ENVIRONMENTAL TECHNICAL SERVICES (UK) LTD

L E G I O N E L L A

RISK ASSESSMENT

Old Walls

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DATE : 10.03.22

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RISK ASSESSMENT

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1.0 EXECUTIVE SUMMARY

This document is intended to identify the risk of developing legionnaire's disease from the building water system. Risk assessments are required by the Health and Safety Executive prior to undertaking remedial action to reduce any risks identified.

The Health and Safety commission issued an Approved Code of Practice for "The Prevention of Control of Legionellosis (including legionnaires'disease)" which came into effect on 15th January 1992, requiring a risk assessment to be taken. Guidance notes were issued by the Health and Safety Executive in the form of L8 and HS(G)274 this risk assessment is structured around the requirements of these two documents.

Details of the requirements can be found in section 3 of this document.

Legionellosis is the term used for infections caused by legionella pneumophila and other bacteria from the family Legionellaceae. Legionnaires' disease is a pneumonia that principally effects those who are susceptible due to age, illness, immunosuppression, smoking etc. and may be fatal. Legionella can also cause less serious illnesses, which are not fatal, or permanently debilitating but which can affect all people.

Infection is attributed to inhaling legionella, either those water droplets which are small enough to penetrate deeply into the lung, or in droplet nuclei (the particles left when water has evaporated). Legionella are widespread in natural sources of water. The 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.

For a risk to be present a chain of events has to occur: -

a. System infection

b. Legionella proliferation enhanced by system conditions

c. Aerosol formation

d. Inhalation of aerosol by susceptible individual

Since aerosol formation and inhalation is difficult to avoid the onus falls on the operator to prevent system infection and to eliminate conditions in which legionella thrive.

Our examination of the water systems have demonstrated that a **Med** risk is present.

Whilst each of the systems requires some attention to arrive at full compliance the management effort and budget should be directed at the high risk systems first to make them safe. Full details of the required actions are enclosed.

2.0 SUMMARY OF RESPONSIBILITIES

ITEM	WORKS	ORGANISATION
1	Carryout Legionella Risk Assessment & Training of Site Staff	Contractor
2	Set up Site Log Books, Carry out Full Audit & Asset Register	Contractor
3	Identify Remedial Works & Potential Breaks in Procedures	Contractor
4	Inspect Systems & Areas in Breach of Bylaws and Legislation	Contractor
5	Set up & show clear Procedures and Responsibilities	Contractor
6	Implement Remedial Works and Procedures	Client
7	Update drawings and Log books if any modifications or Alteration works are carried out with water systems	Client
8	Inform Contractor of any Alteration or Modification works	Client
9	Immediately inform Contractor of any change in contact staff Or Procedures	Client

Declaration

I have checked this section of the document and have accepted the findings. I am aware of both the clients and the contractors responsibilities' are am willing to be bound by them.

Signed……..Date……For and Behalf of Client

Signed…….....Date……For and Behalf of Contractor

3.0 MANAGEMENT AUTHORITIES

	NAME	ADDRESS	TEL NO.
Responsible Estates Engineer	*Trevor Clay*	*Estates Dept Concord College Acton Burnell Shrewsbury*	*01694 731183*
Site Responsible Person	*Sarah Darral*	*As Above*	*As Above*
Water Supply Company	*Sever Trent Water*	*Oxley Moor Road Wolverhampton*	*0345 7500500*
Mechanical & Electrical contractor if appropriate	*In House*	*Concord College Estates Dept*	*01694 731183*
Water Hygiene Company Contact	*Andy Wilkie*	*Environmental Technical Services (UK) LTD*	*01667 459594*
Nearest Medical Assistance	*Medical Centre*	*Concord College*	*01694 731631*

Any of the above not available at the time inspection represent a gap in management procedures which could lead to a risk of infection through miscommunication.

4.0 MANAGEMENT SYSTEMS - DOCUMENTATION

DOC. NO.	DESCRIPTION	SECTION
CC22	Procedures & Responsibilities	2.0
CC22	System Drawings	7.0
CC22	Monitoring Procedures	Appendix C
CC22	Cleaning Procedures	Specification
CC22	Disinfection Procedures	Specification
CC22	Operating and Maintenance Procedures	Appendix B
CC22	Training Records	Appendix B
CC22	Log Books - Hot & Cold Water Systems	4.0
CC22	Procedures for specifying and purchasing water treatment	Appendix D

Any of the above not available at time of inspection represents a non-compliance with the Approved Code of Practice.

5.0 SCOPE OF RISK ASSESSMENT

NUMBER OF FLOORS

Floor Number	B/ment	Ground	1st	2nd	3rd	4th	5th	Loft	Roof
CWS Storage Tank(s)		No							
Feed/Expans. Tanks		No							
HWS Cylinders		Yes							
Sinks		Yes							
Drinking Fountains		No							
Baths		No							
Wash Hand Basins		Yes							
Water Closets		Yes							
P.O.U. Heaters		No							
Showers		Yes							
Urinals		No							
Foot Wash		No							
Fire Hose		No							
Dead Legs		No							
Spa Baths		No							
Little Used Outlets		No							
Tea boiler		No							
Emergency Showers		No							
Water Softener		No							
Combination Unit		No							
Megaflow Unit		No							
Bib Taps		No							
TMVs		No							

General Description of Water Services.

The cold water is fed from the mains and the hot water is fed from a single calorifier in the plant room.

6.0 CWS TANK SURVEY REPORT

TANK ASSET NO	*T.1*	*T.2*	*T.3*	*T.4*
Location				
Access to Tanks				
What does Tank Supply				
Tank Type				
Tank Size				
Capacity				
Source of Supply				
Screened Lid Vent Fitted Y/N				
Condition of Lid/Dimensions				
Condition of Insulation				
Size of Overflow				
Overflow Screen Y/N				
Internal Condition of Tank				
Size of Inlet				
Size of Outlet No. 1				
Size of Outlet No. 2				
Tank Labelled Y/N				
Relation of Inlet to Outlet				
Is Pipe work Insulated				
Drain Size				
Tank Temperature				
Ambient Temperature				
Evidence of Stagnation Y/N				
Sludge Accumulation (L/M/S)				
Is Corrosion Evident (L/M/S)				
Evidence of Biofilm				
Remedial Work Required Y/N				

COMMENTS

There are no water tanks on the premises.

7.0 SCHEMATIC LAYOUT OF SYSTEMS

See C.A.D. Drawings

8.0 HWS CALORIFIER SURVEY REPORT

Calorifier Asset No	C. 1	C.2	C.3	C. 4	C.5
Location	*Plant Room*				
What does Calorifier Feed	*HWS*				
Construction (Copper/Galvanised)	*Stainles*				
Horizontal/Vertical	*Vertical*				
Source of Supply (Mains/Tank)	*Mains*				
Storage (Yes/No)	*Yes*				
Inspection Cover	*No*				
Temperature	*5321*				
Return Temperature	*51.0*				
Calorifier Set Point Temperature	*55.0*				
Base Temperature	*51.5*				
Condition of Insulation	*Good*				
Physical Dimensions (Height/Diameter)	*1.8x0.6*				
Inspection Hatch (Yes/No)	*No*				
Can Unit be Isolated?	*Yes*				
Secondary Return (Yes/No)	*Yes*				
Return Pump (Single/Duplex)	*Single*				
Anti-Stratification Pump (Yes/No)	*No*				
Total base flushing possible (Yes/No)	*Yes*				
Position of Drain Off Cock	*Pipe*				
Diameter Drain-off Cock	*15mm*				
Pressure Gauge (Yes/No)	*N/A*				
Temperature Gauge (Yes/No)	*Yes*				

COMMENTS

The calorifier is in very good condition.

9.0 SAMPLES / RESULTS

SAMPLE NO.	SAMPLE POINT	RESULTS
01	Room G1	ND
02	Kitchen	ND
03	Room G4	ND

COMMENTS/RECOMMENDATIONS

The above results are satisfactory.

Note
ND None Detected
10^1-10^2 Satisfactory
10^3-10^4 Re-Sample Advised
10^5-10^6 Unsatisfactory

10.0 TEMPERATURE REPORT

DATE	SAMPLE POINT	TEMPERATURE °C HOT	COLD
10.03.22	Room G1*	51.6	15.8
	Kitchen*	51.2	14.5
	Room G5	50.7	16.2
	Room G4*	51.0	16.0

INTERPRETATION

Cold Water <20°C Acceptable
Hot Water >50°C Acceptable
Temperatures >20°C or <50°C Unacceptable

CWDS taken after 2 minutes running
HWS taken after 1 minute running

* Sample Point
NTO Not turned on

COMMENTS/RECOMMENDATIONS

The above water temperatures are satisfactory.

11.0 PHOTOGRAPHIC RECORDS

Old Walls Calorifier

Old Walls Shower

12.0 ASSET REGISTER

SITE: Old Walls

LOCATION	OUTLET	ASSET NO.	FED FROM
Boiler House	Calorifier		
Kitchen	Sink		
Room G1	Shower		
Room G1	WC		
Room G1	WB		
Room G2	Shower		
Room G2	WC		
Room G2	WB		
Room G3	Shower		
Room G3	WC		
Room G3	WB		
Room G4	Shower		
Room G4	WC		
Room G4	WB		
Room G5	Shower		
Room G5	WC		
Room G5	WB		
Room G6	Shower		
Room G6	WC		
Room G6	WB		

13.0 WATER SYSTEM SURVEY REPORT

Description	*Location*	*Material*	*Compliance Yes/No*	*Risk High/Med/Low*
DDWS Pipework	All Areas	Foam	Yes	Low
Hot Water Pipework	All Areas	Foam	Yes	Low
Pipe Insulation	Good	Foam	Yes	Low
Fire Hose Reels	No	N/A	N/A	N/A
Sanitary Units	No	N/A	N/A	N/A
Little Used Outlets	No	N/A	N/A	N/A
Redundant Pipework	No	N/A	N/A	N/A
Double Check Valve	Plant Room	Brass	Yes	Low
Tonne Dish Air Break	No	N/A	N/A	N/A
Spa Bath	No	N/A	N/A	N/A
Vending Machines	No	N/A	N/A	N/A
POU Water Heaters	No	N/A	N/A	N/A
Combination Units	No	N/A	N/A	N/A
Showers	Yes	Brass	Yes	Med
Irrigation Wands	No	N/A	N/A	N/A
Spray Humidifier	No	N/A	N/A	N/A
Glass Trap	No	N/A	N/A	N/A
Fume Cupboard	No	N/A	N/A	N/A
Drip Trays	No	N/A	N/A	N/A
TMV's	No	N/A	N/A	N/A
Mixing Taps	Yes	Brass	Yes	Low
Bib Taps	No	N/A	N/A	N/A
Record Keeping	Office	N/A	No	Low

Comments:

The above findings comply with current guidelines.

14.0 REMEDIAL WORKS & COSTINGS

APPENDIX 15

LEGISLATION AND CODES OF PRACTICE

The following are identified as the key Codes of Practice and Legislation applying to water systems and water quality.

L8 HS(G)274	:	The control of legionellosis, including legionnaires' disease.
HSC	:	The prevention and control of Legionellosis. (including legionnaires disease) Approved Code of Practice. (Nov 2000)
SI 1992 No, 2225	:	The notification of cooling towers and evaporative condensers regulation 1992.
SI 1988 No. 1657	:	The control of substances hazardous to health regulations.
The Health and Safety at Work Act 1974.	:	(N.B. the above are empowered by this act)
BACS. Code of Practice	:	The control of Legionella by the safe and effective operation of cooling systems. (British Association of chemical specialities).
T.M.13	:	Minimising the risk of Legionnaire's Disease - 1987. (Chartered Institute of Building Service Engineers).
BS6700	:	Design, Installation, Testing and Maintenance of Services supplying water for domestic use within buildings and their curtilages.
BS1710	:	Pipework identification.
WRC approvals	:	Filtering and Registration Scheme and Installation Practices.
Water Supply Byelaws	:	
The Control of Legionellae in Health Care Premises.	:	A Code of Practice. (DHSS)

APPENDIX 16

APPROVED CODE OF PRACTICE FOR THE PREVENTION OR CONTROL OF LEGIONELLOSIS

SUMMARY

Any water system operating with temperatures of greater than 20°C and which may release a spray or aerosol presents a reasonably foreseeable risk of legionnellosis. Experience shows that the following are the key systems, which required attention.

* Systems incorporating cooling towers or evaporative condenser.

* Hot water services >300 litres in capacity.

* Humidifiers and air washers.

* Spa baths and pools.

* Hot and cold water services in premises where the occupants are particularly susceptible.

For premises covered by the Health and Safety at Work Act 1974, the HSC`s Approved Code of Practice requires the following:

* A risk assessment undertaken by a competent person to identify the risk of legionellosis and any necessary and reasonably practicable precautionary measures required.

* A management plan identifying steps to be taken to minimise the risk. The plan should also identify the responsible persons, the lines of communication and the training and competence requirements for employees and sub-contractors.

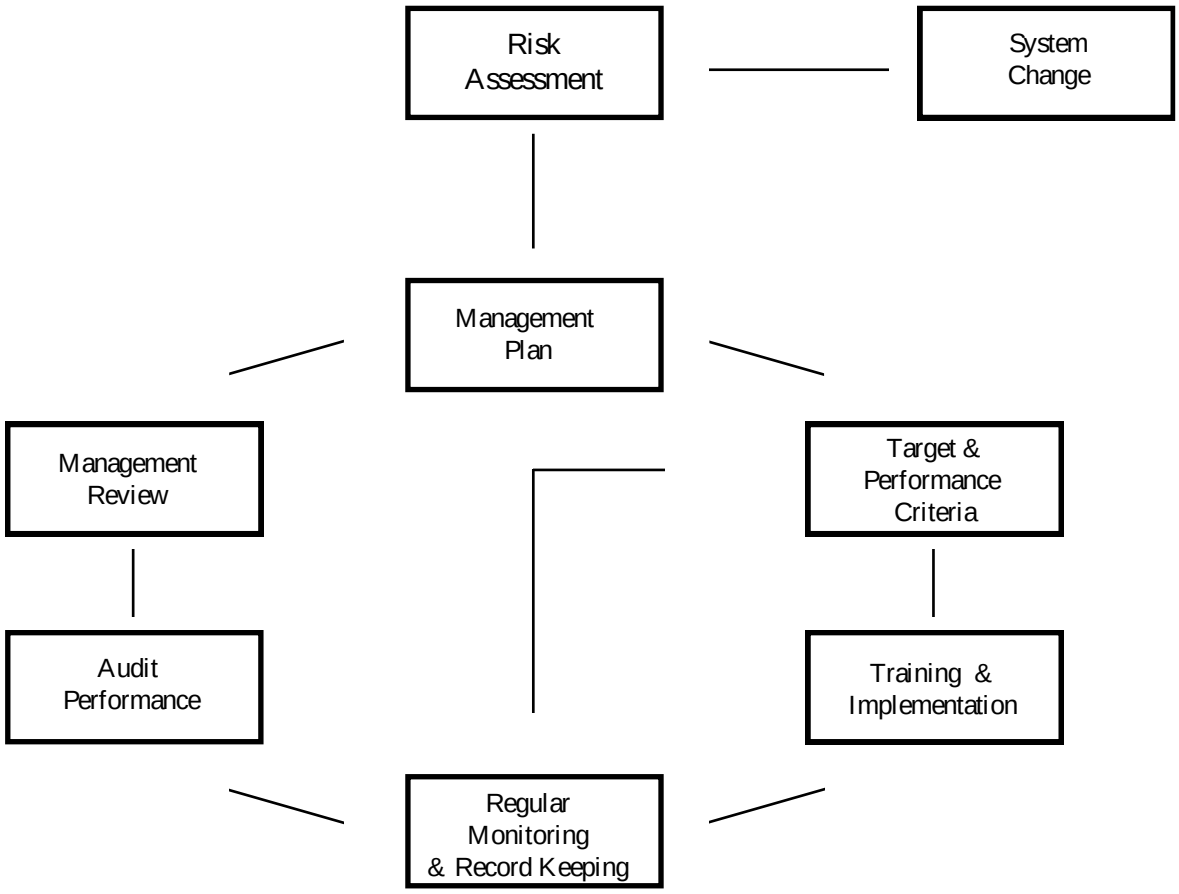
* Implementation of the plan including training.

* Record keeping to track remedial activities and to monitor performance.

* The owner should ensure that the management system performance is audited and subject to management review to keep it relevant.

Figure 01 provides a graphical indication of the requirement of the ACOP, which is enforced by the Health and Safety Executive or the Environmental Health Department of the local authority, depending on your premises type. Failure to comply is not in itself an offence, but failure to comply may be taken by a court as proof that the person has contravened the legal requirements.

Fig 01 – REQUIREMENTS OF THE APPROVED CODE OF PRACTICE



For further details on how to implement the ACOP for your systems please contact Environmental Technical Services who can provide the following services:

* Risk Assessments
* Management plan and procedure development
* Training or personnel
* Remedial action such as
    - Cleaning and disinfection
    - Tank refurbishment
    - Regular water treatment (chemical/plant)
* Provision of log books

* Regular monitoring and system maintenance including sampling, analysis, chemical cleaning and disinfection.

APPENDIX 17

THE CONTROL OF LEGIONELLOSIS L8 SUMMARY FOR

HOT AND COLD WATER SERVICES

L8 applies to all premises covered by the Health and Safety at Work Act 1974, where foreseeable risk of legionellosis is present i.e. most commercial premises with a hot water system of greater than 300 litres capacity.

The prime focus of L8 is to avoid conditions, which permit legionellae to proliferate and to avoid the creation of sprays or aerosols or where this is impracticable to minimise the release of droplets.

The conditions, which promote legionellae proliferation are:

* Temperature in the range of 20 - 45°C
* Presence of sediment, sludge or organic matter which act as nutrients.
* Some unapproved water fittings may harbour legionella and act as a nutrient.
* High microbial levels may act as nutrients and as a host for legionellae.
* Biofilms and slimes may harbour and protect legionellae from biocides. There are often caused by stagnant or low flow conditions.

The main areas of concern for hot and cold water services are shown in Table (1) along with some possible precautionary measures. A risk assessment should be carried out on each site and a management plan developed to minimise the risk. The management plan and its execution should be completely documented as detailed in Table (2).

TABLE 1 - TYPICAL RISKS IN HOT AND COLD WATER SERVICES

ITEMS	POSSIBLE PROBLEM	OPTIONS & PRECAUTIONARY MEASURES
Storage tank	Stagnation Temperature > 20°C Sludge and Scale build up Corrosion deposit build up Ingress of nutrient	Location or inlet and outlet Ensure tanks not too large or numerous Insulation, or low level chlorination Clean and disinfect on regular basis Refurbishment/Butyl lining Tight fitting covers and insect mesh on overflow
Softeners & Filters	Deposit build up Microbiological build up Fitting harbouring legionella	Backwash regularly Disinfect 6 monthly or as monitoring requires Use approved fittings only
Calorifiers	Stratification (temp<60°C) Intermittent use Scale build up	Pumped circulation or regular thermal disinfection Thermal disinfection Pre-treat water or descale as required.
Deadlegs (e.g. taps, showers and other appliances)	Fitting harbouring legionella Stagnation	Use approved fittings only Chlorination and flush through Thermal disinfection and flush through Keep pipe runs short
All pipework and systems	Sludge, scale, debris build up	Clean and disinfect on a regular basis Regular microbiological monitoring (e.g. dipslide 4-6 per annum) Legionella sampling annually

TABLE 2 - RECORDS FOR HOT AND COLD WATER SERVICE

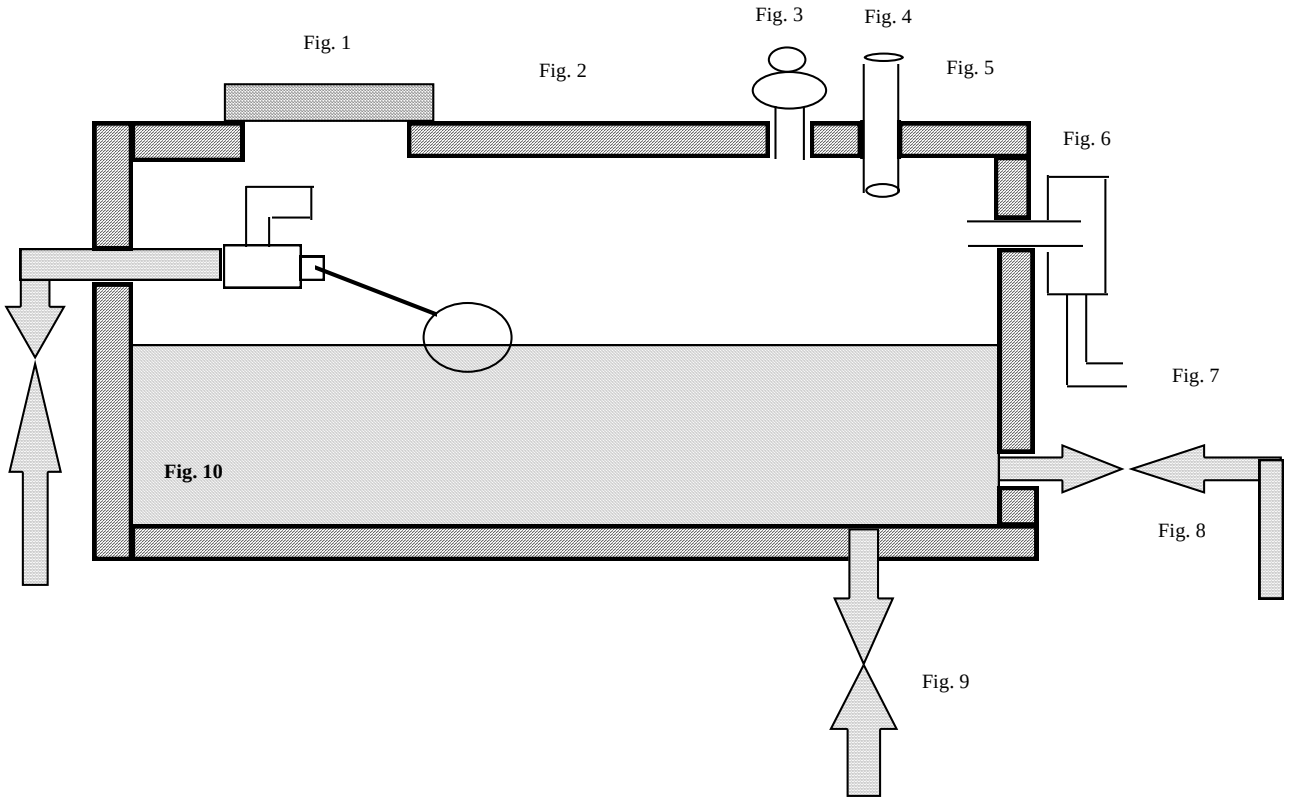
A logbook with the following contents is recommended.

* Identification of those responsible and lines of communication.
* Description and plan of the system.
* Risk assessment.
* Operation of the system.
* Procedures for inspection and checking of the system.
* Management plan of remedial activities and records of progress.
* Records of:
    - Water temperatures
    - Record of operation, maintenance and checking.
    - Inspection record and subsequent action.
    - Cleaning and disinfection record.

APPENDIX 18

CODES OF PRACTICE APPLYING TO

COLD WATER STORAGE TANKS



KEY TO GUIDES

1.	Bye-Laws	:	Water supply bylaws guide.
2.	BS6700:1987	:	Design, installation, testing and maintenance of services supplying water for domestic use within Buildings and their curtiliges.
3.	TM13:1991	:	Minimising the risk of legionnaires` disease.
4.	L8 legionnaires`	:	The control of legionellosis including disease.

APPENDIX 19

SUMMARY OF KEY POINTS COVERED BY BS6700

	REFERENCE	GUIDE
Fig 1.	Securely fixed access cover	Bye-Laws
Fig 2.	Rigid, close fitting and securely fixed cover	Bye-Laws, BS6700:1987, TM13:1991, L8 HS(G)274
Fig 3.	Screened air-vent	Bye-Laws, BS6700:1987
Fig 4.	Sleeve for vent pipe	Bye-Laws
Fig 5.	Insulation against heat and frost	Bye-Laws, TM13:1991, L8 HS(G)274
Fig 6.	Overflow screen to prevent ingress by insects etc.	Bye-Laws
Fig 7.	Warning Pipe	Bye-Laws
Fig 8.	Outlet pipes should be as far away from the inlet as possible to encourage a uniform turnover of water.	Bye-Laws, L8 HS(G)274
Fig 9.	Maintenance drain valve at lowest point.	L8 HS(G)274
Fig 10.	WRC approved linings suitable for contact with drinking water.	Bye-Laws, BS6700:1987
	Cisterns greater than 5000 litre capacity shall be split into two sections to avoid interruption of supply during maintenance	BS6700:1987
	To restrict microbiological growth, it is important that stored potable water should be kept at as low a temperature as practical, ideally less than 20°C.	Bye-Laws, BS6700:1987 TM13:1991 L8 HS(G)274
	Materials of construction shall be those detailed in "The Water Filtering and Materials Directory".	Bye-Laws, BS6700:1987 TM13:1991, L8 HS(G)274
	Every storage cistern shall be so placed and equipped that the interior can be inspected and cleaned.	Bye-Laws, BS6700:1987, TM13:1991, L8 HS(G)274

APPENDIX 20

RECOMMENDED WATER MANAGEMENT PROGRAMME

1. Mains Cold Water Service

1.1	Test free residual chlorine concentration	**Monthly**
1.2	Obtain sample for independent laboratory analysis for total and faecal coliforms.	**6-Monthly**
1.3	Service, maintain water softener and analyse hardness as $CaCO_3$.	**6-monthly**
1.4	Regeneration of water softener in order to backflush resin bed and retard stagnation.	**Weekly**

2. Cold Water Tanks

2.1	Monitor and record temperature at CWS tanks and selected CWDS outlets after 2 minutes running.	**Monthly**
2.2	Obtain samples for independent laboratory analysis for total and faecal coliforms from CWS tanks and selected CWDS outlets.	**6-Monthly**
2.3	Inspect conditions in CWS tanks for presence of organic materials, vermin etc.	**Annually**
2.4	Chlorinate CWS tanks and CWDS outlets to the requirements of L8 (i.e. from at least one hour at 50ppm to at least two hours at 20ppm).	**Annually**

3. Hot Water Services

3.1	Monitor and record temperature at selected HWS outlets.	**Monthly**
3.2	Obtain samples for independent laboratory analysis for legionella pneumophila from HWS calorifiers and selected HWS outlets after 1 minute running.	**6-Monthly**
3.3	Chlorinate HWS outlets to the requirements of L8 (i.e.: from at least one hour at 50ppm to at least two hours at 20ppm).	**Annually**
3.4	HWS calorifiers should be flushed to drain to remove build up of sludge scale in bottom of units.	**6-Monthly**
3.5	Dismantle clean and disinfect shower heads and hoses.	**Quarterly**

4. Heating System

4.1 Analyse and monitor inhibitor concentration to ensure correct dosage and to retard the risk of sludge, corrosion etc. **6-Monthly**

5. Documentation

An on-site logbook should be provided in accordance with the approved code of practice issued by the Health and Safety Commission with up to date details of the following:

5.1 A nominated person with clearly defined lines of communication and details of contractors.

5.2 The risk assessment, incorporating a simple description and plan of the system.

5.3 A written scheme of control and minimising risk.

5.4 A schedule of maintenance procedures.

5.5 Records of water temperatures, bacteriological counts, chlorination procedures, etc.