, Deputy Duty Holder, Head of H&S (E&F), Head of HSD
6.6 Responsibilities

Managerial arrangements for the control of legionella bacteria

- Duty Holder
- Directorate Responsible Persons
- Appointed Responsible Persons
- Estates and Facilities Nominated Estates Responsible Persons
- Operational Delivery
- Contract Support

- Principal
- Director Estates, Facilities and Capital Development
- Assistant Director Infrastructure and Maintenance
- Campus Maintenance Manager M/A End
- Campus Maintenance Manager M/A End Residences
- Campus Maintenance Manager Whitechapel
- Campus Maintenance Manager Chatham House Square
- Water Treatment Contractor Planned/ Reactive
- Water Risk Assessment Consultant
- Water Treatment Authorising Engineer

- Estate and Facilities
  - Head of Health and Safety
  - Compliance Manager
  - Health and Safety Directorate
6.7 Fault Identification, Rectification and Recording

Identify Fault
Update water Logbook
Raise IVANTI Ticket

For example: Water temperature outside parameters; Lack of hot water due to boiler fault/calorifier off-line and so on.

Take Remedial Action

For example: Flush system, pasteurise or chlorinate system, Resample and so on.

Update water Logbook close IVANTI ticket

For example: Record temperatures; Flushing; Laboratory analysis results; Shower descales and so on.
## 6.8 Project Process Check List for Water Management and Legionella Control

<table>
<thead>
<tr>
<th>PROJECT LOCATION/REFERENCE</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PROJECT MANAGER</td>
<td></td>
</tr>
<tr>
<td>PRINCIPAL CONTRACTOR</td>
<td></td>
</tr>
<tr>
<td>MECHANICAL SERVICES CONTRACTOR</td>
<td></td>
</tr>
</tbody>
</table>

### 1. Before Project Commences

<table>
<thead>
<tr>
<th>Question</th>
<th>YES/NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has the water risk assessment been issued?</td>
<td></td>
</tr>
<tr>
<td>If YES to above, please provide reference number, provider and date</td>
<td></td>
</tr>
<tr>
<td>Are recommendations signed off where completed?</td>
<td></td>
</tr>
<tr>
<td>Are any outstanding recommendations to be completed within the current project?</td>
<td></td>
</tr>
<tr>
<td>If YES to above, please provide recommendation reference numbers</td>
<td></td>
</tr>
<tr>
<td>Have previous water temperature monitoring records been provided?</td>
<td></td>
</tr>
<tr>
<td>Are there any temperatures noted out of compliance with L8 recommendations?</td>
<td></td>
</tr>
<tr>
<td>Have previous analytical sampling records been provided?</td>
<td></td>
</tr>
<tr>
<td>Have any positive results been returned?</td>
<td></td>
</tr>
</tbody>
</table>

### 2. During Project

<table>
<thead>
<tr>
<th>Question</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify locations of rarely used outlets within project area</td>
<td></td>
</tr>
<tr>
<td>If a flushing regime is implemented provide details of frequency and responsibility (Details should be recorded on a separate sheet)</td>
<td></td>
</tr>
<tr>
<td>If temperature monitoring is to be undertaken provide details of frequency and responsibility (Details should be recorded on a separate sheet)</td>
<td></td>
</tr>
<tr>
<td>How are details regarding isolation or draining down of systems to be communicated?</td>
<td></td>
</tr>
<tr>
<td>Confirmation of completion of recommendations</td>
<td></td>
</tr>
</tbody>
</table>

### 3. Issue on completion of project

<table>
<thead>
<tr>
<th>Item</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Details of clean and chlorination certificates</td>
<td></td>
</tr>
<tr>
<td>Details of pasteurisation works to hot water system</td>
<td></td>
</tr>
<tr>
<td>Marked up schematics showing all new installations and removed installation pipe work</td>
<td></td>
</tr>
<tr>
<td>Item</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Analytical sample sheets</td>
<td></td>
</tr>
<tr>
<td>Sign off of installations</td>
<td></td>
</tr>
<tr>
<td>TAPS certification</td>
<td></td>
</tr>
<tr>
<td>PM Signature</td>
<td></td>
</tr>
<tr>
<td>Issue Date</td>
<td></td>
</tr>
<tr>
<td>Compliance Manager Signature</td>
<td></td>
</tr>
<tr>
<td>Receipt Date</td>
<td></td>
</tr>
</tbody>
</table>
6.9 Little Used Outlets Safe Operating Procedure

Systems or individual outlets that are not frequently used are known as little used outlets (not used at least once every seven days) allow the development of stagnant water conditions, which increase the potential of bacterial growth and proliferation, including Legionella.

In order to remove any stagnation that may have developed or to stop stagnation from occurring in the first place, it is important to introduce a "flushing" programme where necessary.

Departments/schools shall have the responsibility to identify such outlets and to ensure that this requirement is implemented and systematically audited to ensure adequate and correct implementation.

The flushing programme shall be designed so that it allows for the whole dead leg (section of stagnant water) to be removed. This is achieved by ensuring that the flushing is carried out at the specified system or outlet and for an appropriate length of time (usually two minutes is sufficient). The length of time of purging water from the system is important because it is vital to ensure that all the stagnant water has been expelled from the pipework and at least until circulating hot water or cold water is drawn from the outlet (at water at temperatures exhibited throughout the rest of the system).

Departments/schools shall also inform the Estates helpdesk of any outlets that are no longer utilised and that may be removed.

Usage Evaluation

Label all little used outlets onto a floorplan using a numerical system so those not conversant with the area are able to conduct this duty in the case of leave, training etc.

Infrequently Used Outlets and Dead Legs Flushing Process

The flushing programme shall follow the procedure outlined below:

- Ensure that the system/outlet can be flushed safely and in a tidy manner into an appropriate drain
- Ensure that the purging of water from outlets does not create an unnecessary amount of aerosol at least no more than would be created when outlet is operated normally
- Ensure that splashback is minimised, where practicable, by placing a sponge or another material capable of absorbing some of the force of the water against the surface of the appliance
- Purge the hot and the cold or the mixed water in turn for a minimum of 2 minutes or for a period of time necessary to draw water from the outlet at temperatures exhibited throughout the rest of the system
- Where eyewash showers need to be flushed, it is important to ensure that, where practicable, the showerhead is removed in order to reduce the potential of aerosol production. Where the head is fixed, exposure to the aerosol produced must be minimised. One method that can be employed in this situation is the use of a transparent plastic bag, fixed around the showerhead, with one corner pierced to allow partial discharge of water
- Record all flushing onto the standardised log sheet and send copies of the completed log sheets to the local Campus Manager once a month
6.10 Example of appointment letter RP

Insert Name and Title

Queen Mary University of London
Room 223
Queens’ Building
Mile End Road
London
E1 4NS

(Insert date)

Ref: (Insert Reference)

Dear (Insert First Name),
Responsible Person - Legionella

You are nominated as the Responsible Person - Legionella, as specified under the Health and Safety Executive Approved Code of Practice and guidance document LB ‘Legionnaires' Disease - The control of legionella bacteria in water systems’ 2013, Fourth Edition, and any subsequent revision.

You must undertake the duties attributed to your role as listed within the enclosed EMAP-35, and any subsequent revision.

Yours sincerely,
Mark Vinter
Assistant Director Estates & Facilities (Infrastructure & Maintenance)

Cc Personal file

I accept the appointment detailed above and acknowledge receipt of the QMUL Legionella EMAP-35.

Name & Title.................................................................

Date:..............................
6.11 Example of appointment letter Deputy RP

Insert Name and Title

Queen Mary University of London

Room 223

Queens’ Building

Mile End Road

London

E1 4NS

(Insert date)

Ref: (Insert Reference)

Dear (Insert First Name),

Deputy Responsible Person - Legionella

The QMUL Responsible Person – Legionella is (insert name and title)

You are the nominated deputy Responsible Person – Legionella, as specified under the Health and Safety Executive Approved Code of Practice and guidance document L8 ‘Legionnaires' Disease - The control of legionella bacteria in water systems’ 2013, Fourth Edition, and any subsequent revision.

You should act for the Responsible Person - Legionella on all occasions when the responsible person is unavailable.

You must undertake the duties attributed to the Responsible Person – Legionella as listed within the enclosed QMUL EMAP-35 document, and any subsequent revision.

Yours sincerely

Mark Vinter

Assistant Director Estates & Facilities (Infrastructure & Maintenance)

Cc Personal file

I accept the appointment detailed above and acknowledge receipt of the QMUL Legionella EMAP-35.

Name & Title..............................................................

Date.......