LCA STANDARD FOR THE DELIVERY OF LEGIONELLA RISK ASSESSMENT SERVICES

A) WHAT DOES THIS STANDARD COVER

1 This service standard is for LCA Members involved in identifying, assessing and reporting on the risk associated with Legionella in all types of water systems. Whilst the LCA Member is required to comply with this standard, the exact scope of the individual Legionella risk assessment will vary from site to site and should be a matter of contractual agreement between the LCA Member and the service user.

2 Legionella risk assessment category is divided into the following four sub-categories:

- **a.** Hot and Cold Water Systems Legionella risk assessment
- **b.** Evaporative Cooling Systems Legionella risk assessment
- **c.** Process and Other Systems Legionella risk assessment
- **d.** Legionella risk assessment of hot and cold water systems within a healthcare setting - the specialist water systems are covered under Process and Other Systems

3 This standard includes the:

- **a.** Survey, assessment of Legionella risk and reporting
- **b.** Survey and drafting of schematic diagrams and asset registers, where included in the scope (optional) **NB** this option is also covered by the Independent Consultancy standard where the work is to be completed without risk assessment

4 This standard excludes:

- **a.** Sampling and laboratory analysis (covered under the Legionella Sampling and Testing standard)
- **b.** Other risks (other pathogens, chemical risk, general Health and Safety risks, Water Regulations compliance, etc.) – while an assessor may need to be aware of these elements to complete a Legionella risk assessment; they do not form a part of this standard
- **c.** Provision of written schemes of control
- **d.** Auditing
- **e.** Design and delivery of record systems
- **f.** Competence assessment
- **g.** Producing specifications for tenders

B) COMPETENCE OF STAFF (INCLUDING SUB-CONTRACTORS)

5 The LCA Member must ensure that their personnel involved in all aspects of Legionella risk identification, assessment and review are competent to carry out their specific tasks by reason of their training, knowledge, skill, and experience. There are several stages involved in delivering a satisfactory Legionella risk assessment service:

- **a.** Obtaining the required information to design the risk assessment programme (The Surveyor)
- **b.** Designing and costing the risk assessment programme and defining the scope of service (The Designer)
- **c.** Planning and initiation of the programme (The Planner)
- **d.** Carrying out the risk assessment including, monitoring and inspection tasks (The Technician)
- **e.** Reporting and communicating the findings, significance of results and recommendations (The Reporter)
- **f.** Ensuring the service has been delivered according to the LCA Member's company procedures (The Auditor)

6 The level of knowledge and skill required to carry out a suitable and sufficient Legionella risk assessment will vary significantly with the complexity of the water systems being assessed and risk profile of the population that may be affected e.g. there is a vast difference between the requirements associated with a simple office block water system and a large and complex hospital water system or an industrial cooling process.

7 The competence of the assessor is of paramount importance and should be matched to the complexity of the system and the risks being assessed. The differentiation of four classes of risk assessment in Appendix 1 reflects the general complexity but there will always be systems that fall outside these classifications. If the assessor is not competent then the assessment

is unlikely to be suitable or sufficient. In each case, they should be able to demonstrate that they have sufficient experience, specialist knowledge and understanding of:

- **a.** The type of water system(s) and associated equipment to be assessed
- **b.** The factors affecting the colonisation by and growth of Legionella
- **c.** The evaluation and assessment of risk from Legionella and the adequacy of controls in place
- **d.** The procedures necessary to complete surveys, measurements and sampling
- **e.** The corrective actions that can be applied to reduce or eliminate the risk
- **f.** The relevant control measures that can be applied, e.g. water treatment, temperature control, thermal and chemical disinfection, cleaning, inspections, monitoring, etc.
- **g.** The relevant monitoring techniques to assess the performance of the control measures, e.g. temperature and biocide monitoring, sampling for microbiological testing
- **h.** The suitability of records required to demonstrate compliance

8 Risk assessors should be aware of their limitations and not work beyond their competence. They should be able to seek more competent help where unexpected complexities arise. Where a risk assessor is unable to complete a risk assessment or gain access to additional competent help, they must either decline to complete the risk assessment or include a statement to the effect that the assessment is not complete and detail its limitations.

9 LCA Members may use a prepared template or proforma for their risk assessment survey and report preparation and this constitutes a valuable aide memoire. Care should be taken that the template format does not prevent significant non-standard findings from being reported. An important aspect of the competence of a Legionella risk assessor is the ability to be able to go beyond any prepared template where the template does not fit the situation.

10 See Appendix 1 for further guidance on the specialist requirements of a competent assessor for different types of water systems.

11 The LCA Member must not knowingly carry out risk assessments on water systems where their personnel lack the assessed competence to do so.

C) SERVICE DELIVERY

12 The LCA Member should have clear processes and documented procedures which cover:

- **a.** Agreeing the scope of the assessment and services to be provided in detail, including any exclusions
- **b.** Preparatory arrangements
- **c.** Carrying out the risk assessment
- **d.** Reporting
- **e.** Risk assessment reviews and reassessment (if requested by the service user)

Section 1. Agreeing the scope of the assessment service to be provided

13 When making an offer to undertake Legionella risk assessment services, the LCA Member must agree key aspects of the scope of works with the client beforehand and detail these in the proposal document or quotation. These need to include:

- **a.** Which premises and/or buildings are to be covered by the assessment
- **b.** Which water systems are to be assessed and any that are knowingly excluded
- **c.** Whether the assessor will have access to previous risk assessments
- **d.** What the requirements will be regarding schematic diagrams and asset registers (refer to appendix 2) i.e.
  - *i.* Whether the client will provide pre-existing schematic diagrams and asset registers to assist the assessor and whether their review is to form part of the assessment and the extent of that review
  - *ii.* Whether the assessor is to produce schematic diagrams as part of the assessment and their format
  - *iii.* Whether the assessor is to produce asset registers as part of the assessment and their format

Information Box 1: Written Schemes of Control
Risk assessment does not involve the preparation of the written scheme of control, but it does provide information that is critical to its preparation in the form of identification of risk systems, condition reports, risk evaluation, recommended corrective actions and control measures.

e. What the requirements will be regarding the written scheme of control i.e.
- *i.* Whether the client will provide pre-existing written scheme of control and records for the assessor to review as part of the assessment
- *ii.* Whether the agreed scope of work includes provision of additional input into the production or changes to a written scheme of control over and above the production of the risk assessment.

f. Any restriction on taking photographs for inclusion in the final report

g. The format in which the final assessment is to be presented e.g. electronic format, hard copy, number of copies, etc.

h. To whom the final assessment is to be sent

i. What arrangements need to be in place to provide access and assistance that may be required from a competent escort who is familiar with the site and water systems to be assessed

j. What are the specific site safety and/or other requirements, e.g. induction training, permit to work, working at height, etc.

k. Contacts to whom any issues of immediate concern should be reported

l. Define what happens after the report is issued; e.g. how any queries or other matters arising from the final report are to be addressed, presentation of the report and/or responding to subsequent communications and any additional implications how to assess areas of repetition such as identical business units or flats – an agreement on what proportion will be surveyed

m. How to record any unavoidable omissions; the effect any such omissions might have on the assessment; whether the required information can be obtained by other means and; what provision should be made to provide access on a subsequent occasion and any additional implications

n. Where reported information, such as records of previous inspections, is to be included, how this should be identified and used in the assessment of risk; e.g. calorifier or cooling tower internal inspection reports

o. Is an executive summary to be included and its extent defined; e.g. individual executive summaries and/or overall executive summary for multisite projects?

14 If the client accepts the LCA Member's proposals, there then needs to be a record of a formal agreement between both parties defining the above points. This may take the form of a signed agreement, a purchase order or emailed acceptance referencing the LCA Member's detailed quotation or proposal which defines these points.

Section 2. Preparatory Arrangements

15 The LCA Member's procedures should include the following preparatory arrangements:

a. The LCA Member must ensure that the personnel assigned to carry out the assessment and associated tasks are competent to do so (based on the expected type and inherent complexity of the water systems and the likely risk profile of the exposed population)

b. Provision of equipment required to carry out the assessment survey

c. Complete a documented pre-work task risk assessment prior to work on site

d. Produce a method statement or procedure for carrying out the risk assessment

Section 3. Carrying out the assessment

16 The LCA Member must ensure that (subject to scope) all required systems are identified and included in the risk assessment process.

Note 1 - If an existing risk assessment report is available, it can be a valuable resource for the risk assessor in carrying out a reassessment. Appraisal of the current risk assessment can give the assessor valuable information about the water systems being assessed and the attitude of the management on site however the appraisal of the validity of the existing risk assessment cannot be performed adequately without a site survey.

17 The risk assessment process must include, where applicable and relevant to the assessment of risk:

- **a.** Review of any previous risk assessments
- **b.** Review of existing schematic diagrams and asset registers (if available) and comment/recommendation on their accuracy and suitability for understanding Legionella risk
- **c.** Preparation of new schematic diagrams and /or asset registers (where required by the agreed scope)
- **d.** Inspection and assessment of the condition of system water and accessible equipment and an assessment of the contribution to risk made by the design, construction and operation of the system (condition surveys)
- **e.** It may be useful to include an appraisal of condition surveys from site records, but this should be clearly identified, and any limitations taken into account in the assessment of risk
- **f.** Where it is not possible to inspect all parts of the system and it is not possible to determine the system condition from other evidence, it may be necessary to postpone the assessment and return at a later date when access can be arranged
- **g.** Assessment of the inherent risk presented by the system before any controls are applied (worst case)
- **h.** Assessment of the residual risk presented by the system when the controls in place are applied (current level of risk)
- **i.** Assessment of any risk gap between residual risk and ALARP (as low as reasonably practicable) risk

18 If there is no written scheme of control in place, a high priority in the risk assessment recommendations must be that one needs to be produced, unless the LCA Member considers that there is no reasonably foreseeable risk, in which case they must document that this is their assessment.

19 Where a written scheme of control is in place, the risk assessor should check the written scheme of control and report on its adequacy. The written scheme of control should include:

- **a.** Purpose and scope of the written scheme of control
- **b.** Reference to identified risks
- **c.** Notification of any cooling towers or evaporative condensers
- **d.** Management structure
  - *i.* dutyholder
  - *ii.* responsible person(s) and communication pathways
  - *iii.* Training records of personnel involved in the scheme of control
  - *iv.* Allocation of all responsibilities i.e. to the dutyholder, responsible person(s), site staff and third parties such as water treatment providers and other subcontractors
- **e.** Schematic diagram
- **f.** Description of the correct operation of the plant and any controls to be implemented to minimise risk - these must address the identified risk
- **g.** Start-up and shut-down procedures, and plant rotation and flushing requirements for little-used outlets
- **h.** Details of any plant or equipment brought onto site by third parties
- **i.** Method statements and task risk assessments including those for storage, handling, use and disposal of any chemical used both on the treatment of the system and the testing of the system water
- **j.** Schedule of monitoring, other operational checks, inspections and calibrations that are to be completed on the

systems, along with the required frequency of the tests and the control limits

k. Planned appropriate corrective actions (Planned appropriate corrective actions in a written scheme of control are pre-planned actions to respond to foreseeable situations that may arise. Any anticipated result should have a planned response detailed in the written scheme – e.g. low HWS temperature, check calorifier and retest in one hour, low bromine, check/adjust brominator and retest in one hour, etc.)

i. Dosing system and/or control system failure

ii. Failure of control measures

iii. Very high microbial activity as estimated by dipslides, TVC counts or repeat positive water analyses for Legionella spp.

l. Incident plans which cover, where appropriate:

i. An outbreak of legionellosis at the site

ii. An outbreak of legionellosis close to the site

20 Where a scheme of control is in place, the records of this should be reviewed for:

a. The effectiveness of the control measures

b. The maintenance history of the systems

Information Box 2: Proportionality in Risk Assessment and Written Schemes of Control

The above list of requirements for a written scheme are dependent on the complexity of the system and the level of risk present. It may be proportionate to expect detailed written procedures for start-up and shut down in a hospital hot and cold water system or a cooling tower. It would not be proportionate to expect the same level of written detail in a domestic house with a simple hot and cold water system only and normal susceptibility of occupants.

The risk assessor must make an assessment of the suitability of the written scheme and whether it is proportional to the risk identified.

c. History of past issues, such as water temperature in Legionella growth range, positive Legionella results, high dipslides, etc. For actions taken after adverse results have been found in the past, the following should be considered:

i. Were the correct actions taken and the correct communication chain invoked?

ii. Were the actions taken within a timely fashion?

iii. Were the results rechecked (after the action) to confirm conditions were back under control?

iv. If the actions did not result in better control, was an escalation procedure invoked to ensure conditions were eventually controlled? If not, is there an escalation procedure in place?

v. Were there lessons learned or a new procedure put in place to prevent recurrence?

d. Monitoring and inspection records for the systems and significant deviations from acceptable operating conditions

21 The LCA Member must also assess management responsibilities to include:

a. The dutyholder, the responsible person and any deputies are clearly identified in the written scheme of control

b. Where applicable (healthcare or other settings where a WSG is in place), there is an appropriately comprised multi-disciplinary water safety group

c. The roles of all responsible parties (e.g. consultants, facilities management companies and water treatment companies) are clearly defined and contact details for these persons and parties are readily available

d. Lines of communication and the reporting structure are clearly stated in the written scheme of control

e. The responsibility for tasks to be undertaken by each individual or party are outlined clearly with the necessary frequency of the tasks

f. The ability of management to maintain control of the risk of Legionella

22 The LCA Member needs to review the available training records of those personnel with an involvement in the written scheme of control and comment on their relevance and validity. In addition to the formal training records, the LCA Member should assess the level of competence of the staff by studying the site records.

Information Box 3: Competence of Individuals Involved in Legionella Control

Legionella risk assessment does not usually involve directly assessing the competence of individuals involved in Legionella control. An assessment of their competence however must be made based on the available evidence. The assessor may look at actions taken after adverse results have been found in the past to ensure that suitable corrective actions were taken in a timely manner.

Completed service reports or logbook entries with the correct advice and non-conformances properly identified supports the competence of the individual involved. The assessor must have sufficient competence in testing, analysis and management themselves to be able to assess the competence of others from their work.

Training and competence assessment records can be checked to verify that staff have been deemed competent to undertake the written scheme of control tasks.

The assessor might be concerned that the training and checks on competence for individuals are inadequate, in which case they should make recommendations to improve the procedure for confirming competence.

Section 4. Reporting

Information Box 4: Urgent Reporting of Matters of Immediate Concern

If the LCA Member identifies an imminent danger of exposure to Legionella, e.g. failure of a biocide dosing system or a previously unidentified water system, or one which falls outside the scope of their brief, they must report this immediately to the agreed emergency contact, and not keep this for the final written report. Information which relates to non-Legionella risks may be identified and reported as a matter of immediate concern, as a duty of care, but these other risks should not dilute the assessment of Legionella risk in the risk assessment report.

23 Risk assessment reports should be concise without unnecessary repetition and/or the inclusion of unnecessary information. Examples of inappropriate content include large extracts of guidance, such as ACoP L8 and HSG274 or information which relates to risk systems other than those that are the subject of the assessment. Risks other than those associated with Legionella may be identified, but detailed discussion should be elsewhere.

Information Box 5: Purpose of Legionella Risk Assessment Reporting

The risk assessment is the process and the written report is the record of that process. The principal purpose of the risk assessment report is to communicate clearly to the dutyholder the risks identified and assessed in an efficient and effective manner. It should be sufficiently detailed to allow dutyholders an appropriate understanding of the key issues and actions required to control risks from exposure to Legionella.

24 The LCA Member must ensure that, subject to the agreed scope and where relevant, the assessment report contains the following:

a. Assessment Details

i. An executive summary (for simple systems this may not be required) *

ii. The scope of the assessment, including clear identification of buildings, systems assessed and their use

iii. The identification of which systems can present a risk from Legionella and those which cannot

iv. Analysis and evaluation of risk for each system including an explanation of how the risk rating is derived (care should be taken not to provide false reassurance with an overall risk for a building or site where individual system risks differ)

v. Consideration of elimination or substitution of the risk

vi. Identification of key personnel, both staff and contractors, and an assessment of their competence based on the training and operational records available

vii. Schematic diagrams (if they have been produced); or reference to them (if they have been reviewed); or recommendation that they be produced or updated, as appropriate. *

viii. Asset registers (if they have been produced); or reference to them (if they have been reviewed); or recommendation that they be produced or updated, as appropriate. *

ix. The results of condition surveys including operating parameters, temperatures, system inspections and asset registers and if third party information is to be used it should be clearly identified in the assessment.

x. The review of the existing written scheme of control (if there is one) *

xi. An assessment of the potential for Legionella to grow and the effectiveness of the control measures

xii. Any limitations of the assessment

xiii. Any matters or areas of evident concern identified which fall outside the scope of the assessment

xiv. Details of the competence of the assessor

xv. Details of the person involved in QA reviewing the assessment report (if different)

xvi. Details of any sources of reference and guidance utilised, e.g., bibliography *

b. Recommendations

i. Prioritised recommendations for corrective actions to eliminate or reduce the risk

ii. If the existing written scheme of control and control measures are inadequate then the report should give recommendations for site and system specific control measures (monitoring, inspection and treatment, etc.) including identification of sentinel outlets and/or other sample and inspection points i.e. the recommendation must not simply duplicate HSE guidance verbatim or include the guidance tables. For example; the frequency of flushing expansion vessels must be specified, as this should be determined by this risk assessment document.

iii. Short term control measures to be applied until completion of corrective actions

iv. Longer term control measures to be applied following completion of corrective actions

v. Recommended precautions to be taken when testing, maintaining or operating low risk systems, such as fire systems, heating and chilled water systems, etc. *

vi. The recommended review date and guidance regarding the circumstances under which a reassessment will be required (see section 5 for more detail on review and reassessment)

25 **NB** Not all risk assessment reports will require every item, e.g. individually occupied residential premises with low risk water systems (e.g. Tenanted flat) may not require items marked*.

26 Special requirements for healthcare premises: the report should include a statement that it is a Legionella risk assessment and not a water system risk assessment as required by HTM04-01 and include an explanation of the additional requirements of HTM04-01.

Note 2 – recommendations should be site and system specific and not simply reproduced from HSG274 guidance.

Section 5. Risk Assessment Reviews and Reassessment

Information Box 6: Legionella Risk Assessment Reviews

Risk assessment records should be live documents and reviewed by the dutyholder as soon as there is any reason to question their validity (L8 paras 32 and 47). Reviewing a risk assessment or reassessing the risk is a definite action or event with the objective of keeping the risk assessment up to date. It is the dutyholder's responsibility to identify the requirement to carry out a review, and if necessary, a reassessment as detailed in D) below.

27 The LCA Member, if contracted to do so by the client, should have procedures to review the existing risk assessment, determine whether it is still valid and to decide if a reassessment is required and its extent.

Section 6. Verification and Quality Control

28 The LCA Member must have procedures and records to ensure that:

- **a.** The survey, risk assessment and reporting has been completed to the scope agreed
- **b.** Appropriate recommendations have been made to achieve ALARP risk
- **c.** Significant non-conformances are recorded and tracked to conclusion where the LCA Member has an ongoing relationship with the client

29 A representative proportion of output must be reviewed to ensure compliance with the above and records kept of the review.

D) WHAT YOU NEED TO TELL YOUR CUSTOMER

30 There are several key responsibilities that the dutyholder has a legal duty to address. These are listed below:

- **a.** The dutyholder must ensure there is a Legionella risk assessment record that includes all systems where water is stored or used in any premises controlled by the dutyholder (COSHH Regs). This risk assessment should be regularly reviewed to ensure it is valid and reassessed when required. (See L8 paras 32 and 47).
- **b.** Any invitation to potential service providers to quote/tender for Legionella risk assessment services should have a clear scope of work defined by the dutyholder or their representative.
- **c.** Make reasonable enquiries of the service provider regarding proof of competence of individuals involved in carrying out the Legionella risk assessment e.g. provision by the service provider of: training records, competence evaluations, examples of previous work, etc. (See LCA Buyers Guide 702.17 06-17)
- **d.** Schematic diagrams and asset registers should be available in order to inform and help the risk assessor (See L8 paras 38 and 40). Pipework engineering drawings may be too detailed to allow simple communication of Legionella risk but schematic diagrams must show detail relevant to Legionella control.
- **e.** The findings of the risk assessment including the required corrective actions and the control measures should be implemented. The output from the scheme of control should be recorded and used in any subsequent review of risk.
- **f.** A written scheme of control should be produced and maintained and the output from this should be recorded and used in any subsequent review of risk.
- **g.** Regular reviews of the effectiveness of Legionella control activities should be carried out to verify the written scheme of control remains adequate.
- **h.** The dutyholder should have change management procedures and/or regular review procedures should be in place to determine if the existing risk assessment remains valid, suitable and sufficient. If it is not, then a reassessment of the risk is required.

Note 3 - It is likely that the risk assessor or other service providers can play a valuable role in these processes and an outside perspective can be invaluable.

Information Box 7: Additional Requirements for Health Care Premises

Healthcare Premises are covered not only by L8 but also HTM04-01: Safe water in Healthcare premises which requires the dutyholder to establish a Water Safety Group (WSG) and produce a water safety plan (WSP). This includes but goes considerably beyond the Legionella risk assessment.

In this case the dutyholder has broader responsibilities to ensure that all members of the WSG are competent.

Further information defining Healthcare premises can be obtained at:

www.cqc.org.uk/sites/default/files/20151230_100001_Scope_of_registration_guidance_updated_March_2015_01.pdf

Appendix 1 – Competence Requirements for Risk Assessors for Different System Types

31 The principle of proportional management of legionellosis risk is founded on effective risk assessment. Any shortcoming in this process is likely to have an impact throughout subsequent risk management. Complex systems and especially those with a highly susceptible population, such as healthcare, require assessors with the highest levels of competence.

32 Those involved in risk assessment need a suitable and sufficient understanding of Legionella and legionellosis, appropriate control measures and regulatory requirements. They need a good, practical understanding of the principles of risk assessment and require an appropriate understanding of design and operation of the type of water systems to be assessed and the implications for the risk from Legionella.

Hot and cold water systems (non-healthcare)	
Types of system (including but not limited to)	**Specialist Requirements**
• Individually occupied residential premises with low risk water systems (e.g. Tenanted flat) • Multi occupancy dwellings (e.g. Flats with part common water systems) • Hotels, leisure centres, universities, schools, military barracks • Commercial buildings with larger but relatively simple water systems (e.g. Office block) • Industrial premises (e.g. Unique hot and cold water systems developed to meet specific demand)	Assessors should have knowledge, experience and/or training in: • Types of systems, their components, their operation and likely risk factors e.g. - Small mains fed systems - Gravity fed cold water systems - Pressurised systems - Recirculating hot water systems • Water heater types, their operation and likely risk factors • Disinfection and cleaning techniques • Water regulatory requirements for the setting of the assessment
Evaporative cooling systems	
Types of system (including but not limited to)	**Specialist Requirements**
• Cooling towers • Evaporative condensers • Dry/wet cooling systems including adiabatic coolers • Plume abatement cooling towers • Humidifiers	Assessors should have knowledge, experience and/or training in: • Cooling system design and operation • Cooling water treatment theory and practice • Water testing, monitoring and interpretation • System condition appraisal • Pack inspection techniques • Cleaning and disinfection techniques
Other Risk Systems	
Types of system (including but not limited to)	**Specialist Requirements**
• Swimming pools • Spa and hydrotherapy pools • Vehicle wash systems • Misting systems • Leisure and ornamental water features • Engineering and machining systems • Paint prep systems • Fume scrubbers • Fire and deluge systems • Hose pipe and sprinkler systems, water bowsers • Pressure washers • Dentistry equipment • Emergency showers • Rainwater harvesting/grey water • Wet dust collectors • Water jet cutters • Tunnel washer systems	Risk assessments of these systems may require the assessor to use a first principles approach. Assessors should therefore have a level of competence appropriate to the type of system being assessed including: • Water chemistry, treatment and testing • Applicable inspection and condition appraisal techniques • Cleaning methodologies, etc. Since there is such a wide variety of other systems, it can be highly beneficial to the assessor to have the availability of someone (usually an employee of the service user) with intimate working knowledge of the system being assessed.

Hot and Cold Water Systems in Healthcare	
Types of system (including but not limited to)	**Specialist Requirements**
These include hot and cold water systems within healthcare premises.	Assessors must have an understanding of the elevated susceptibility of users to Legionella bacteria and the enhanced precautions advocated in guidance specifically for healthcare premises. Assessors should have an awareness of other potential waterborne infection risks to which users might be particularly susceptible in healthcare and how these risks interact with Legionella risk. These other infection risks are generally not included in the Legionella risk assessment but may have implications for the recommendations of the Legionella risk assessment i.e. they should not conflict. An Assessor involved in Healthcare should also understand: • The requirements of the relevant managerial and technical aspects of HTM 00 and HTM 04-01 as a minimum; • The elevated susceptibility of patients in certain areas of the hospital (not all patients are of a high susceptibility); • The application of, and often reliance on water treatment in hospital water systems and its relevance to end use of the water; • The complex arrangements including the interaction between estates, clinical departments, infection control, sterile services and health and safety departments; • The restrictions on surveys that exist in areas such as augmented care wards and operating theatres; • Large and complex domestic water systems, including the principles of HWS recirculating systems in HSG274 part 2. • Hydrotherapy and Birthing Pools.

Appendix 2 – Schematic Diagrams for Legionella Risk Assessment

33 Schematic diagrams are accurate but simplified illustrations of the configuration of water systems, which include all key components and omit anything which is not relevant. They are not formal technical drawings and are intended to be easy to read without specialised training or experience. Determining what is relevant and what is not relevant is an important skill in drafting schematic diagrams and communicating the risk from Legionella.

34 They must clearly indicate where assumptions have been made or where uncertainty exists. A schematic diagram that shows the incorrect pipework or system relationships can result in failure to adequately identify suitable control strategies and actions and therefore increase the risk from Legionella.

35 All risk systems (e.g. evaporative cooling, hot and cold water, process, etc.) must have a schematic diagram and this should include, where present in the system:

- **a.** Source of makeup water
- **b.** Piping routes and relationships including risers, branches and the extent of water return pipework and connections
- **c.** Cooling towers, evaporative condensers, heat exchangers and chillers
- **d.** Storage and header tanks
- **e.** Calorifiers and water heaters
- **f.** Water softeners and other pre-treatment plant
- **g.** Water treatment equipment
- **h.** Pumps
- **i.** Strainers
- **j.** TMVs
- **k.** All outlets
- **l.** Deadlegs
- **m.** Dead ends
- **n.** Any other detail relevant to the communication of risk

36 Whilst it is not a requirement of a risk assessment to produce either schematic diagrams or asset registers, the absence of an adequate schematic diagram, in particular, can limit the accuracy of the assessment – particularly in complex or substantially modified water systems. The LCA Member should explain this to the client in advance of the assessment. For extremely complex systems or high-risk areas it may be impossible to complete a risk assessment without schematic diagrams or asset registers. The risk assessor should also consider the schematic diagram as part of the communication of risk - detailed pipework scale drawings may not be as effective in communication as a simplified drawing that retains the essential detail.

37 In the absence of an up-to-date schematic diagram the risk assessor may judge that for a simple water system in a small building there is sufficient information to complete and issue a risk assessment, and full reasons for this decision should be given in the assessment. The risk assessor may produce diagrams during the site survey in order to assist in understanding the system and explaining the findings of the assessment. These may not meet the requirements of L8 para 40 and the written scheme of control, where full system schematic diagrams are needed.

38 For larger buildings and systems and settings of elevated susceptibilities full schematic drawings will always be needed to produce a suitable and sufficient risk assessment.

39 The schematic diagram should contain sufficient detail to communicate the risk and enable implementation of the written scheme of control, e.g. it is essential to include all recirculating loops on schematic diagrams when the recommendations for the written scheme of control include monitoring of these areas. Identification of sentinel points, sample points from sample plan, TMVs etc. can be useful in communicating the risk and in implementation of a written scheme of control.

FOR AND ON BEHALF OF THE LEGIONELLA CONTROL ASSOCIATION