Lothian NHS Board

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2-4 Waterloo Place
Edinburgh
EH1 3EG

Telephone: 0131 536 9000
www.nhslothian.scot.nhs.uk
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Date: 08/03/2024
Your Ref:
Our Ref: 8413

Enquiries to : Richard Mutch
Extension: 35687
Direct Line: 0131 465 5687
loth.freedomofinformation@nhs.scot
richard.mutch@nhs.scot

Dear

FREEDOM OF INFORMATION – LEGIONELLA

I write in response to your request for information in relation to Legionella in East Calder Health Centre.

Question:
1. The date Legionella was identified.
2. The location(s) of Legionella.
3. The strain and bacteria count of Legionella identified.
4. The source, or presumed source, of Legionella.
5. Any rooms or other facilities (toilet, wash hand basin etc.) in East Calder Health Centre that were unusable because of the presence of Legionella and the dates/duration any room or facility was unusable.
6. The cost of Legionella testing for each fiscal year since 2016/17 to date.
7. The cost for treatment/eradication of each episode where Legionella was detected.
8. The numbers of staff in East Calder health centre who contracted Legionella due to any identified with East Calder Health Centre since 1 January 2016.
9. The numbers of patients attending East Calder health centre who contracted Legionella due to any identified with East Calder Health Centre since 1 January 2016.
10. Copy of ALL Legionella risk assessments for East Calder Health Centre and, if separate, those risk assessments pertaining to staff employed and to patients visiting East Calder Health Centre.
11. Copies of any correspondence notifying any relevant authorities of the presence of Legionella e.g. HSE, Public Health Scotland, West Lothian Council.
12. Copy of required Legionella control measures.

- It is requested that the numerical and date data is provided in tabular form in an excel spreadsheet.

Answer:

Please see enclosed spreadsheet and documents. Please note that names and details have been redacted from this response as NHS Lothian has a policy of not releasing this information below a senior level. Section 38(1)(b) of the Freedom of information (Scotland) Act 2002 – personal information.

Question:

13. Statement on what NHS Lothian considers “an acceptable level of Legionella” in health care facilities.

Answer:

A threshold of <1 colony forming units (CFU) per litre for Legionella of any species or serogroup is defined by the Health and Safety Commission (2000). Approved Code of Practice, Legionnaires’ disease: the control of Legionella bacteria in water systems (L8). Health and Safety Executive, 2000 and Scottish Health Technical Memorandum (SHTM 04-01) as the acceptable level of Legionella in water systems.

The actions taken by NHS Lothian in response to any count of ≥ 1 cfu/1000mls are defined by Public Health England Guidance ‘Responding to the detection of Legionella in healthcare premises’ (2015) i in the absence of NHS Scotland specific guidance.

I hope the information provided helps with your request.

If you are unhappy with our response to your request, you do have the right to request us to review it. Your request should be made within 40 working days of receipt of this letter, and we will reply within 20 working days of receipt. If our decision is unchanged following a review and you remain dissatisfied with this, you then have the right to make a formal complaint to the Scottish Information Commissioner within 6 months of receipt of our review response. You can do this by using the Scottish Information Commissioner’s Office online appeals service at www.itspublicknowledge.info/Appeal. If you remain dissatisfied with the Commissioner’s response you then have the option to appeal to the Court of Session on a point of law.

If you require a review of our decision to be carried out, please write to the FOI Reviewer at the email address at the head of this letter. The review will be undertaken by a Reviewer who was not involved in the original decision-making process.

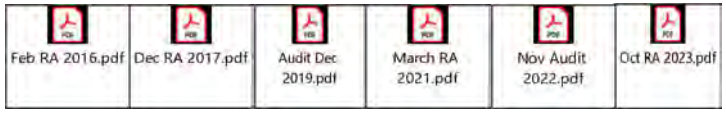
FOI responses (subject to redaction of personal information) may appear on NHS Lothian’s Freedom of Information website at: https://org.nhslothian.scot/FOI/Pages/default.aspx

Yours sincerely

ALISON MACDONALD
Executive Director, Nursing, Midwifery and AHPs
Cc: Chief Executive
Enc.

1.The date Legionella was identified.	2.The location(s) of Legionella.	3.The strain and bacteria count of Legionella identified.	4.The source, or presumed source, of Legionella.	5. Any rooms or other facilities (toilet, wash hand basin etc.) in East Calder Health Centre that were unusable because of the presence of Legionella and the dates/duration any room or facility was unusable.
16 December 2019	Room 8 (G/050)	Legionella Species **40 cfu/l**	Local	No
21 November 2022	359/G/14 Sink Hot	Legionella Species **1,706 cfu/l**	Local	No
21 November 2022	Plantroom Gas Fired Water Heater	Legionella Species **529 cfu/l**	Local	N/A
04 December 2022	G12 WHB Hot	Legionella Species **194 cfu/l**	Local	No
29 October 2023	Male Public Toilet G/39 WHB Hot	Legionella Species **3,142 cfu/l**	Faulty Valve	2 Weeks
29 October 2023	New Portacabin Consulting Room 4 WHB Mixer	Legionella Species **57 cfu/l**	Lack of use	No
19 November 2023	Ladies Public WC WHB Hot (Pre Flush)	Legionella Species **191 cfu/l**	Faulty Valve	1 Week
19 November 2023	Ladies Public WC WHB Hot (Post Flush)	Legionella Species **19,153 cfu/l**	Faulty Valve	1 Week
19 November 2023	Secretaries Room (Room Opposite) WHB Mixer	Legionella Species **131 cfu/l**	Local	No
24 December 2023	Secretaries Room WHB Mixed	Legionella Species **60 cfu/l**	Local	No
22 January 2024	Secretaries Room (Pre Flush)	Legionella Species **199 cfu/l**	Local	No
22 January 2024	Secretaries Room (Post Flush)	Legionella Species **4,911 cfu/l**	Local	No
03 February 2024	Secretaries Room G09 WHB Mixer GP Registrar	Legionella Species **20 cfu/l**	Local	No
03 February 2024	Consultant Room G14 WHB Hot Room 2	Legionella Species **509 cfu/l**	Local	No

Q10.Westfield water risk assessments & Audits (Double click on Icons below to view document)



6.The cost of Legionella testing for each fiscal year since 2016/17 to date.		Year	7.The cost for treatment/eradication of each episode where Legionella was detected.	Q11.Copies of any correspondence notifying any relevant authorities of the presence of Legionella e.g. HSE, Public Health Scotland, West Lothian Council.
£100.00	Initial sampling included in Risk Assessment costs between 2016-2023	2019	£150.00	**Please see enclosed**
Additional sampling - £605.00		2022	£750.00 - Not including sampling	
Additional sampling - £1567.50		2023	Cost of eradication to date £4640.00	
Additional sampling to date - £357.50		2024		

Q12.Copy of required Legionella control measures.
Double click to view documents
Legionella control measures.pdf

Procedure Reference	Operation
5.1	FAILURE OF WATER SYSTEM CONTROL MEASURES
5.2	POSITIVE LEGIONELLA TEST RESULT
5.3	EMERGENCY REPAIRS
5.4	DISINFECTION OF WATER SYSTEM
5.5	DOMESTIC FLUSHING

THE FOLLOWING PAGES DESCRIBE OUT-OF-SPECIFICATION TEST RESULT AND / OR WHERE *LEGIONELLA* HAS BEEN IDENTIFIED AND/OR BACTERIA COUNTS BEING INEXCESS OF THE RECOMMENDED LIMITS IN THE WATER SYSTEM ARE IDENTIFIED.

The Health and Safety at Work Act places a duty on employers to ensure, so far as is reasonably practicable, the maintenance of safe working conditions without risks to health, not only to employees, but also to the general public.

The risk to personnel associated with the presence of *Legionella* depends on a number of variables and may be quite low. However, since the actions to eradicate it are straightforward and reasonably practicable, it would be wise to put them in hand without delay if *Legionella* has been identified.

When analysis confirms that the levels of bacteriological contamination are in excess of acceptable limits, and/or the presence of Coliforms or *E.coli* is identified, the procedures recommended in this section should be applied.

5.1 Failure of Water System Control Measures:

Where any reported test result, non-compliance issue or defect is made known which affects the integrity of the water system and indicates the failure of Control Measures and / or increased risk of Legionella the following procedures shall be followed and duly recorded within Section 2.3 of this document and brought to the attention of the relevant Infection Control Team, Assurance team and Water Management Group.

IN ALL CASES A NON-CONFORMANCE REPORT SHOULD BE OPENED BY THE ASSURANCE TEAM TO DOCUMENT AND CONTROL ACTIONS.

5.2 Positive Legionella Test Result

Microbiological Sampling (Legionella)
Sampling requirements and frequency are to be formulated by St Michael's Hospital and Water Safety Plan/Written Scheme should be updated as appropriate.

Legionella testing may be required:

- In systems where the temperature control regimes are not consistently achieved, frequent testing e.g. weekly should be carried out to provide early warning of loss of control. Once the system is brought back under control as demonstrated by monitoring, the frequency of testing should be reviewed.
- Weekly checks are recommended until the system is brought under control;
- When an outbreak is suspected or has been identified;
- In wards with at-risk patients

As a minimum, samples should be taken as follows:

- From the cold-water storage and the furthermost outlet from the tank, on every loop;
- From the calorifier flow, or the closest tap to the calorifier, and the furthermost tap on the hot water service circulating system (these should be identified on sentinel outlet register);
- Additional samples should be taken from the base of the calorifier via drain valves;
- From areas where the target control parameters are not met (i.e. where temperatures are below 55°c for hot water systems or ≥20°c for cold water systems);
- From areas subject to low usage, stagnation, excess storage capacity, dead legs, excessive heat loss, crossflow from the water system or other anomaly.
- High Risk Patient Areas
- Additional random samples may also be considered appropriate where systems are known to be susceptible to colonisation.

The temperature control regime is the preferred strategy for reducing the risk from *Legionella* and other waterborne organisms in water systems. This will require monitoring on a regular basis.

HSG 274 Part 2 Table 2.3 Actions to be taken following Legionella sampling in hot and cold water systems in healthcare premises with susceptible patients

Legionella bacteria (cfu/Litre)	**Recommended Actions**
Not detected or up to 100cfu/l	In healthcare, the primary concern is protecting susceptible patients, so any detection of Legionella should be investigated and, if necessary, the system resample to aid interpretation of the results in line with the mentoring strategy and risk assessment
>100cfu/l and up to 1000 cfu/l	Either: • If the minority of sample are positive, the system should be resampled. If similar results are found again, review the control measures and risk assessment to identify any remedial actions necessary or • If the majority of samples are positive, the system may be colonised, albeit at a low level. An immediate review of control measures and a risk assessment should be carried out to identify any other remedial action required. Disinfection of the system should be considered
>1000cfu/l	The system should be resample and an immediate review of the control measures and risk assessment carried out to identify any remedial actions, including possible disinfection of the system. Retesting should take place a few days after disinfection and at frequent intervals thereafter until a satisfactory level of control is achieved

Communication pathway for Legionella results from water samples:

Water samples are sent to; UKASS-accredited laboratories which provide this service for NHS and other organisations that manage buildings. Reports will come back initially to the estates department.

Negative water samples are recorded as part of the documentation of Legionella control. If they are related to investigation of an "incident" such as a clinical case or a previous positive sample then these results are communicated to those managing that incident.

The information on the report which needs to be communicated is:

- Date of sampling
- Location and type of water outlet
- Identification of the organism, (Legionella pneumophila with or Legionella species other than L pneumophila.)
- Count of organisms per Litre.

Estates will

- Inspect the system and take further action in accordance with HSE guidance and locally agreed procedures
- Inform Charge Nurse and or Clinical Nurse Manager of the Clinical Area concerned if appropriate of any control measures being taken/required
- Inform Area Manager for the Sector if appropriate.

The results of this initial risk assessment must be communicated to all those noted above and also to the Facilities Area Manager for the site involved.

The Infection Control Manager for Infection Prevention and Control will inform NHS Lothian

If there is impact on patient care then an Incident Management Team (IMT) may be convened to assess the risk and further actions.

5.3 Emergency Repairs

Emergency repairs may be required at any time and should be undertaken by trained and competent personnel. Such repairs can vary from a simple repair to a section of pipe work, replacement of a component or major burst or loss of service. In all such cases the integrity and safety of the water distribution system must be maintained at all times. All repairs will be raised through the Estates Helpdesk process through Agility; this will be assigned to trained and competent personnel to attend.

5.4 Disinfection of Water System and Components

There are a number of different chemical and thermal disinfection methods available ALL of which shall be undertaken by trained and competent personnel in strict accordance with all Statutory Requirements, Safety Precautions and Manufacturers Instructions.

Disinfection - is the process of destroying or inactivating Pathogenic organisms and is generally applied to the water supply.

Sterilisation – is the process of destroying or inactivating all Organic Life Forms and is generally applied to all systems of transmission and storage materials.

In ALL instances no matter what disinfection method is employed, due regard shall be taken of patient groups, specialist equipment and processes which may be sensitive to the disinfection process being used – eg Renal Dialysis patients **must not** be exposed to Silver Hydrogen Peroxide chemicals as such the RO Water Treatment Plant and Dialysis Machines must be disconnected from the water system until the disinfection process is completed.

Silver Hydrogen Peroxide should NOT be used for a period of 90 days or longer, as required by the Drinking Water Inspectorate.

The disinfection process may be required for the following situations:

REPAIRS -	Repair fittings and exposed pipe ends should be clean and disinfected before use. Such items should be sprayed with a suitable disinfection solution such as a Sodium Hypochlorite @ strength of 1000 mg/l (1000ppm) with a minimum contact time of 5 minutes or equal and approved.
MINOR ALTERATIONS -	Pipework should be cleaned internally by spraying with a suitable disinfection solution such as a Sodium Hypochlorite @ strength of 1000 mg/l (1000ppm) or where pipes are long and internal surfaces cannot be reached with sprays then a swab soaked in a solution of 50mg/l (50ppm) with a contact time of one hour or equal and approved.
NEW SUPPLY PIPEWORK -	Pipes are filled with a solution such as a Sodium Hypochlorite @ strength of 20 mg/l (20ppm) with a contact time of 24 hours. Or Sodium Hypochlorite and water at strength of 50mg/l (50ppm) for a contact period of one hour. Minimum free chlorine after one hour – 30mg/l (30ppm) or equal and approved
SYSTEM DISINFECTION -	This will include water storage tanks and possibly the water distribution system. The advice and use of Legionella Control Association (LCA) approved contractors will be used for this purpose

5.5 Domestic Flushing

The domestic staff is required to run (flushing) of water outlets (taps and Showers) will take place on a daily basis during the cleaning of the room or facility. The length of the process must be sufficient ensure the supply of fresh water to the outlet. The water will be run a minimum period of 3 minutes.

Where Domestic Staff cannot access a room or facility for cleaning and outlet run through (due to clinical or operations reasons) this must be reported to the clinical teams and the Domestic Supervisor. This will be recorded on the Completion of Tasks weekly sheet.

Hello,

We are not aware of any recent cases of Legionella linked with this setting and we have had no reports of any illness within this local community. No public health actions at this time.

Many thanks,
[redacted]

[redacted]
Advanced Health Protection Nurse
Health Protection Team | NHS Lothian
Waverley Gate | 2-4 Waterloo Place | Edinburgh | EH1 3EG
[redacted]
Care & Compassion | Dignity & Respect | Quality | Teamwork | Openness, Honesty & Responsibility

Please note I do not work Wednesdays.

From: Inverarity, Donald <[redacted]
Sent: 30 October 2023 14:05
To: [redacted]@nhslothian.scot.nhs.[redacted]@nhslothian.scot.nhs.uk>; [redacted]@nhslothian.scot.nhs.uk>; [redacted]@nhslothian.scot.nhs.uk>; [redacted]nhslothian.scot.nhs.uk>; [redacted]@nhslothian.scot.nhs.uk>; Protection, Health <health.protection@nhslothian.scot.nhs.uk>
Cc: InfectionControl <InfectionControl@nhslothian.scot.nhs.uk>; [redacted]@nhslothian.scot.nhs.uk>; [redacted]@nhslothian.scot.nhs.uk>; Guthrie, Lindsay [redacted]@nhslothian.scot.nhs.uk>; [redacted]nhslothian.scot.nhs.uk>; [redacted]@nhslothian.scot.nhs.uk>; [redacted]@nhslothian.scot.nhs.uk>; [redacted]@nhslothian.scot.nhs.uk>; [redacted]nhslothian.scot.nhs.uk>
Subject: RE: East Calder Health Centre

Hi [redacted]
I've copied the NHSL Public Health team in to this as there is a Legionella species count of >3000cfu/L in a public toilet in a public building.
I'm presuming this was 6 monthly surveillance water testing at East Calder Health Centre? Was it to inform a revision of the water safety audit of the building? Either way, in my role as microbiologist with counts >1000cfu/L I'd like to see the previous water safety audits for this building to see whether any water system nonconformances have been identified before.
I agree with your plan for point of use filters as an immediate control measure. Before any system wide or local disinfection, it would be useful for us to decide whether the round of testing that Westfield undertook is sufficiently extensive as its not clear to me from their e-mail if they only tested 7 outlets or if there were other non detectable outlets. Are the Portacabins leased? If so it would be useful to understand who "owns and runs" them and how long they have been on site and what water testing was undertaken when installed? Could any floorplan of the building and its plumbing be circulated too? Also what design of tap is in place in the affected outlets?
Could the practice management team provide insight as to:

1. Whether flushing of water outlets has been undertaken as intended?

2. Whether anyone (staff or patients) who have been using the affected outlets (particularly the public toilet) are ill with chest infections or unexplained fevers as they will need clinically assessed as to whether they might have a Legionella infection and this is not straight forward to diagnose from a clinical laboratory perspective if the pathogen is a non pneumophila species of Legionella (as it is here).
3. Is the male public toilet commonly used ?

Our experience from another similar property has been that individual water heaters (or their expansion vessels) may be seeded to and lead to persistence and we may need to consider that when planning corrective work.
Overall at this stage once the known risk is mitigated by the POU filters, we have opportunity to plan the response and any further areas to test before starting definitive corrective interventions.
Thanks
Donald Inverarity
Consultant Microbiologist

From: [redacted]@nhslothian.scot.nhs.uk>
Sent: 30 October 2023 13:36
To: [redacted]@nhslothian.scot.nhs.uk>; [redacted]nhslothian.scot.nhs.uk>; [redacted]@nhslothian.scot.nhs.uk>; [redacted]@nhslothian.scot.nhs.uk>; [redacted]@nhslothian.scot.nhs.uk>; [redacted]@nhslothian.scot.nhs.uk>
Cc: InfectionControl <InfectionControl@nhslothian.scot.nhs.uk>; [redacted]@nhslothian.scot.nhs.uk>; [redacted]@nhslothian.scot.nhs.uk>; Guthrie, Lindsay <Lindsay.[redacted] Inverarity, Donald [redacted]@nhslothian.scot.nhs.uk>; [redacted]nhslothian.scot.nhs.uk>; [redacted]@nhslothian.scot.nhs.uk>; [redacted]nhslothian.scot.nhs.uk>; [redacted]@nhslothian.scot.nhs.uk>; [redacted]@nhslothian.scot.nhs.uk>
Subject: Fw: East Calder Health Centre

Hi All,

Please see notification below from our Water Management Consultant.
2 positive samples of Legionella Species detected at East Calder.
I have initially instructed the fitting of point of use filters at these outlets. These will be in place today.
Thereafter we will carry out any required remedial work.

Regards,

[redacted]
Estates Sector Manager
St.Johns Hospital
Livingston,
NHS Lothian
EH54 6PP
[redacted]

Mobile [redacted]
[redacted]

From: [redacted]@nhslothian.scot.nhs.uk>
Sent: Friday, January 26, 2024 8:30 AM
To: East Region HPT <eos.eastregionhpt@nhs.scot>
Subject: East Calder Health Centre

Hi, FAO HPT,

As a follow up to the attached email from 30/10/23, further water sampling after remedial works carried out addressing the initial positive readings, has detected Legionella in another outlet at East Calder HC.
A count of 199 pre flush and 4911 post flush was detected after sampling carried out on the 12/1/24 at the Secretaries Room (G09) WHB mixer tap.
However, the same outlet was initially sampled on 9/11/23 where a count of 131 cfu/L pre flush was detected. A POU filter was fitted when the results where received on the 17/11/23 and a filter has remained fitted since then.
(Further sampling was carried out on this outlet and 2 consecutive clears where received, the 3rd sample thereafter had a count of 60 cfu/l; and then we received the high-count outlined above thereafter.

As stated a POU filter has remained in place throughout the above since 17/11/23.

Regards,

[redacted]
Estates Sector Manager
St.Johns Hospital
Livingston,
NHS Lothian
EH54 6PP
[redacted]

NHS LOTHIAN

West Lothian Healthcare Division
East Calder Health Centre
East Calder

WATERBORNE MICRO-ORGANISMS

Risk Assessment & Control Scheme Review

February 2016

NHS Lothian
East Calder Health Centre
East Calder

February 2016

CONTENTS

Prepared By	First Approval	Authorised By
Colin Mitchell	David Souza	William Leitch

The Author may be contacted regarding the report content as follows;

Email : colinmitchell@west-cal.co.uk

Tel: 01236786300

SUMMARY

The review process involved assessing the current system conditions, operational and maintenance practices and the impact of subsequently implemented Remedial Actions and Control Measures. A total of thirteen formal assessment sheets were produced, of which one achieved a High/Medium Risk Rating with the remainder in the Low/Medium and Low Risk categories. In general, similar risk ratings were achieved although a slight improvement in scores has been noted due to improved domestic hot water temperatures.

One CWS tank remains drained and isolated and this is to be commended as it removes the risks associated with a parallel tank arrangement and increases turnover through the online vessel. Satisfactory temperatures were recorded at the DHWS gas fired water heaters to provide an effective thermal control regime within the premises. However, a low hot water outlet temperature was recorded at the Treatment Room G/49 sink and required an extended flush to achieve a satisfactory temperature. This should be investigated to determine if there is a circulation issue or if the outlet is served by a single pipe.

As stated in previous reports, there is a MWS supply within the Bin Wash area which was found to be isolated at high level. This branch represents a significant effective dead leg and it is recommended that this pipework be completely removed, back to the branch point on the MWS supply to prevent back-contamination of the live system.

INTRODUCTION

This document relates to an ongoing programme of water quality monitoring at East Calder Health Centre, carried out by Westfield Caledonian during February 2016. As part of this visit, a review of the Water Quality Risk Assessment, relating to the domestic water systems contained within this building was carried out. This survey was carried out to satisfy the requirements of the Approved Code of Practice (L8) and guidance document HSG 274 and to determine aspects of the system design, condition and mode of operation which may compromise the quality of the water to which occupants are exposed and subsequent health risk. This assessment survey and control scheme review was carried out in a manner consistent with requirements with *BS8580:2010 Water Quality-Risk Assessment for Legionella control – code of practice.*

The motivation for commissioning the survey derives from the NHS Lothian Estates Management desire to ensure that the risk to patients, staff and visitors and the public at large from waterborne micro-organisms, including *Legionella*, is prevented or at least adequately controlled. This document contains a narrative describing the system and its operation, the risk contributing factors and conditions, and a review of the adequacy and effectiveness of the control scheme being implemented.

The formal, quantitative risk assessments address aspects of the system design and condition which may compromise the water quality and affect the risk of user infection. A numerical value is derived which is deemed to be representative of the risk, with additional values listed to demonstrate the reduction in risk which can be achieved should the recommendations contained within this report be implemented.

A third numerical value is also listed which gives the risk score from the previous assessment, to enable a quantification of the reduction in risk which has been achieved. The subsequently derived recommendations are of two types, namely Remedial Actions, or Control Measures. The remedial actions are designed to alter the system configuration such that inherent water quality compromising characteristics are removed, or to facilitate the implementation of subsequent control measures. In addition to the Risk Assessment a number of samples were collected to determine the microbiological safety of the domestic water systems.

SYSTEM DESCRIPTION

The Mains cold water service (MWS) enters the building at ground floor level adjacent to the boiler room. The main supply line rises vertically to supply two cold water service (CWS) storage tanks situated within the plantroom at 1st floor level. A branch is taken off this main supply line within the plantroom, which supplies the heating system feed and expansion tank. A branch is also taken off the main riser at ground floor level and runs along the main corridor before rising to supply the pantry area on the 1st floor.

Cold water downservice supplies are provided from CWS tank no.1 located at high level within the 1st floor plantroom. CWS tank no.2 is kept drained and isolated ready to be used should cleaning and disinfection of CWS tank no.1 be required. Two separate supplies are taken from each CWS tank one to supply a cold feed to the two gas fired water heaters located within the ground floor boiler room and the other to provide cold water downservices. Pipework runs along the main corridor on the ground floor with branches taken off adjacent to each room which contains a wash hand basin (whb) or sink, and also to supply the toilet areas. Branches are also taken off within the corridor area which rise vertically to supply the toilets and DSR on the 1st floor level. The second branch drops to the boiler room area to supply the two vertical direct gas fired water heaters (DGFWH).

Domestic hot water services (DHWS) within the East Calder Health Centre are supplied by the two vertical DGFWHs situated within the boiler room on the ground floor. Hot water runs at high level on the ground floor through a two pipe system.

An extension has been built to the left of the building that provides additional Consulting Rooms. Each room has a single sink and all outlets are mains fed with local electric point of use water heaters located under each sink.

ASSESSMENT FINDINGS

Control Scheme

During this assessment, discussions with site management confirmed they are completely aware of their responsibilities in respect of controlling the risk from waterborne micro-organisms.

A number of procedures are carried out and records retained within Log Books held in the Works Department at St Johns Hospital, Livingston. These Log Books also include records from community premises. These procedures include:

- Weekly - Simulated usage programmes (SUP) and bath temperatures.
- Monthly - Sentinel outlet temperatures and temperatures at shower outlets.
- Six-monthly – Thermostatic mixing valves (TMVs) including baths and showers – includes extra clean and fail safe; and cold water storage tanks monitoring inlet and outlet temperatures, although records indicated this was carried out annually only.
- Annual – Disinfection of drinking fountains carried out by external contractor, although this procedure does not include appliances within the community.

The records within these Log Books appeared to be up to date and recorded in a proper manner. The procedures should include feedback of criteria outwith recommended limits highlighting the need for any additional remedial works to rectify the situation.

Cold Water Service (CWS) Storage Tanks

The two CWS tanks located at high level within the 1st floor plantroom are of pre-insulated sectional construction, and are considered to be fully Byelaw compliant, being completely insulated, with overflow pipework suitably screened. The tanks are arranged in parallel although CWS tank no.2 remains drained and isolated. This is to be commended as often parallel tanks can experience a degree of hydraulic imbalance, with the majority of water supplied through only one tank, resulting in stagnation and contamination within the second vessel. Internal inspection of CWS tank no.1 revealed good hygienic conditions, with only light sedimental accumulations observed. A satisfactory contents temperature was recorded, suggesting that sufficient turnover is occurring through the on line tank to prevent excessive heat gain.

ASSESSMENT FINDINGS

Laboratory analysis of a sample collected from this tank also returned results which are regarded as entirely satisfactory and we have no specific recommendations with regards to the CWS tanks other than that they be subject to regular control measures.

The following photographs illustrate our observations:

Roofspace CWS Tank – Pre Insulated GRP Construction

ASSESSMENT FINDINGS

CWS Tank No. 2 – Drained and Isolated

CWS Tank No. 1 – Light Sedimental Accumulations

ASSESSMENT FINDINGS

CWS Tank No. 1 – Contents Temperature Satisfactory

Domestic Hot Water Service

Domestic hot water is provided throughout the main building by two vertical direct gas fired water heaters (DGFWHs located within the ground floor boiler room. These are arranged in parallel and samples were drawn from both drain valves to assess the conditions at the base of each vessel. These were found to be discoloured and at temperatures which compared well with those shown on the contents gauges. Both gauges indicated temperatures in excess of 60°C suggesting that little stratification is occurring within the water heaters.

Utilising a contact probe on the DHWS flow and return pipework revealed satisfactory temperatures, suggesting that the system is operating correctly to provide a suitable thermal control regime within the premises to prevent the growth and proliferation of micro-organisms. We would however, recommended that regular flushing of the drain valves be carried out, to remove sedimental deposits which are inevitable given time, and can provide a harbour and nutrient source for the growth and proliferation of micro-organisms. Regular temperature monitoring activities should also be undertaken to ensure satisfactory storage temperatures are maintained within both vessels.

ASSESSMENT FINDINGS

Hot water outlet temperatures should be maintained at between 55°C and 60°C. The lower limit is required to ensure pasteurisation of both the water and supplying pipework, whilst the upper limit is necessary to minimise the risk of user scalding. With regard to the preceding criteria, hot water outlet temperatures recorded throughout the premises were satisfactory in that these were in excess of 55°C and sufficiently high to provide an effective thermal control regime. Temperatures were however recorded above 60°C and as such represent an increased risk of user scalding. It is recommended that the thermostatic controls on the gas fired water heaters be adjusted to lower the storage temperatures slightly and maintain outlet temperatures between 55°C and 60°C.

A low hot water outlet temperature was recorded at the Treatment Room G/49 Sink after one minute and this took an extended flush to achieve a temperature above 55°C. It was not clear if return pipework is provided on the branch to this outlet and this should be investigated to determine if there is a circulation issue or if the outlet is served by a single pipe. If return pipework is provided then the circulation issue should be addressed, ensuring all valves are open. If the outlet is supplied through a single pipe then a flushing programme should be implemented to ensure regular thermal disinfection of the pipework, with consideration given to extending the return pipe to achieve circulation.

There is an additional consideration with regards to hot water within healthcare premises, which is a SHTM requirement, namely the high scald risk attached to susceptible users. This states that hot water outlets to which patients are exposed should be restricted to 41°C, and this is normally achieved by the use of thermostatic mixing valves (TMVs). Where TMVs are used, it should be ensured that the temperature up to the inlet ports valve is between 55°C and 60°C. The TMV supplying the public toilet WHB was also inspected and utilising a contact probe on the inlet port revealed a satisfactory supply temperature. The outlet temperature was satisfactory and limited to 41°C to prevent accidental user scalding. All TMVs should be serviced on a six-monthly basis and completely overhauled on an annual basis to ensure correct operation.

Electric point of use water heaters are used to provide hot water to the Consulting Rooms within the extension. Where these are used, a minimum temperature of 55°C is still required in healthcare premises.

ASSESSMENT FINDINGS

The temperature recorded at the extension Consultant Room 3 sink was below 50°C and it should be ensured that the thermostatic controls are set to ensure a minimum temperature of 50°C can be achieve after a period of low demand.

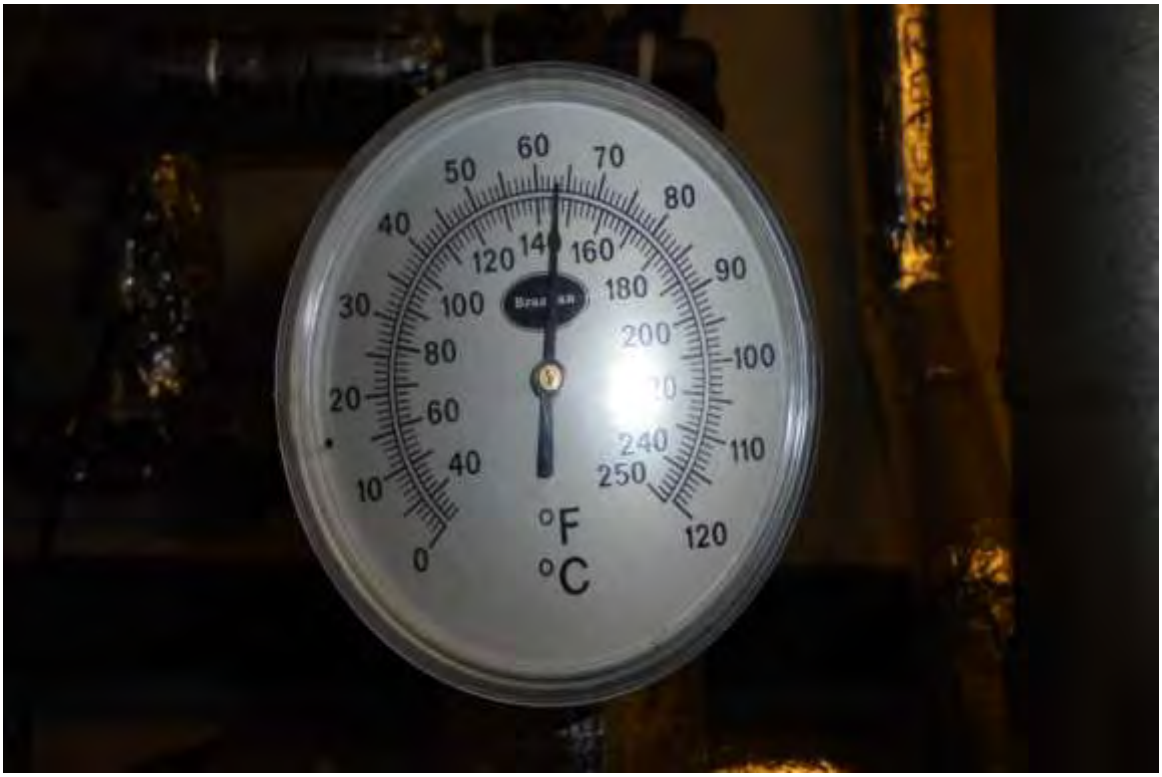
Gas Fired Water Heaters – General Arrangement

ASSESSMENT FINDINGS

Gas Fired Water Heater No. 1 – Contents Gauge at 62°C

Gas Fired Water Heater No. 1 –Drain Sample Discoloured and at Satisfactory Temperature

ASSESSMENT FINDINGS



Gas Fired Water Heater No. 2 – Contents Gauge at 62°C

Gas Fired Water Heater No. 2 –Drain Sample Discoloured and at Satisfactory Temperature

ASSESSMENT FINDINGS

DHWS Flow Temperature Satisfactory (>55°C)

DHWS Return Temperature Satisfactory (>55°C)

ASSESSMENT FINDINGS

Treatment Room G/49 Sink – Hot Water Too Low After 1 Minute (<55°C)

Treatment Room G/49 Sink – Hot Water Satisfactory After Extended Flush

ASSESSMENT FINDINGS

DRS Sink – Hot Water Outlet Temperature Too High (>60°C) Scald Ha ard

Public Toilet WHB – Hot Water Outlet Temperature Satisfactory – Thermostatic Control

ASSESSMENT FINDINGS

Public Toilet WHB – Hot Water Temperature to TMV Satisfactory

1st Floor Staff Room Sink – Hot Water Outlet Temperature Too High (>60°C) Scald Ha ard

ASSESSMENT FINDINGS

Extension Consulting Room 3 Sink – Hot Water Outlet Temperature Too Low (<50°C) Supplied via POUH

Cold Water Temperatures

Westfield Caledonian recommends that cold water is distributed at temperatures <20°C as at higher temperatures micro-organisms begin to proliferate. There is further guidance which suggests that cold water temperatures should not rise by more than 2°C above that measured at the incoming Main. With regard to these guidelines, cold water outlet temperatures recorded throughout the Health Centre were generally satisfactory, although an extended flush was required at the Treatment Room G/49 Sink to achieve a temperature which compared well with the storage temperature within the CWS tank. It is recommended that this outlet be included in a twice-weekly simulated usage programme (SUP) to ensure that a fresh charge of water is drawn through the pipework to prevent heat gain, stagnation and back-contamination of the live systems. Regular temperature monitoring should be carried out to help identify any additional outlets which may be rarely used through measurement of elevated cold water temperatures and these should be included in the SUP.

ASSESSMENT FINDINGS

Treatment Room G/49 Sink – Cold Water Elevated After 2 Minutes

Treatment Room G/49 Sink – Cold Water Satisfactory After Extended Flush

ASSESSMENT FINDINGS

DRS Sink – Cold Water Outlet Temperature Satisfactory

Public Toilet WHB – Cold Water Outlet Temperature Satisfactory

ASSESSMENT FINDINGS

1st Floor Staff Room Sink – Cold Water Outlet Temperature Satisfactory

Extension Consulting Room 3 Sink – Cold Water Outlet Temperature Satisfactory

ASSESSMENT FINDINGS

Showers and Aerosol Generating Outlets

There are no showers or aerosol generating outlets within the premises and as such the risks associated with these appliances can be considered minimal.

Dead Legs

No actual dead legs were identified during the survey, although it should be recognised that effective dead legs are created by any rarely used outlets. As stated in previous reports, it is has been pointed out that there is a MWS supply within the bin wash area which was found to be isolated at high level. This branch represents a significant effective dead leg and it is recommended that this pipework be completely removed, back to the branch point on the MWS supply to prevent back-contamination of the live system. Any outlets which are considered to be rarely used should be included within a weekly SUP to ensure a fresh charge of water is drawn through the supplying pipework on a regular basis. Any outlets no longer required should also be removed with pipework properly capped as close as possible to the live system.

A branch has also been taken in the plant room to supply the heating system pressurisation unit. Although a check valve was installed prior to the connection to the pressurisation unit, this should be installed at the branch point to prevent back-contamination. A check valve should be installed on this leg at the branch as it is recognised that under normal operation little turnover will occur through this pipe.

The following photographs illustrate our observations:

ASSESSMENT FINDINGS

Bin Store MWS Connection – Effective Dead Leg

MWS Branch to Heating System Pressurisation Unit with Check Valve installed at Connection to Pressurisation Unit

ASSESSMENT FINDINGS

Drinking Water

Drinking water is provided by a MWS connected sink within the 1st floor Staff kitchen area. This location has been suitably identified as "Drinking Water" for health and safety purposes, and it can be considered that NHS Lothian have complied with their statutory obligation to provide a wholesome supply of drinking water.

Other Services

In addition to domestic water systems, occasion may arise where a health risk is presented from waterborne micro-organisms from other services. These include HVAC systems where condensate disposal from cooling coils and humidification processes need to be assessed to determine whether the release of water aerosol into the supply air is likely. However, no such potential aerosol generating equipment was found on the site, and it may be assumed therefore that no risk is present.

SUMMARY OF RISKS

Assessed Point Description	Ref.	Risk Scores Cur.	Prev.	Rec.
1st Floor Staff Room MWS (359/1/15)	5261/08	22	21	19
Ground Floor Treatment Room DHWS (359/G/49)	5261/07	19	13	12
Extension Consultant Room 3 Sink Hot	5261/12	19	17	13
Ground Floor Treatment Room CWS (359/G/49)	5261/06	18	15	14
1st Floor Staff Room DHWS (359/1/15)	5261/09	17	17	17
Extension Consultant Room 3 Sink Cold	5261/11	17	17	15
CWS Tank No. 1	5261/01A	15	14	13
Ground Floor DSR CWS (359/G/49)	5261/04	15	15	14
Ground Floor DSR DHWS (359/G/49)	5261/05	13	13	12
DGF Calorifier No. 1	5261/02	14	12	11
DGF Calorifier No. 2	5261/03	14	12	11
CWS Tank No. 2	5261/01B	-	0	13
Bin Wash MWS Outlet	5261/10	-	0	13

Risk Ratings	Score
High	>22
High/Med	20-22
Low/Med	17-19
Low	<17

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 15

Source Description	:	CWS Tank 1
Assessment Justification	:	Cold Water Storage
Assessor	:	Mr C Mitchell
Date of Previous	:	16th December 2013
Date	:	25th February 2016
pH	:	7.4
FRC	:	<0.1 ppm
Temp 1	:	6.0°C
Temp 2	:	-

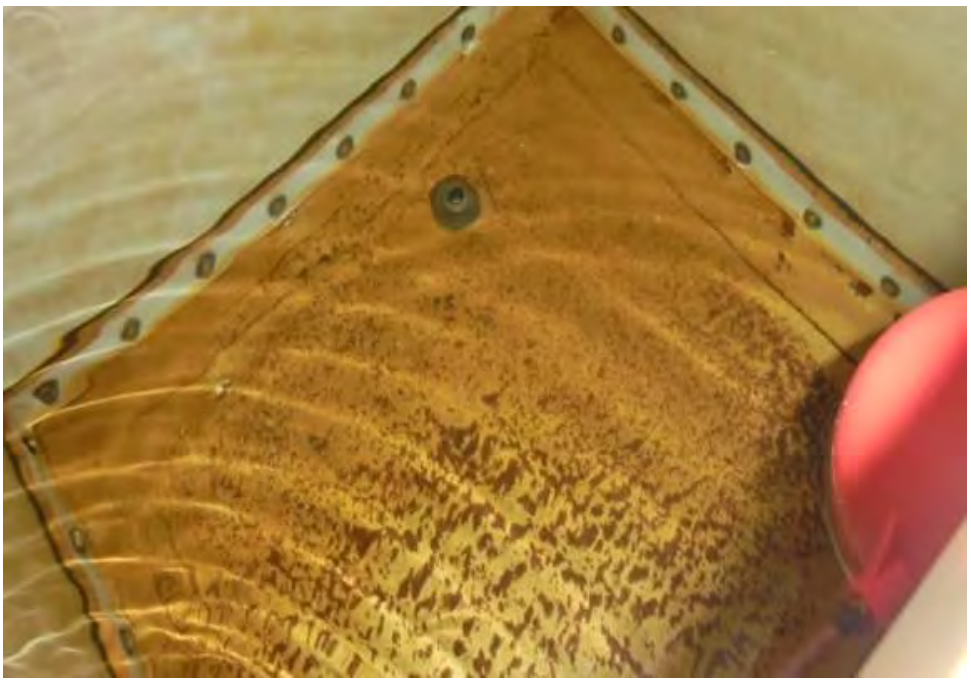
High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/01A

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	2	2	Mains Water Supply.
B	**Supply System**	**1**	1	1	
C	**Point Condition**	**2**	2	1	Light sediment.
D	**Turnover**	**2**	2	1	Daily.
E	**Incubation**	**3**	3	3	<20°C.
F	**Acidity**	**3**	3	3	
G	**Exposed Populace**	**1**	1	1	
H	**Infection Risk**	**1**	1	1	
TOTALS		**15**	15	13	



WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 0

Source Description	:	CWS Tank 2
Assessment Justification	:	Cold Water Storage
Assessor	:	Mr C Mitchell
Date of Previous	:	16th December 2013
Date	:	25th February 2016
pH	:	-
FRC	:	-
Temp 1	:	-
Temp 2	:	-

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/01B

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	-		2	Mains Water Supply.
B	**Supply System**	-		1	
C	**Point Condition**	-		1	
D	**Turnover**	-		1	
E	**Incubation**	-		3	
F	**Acidity**	-		3	
G	**Exposed Populace**	-		1	
H	**Infection Risk**	-		1	
TOTALS		**0**	**0**	17	**Drained and isolated.**

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 12

Source Description	:	Direct Gas Fired Water Heater No. 1
Assessment Justification	:	Hot Water Generation & Storage
Assessor	:	Mr C Mitchell
Date of Previous	:	16th December 2013
Date	:	25th February 2016
pH	:	7.4
FRC	:	<0.1 ppm
Temp 1	:	56.5°C Drain
Temp 2	:	63.0°C Gauge

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/02

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	2	2	Supplied from CWS Tank Ref. 5261/01.
B	**Supply System**	**1**	1	1	
C	**Point Condition**	**3**	1	1	Discoloured
D	**Turnover**	**2**	2	1	Daily turnover.
E	**Incubation**	**1**	1	1	Drain sample >55°C
F	**Acidity**	**3**	3	3	
G	**Exposed Populace**	**1**	1	1	
H	**Infection Risk**	**1**	1	1	
TOTALS		**12**	12	11	

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 14

Source Description	:	Direct Gas Fired Water Heater No. 2
Assessment Justification	:	Hot Water Generation & Storage
Assessor	:	Mr C Mitchell
Date of Previous	:	16th December 2013
Date	:	25th February 2016
pH	:	7.4
FRC	:	<0.1 ppm
Temp 1	:	60.8°C Base
Temp 2	:	64.0°C Gauge

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/03

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	2	2	Supplied from CWS Tank Ref. 5261/01.
B	**Supply System**	**1**	1	1	
C	**Point Condition**	**3**	1	1	Discoloured
D	**Turnover**	**2**	2	1	Daily turnover.
E	**Incubation**	**1**	1	1	Drain sample >55°C.
F	**Acidity**	**3**	3	3	
G	**Exposed Populace**	**1**	1	1	
H	**Infection Risk**	**1**	1	1	
TOTALS		**14**	12	11	

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 15

Source Description : Ground Floor DSR CWS (359/G/49)
Assessment Justification : Sentinel Point
Assessor : Mr C Mitchell
Date of Previous : 16th December 2013
Date : 25th February 2016
pH : 7.4
FRC : <0.1 ppm
Temp 1 : 5.9°C
Temp 2 : -

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/04

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	2	2	Supplied from CWS Tank Ref. 5261/01.
B	**Supply System**	**1**	1	1	
C	**Point Condition**	**1**	1	1	
D	**Turnover**	**2**	2	1	Daily turnover.
E	**Incubation**	**3**	3	3	<20°C.
F	**Acidity**	**3**	3	3	
G	**Exposed Populace**	**2**	2	2	Normal use.
H	**Infection Risk**	**1**	1	1	
TOTALS		**15**	15	14	

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 13

Source Description	:	Ground Floor DSR DHWS (359/G/49)
Assessment Justification	:	Sentinel Point
Assessor	:	Mr C Mitchell
Date of Previous	:	16th December 2013
Date	:	25th February 2016
pH	:	7.4
FRC	:	<0.1 ppm
Temp 1	:	62.1°C
Temp 2	:	

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/05

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	2	2	Supplied from DGFWH Ref. 5261/02 & 03.
B	**Supply System**	**1**	1	1	
C	**Point Condition**	**1**	1	1	
D	**Turnover**	**2**	2	1	Daily turnover.
E	**Incubation**	**1**	1	1	Temp >60°C - Scald hazard.. Scald hazard.
F	**Acidity**	**3**	3	3	
G	**Exposed Populace**	**2**	2	2	Normal use.
H	**Infection Risk**	**1**	1	1	
TOTALS		**13**	13	12	

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 18

Source Description	:	Ground Floor Treatment Room (359/G/49)
Assessment Justification	:	Sentinel Point
Assessor	:	Mr C Mitchell
Date of Previous	:	16th December 2013
Date	:	25th February 2016
pH	:	7.4
FRC	:	<0.1 ppm
Temp 1	:	18.9°C After 2 minutes
Temp 2	:	8.4°C Extended Flush

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/06

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	2	2	Supplied from CWS Tank Ref. 5261/01.
B	**Supply System**	**2**	2	1	Long supply line.
C	**Point Condition**	**1**	1	1	
D	**Turnover**	**3**	1	1	Less than daily.
E	**Incubation**	**4**	3	3	<20°C. Significant gain over storage temp.
F	**Acidity**	**3**	3	3	
G	**Exposed Populace**	**2**	2	2	
H	**Infection Risk**	**1**	1	1	
TOTALS		**18**	15	14	

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 19

Source Description	:	Ground Floor Treatment Room DHWS (359/G/49)
Assessment Justification	:	Sentinel Point
Assessor	:	Mr C Mitchell
Date of Previous	:	16th December 2013
Date	:	25th February 2016
pH	:	7.4
FRC	:	<0.1 ppm
Temp 1	:	19.7°C (After 1 Min)
Temp 2	:	58.4°C (Extended Flush)

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/07

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	2	2	Supplied from DGFWH Ref. 5261/02 & 03.
B	**Supply System**	**2**	2	1	Long supply line. Ineffective circulation.
C	**Point Condition**	**1**	1	1	
D	**Turnover**	**3**	1	1	Less than daily.
E	**Incubation**	**5**	1	1	<50°C.
F	**Acidity**	**3**	3	3	Temp >20°C and <50°C. Hot water too cool.
G	**Exposed Populace**	**2**	2	2	
H	**Infection Risk**	**1**	1	1	
TOTALS		**19**	13	12	

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 22

Source Description : 1st Floor Staff Room MWS (359/1/15)
Assessment Justification : Drinking Water/Food Preparation
Assessor : Mr C Mitchell
Date of Previous : 16th December 2013
Date : 25th February 2016
pH : 7.4
FRC : <0.1 ppm
Temp 1 : 5.8°C
Temp 2 :

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/08

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	2	2	Supplied from MWS.
B	**Supply System**	**3**	3	1	Effective Dead Leg.
C	**Point Condition**	**1**	1	1	
D	**Turnover**	**2**	1	2	
E	**Incubation**	**3**	3	3	<20°C.
F	**Acidity**	**3**	3	3	
G	**Exposed Populace**	**3**	3	3	Drinking water.
H	**Infection Risk**	**5**	5	5	Drinking water/food preparation.
TOTALS		**22**	21	19	

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 17

Source Description	:	1st Floor Staff Room DHWS (359/1/15)
Assessment Justification	:	Food Preparation
Assessor	:	Mr C Mitchell
Date of Previous	:	16th December 2013
Date	:	25th February 2016
pH	:	7.4
FRC	:	<0.1 ppm
Temp 1	:	62.8°C
Temp 2	:	

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/09

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	2	2	Supplied from DGFWH Ref. 5261/02 & 03.
B	**Supply System**	**1**	1	1	
C	**Point Condition**	**1**	1	1	
D	**Turnover**	**2**	2	2	Daily.
E	**Incubation**	**1**	1	1	Temp >60°C - Scald hazard. Scald hazard.
F	**Acidity**	**3**	3	3	
G	**Exposed Populace**	**2**	2	2	Normal use.
H	**Infection Risk**	**5**	5	5	Food preparation area.
TOTALS		**17**	17	17	

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 0

Source Description : Bin Wash MWS Outlet
Assessment Justification : Rarely Used Outlet
Assessor : Mr C Mitchell
Date of Previous : 16th December 2013
Date : 25th February 2016
pH : 7.4
FRC : <0.1 ppm
Temp 1 : -
Temp 2 :

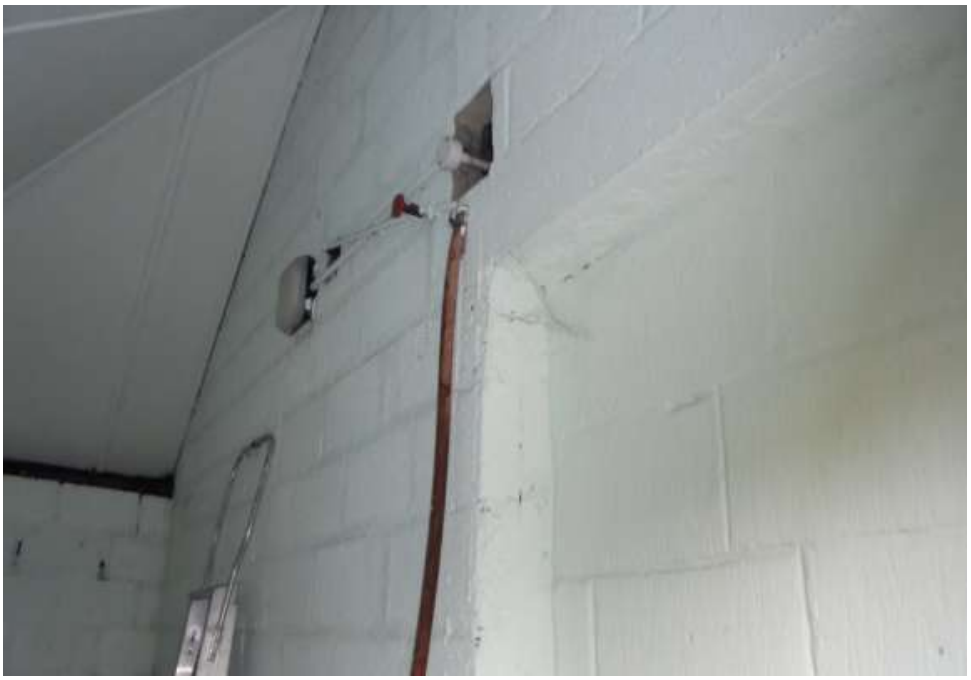
High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/10

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	-	-	2	Mains Water Supply.
B	**Supply System**	-	-	1	
C	**Point Condition**	-	-	1	
D	**Turnover**	-	-	1	
E	**Incubation**	-	-	3	
F	**Acidity**	-	-	3	
G	**Exposed Populace**	-	-	1	
H	**Infection Risk**	-	-	1	
TOTALS		**0**	0	13	**Isolated**



WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 17

Source Description : Extension Consultant Room 3 Sink Cold
Assessment Justification : Sentinel Point
Assessor : Mr C Mitchell
Date of Previous : 16th December 2013
Date : 25th February 2016
pH : 7.4
FRC : <0.1 ppm
Temp 1 : 5.8°C
Temp 2 :

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/11

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	2	2	Mains Water Supply.
B	**Supply System**	**3**	3	1	Effective Dead Leg.
C	**Point Condition**	**1**	1	1	
D	**Turnover**	**2**	2	2	Daily turnover.
E	**Incubation**	**3**	3	3	<20°C
F	**Acidity**	**3**	3	3	
G	**Exposed Populace**	**2**	2	2	Normal use.
H	**Infection Risk**	**1**	1	1	
TOTALS		**17**	17	15	

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 19

Source Description : Extension Consultant Room 3 Sink Hot
Assessment Justification : Sentinel Point
Assessor : Mr C Mitchell
Date of Previous : 16th December 2013
Date : 25th February 2016
pH : 7.4
FRC : <0.1 ppm
Temp 1 : 43.7°C
Temp 2 :

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/12

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	2	2	POUH via MWS
B	**Supply System**	**3**	3	1	Effective dead leg.
C	**Point Condition**	**1**	1	1	
D	**Turnover**	**2**	2	2	Daily turnover.
E	**Incubation**	**5**	3	3	Temp >20°C and <50°C. Hot water too cool.
F	**Acidity**	**3**	3	3	
G	**Exposed Populace**	**2**	2	2	Normal use.
H	**Infection Risk**	**1**	1	1	
TOTALS		**19**	17	15	

REMEDIAL ACTIONS

Service	Remedial Action	Priority Rating	Status
Domestic Hot Water Service	Thermostatic controls to be adjusted to reduce the scald risk to users.	2	
	Investigate the cause of low initial hot water temperature at Treatment Room g49 Sink.	2	
Dead Legs	MWS supply in Bin Store to be completely removed, back to the live system.	2	
	Check valve to be installed on MWS supply to heating system pressurisation unit in Plant Room at branch point.	2	

Priority Rating 1 - Represent unsatisfactory conditions which may result in a failure of the Control Scheme and/or a serious health and safety risk. Require immediate attention in order to reduce the risk to a satisfactory level.

Priority Rating 2 - Represent conditions which may lead to, or encourage the growth of micro-organisms within the water systems. Require remedial actions in order to reduce the risk to a satisfactory level.

Priority Rating 3– Represent generally satisfactory arrangements, but the recommended remedial actions, will reduce the overall risk. These low priority actions are usually simple and inexpensive and should be completed as soon as is reasonably practicable.

CONTROL MEASURES

Service	Control Measure	Frequency
Water Heaters	Purge any debris in the base of the water heater to a suitable drain. Collect the initial flush from the base of hot water heaters to inspect clarity, quantity of debris and temperature.	Annually.
	Check water heater flow temperatures (thermostat settings should modulate as close to 60°C as practicable without going below 60°C). Check water heater return temperature is not below 55°C in healthcare premises.	Monthly.
Hot Water Services	Take temperatures at return legs of principal loops (sentinel points) to confirm they are at a minimum of 55°C in healthcare premises. Temperature measurements may be taken on the surface of metallic pipework.	Monthly.
	Take temperatures at return legs of subordinate loops, temperature measurements can be taken on the surface pipes, but where this is not practicable, the temperature of water from the last outlet on each loop may be measured and this should be greater than 55°C in healthcare premises within one minute of running. If the temperatures rise is slow, it should be confirmed that the outlet is on a long leg and not that the flow and return has failed in that local area.	Quarterly (ideally on a rolling monthly rota).

CONTROL MEASURES

Service	Control Measure	Frequency
Hot Water Services	Take temperatures at a representative selection of other points (intermediate outlets of single pipe systems and tertiary loops in circulating systems) to confirm they are at a minimum of 55°C in healthcare premises to create a temperature profile of the whole system over a defined time period.	Representative selection of other sentinel outlets considered on a rotational basis to ensure the whole system is reaching satisfactory temperatures for *Legionella* control.
Cold Water Tanks	Inspect cold water storage tank overflow, warning and vent pipes to ensure they are intact and screens free from damage or blockages.	Annually.
	Inspect tank internal surfaces for signs of sediment, corrosion or bio-fouling and carry out hygienic maintenance works where necessary.	Annually.
	Check the tank water temperature remote from the ball valve and the incoming mains temperature. Record the maximum temperatures of the stored and supply water recorded by fixed maximum/minimum thermometers where fitted.	Annually (Summer) or as indicated by the temperature profiling.
Cold Water Services	Check temperatures at sentinel taps (typically those nearest to and furthest from the cold tank, but may also include other key locations on long branches to zones or floor levels). These outlets should be below 20°C within two minutes of running the cold tap. To identify any local heat gain, which might not be apparent after one minute, observe the thermometer reading during flushing.	Monthly.
	Take temperatures at a representative selection of other points to confirm they are below 20°C to create a temperature profile of the whole system over a defined time period. Peak temperatures or any temperatures that are slow to fall should be an indicator of a localised problem.	Representative selection of other sentinel outlets considered on a rotational basis to ensure the whole system is reaching satisfactory temperatures for *Legionella* control.

CONTROL MEASURES

Service	Control Measure	Frequency
System Conditions	Check thermal insulation to ensure it is intact and consider weather-proofing where components are exposed to the outdoor environment.	Annually.
	Inspect all outlets for signs of contamination and scale and clean where necessary, using clean disposable cloths and appropriate sanitising/descaling agents.	Annually
Infrequently Used Outlets	Consideration should be given to removing infrequently used showers, taps and any associated equipment that uses water. If removed any redundant supply pipework should be cut back as far as possible to a common supply (e.g. to the re-circulating pipework or the pipework supplying a more frequently used upstream fitting) but preferably by removing the feeding "T". Infrequently used equipment within a water system (i.e. not used for a period equal to or greater than seven days) should be included on the flushing regime. Flush the outlets until the temperature at the outlet stabilises and is comparable to supply water and purge to drain. Regularly use outlets to minimise the risk from microbial growth in the peripheral parts of the water system, sustain and log this procedure once started. For high risk populations, e.g. healthcare and care homes, more frequent flushing may be required as indicated by the risk assessment.	Weekly.
TMVs	Risk assess whether the TMV fitting is required, and if not, remove. Where needed, inspect, clean, de-scale and disinfect any strainers or filters associated with TMVs.	Annually or on a frequency defined manufacturer's recommendations.

CONTROL MEASURES

Service	Control Measure	Frequency
TMVs	To maintain protection against scald risk, TMVs require routine maintenance carried out by competent persons in accordance with the manufacturer's instructions. There is further information in HSG 274 paragraphs 2.152-2.168.	
Drinking Water	Filters should be replaced on a regular basis and hygienic maintenance procedures should be undertaken to prevent water quality deterioration. These should include flushing the internal components with a biofilm dispersing solution such as Citric Acid, as micro-organisms can often form on the internal surfaces of the chilled water pipework.	In strict accordance with manufacturers' guidelines, usually quarterly sanitizing and annual filter replacement.

APPENDIX I

INTRODUCTION

This document relates to an ongoing programme of water quality monitoring at East Calder Health Centre, East Calder.

It is intended that this document will help to demonstrate the measures taken by NHS Lothian NHS Management to comply with the relevant parts of Health & Safety Executive's (HSE) Approved Code of Practice and Guidance Note (L8)and Guidance Document HSE 274, when viewed together with the Logbook and Control Manual management system. The sampling also ensures a wholesome supply of drinking water is delivered in accordance with Workplace (Health, Safety and Welfare) Regulation 22.

Total bacteria counts are used as indicators to determine the degree of contamination which exists in cold water storage and distribution systems, to allow proper scheduling and budgeting of cleaning and sterilisation works, to ensure the quality of water being supplied remains within the limits recommended in EC Directive 98/83 EC.

SUMMARY

This summary relates to the results of the tests carried out by Westfield Caledonian for NHS Lothian Division, at their East Calder Health Centre premises. The visit was carried out by Westfield Caledonian's Senior Technical Services Engineer, Colin Mitchell, on 25th February 2016.

Laboratory analysis of three samples retrieved from the domestic hot water systems confirmed the absence of the *Legionella* bacteria in viable concentrations. This confirms that the risk of infection from the hot water systems at the time of the visit was low.

Five samples were also collected from the domestic cold water systems, subsequent laboratory analysis of which returned results which are regarded as entirely satisfactory. No indicator organisms such as coliforms or *E.coli* were detected in any of the samples, and the TVC levels detected do not represent a health risk to occupants. We have no specific recommendations with regards to sample analysis results at this time, other than that the monitoring programme continues, to determine the need for future remedial action.

WATER SAMPLE ANALYSIS RESULTS (LEGIONELLA)

Client Name and Site Address	**Report To:**	**Job No.:**
NHS Lothian East Calder Health Centre East Calder	Mr I Fleming **Surveyor:** C Mitchell	5261/10/1 **Page No. 1 of 1**

Sampling Date	**Date to Lab**	**Analysis Commenced**	**Analysis Completed**
25/02/16	25/02/16	26/02/16	07/03/16

Analysis performed at Westfield Caledonian's UKAS accredited testing laboratory No. 4042

			Positive	
Sample No.	**Source Description**	**Negative** (Note 1)	**Type** (Note 2)	**Concentration** (Note 3)
1	DGWH Composite Drain Sample	N		
2	Extension Common Room 3 Sink	N		
3	Treatment Room Sink	N		

Note 1. Negative. No *Legionella* detected (<40CFU/1000ml)
Note 2. Lp = *Legionella pneumophila*, SG = Serogroup, L.Sp. = *Legionella* Species
Note 3. Estimated concentration per 1000ml based on 200ml of centrifuged sample.

PAGE NO	CLIENT NAME & SITE ADDRESS	CONTACT(S) NAME & TEL NO	SURVEYOR	JOB NO.
1	NHS Lothian East Calder Health Centre East Calder	Mr I Fleming	C Mitchell	5261/10/1
				SURVEY DATE: 25/02/16

SAMPLE NO.	LOCATION & DESCRIPTION	[Cl] ppm	SAMPLE TYPE	pH	°C	REMARKS
1	DGFWH Composite Sample	<0.2	Lp	7.2	56.5	Sample 2 at 60.8°C. Flow at 67.4°C. Both samples discoloured. Return at 58.8°C.
2	Extension Common Room 3 Sink	<0.2	Lp	7.2	43.7	
3	Treatment Room Sink	<0.2	Lp	7.2	18.9	58.4°C at 4 min. Single pipe supply.

POTABLE WATER SAMPLE ANALYSIS

Client Name and Site Address	**Report To:**	**Job No.:**
NHS Lothian East Calder Health Centre East Calder	Mr I Fleming **Surveyor:** C Mitchell	5261/10/1 **Page No. 1 of 1**

Sampling Date	**Date to Lab**	**Analysis Commenced**	**Analysis Completed**
25/02/16	25/02/16	25/02/16	28/02/16

Analysis performed at Westfield Caledonian's UKAS accredited testing laboratory No. 4042

Sample No.	**Source Description**	**2 Day 37°C TVC/ml**	**3 Day 22°C TVC/ml**	**Coliforms cfu/100ml**	**E. coli cfu/100ml**	**Other**
1	Extension Consulting Room 3 Sink	<1	1	<1	<1	
2	Treatment Room Sink	**53**	20	<1	<1	
3	DSR Sink	2	29	<1	<1	
4	1st Floor Staff Sink	<1	<1	<1	<1	
5	CWS Tank 1	**50**	81	<1	<1	

GUIDE LEVELS
2 day 37°C TVC (Total Viable Count) <50 cfu/ml.
3 day 22°C TVC (Total Viable Count) <300 cfu/ml.
Coliforms and *E.coli* should not be present (i.e. <1cfu per 100ml).
*Other - *Pseudomonas aeruginosa* should not be present (i.e. <1cfu per 100ml).
**Other- *Enterococci* should not be present (i.e. <1cfu per 100 ml).

PAGE NO	CLIENT NAME & SITE ADDRESS	CONTACT(S) NAME & TEL NO	SURVEYOR	JOB NO.
1	NHS Lothian East Calder Health Centre East Calder	Mr I Fleming	C Mitchell	5261/10/1
				SURVEY DATE: 25/02/16

SAMPLE NO.	LOCATION & DESCRIPTION	[Cl] ppm	SAMPLE TYPE	pH	°C	REMARKS
1	Extension Consulting Room 3 Sink	<0.2	TVC	7.2	5.8	
2	Treatment Room Sink	<0.2	TVC	7.2	19.7	Extended flush – 8.4°C.
3	DSR Sink	<0.2	TVC	7.2	5.9	Hot at 62.1°C.
4	1st Floor Staff Sink	<0.2	TVC	7.2	5.8	Hot at 62.8°C.
5	CWS Tank 1	<0.2	TVC	7.2	6.0	

NHS LOTHIAN

East Calder Health Centre
East Calder

Water Safety Risk Assessment (Engineering)

Waterborne Micro-organisms
(Including Legionella, P. Aeruginosa and other Pathogens)

December 2017

NHS Lothian
East Calder Health Centre
East Calder

December 2017

CONTENTS

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INTRODUCTION

NHS Lothian manage the risks associated with water systems on their premises through an integrated Water Safety Plan (WSP). The WSP for each site describes what risks are presented to the building users from the domestic (or process) water systems, and how they are to be managed. The WSP is derived from the findings of risk assessment, and this document describes the findings of the risk assessment for waterborne micro-organisms (including *Legionella, Pseudomonas aeruginosa* and any other health threatening pathogen) for East Calder Health Centre. The survey was carried out by Westfield Caledonian's Senior Technical Services Engineer, Colin Mitchell, on 19th December 2017.

The objective of the survey was to assess the design, installation, condition and mode of operation of the water systems, with respect to the risk of waterborne micro-organisms contamination, and potential subsequent infection risk for the building users. The system assessment survey was carried out in a manner consistent with the requirements of *BS8580:2010 Water Quality – Risk Assessments for Legionella Control – Code of Practice* and taking cognisance of the Guidance Documents HSG274 and HTM 04-01.

This document provides a description of the installed water systems, including a schematic representation, together with a detailed narrative explaining the findings of the risk assessment survey. The report also contains a series of formal risk assessment reports for significant and representative plant items and outlets, whose function is to provide a quantitative guide to the impact of both risk creating factors and risk mitigating actions and activities. Finally, the report contains a series of recommendations which should be utilised in the development of the WSP for the site/building, namely Remedial Actions, or Control Measures. Remedial actions are designed to alter the system configuration such that inherent water quality compromising characteristics are removed, or to facilitate the implementation of subsequent appropriate control measures. These actions are listed as an Action Plan which will be incorporated into the WSP. The listed control measures should be considered as ongoing PPM routines, whose purpose will either be to further mitigate risk factors, or to monitor the system for correct operation and the efficacy of the WSP. These routines will also be incorporated into the WSP and managed and recorded by the Estates electronic PPM system. This document also contains a schedule of plant items to which the recommended PPMs should be applied.

INTRODUCTION

Scope Limitations; Although this survey and report assessed the risk from waterborne micro-organisms, including *Pseudomonas aeruginosa,* the means of infection and contaminant transfer for this particular organism means that *infection* control is achieved through clinical procedure rather than through engineering controls. Whilst this assessment addresses the risk of the organism's presence and potential proliferation within the water systems, Infection Prevention and Control procedures should be referenced with respect to managing the risk of *Pseudomonas* infection.

SYSTEM DESCRIPTION

The Mains cold water service (MWS) enters the building at ground floor level adjacent to the boiler room. The main supply line rises vertically to supply two cold water service (CWS) storage tanks situated at high level within the 1st floor plantroom. A branch is taken to supply the heating system pressurisation unit in the ground floor plantroom. A branch is also taken off the main riser at ground floor level and runs along the main corridor before rising to supply the staff kitchen on the 1st floor.

Cold water downservice supplies are provided from CWS tank no.1 located at high level within the 1st floor plantroom. CWS tank no.2 is kept drained and isolated ready to be used should cleaning and disinfection of CWS tank no.1 be required. Two separate supplies are taken from each CWS tank, one to supply a cold feed to the two gas fired water heaters located within the ground floor plantroom and the other to provide cold water downservices. Pipework runs along the main corridor on the ground floor with branches taken off adjacent to each room which contains a wash hand basin (whb) or sink, and also to supply the toilet areas. Branches are also taken off within the corridor area which rise vertically to supply the toilets and DSR on the 1st floor level. The second branch drops to the boiler room area to supply the two vertical direct gas fired water heaters (DGFWH).

Domestic hot water services (DHWS) within the East Calder Health Centre are supplied by the two vertical DGFWHs situated within the boiler room on the ground floor. Hot water runs at high level on the ground floor through a two pipe system.

An extension has been built to the left of the building that provides additional Consulting Rooms. Each room has a single sink and all outlets are mains fed with local electric point of use water heaters located under each sink.

ASSESSMENT FINDINGS

Management and Control of Risk (WSP)

As inadequate management, lack of training and poor communication have all been identified as contributing factors in outbreaks of the *Legionella* disease, the importance of an appropriate management structure is stressed. This structure, which is one of the foremost requirements of the HSC Approved Code of Practise (L8), should detail the responsibilities allocated to specific individuals and monitor the effectiveness of the Control Measures undertaken at the prescribed intervals. NHS Lothian Estates Department operate generally in accordance with their Written Scheme and Operational Procedure for "Managing the Control of Legionella, Hygiene, "Safe" Hot Water, Cold Water and Drinking Water Systems", with the most recent issue being Version 3 revision 5 dated July 2015. However, NHS Lothian have now adopted the HTM 04-01 model of a Water Safety Plan (WSP) to facilitate the management of the risks associated with water systems.

To adequately address the health risks presented by microbiological contamination of water, it is necessary to derive, document and implement what was formally referred to as a Written Scheme. This now forms part of the WSP, and should include documentation clearly defining and describing the domestic water systems within the building/premises; any alterations; and details of all maintenance or remediation activities carried out on these systems which may be considered to form appropriate Control Measures. Six main control procedures have been identified and pro-formas included within the Operational Procedure document, as follows:

- DHWS calorifiers, including monthly temperature check and flush; 6-monthly sampling; 2-yearly insurance inspection.
- Cold water storage tanks, includes annual inspection; 6-monthly temperature checks.
- Maintenance and checking of thermostatic mixing valves, including showers, 24-week temperature and safety checks.
- Sentinel taps – monthly temperature checks.
- Flushing of water systems temporarily out of use - weekly.
- Shower heads – 4-weekly checks.

ASSESSMENT FINDINGS

Planned preventative maintenance procedures (PPM) are implemented at specific frequencies, with records retained both electronically on the Backtraq system and in Logbooks held in the Estates workshop at St. Johns Hospital. It is recommended that all procedures be implemented and records retained to demonstrate the steps taken to control waterborne micro-organisms.

The remedial actions and control measures detailed within this report are incorporated in the WSP for this building, and the electronic maintenance system should be revised to reflect these requirements. Due to the susceptibility of individuals, it is recommended that the water system condition and the WSP be audited and reviewed annually.

Cold Water Service (CWS) Storage Tanks

The two CWS tanks are provided at high level within the 1st floor plantroom are of modern pre-insulated sectional construction. The risk of contaminant ingress is low as the lids are secure and overflow pipework suitably screened as such the tanks are considered to be fully Byelaw compliant. The tanks are arranged in parallel although CWS tank no.2 is kept drained and isolated. This is to be commended as often parallel tanks can experience a degree of hydraulic imbalance, with the majority of water supplied through only one tank, resulting in stagnation and contamination within the second vessel. Internal inspection of CWS tank no.1 revealed relatively good hygienic conditions, although light sedimental deposits were present at the base. A satisfactory contents temperature was recorded, suggesting that sufficient turnover is occurring through the on line tank to prevent excessive heat gain and laboratory analysis of a sample collected from this tank also returned satisfactory results. We have no specific recommendations with regards to the CWS tanks other than that they be subject to regular control measures.

The following photographs illustrate our observations:

ASSESSMENT FINDINGS

CWS Tank No. 1 – Light Sedimental Accumulations

CWS Tank No. 1 – Contents Temperature Satisfactory

ASSESSMENT FINDINGS

CWS Tank No. 2 – Drained and Isolated

Domestic Hot Water Service

Westfield Caledonian recommends that hot water be generated and stored in excess of 60°C, to ensure that outlet temperatures at uncontrolled locations remain between 55°C and 60°C throughout the premises. The Approved Code of Practice (ACOP)(L8) and HSE Guidance Document HSG274 also states that a minimum system return temperature of 55°C should be maintained within healthcare premises. This is also a requirement of Scottish Healthcare Technical Memorandum (SHTM) 04-01.

Domestic hot water is provided throughout the main building by two vertical direct gas fired water heaters (DGFWHs located within the ground floor plantroom. The contents gauges indicated temperatures in excess of 55°C however utilising a contact probe on the flow pipe from both vessels revealed temperatures in excess of those indicated on the gauges. As such the gauges should be adjusted or replaced to ensure they provide an accurate reading. Samples were drawn from both drain valves to assess the conditions at the base of each vessel. These were found to be discoloured and at temperatures which compared well with the storage temperatures.

ASSESSMENT FINDINGS

Regular flushing of the drain valves should be carried out, to remove sedimental deposits which are inevitable given time. This should be carried out at least on an annual basis as these accumulations can provide a harbour and nutrient source for the growth and proliferation of micro-organisms. Monthly temperature monitoring activities should also be undertaken to ensure satisfactory storage temperatures are maintained within both vessels.

Utilising a contact probe on the DHWS flow and return pipework revealed satisfactory temperatures, suggesting that the system is operating correctly to prevent the growth and proliferation of micro-organisms. Hot water outlet temperatures at untempered locations should be maintained between 55°C and 60°C to provide an effective thermal control regime. These were generally satisfactory although low temperature was recorded at the Treatment Room G/49 Sink after one minute and this took an extended flush to achieve a temperature above 55°C. This suggests there is ineffective circulation to this area and this was confirmed utilising a contact probe on the flow and return pipes to this area. The circulation issue should be addressed, and it should be ensured that there is no air in the system and that all valves are open. It may be necessary to upgrade the circulation pump in the ground floor plantroom.

There is additional consideration with regards to hot water within healthcare premises, which is an SHTM requirement, namely the high scald risk attached to susceptible users. This states that hot water outlets to which patients are exposed should be restricted to 41°C. This is normally achieved by the use of thermostatic mixing valves (TMVs) or thermostatically controlled taps. Where TMVs are provided, it should be ensured that the temperature up to the inlet port of the mixing valve is at least 55°C. The TMV supplying the public toilet WHB was also inspected and utilising a contact probe on the inlet port revealed a satisfactory supply temperature. The outlet temperature was satisfactory and restricted to 41°C to prevent accidental user scalding. All TMVs should be serviced on a six-monthly basis and completely overhauled on an annual basis to ensure correct operation.

ASSESSMENT FINDINGS

Gas Fired Water Heaters – General Arrangement

Gas Fired Water Heater No. 1 – Contents Gauge at 55°C

ASSESSMENT FINDINGS

Gas Fired Water Heater No. 1 – Contents Temperature Confirmed at 63°C

Gas Fired Water Heater No. 1 –Drain Sample Clear and at Satisfactory Temperature

ASSESSMENT FINDINGS

Gas Fired Water Heater No. 2 – Contents Gauge at 56°C

Gas Fired Water Heater No. 2 – Contents Temperature Confirmed at 58°C

ASSESSMENT FINDINGS

Gas Fired Water Heater No. 2 –Drain Sample Discoloured and at Satisfactory Temperature

DHWS Flow Temperature Satisfactory (>55°C)

ASSESSMENT FINDINGS

DHWS Return Temperature Satisfactory (>55°C)

Treatment Room G/49 Sink – Hot Water Too Low After 1 Minute (<55°C)

ASSESSMENT FINDINGS

DHWS Flow Temperature to Treatment Room G/49 Too Low (<55°C)

DHWS Return Temperature from Treatment Room G/49 Too Low (<55°C)

ASSESSMENT FINDINGS

Treatment Room G/49 Sink – Hot Water Satisfactory After Extended Flush Ineffective Circulation

DHWS Flow Temperature to Treatment Room G/49 Satisfactory after Extended Flush

ASSESSMENT FINDINGS

DHWS Return Temperature from Treatment Room G/49
Too Low (<55°C) after Extended Flush

DRS Sink – Hot Water Outlet Temperature Satisfactory

ASSESSMENT FINDINGS

Public Toilet WHB – Hot Water Outlet Temperature Satisfactory – Thermostatic Control

Public Toilet WHB – Hot Water Temperature to TMV Satisfactory

ASSESSMENT FINDINGS

1st Floor Staff Room Sink – Hot Water Outlet Temperature Satisfactory

Mains fed, electric under-sink point of use water heaters are used to provide hot water to the Consulting Rooms within the extension wing. Where these are used, a minimum temperature of 55°C is required in healthcare premises. The temperature recorded at the extension Consultant Room 3 sink was below 50°C and the heater appeared to be faulty. It should be ensured that the thermostatic controls are set to ensure a minimum temperature of 55°C can be achieve after a period of low demand, as these heaters require a recovery period following a recent draw off.

ASSESSMENT FINDINGS

Extension Consulting Room 3 Sink – Electric Point of Use Water Heater

Extension Consulting Room 3 Sink – Hot Water Outlet Temperature Too Low (<50°C) Supplied via POUH

ASSESSMENT FINDINGS

Cold Water Temperatures

Bacteria, including *Legionella,* multiply most rapidly in warm water, but not in hot or cold water. Westfield Caledonian recommends that cold water is stored and distributed at below 20°C, as above this limit micro-organisms will begin to proliferate. It is also considered good practice to have water supplied to extremity outlets at temperatures no more than 2°C above the source temperature, to ensure that internal heat gain will not compromise the bacteriological safety of the supplied water.

With regard to these guidelines, cold water outlet temperatures recorded throughout the Health Centre were generally satisfactory, although an extended flush was required at the Treatment Room G/49 Sink to achieve a temperature which compared well with the storage temperature within the CWS tank. It is recommended that this outlet be included in a twice-weekly simulated usage programme (SUP) to ensure that a fresh charge of water is drawn through the pipework to prevent heat gain, stagnation and back-contamination of the live systems. Regular temperature monitoring should be carried out to help identify any additional outlets which may be rarely used and these should be included in the SUP.

Treatment Room G/49 Sink – Cold Water Elevated After 2 Minutes

ASSESSMENT FINDINGS

Treatment Room G/49 Sink – Cold Water Acceptable After Extended Flush

DRS Sink – Cold Water Outlet Temperature Satisfactory

ASSESSMENT FINDINGS

1st Floor Staff Room Sink – Cold Water Outlet Temperature Satisfactory

Extension Consulting Room 3 Sink – Cold Water Outlet Temperature Satisfactory

ASSESSMENT FINDINGS

Showers and Aerosol Generation

There are no showers or aerosol generating outlets within the building and as such the risks associated with these appliances can be considered minimal.

Scald Risk

It is also a requirement of the WSP that Scald Risk Assessments be carried out by management to ensure all susceptible building users are adequately protected.
The risk of scalding is considered to be negated by the installation of thermostatic mixing devices at all patient accessible outlets. As previously stated, all TMVs and thermostatically controlled taps should be subject to regular temperature checks in accordance with the requirements of Performance Specification D08 to ensure correct operation.

Dead Legs

One of the most significant contributing factors to the risk of bacteriological contamination occurring in domestic water systems is the existence of dead legs. Westfield Caledonian differentiates between Actual and Effective dead legs, with the former typically being sections of pipework originally installed to serve either removed or redundant plant items or outlets. An Effective dead leg may be defined as a pipework section which supplies rarely used or emergency service outlets which, whilst requiring to be retained, rarely experiences water throughput.

No actual dead legs were identified during the survey, although it should be recognised that effective dead legs are created by any rarely used outlets. As stated in previous reports, a MWS supply within the bin wash area exists although this has been isolated at high level. This branch represents a significant effective dead leg and it is recommended that this pipework be completely removed, back to the branch point on the MWS supply to prevent back-contamination of the live system. Alternatively the valve can be opened and the outlet included in a twice weekly flushing programme. Any outlets which are considered to be rarely used should be included within a SUP to ensure a fresh charge of water is drawn through the supplying pipework on a regular basis. Any outlets no longer required should also be removed with pipework properly capped as close as possible to the live system.

ASSESSMENT FINDINGS

A MWS branch has also been taken in the ground floor plantroom to supply the heating system pressurisation unit. Although a check valve was installed prior to the connection to the pressurisation unit, this should be installed at the branch point to prevent back-contamination. The flexible quick-fill connection should also be physically disconnected when not in use.

The following photographs illustrate our observations:

Bin Store MWS Connection Isolated at High Level – Effective Dead Leg

ASSESSMENT FINDINGS

MWS Branch to Heating System Pressurisation Unit with Check Valve installed and Flexible Quick-fill Hose Connected

Drinking Water

Drinking water is provided by a MWS connected sink within the 1st floor Staff kitchen area. This location has been suitably identified as "Drinking Water" for health and safety purposes, and it can be considered that NHS Lothian have complied with their statutory obligation to provide a wholesome supply of drinking water.

Other Services

In addition to domestic water systems, occasions may arise where a health risk is presented from waterborne micro-organisms from other services. These include fire suppression systems such as sprinklers where aerosols are released into the air, and care should be taken during testing of these systems. In addition, condensate may be created by cooling and humidification processes in HVAC systems which could result in aerosols being released into supply air. There were no other services identified during the survey that will present any risks with relation to waterborne micro-organisms, and it can be concluded therefore that the risks are minimal.

QUANTITATIVE RISK ASSESSMENT

Introduction

To quantify the risk from waterborne micro-organisms, and the subsequent impact of the implementation of the Water Safety Plan (both Control Measures and Remedial Actions) Westfield Caledonian have developed a quantitative risk assessment format which allows risk reducing actions to be quantified as reduced risk rating scores. The scoring system addresses six aspects of the water, the supplying plant and systems which will impact the risk to the microbiological safety of the water, with a further two aspects assessed to determine the risk to building users (or indeed the public at large) of infection, should the supplied water be contaminated.

Risk Assessment Process

The domestic water systems and process water systems (where they exist) will be surveyed and assessed with respect to the risk of waterborne microorganisms contaminating the water. The assessment will consider aspects of the systems' design, installation, condition and applied operational practices.

The assessment will address, as a minimum;

- **The supply water condition,** giving consideration to source, treatment and any other pertinent condition.
- **The supply system,** giving consideration to dead-legs, potential for heat gain/loss, extent of supply, existence of in-line components (filters/strainers/TMVs) and any other pertinent condition.
- **The point condition,** giving consideration to hygienic condition, opportunity for contaminant ingress, maintainability and any other pertinent condition.
- **The rate of turnover,** giving consideration to usage patterns, applied control measures and any other pertinent condition.
- **The likelihood of incubation** giving consideration to distribution temperature profiles and likelihood of variance.
- **The chemical characteristics** of the water that will affect the likelihood of microorganism survival/proliferation (specifically, pH).

QUANTITATIVE RISK ASSESSMENT

To assess the risk of infection arising from pathogen contaminated water, the assessment will address;

- **Degree of exposure** giving consideration to rate of use (number of persons exposed), location (enclosed space/external location).
- **Infection risk** giving consideration to the means of infection (inhalation/ingestion/contact) and the susceptibility of those exposed (elderly/immunosuppressed/neonatal).

It is essential the cumulative effect of all components is considered when assessing each component/outlet. (from tank, to calorifier, through system, to outlet etc).

The formal risk assessment sheets are provided with a Remarks column adjacent to each score, in which the "points added" weightings are explained. Each risk assessment gives scores for the currently observed conditions, the previously observed conditions, and for the condition with all recommendations implemented. These varying scores are intended to quantify the degree of risk reduction achieved since the previous risk assessment, and what further reduction may be achieved by implementing the recommendations derived from this assessment.

SUMMARY OF RISKS

Assessed Point Description	Ref.	Risk Scores Cur.	Prev.	Rec.
CWS Tank No. 1	5261/01A	15	15	14
CWS Tank No. 2	5261/01B	-	-	14
DGF Calorifier No. 1	5261/02	13	12	12
DGF Calorifier No. 2	5261/03	14	14	12
Ground Floor DSR CWS (359/G/49)	5261/04	15	15	15
Ground Floor DSR DHWS (359/G/49)	5261/05	13	13	13
Ground Floor Treatment Room CWS (359/G/49)	5261/06	18	18	15
Ground Floor Treatment Room DHWS (359/G/49)	5261/07	19	19	12
1st Floor Staff Room MWS (359/1/15)	5261/08	22	22	20
1st Floor Staff Room DHWS (359/1/15)	5261/09	17	17	17
Bin Wash MWS Outlet	5261/10	-	-	13
Extension Consultant Room 3 Sink Cold	5261/11	17	17	15
Extension Consultant Room 3 Sink Hot	5261/12	19	19	13

Risk Ratings	Score
High	>22
High/Med	20-22
Low/Med	17-19
Low	<17

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 15

Source Description	:	CWS Tank 1
Assessment Justification	:	Cold Water Storage
Assessor	:	Mr C Mitchell
Date	:	19th December 2017
Date of Previous	:	25th February 2016
pH	:	7.4
FRC	:	<0.1 ppm
Temp 1	:	6.0°C
Temp 2	:	-

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/01A

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	2	2	Mains Water Supply.
B	**Supply System**	**1**	1	1	
C	**Point Condition**	**2**	2	1	Light sediment.
D	**Turnover**	**2**	2	2	Daily.
E	**Incubation**	**3**	3	3	<20°C.
F	**Acidity**	**3**	3	3	
G	**Exposed Populace**	**1**	1	1	
H	**Infection Risk**	**1**	1	1	
TOTALS		**15**	15	14	

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 0

Source Description : CWS Tank 2
Assessment Justification : Cold Water Storage
Assessor : Mr C Mitchell
Date : 19th December 2017
Date of Previous : 25th February 2016
pH : -
FRC : -
Temp 1 : -
Temp 2 : -

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/01B

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	-	-	2	Mains Water Supply.
B	**Supply System**	-	-	1	
C	**Point Condition**	-	-	1	
D	**Turnover**	-	-	2	
E	**Incubation**	-	-	3	
F	**Acidity**	-	-	3	
G	**Exposed Populace**	-	-	1	
H	**Infection Risk**	-	-	1	
TOTALS		**0**	**0**	14	**Drained and isolated.**

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 12

Source Description	:	Direct Gas Fired Water Heater No. 1
Assessment Justification	:	Hot Water Generation & Storage
Assessor	:	Mr C Mitchell
Date	:	19th December 2017
Date of Previous	:	25th February 2016
pH	:	7.4
FRC	:	<0.1 ppm
Temp 1	:	56.5°C Drain
Temp 2	:	62.9°C Gauge

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/02

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	2	2	Supplied from CWS Tank Ref. 5261/01.
B	**Supply System**	**1**	1	1	
C	**Point Condition**	**2**	1	1	Discoloured
D	**Turnover**	**2**	2	2	Daily turnover.
E	**Incubation**	**1**	1	1	Drain sample >55°C
F	**Acidity**	**3**	3	3	
G	**Exposed Populace**	**1**	1	1	
H	**Infection Risk**	**1**	1	1	
TOTALS		**13**	12	12	

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 14

Source Description	:	Direct Gas Fired Water Heater No. 2
Assessment Justification	:	Hot Water Generation & Storage
Assessor	:	Mr C Mitchell
Date	:	19th December 2017
Date of Previous	:	25th February 2016
pH	:	7.4
FRC	:	<0.1 ppm
Temp 1	:	60.3°C Base
Temp 2	:	58.0°C Gauge

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/03

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	2	2	Supplied from CWS Tank Ref. 5261/01.
B	**Supply System**	**1**	1	1	
C	**Point Condition**	**3**	3	1	Discoloured
D	**Turnover**	**2**	2	2	Daily turnover.
E	**Incubation**	**1**	1	1	Drain sample >55°C.
F	**Acidity**	**3**	3	3	
G	**Exposed Populace**	**1**	1	1	
H	**Infection Risk**	**1**	1	1	
TOTALS		**14**	14	12	

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 15

Source Description : Ground Floor DSR CWS (359/G/49)
Assessment Justification : Sentinel Point
Assessor : Mr C Mitchell
Date : 19th December 2017
Date of Previous : 25th February 2016
pH : 7.4
FRC : <0.1 ppm
Temp 1 : 7.6°C
Temp 2 : -

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/04

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	2	2	Supplied from CWS Tank Ref. 5261/01.
B	**Supply System**	**1**	1	1	
C	**Point Condition**	**1**	1	1	
D	**Turnover**	**2**	2	2	Daily turnover.
E	**Incubation**	**3**	3	3	<20°C.
F	**Acidity**	**3**	3	3	
G	**Exposed Populace**	**2**	2	2	Normal use.
H	**Infection Risk**	**1**	1	1	
TOTALS		**15**	15	15	

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 13

Source Description	:	Ground Floor DSR DHWS (359/G/49)
Assessment Justification	:	Sentinel Point
Assessor	:	Mr C Mitchell
Date	:	19th December 2017
Date of Previous	:	25th February 2016
pH	:	7.4
FRC	:	<0.1 ppm
Temp 1	:	57.3°C
Temp 2	:	

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/05

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	2	2	Supplied from DGFWH Ref. 5261/02 & 03.
B	**Supply System**	**1**	1	1	
C	**Point Condition**	**1**	1	1	
D	**Turnover**	**2**	2	2	Daily turnover.
E	**Incubation**	**1**	1	1	Temp >60°C - Scald hazard.. Scald hazard.
F	**Acidity**	**3**	3	3	
G	**Exposed Populace**	**2**	2	2	Normal use.
H	**Infection Risk**	**1**	1	1	
TOTALS		**13**	13	13	

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 18

Source Description	:	Ground Floor Treatment Room (359/G/49)
Assessment Justification	:	Sentinel Point
Assessor	:	Mr C Mitchell
Date	:	19th December 2017
Date of Previous	:	25th February 2016
pH	:	7.4
FRC	:	<0.1 ppm
Temp 1	:	17.0°C After 2 minutes
Temp 2	:	14.1°C Extended Flush

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/06

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	2	2	Supplied from CWS Tank Ref. 5261/01.
B	**Supply System**	**2**	2	1	Long supply line.
C	**Point Condition**	**1**	1	1	
D	**Turnover**	**3**	3	2	Less than daily.
E	**Incubation**	**4**	4	3	<20°C. Significant gain over storage temp.
F	**Acidity**	**3**	3	3	
G	**Exposed Populace**	**2**	2	2	
H	**Infection Risk**	**1**	1	1	
TOTALS		**18**	18	15	

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 19

Source Description	:	Ground Floor Treatment Room DHWS (359/G/49)
Assessment Justification	:	Sentinel Point
Assessor	:	Mr C Mitchell
Date	:	19th December 2017
Date of Previous	:	25th February 2016
pH	:	7.4
FRC	:	<0.1 ppm
Temp 1	:	24.9°C (After 1 Min)
Temp 2	:	56.4°C (Extended Flush)

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/07

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	2	2	Supplied from DGFWH Ref. 5261/02 & 03.
B	**Supply System**	**2**	2	1	Long supply line. Ineffective circulation.
C	**Point Condition**	**1**	1	1	
D	**Turnover**	**3**	3	2	Less than daily.
E	**Incubation**	**5**	5	1	<50°C.
F	**Acidity**	**3**	3	3	Temp >20°C and <50°C. Hot water too cool.
G	**Exposed Populace**	**2**	2	2	
H	**Infection Risk**	**1**	1	1	
TOTALS		**19**	19	13	

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 22

Source Description	:	1st Floor Staff Room MWS (359/1/15)
Assessment Justification	:	Drinking Water/Food Preparation
Assessor	:	Mr C Mitchell
Date	:	19th December 2017
Date of Previous	:	25th February 2016
pH	:	7.4
FRC	:	<0.1 ppm
Temp 1	:	6.2°C
Temp 2	:	

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/08

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	2	2	Supplied from MWS.
B	**Supply System**	**3**	3	1	Effective Dead Leg.
C	**Point Condition**	**1**	1	1	
D	**Turnover**	**2**	2	2	
E	**Incubation**	**3**	3	3	<20°C.
F	**Acidity**	**3**	3	3	
G	**Exposed Populace**	**3**	3	3	Drinking water.
H	**Infection Risk**	**5**	5	5	Drinking water/food preparation.
TOTALS		**22**	22	20	

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 17

Source Description	:	1st Floor Staff Room DHWS (359/1/15)
Assessment Justification	:	Food Preparation
Assessor	:	Mr C Mitchell
Date	:	19th December 2017
Date of Previous	:	25th February 2016
pH	:	7.4
FRC	:	<0.1 ppm
Temp 1	:	57.4°C
Temp 2	:	

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/09

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	2	2	Supplied from DGFWH Ref. 5261/02 & 03.
B	**Supply System**	**1**	1	1	
C	**Point Condition**	**1**	1	1	
D	**Turnover**	**2**	2	2	Daily.
E	**Incubation**	**1**	1	1	Temp >60°C - Scald hazard. Scald hazard.
F	**Acidity**	**3**	3	3	
G	**Exposed Populace**	**2**	2	2	Normal use.
H	**Infection Risk**	**5**	5	5	Food preparation area.
TOTALS		**17**	17	17	

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 0

Source Description : Bin Wash MWS Outlet
Assessment Justification : Rarely Used Outlet
Assessor : Mr C Mitchell
Date : 19th December 2017
Date of Previous : 25th February 2016
pH : 7.4
FRC : <0.1 ppm
Temp 1 : -
Temp 2 :

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/10

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	-	-	2	Mains Water Supply.
B	**Supply System**	-	-	1	
C	**Point Condition**	-	-	1	
D	**Turnover**	-	-	1	
E	**Incubation**	-	-	3	
F	**Acidity**	-	-	3	
G	**Exposed Populace**	-	-	1	
H	**Infection Risk**	-	-	1	
TOTALS		**0**	0	13	**Isolated**

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 17

Source Description : Extension Consultant Room 3 Sink Cold
Assessment Justification : Sentinel Point
Assessor : Mr C Mitchell
Date : 19th December 2017
Date of Previous : 25th February 2016
pH : 7.4
FRC : <0.1 ppm
Temp 1 : 5.6°C
Temp 2 :

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/11

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	2	2	Mains Water Supply.
B	**Supply System**	**3**	3	1	Effective Dead Leg.
C	**Point Condition**	**1**	1	1	
D	**Turnover**	**2**	2	2	Daily turnover.
E	**Incubation**	**3**	3	3	<20°C
F	**Acidity**	**3**	3	3	
G	**Exposed Populace**	**2**	2	2	Normal use.
H	**Infection Risk**	**1**	1	1	
TOTALS		**17**	17	15	

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 19

Source Description : Extension Consultant Room 3 Sink Hot
Assessment Justification : Sentinel Point
Assessor : Mr C Mitchell
Date : 19th December 2017
Date of Previous : 25th February 2016
pH : 7.4
FRC : <0.1 ppm
Temp 1 : 11.2°C
Temp 2 :

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/12

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	2	2	POUH via MWS
B	**Supply System**	**3**	3	1	Effective dead leg.
C	**Point Condition**	**1**	1	1	
D	**Turnover**	**2**	2	2	Daily turnover.
E	**Incubation**	**5**	5	3	Temp >20°C and <50°C. Hot water too cool.
F	**Acidity**	**3**	3	3	
G	**Exposed Populace**	**2**	2	2	Normal use.
H	**Infection Risk**	**1**	1	1	
TOTALS		**19**	19	15	

ASSETS & CONTROL MEASURES

ASSET ID	ASSET DESCRIPTION	MANUFACTURER	Model/Capacity	Serial Number	LOCATION	APPLICABLE PPMS
	MWS & CWDS Distribution Systems					Monthly Cold Water Temperatures
	DHWS Distribution System					Monthly Hot Water Temperatures
8500196353	CWS Tank	Balmoral	1000L		Roofspace	
8500196354	CWS Tank	Balmoral	1000L		Roofspace	
8500196350	Gas Fired Water Heater	Andrews	136L		Boiler/Plantroom	Monthly flow & return temperature monitoring. Annual drain flushing.
8500196351	Gas Fired Water Heater	Andrews	136L		Boiler/Plantroom	Monthly flow & return temperature monitoring. Annual drain flushing.
8500196613	DHWS Circulation Pump	Grundfos	UP 20-40 N 150		Boiler/Plantroom	None
See TMV Schedule	TMVs					6-monthly servicing/testing.

REMEDIAL ACTION PLAN

Service	Remedial Action	L	C	Risk Score (LxC)	Budget Cost	Who Responsible	Target Date	Actual Date
WSP	WSP to be derived and documented.	5	5	**25**		Westfield Caledonian		
	Scald Risk Assessment required.	2	5	**10**		Site Management		
Gas Fired Water Heater	Contents gauges to be adjusted/replaced to provide an accurate reading.	3	2	**6**		Estates		
DHWS System	Investigate poor circulation to Room 8 (G/05) and if necessary replace/upgrade circulation pump.	**3**	**4**	**12**		Estates		
Electric Point of Use Heaters	Repair/Replace water heater in Consulting Room 3 and ensure all water heater set to deliver hot water at 55°C.	**3**	**4**	**12**		Estates		
Dead Legs	Completely remove redundant MWS branch to Bin Store back to branch point on live system.	**3**	**3**	**9**		Estates		
	Install a double check valve on MWS at the branch point to heating system pressurisation unit.	**3**	**3**	**9**		Estates		
	Physically disconnect flexible quick-fill connection to heating system pressurisation unit under normal operation.	2	3	**6**		Estates		

REMEDIAL ACTION PLAN

Low Risk	**1-3**
Moderate Risk	**4-6**
High Risk	**8-12**
Extreme Risk	**15-25**

APPENDIX I

Water Sample Analysis Results

SUMMARY

Legionella Sample Analysis

Two samples were collected from the hot water storage and distribution system and tested specifically for the *Legionella* bacterium. Analysis of the samples returned negative results, indicating that the risk of infection at the time of the visit was low.

TVC Sample Analysis

The EC Guidelines relating to water quality state that on two and three day counts, the Total Viable Count of bacteria (TVC) levels should not demonstrate any significant increase over those normally experienced. Westfield Caledonian suggest, that levels of 50 and 300 colony forming units per millilitre (cfu/ml) be adopted. The EC Guidelines also consider that coliforms and/or *E.coli* should not be present.

Three samples were collected from the domestic cold water distribution systems to determine the TVC levels and confirm the absence of the indicator organisms, coliforms and faecal *E.coli*. Subsequent laboratory analysis confirmed satisfactory levels of bacteria and we have no concerns with regards to sample analysis results.

WATER SAMPLE ANALYSIS RESULTS (LEGIONELLA)

Client Name and Site Address	**Report To:**	**Job No.:**
NHS Lothian East Calder Health Centre East Calder	I Fleming **Surveyor:** C.Mitchell	5261/12/1 **Page No. 1 of 1**

Sampling Date	**Date to Lab**	**Analysis Commenced**	**Analysis Completed**
19/12/17	19/12/17	19/12/17	30/12/17

Analysis performed at Westfield Caledonian's UKAS accredited testing laboratory No. 4042

			Positive	
Sample No.	**Source Description**	**Result** (Note 1)	**Type** (Note 2)	**Concentration** (Note 3)
1	Gas Fired Water Heater Composite	Negative		
2	1st Floor Staff Room Sink	Negative		
3	Ground Floor Treatment Room Sink	Negative		

Note 1. Negative = No *Legionella* detected (<40CFU/1000ml)
Note 2. Lp = *Legionella pneumophila*, SG = Serogroup, L.Sp. = *Legionella* Species
Note 3. Estimated concentration per 1000ml based on 200ml of centrifuged sample.

PAGE NO	CLIENT NAME & SITE ADDRESS	CONTACT(S) NAME & TEL NO	SURVEYOR	JOB NO.
1	NHS Lothian East Calder Health Centre East Calder	I Fleming	C.Mitchell	5261/12/1
				SURVEY DATE: 19/12/17

SAMPLE NO.	LOCATION & DESCRIPTION	[Cl] ppm	SAMPLE TYPE	pH	°C	REMARKS
1	Gas Fired Water Heater Composite	<0.2	Lp	7.6	-	No.1 Storage – 62.9°C Base – 56.5°C No.2 Storage – 58.0°C Base – 50.3°C
2	1st Floor Staff Room Sink	<0.2	Lp	7.6	57.4	
3	Ground Floor Treatment Room Sink	<0.2	Lp	7.6	24.9	56.4°C after extended flush.

POTABLE WATER SAMPLE ANALYSIS

Client Name and Site Address	**Report To:**	**Job No.:**
NHS Lothian East Calder Health Centre East Calder	I Fleming **Surveyor:** C.Mitchell	5261/12/1 **Page No. 1 of 1**

Sampling Date	**Date to Lab**	**Analysis Commenced**	**Analysis Completed**
19/12/17	19/12/17	19/12/17	22/12/17

Analysis performed at Westfield Caledonian's UKAS accredited testing laboratory No. 4042

Sample No.	**Source Description**	**2 Day 37°C TVC/ml**	**3 Day 22°C TVC/ml**	**Coliforms cfu/100ml**	**E. coli cfu/100ml**	**Other ***
1	CWS Tank 1	2	2	<1	<1	
2	1st Floor Staff Room Sink	1	<1	<1	<1	
3	Ground Floor DSR Sink	<1	<1	<1	<1	
4	Ground Floor Treatment Room Sink	<1	<1	<1	<1	
5	Extension Room 3 Sink	<1	1	<1	<1	

GUIDE LEVELS
2 day 37°C TVC (Total Viable Count) <50 cfu/ml.
3 day 22°C TVC (Total Viable Count) <300 cfu/ml.
Coliforms and *E.coli* should not be present (i.e. <1cfu per 100ml).
*Other - *Pseudomonas aeruginosa* should not be present (i.e. <1cfu per 100ml).
**Other- *Enterococci* should not be present (i.e. <1cfu per 100 ml).

PAGE NO	CLIENT NAME & SITE ADDRESS	CONTACT(S) NAME & TEL NO	SURVEYOR	JOB NO.
1	NHS Lothian East Calder Health Centre East Calder	I Fleming	C.Mitchell	5261/12/1
				SURVEY DATE: 19/12/17

SAMPLE NO.	LOCATION & DESCRIPTION	[Cl] ppm	SAMPLE TYPE	pH	°C	REMARKS
1	CWS Tank 1	<0.2	TVC	7.6	7.7	
2	1st Floor Staff Room Sink	<0.2	TVC	7.6	6.2	
3	Ground Floor DSR Sink	<0.2	TVC	7.6	7.6	Hot at 57.3°C
4	Ground Floor Treatment Room Sink	<0.2	TVC	7.6	17.0	14.1°C after extended flush.
5	Extension Room 3 Sink	<0.2	TVC	7.6	5.6	Cold at 11.2°C

APPENDIX II

Procedures

CONTROL MEASURES

Service	Control Measure	Frequency
Water Heaters	Purge any debris in the base of the water heater to a suitable drain. Collect the initial flush from the base of hot water heaters to inspect clarity, quantity of debris and temperature.	Annually.
	Check water heater flow temperatures (thermostat settings should modulate as close to 60°C as practicable without going below 60°C). Check water heater return temperature is not below 55°C in healthcare premises.	Monthly.
Hot Water Services	Take temperatures at return legs of principal loops (sentinel points) to confirm they are at a minimum of 55°C in healthcare premises. Temperature measurements may be taken on the surface of metallic pipework.	Monthly.
	Take temperatures at return legs of subordinate loops, temperature measurements can be taken on the surface pipes, but where this is not practicable, the temperature of water from the last outlet on each loop may be measured and this should be greater than 55°C in healthcare premises within one minute of running. If the temperatures rise is slow, it should be confirmed that the outlet is on a long leg and not that the flow and return has failed in that local area.	Quarterly (ideally on a rolling monthly rota).
Hot Water Services	Take temperatures at a representative selection of other points (intermediate outlets of single pipe systems and tertiary loops in circulating systems) to confirm they are at a minimum of 55°C in healthcare premises to create a temperature profile of the whole system over a defined time period.	Representative selection of other sentinel outlets considered on a rotational basis to ensure the whole system is reaching satisfactory temperatures for *Legionella* control.

CONTROL MEASURES

Service	Control Measure	Frequency
Cold Water Tanks	Inspect cold water storage tank overflow, warning and vent pipes to ensure they are intact and screens free from damage or blockages.	Annually.
	Inspect tank internal surfaces for signs of sediment, corrosion or bio-fouling and carry out hygienic maintenance works where necessary.	Annually.
	Check the tank water temperature remote from the ball valve and the incoming mains temperature. Record the maximum temperatures of the stored and supply water recorded by fixed maximum/minimum thermometers where fitted.	Annually (Summer) or as indicated by the temperature profiling.
Cold Water Services	Check temperatures at sentinel taps (typically those nearest to and furthest from the cold tank, but may also include other key locations on long branches to zones or floor levels). These outlets should be below 20°C within two minutes of running the cold tap. To identify any local heat gain, which might not be apparent after one minute, observe the thermometer reading during flushing.	Monthly.
	Take temperatures at a representative selection of other points to confirm they are below 20°C to create a temperature profile of the whole system over a defined time period. Peak temperatures or any temperatures that are slow to fall should be an indicator of a localised problem.	Representative selection of other sentinel outlets considered on a rotational basis to ensure the whole system is reaching satisfactory temperatures for *Legionella* control.
System Conditions	Check thermal insulation to ensure it is intact and consider weather-proofing where components are exposed to the outdoor environment.	Annually.
	Inspect all outlets for signs of contamination and scale and clean where necessary, using clean disposable cloths and appropriate sanitising/descaling agents.	Annually

CONTROL MEASURES

Service	Control Measure	Frequency
Infrequently Used Outlets	Consideration should be given to removing infrequently used showers, taps and any associated equipment that uses water. If removed any redundant supply pipework should be cut back as far as possible to a common supply (e.g. to the re-circulating pipework or the pipework supplying a more frequently used upstream fitting) but preferably by removing the feeding "T". Infrequently used equipment within a water system (i.e. not used for a period equal to or greater than seven days) should be included on the flushing regime. Flush the outlets until the temperature at the outlet stabilises and is comparable to supply water and purge to drain. Regularly use outlets to minimise the risk from microbial growth in the peripheral parts of the water system, sustain and log this procedure once started.	Weekly.
TMVs	Risk assess whether the TMV fitting is required, and if not, remove. Where needed, inspect, clean, de-scale and disinfect any strainers or filters associated with TMVs. To maintain protection against scald risk, TMVs require routine maintenance carried out by competent persons in accordance with the manufacturer's instructions. There is further information in HSG 274 paragraphs 2.152-2.168.	Annually or on a frequency defined manufacturer's recommendations.
Drinking Water	Filters should be replaced on a regular basis and hygienic maintenance procedures should be undertaken to prevent water quality deterioration. These should include flushing the internal components with a biofilm dispersing solution such as Citric Acid, as micro-organisms can often form on the internal surfaces of the chilled water pipework.	In strict accordance with manufacturers' guidelines, usually quarterly sanitizing and annual filter replacement.

CONTROL MEASURES

NHS LOTHIAN
East Calder Health Centre
East Calder

WATER SAFETY PLAN
Review and Audit Report

December 2019

CONTENTS

Prepared By	First Approval	Authorised By
Colin Mitchell	David Souza	William Leitch

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INTRODUCTION

NHS Lothian manage the health risks associated with water systems on their premises through an integrated Water Safety Plan (WSP). The NHS Lothian Water Safety Policy requires WSPs to be reviewed and audited at frequencies of 6 or 12 months, depending on the risk factors assigned to an individual property or system. This document describes the findings of the WSP audit carried out at East Calder Health Centre, on 4th December 2019 by Westfield Caledonian's Senior Technical Services Engineer, Colin Mitchell.

The Audit includes a review of the systems' condition and operation, the effectiveness and suitability of applied control measures, and the status of the Remedial Action Plan (RAP) which was derived from the original system risk assessment and subsequent reviews. The risk assessment findings are also reviewed to ensure they are still representative of the prevailing conditions at the time of the audit, and the WSP is amended to reflect any variances which have occurred. The records relating to the applied control measures are audited, and the efficacy of the WSP is assessed through inspection processes and sample retrieval and analysis, the results of which are also reported in this document.

CONDITION AUDIT REPORT

Legionella Sample Analysis

Three samples were collected from the domestic hot water storage and distribution systems and analysed specifically for the presence of the *Legionella* bacterium. On this occasion, laboratory analysis confirmed the presence of *Legionella* species at a concentration of 40 cfu/l in the sample collected from Room 8 (G/05) sink. This result was reported via telephone and confirmed in an email dated 17th December 2019. along with the recommendations that the storage temperatures of the water heaters be increased and circulation to this area be improved, as the hot water outlet temperature failed to reach 50°C even after an extended flush.

Following remedial works, a resample was collected on 19th December 2019 and subsequent laboratory analysis failed to isolate the *Legionella* bacterium in viable concentrations. A sufficiently high outlet temperature was recorded at the outlet, although the temperature recorded on the return pipe in the adjacent Secretarial Office was again well below 50C, confirming poor circulation was still evident. It is however understood that Estates are aware of the issue and a new circulation pump is to be installed in an attempt to address this issue. Control measures are in place to flush the outlet a regular basis to draw water at a sufficiently high temperature through the outlet to prevent the growth of micro-organisms.

TVC Sample Analysis

Five samples were collected from the domestic Mains water supplies (MWS) and downservice distribution outlets to determine the TVC levels as well as confirm the absence of the indicator organisms, coliforms and faecal *E.coli*. Subsequent laboratory analysis returned results which are regarded as entirely satisfactory, and we have no recommendations with regards to sample analysis results at this time other than the monitoring programme be continued to determine the need for future remedial action.

Cold Water Service (CWS) Tanks

The two CWS tanks located at high level within the 1st floor plantroom were inspected as and CWS tank No. 2 continues to be drained and isolated. This has been done in a manner to minimise the creation of dead legs on the MWS and CWDS systems and is to be commended as it removes the risks associated with parallel tanks.

CONDITION AUDIT REPORT

The tanks are of modern construction and are considered to be fully Byelaw compliant. Internal inspection of CWS tank no.1 revealed similar conditions to the previous visit, with only light sedimental accumulations observed. The storage temperature recorded was well below the recommended upper limit of 20°C and compared well with the MWS reference temperature recorded at the 1st floor kitchen sink, suggesting sufficient turnover is occurring to prevent excessive heat gain. Laboratory analysis of the sample collected from this tank returned satisfactory results and we have no specific recommendations with regards to the CWS tanks other than that they be subject to regular control measures.

The following photographs illustrate the conditions identified.

CWS Tank No. 1 – Light Sedimental Accumulations

CONDITION AUDIT REPORT

CWS Tank No. 1 – Contents Temperature at 9.5°C

CWS Tank No. 2 – Drained and Isolated

CONDITION AUDIT REPORT

Hot Water Generation & Storage

Westfield Caledonian recommends that hot water be generated and stored in excess of 60°C, to ensure that outlet temperatures at uncontrolled locations remain between 55°C and 60°C throughout the premises. Healthcare Technical Memorandum (HTM) 04-01 and HSE Guidance Document HSG274 state that a minimum system return temperature of 55°C should be maintained within healthcare premises.

Domestic hot water is provided throughout the main building by two vertical direct gas fired water heaters located in the ground floor boiler room. These vessels are configured to work in parallel and contents gauges indicated storage temperatures below 55°C. Water was noted inside the gauge on water heater No.2 and this should be replaced to ensure an accurate reading is provided. Utilising a contact probe on the main flow pipe revealed a temperature of approximately 54°C and as expected a low return temperature was also recorded, although this did compare well with the flow temperature, suggesting circulation is adequate. It is recommended that the thermostatic controls on the water heaters be adjusted, with the storage temperatures increased to at least 60°C.

Samples were collected from the base drain points and these were found to be discoloured, confirming a degree of sedimental accumulation is present at the base of each vessel. Regular flushing of the drain valve should be carried out, to remove these accumulations as they can encourage the growth and proliferation of micro-organisms. This should initially be carried out quarterly, although can be reduced to six-monthly and then annually, following consecutive clear samples. Monthly temperature monitoring activities should be carried out to ensure satisfactory flow and return temperatures can be maintained and determine the need for further adjustment of the thermostatic controls.

Hot water outlet temperatures should be maintained between 55°C and 60°C to provide an effective thermal control regime. There is additional consideration with regards to hot water within healthcare premises, which is an SHTM requirement, namely the high scald risk attached to susceptible users. This states that hot water outlets to which patients are exposed should be restricted to 41°C. This is normally achieved by the use of thermostatic mixing valves (TMVs) or thermostatically controlled taps.

Where TMVs are provided, it should be ensured that the temperature up to the inlet port of the mixing valve is at least 55°C.

With respect to the preceding criteria, as expected, hot water temperatures were too low, and below the recommended range. An extended flush was required at Room 8 (G/05) to achieve a temperature approaching 50°C and the return temperature recorded utilising a contact probe on the return pipe in the Secretarial Office (G/09) confirmed poor circulation was occurring to this area. Following correspondence with the Estates department it is recognised that a new circulation pump is to be installed in an attempt to address this issue. In the meantime the outlet is to be included in a simulated usage programme, whereby it is flushed on a twice weekly basis to draw sufficiently high water through the supply pipework to thermally disinfect surfaces. A satisfactory outlet temperature was recorded at the reception gents toilet WHB which is supplied via a TMV. All TMVs should be subject to six-monthly temperature checks and operational adjustment as required by the manufacturer and in accordance with Performance Specification D08. This should be carried out following adjustment of the thermostatic controls on the water heaters to ensure correct operation to prevent user scalding.

The following photographs illustrate the conditions identified.

CONDITION AUDIT REPORT

Gas Fired Water Heaters – General Arrangement

Gas Fired Water Heater No. 1 – Contents Temperature at Approximately 40°C Water in Gauge – Replace

CONDITION AUDIT REPORT

Gas Fired Water Heater No. 2 – Contents Temperature approx. 54°C

DHWS Flow Temperature Too Low (<60°C)

CONDITION AUDIT REPORT

DHWS Return Temperature Too Low (<55°C)

Gas Fired Water Heater No. 1 – Drain Sample Discoloured and at Acceptable Temperature

CONDITION AUDIT REPORT

Room 8 (G/05) Sink - Hot Water Outlet Temperature Too Cold (<50°C)

Room 8 (G/05) Sink - Hot Water Outlet Temperature Too Low (<50°C) After Extended Flush (4 Minutes)

CONDITION AUDIT REPORT

Secretarial Office (G/09) Hot Water Flow Temperature Too Low (<55°C)

Secretarial Office (G/09) Hot Water Return Temperature Too Low (<55°C)

CONDITION AUDIT REPORT

Patients Toilet G39 WHB – Hot Water Outlet Temperature Satisfactory Thermostatic Control

Reception Gents Toilet WHB – Supply Temperature to TMV Too Low (<55°C)

1st Floor Staff Room Kitchen Sink - Hot Water Outlet Temperature Too Low (<55°C)

The three Consulting Rooms within the extension wing each have a sink which are supplied from Mains fed, electric under-sink point of use water heaters. Where these are used, a minimum temperature of 55°C is required in healthcare premises. The temperature recorded at the extension Consultant Room 3 sink was slightly low. It should be ensured that the thermostatic controls are set to ensure a minimum temperature of 55°C can be achieve after a period of low demand, as these heaters require a recovery period following a recent draw off.

CONDITION AUDIT REPORT

Extension Consulting Room 3 Sink - Hot Water Outlet Slightly Low (<50°C)

Extension Consulting Room 3 Sink – Electric Point of Use Water Heater

CONDITION AUDIT REPORT

Cold Water Temperatures

Bacteria, including *Legionella,* multiply most rapidly in warm water, but less so in hot or cold water. Westfield Caledonian recommends that cold water is stored and distributed at below 20°C, as at higher temperatures, microorganism growth is encouraged. It is also considered good practice to have water supplied to extremity outlets at temperatures no more than 2°C above the source temperature, to ensure that internal heat gain will not compromise the bacteriological safety of the supplied water.

Cold water outlet temperatures recorded throughout the premises were generally satisfactory and compared well with the storage temperature recorded within the CWS tank. However an elevated temperature was recorded at the WHB within Room 8 (G/05) and this required an extended flush before a satisfactory temperature was achieved. This suggests a degree of heat gain is occurring within the supply pipework possibly due to low turnover and it is recommended that this outlet be included in a twice weekly flushing programme as detailed in SHTM 04-01.

The following photographs illustrate typical outlet temperatures recorded during the visit.

1st Floor Staff Room Kitchen Sink - Cold Water Outlet Temperature Satisfactory

CONDITION AUDIT REPORT

Extension Consulting Room 3 Sink - Cold Water Outlet Temperature Satisfactory

Room 8 (G/05) Sink - Cold Water Outlet Temperature Too Warm (>20°C)

CONDITION AUDIT REPORT

Room 8 (G/05) Sink - Cold Water Outlet Temperature Satisfactory After Extended Flush (4 Minutes)

Reception Gents Toilet WHB - Cold Water Outlet Temperature Satisfactory

Showers and Aerosol Generators

Shower outlets, by the very nature of their operation, present a higher risk than normal water outlets supplied from the same systems due to the normal operating temperatures being within the range where microbiological proliferation occurs. Combine this with the aerosol generation and you have an ideal infection route for the bacterium *Legionella pneumophila*. There are no shower facilities within the building and as such the risk associated with these outlets is low.

Dead Legs

No actual dead legs were identified during the survey, although it should be recognised that effective dead legs are created by any rarely used outlets. As stated in previous reports, a MWS supply within the bin wash area exists although this has been isolated at high level. This branch represents a significant effective dead leg and it is recommended that this pipework be completely removed, back to the branch point on the MWS supply to prevent back-contamination of the live system. Alternatively the valve can be opened and the outlet included in a twice weekly flushing programme. Any outlets which are considered to be rarely used should be included within a SUP to ensure a fresh charge of water is drawn through the supplying pipework on a regular basis. Any outlets no longer required should also be removed with pipework properly capped as close as possible to the live system.

A MWS branch has also been taken in the ground floor plantroom to supply the heating system pressurisation unit. Although a check valve was installed prior to the connection to the pressurisation unit, this should be installed at the branch point to prevent back-contamination. The flexible quick-fill connection should also be physically disconnected when not in use.

Drinking Water

Drinking water is provided within East Calder Health Centre by a MWS connected sink within the 1st floor Staff kitchen and outlets within Consulting Rooms within the extension. The 1st floor kitchen sink is suitably identified as “Drinking Water” however should outlets within Consulting Rooms be intended as drinking water, then these should be suitably identified for Health and Safety Purposes.

Distribution System and Outlet Conditions

Generally, all hot and cold services pipework sections within the building are adequately insulated, thus preventing heat loss/gain situations occurring within the water contained within the pipework sections. All outlets inspected were free from significant accumulations of scale, although it is recommended that all faucets be inspected and cleaned/sanitised on a regular basis by housekeeping staff utilising clean, disposable cloths and approved sanitising agents.

WATER SAFETY PLAN REVIEW

The findings of this survey and audit revealed that the currently applied Water Safety Plan is suitable and sufficient to adequately control the risks associated with waterborne micro-organisms within the water systems. There has been significant changes to the Management Structure and this has been updated, detailing the roles and responsibilities of new personnel involved in the Water Safety Group. There have been no significant changes to the water systems or building usage since the last survey although there remain a number of Remedial Actions which are outstanding from the Risk Assessment, namely the issue with poor circulation to room (G/05) although it is understood that this issue is to be addressed by installing a new circulation pump.

REMEDIAL ACTION PLAN REVIEW

Service	Remedial Action	When Added	Last Reviewed	Status	Comments
WSP	WSP to be derived and documented.	December 2017	December 2019	Actioned – Management Structure Updated	See Water Safety Plan Review Section
	Scald Risk Assessment required.	December 2017	December 2019	Outstanding	
Gas Fired Water Heater	Contents gauges to be adjusted/replaced to provide an accurate reading.	December 2017	December 2019	Outstanding	
	Storage temperatures to be increased to at least 60°C.	December 2019	December 2019	Complete	Storage temperatures increased following Audit visit.
DHWS System	Investigate poor circulation to Room 8 (G/05) and if necessary replace/upgrade circulation pump.	December 2017	December 2019	Outstanding	
Electric Point of Use Heaters	Repair/Replace water heater in Consulting Room 3 and ensure all water heater set to deliver hot water at 55°C.	December 2017	December 2019	Complete	
	Adjust thermostatic controls to achieve an outlet temperature of at least 55°C following a period of low demand.	December 2019	December 2019	New	

REMEDIAL ACTION PLAN REVIEW

Service	Remedial Action	When Added	Last Reviewed	Status	Comments
Dead Legs	Completely remove redundant MWS branch to Bin Store back to branch point on live system.	December 2017	December 2019	Outstanding	
	Install a double check valve on MWS at the branch point to heating system pressurisation unit.	December 2017	December 2019	Outstanding	
	Physically disconnect flexible quick-fill connection to heating system pressurisation unit under normal operation.	December 2017	December 2019	Outstanding	

WATER SAMPLE ANALYSIS RESULTS (LEGIONELLA)

Client Name and Site Address	**Report To:**	**Job No.:**
NHS Lothian East Calder Health Centre East Calder	M. Mastaglio **Surveyor:** C. Mitchell	5261/14/1 **Page No. 1 of 1**

Sampling Date	**Date to Lab**	**Analysis Commenced**	**Analysis Completed**
04/12/2019	04/12/2019	04/12/2019	16/12/2019

Analysis performed at Westfield Caledonian's UKAS accredited testing laboratory No. 4042

			Positive	
Sample No.	**Source Description**	**Result** (Note 1)	**Type** (Note 2)	**Concentration** (Note 3)
1	DHWS Composite Sample	Negative		
2	1st Floor Staff Sink	Negative		
3	Room 8 (G/05) Sink		**L.sp**	**40**

Note 1. Negative = No *Legionella* detected (<40CFU/1000ml)
Note 2. Lp = *Legionella pneumophila*, SG = Serogroup, L.Sp. = *Legionella* Species
Note 3. Estimated concentration per 1000ml based on 200ml of centrifuged sample.

PAGE NO	CLIENT NAME & SITE ADDRESS	CONTACT(S) NAME & TEL NO	SURVEYOR	JOB NO.
1	NHS Lothian East Calder Health Centre East Calder	M. Mastaglio	C. Mitchell	5261/14/1
				SURVEY DATE: 04/12/2019

SAMPLE NO.	LOCATION & DESCRIPTION	[Cl] ppm	SAMPLE TYPE	pH	°C	REMARKS
1	DHWS Composite Sample	<0.2	Lp	7.6	52.0	Storage Temperatures Slightly Low Flow Temp – 53.7°C Return Temp – 52.3°C
2	1st Floor Staff Sink	<0.2	Lp	7.6	50.6	
3	Room 8 (G/05) Sink	<0.2	Lp	7.6	21.6	Extended Flush (5 mins) - 48.6°C Room 359/G/09 Flow Temp – 46.6°C Return Temp – 38.7°C Poor Circulation.

POTABLE WATER SAMPLE ANALYSIS

Client Name and Site Address	**Report To:**	**Job No.:**
NHS Lothian East Calder Health Centre East Calder	M. Mastaglio **Surveyor:** C. Mitchell	5261/14/1 **Page No. 1 of 1**

Sampling Date	**Date to Lab**	**Analysis Commenced**	**Analysis Completed**
04/12/2019	04/12/2019	04/12/2019	07/12/2019

Analysis performed at Westfield Caledonian's UKAS accredited testing laboratory No. 4042

Sample No.	**Source Description**	**2 Day 37°C TVC/ml**	**3 Day 22°C TVC/ml**	**Coliforms cfu/100ml**	**E. coli cfu/100ml**	**Other ***
1	Extension Consulting Room 3 Sink	2	<1	<1	<1	
2	Room 8 (G/05) Sink	1	3	1	<1	
3	Reception Gents Toilet WHB	2	6	<1	<1	
4	1st Floor Staff Sink	1	18	<1	<1	
5	CWS Tank 1	<1	14	<1	<1	

GUIDE LEVELS
2 day 37°C TVC (Total Viable Count) <50 cfu/ml.
3 day 22°C TVC (Total Viable Count) <300 cfu/ml.
Coliforms and *E.coli* should not be present (i.e. <1cfu per 100ml).
*Other - *Pseudomonas aeruginosa* should not be present (i.e. <1cfu per 100ml).
**Other- *Enterococci* should not be present (i.e. <1cfu per 100 ml).

PAGE NO	CLIENT NAME & SITE ADDRESS	CONTACT(S) NAME & TEL NO	SURVEYOR	JOB NO.
1	NHS Lothian East Calder Health Centre East Calder	M. Mastaglio	C. Mitchell	5261/14/1
				SURVEY DATE: 04/12/2019

SAMPLE NO.	LOCATION & DESCRIPTION	[Cl] ppm	SAMPLE TYPE	pH	°C	REMARKS
1	Extension Consulting Room 3 Sink	<0.2	TVC	7.6	7.3	Hot – 53.5°C.
2	Room 8 (G/05) Sink	<0.2	TVC	7.6	17.1	Extended Flush - 10.2°C.
3	Reception Gents Toilet WHB	<0.2	TVC	7.6	9.4	Hot – 38.3°C. Inlet to TMV – 50.4°C.
4	1st Floor Staff Sink	<0.2	TVC	7.6	8.7	
5	CWS Tank 1	<0.2	TVC	7.6	9.5	Light Sediment at Base of Tank.

APPENDIX I

Immediately Reportable Observation or Result

From: Colin Mitchell
Sent: 17 December 2019 12:28
To: 'Mastaglio, Michael' <Michael.Mastaglio@nhslothian.scot.nhs.uk>
Cc: Strachan, Ian <Ian.Strachan@nhslothian.scot.nhs.uk>
Subject: East Calder Health Centre

Hi Michael/Ian

The lab have reported a sample collected from East Calder Health Centre is positive for *Legionella* species at a concentration of 40 cfu/l.
This was collected from the Room 8 (G/05) Sink where the hot water temperature rise was slow.
The storage temperatures recorded at the gas fired water heaters were slightly low at approximately 53°C.
Poor circulation to the Room 8 (G/05) was however confirmed by measuring the flow and return temperatures on the pipes at high level in the adjacent office.
The infection risk is considered to be low due to the low concentration and the bacteria being *Legionella* species.
We do however recommend that circulation to this area be investigated to ensure a sufficiently high hot water temperature can be maintained to provide an effective thermal control regime within the building.

Should you require any further advice or information, please do not hesitate to contact us.

Regards,

Colin Mitchell

Senior Technical Services Engineer

Westfield Caledonian
4 Mollins Court
Cumbernauld
G68 9HP

Tel. 01236 786300
Fax. 01236 786301
Mob. 07876 440984

APPENDIX II

Resampling

WATER SAMPLE ANALYSIS RESULTS (LEGIONELLA)

Client Name and Site Address	**Report To:**	**Job No.:**
NHS Lothian East Calder Health Centre	Mr. M Mastaglio **Surveyor:** Mr. C Mitchell	70469 **Page No. 1 of 1**

Sampling Date	**Date to Lab**	**Analysis Commenced**	**Analysis Completed**
19/12/2019	19/12/2019	19/12/2019	03/01/2020

Analysis performed at Westfield Caledonian's UKAS accredited testing laboratory No. 4042

			Positive	
Sample No.	**Source Description**	**Result** (Note 1)	**Type** (Note 2)	**Concentration** (Note 3)
1	Room 8 (G/05) Sink	Negative		

Note 1. Negative = No *Legionella* detected (<40CFU/1000ml)
Note 2. Lp = *Legionella pneumophila*, SG = Serogroup, L.Sp. = *Legionella* Species
Note 3. Estimated concentration per 1000ml based on 200ml of centrifuged sample.

WATER SAMPLE ANALYSIS RESULTS (LEGIONELLA)

PAGE NO	CLIENT NAME & SITE ADDRESS	CONTACT(S) NAME & TEL NO	SURVEYOR	JOB NO.
1	NHS Lothian East Calder Health Centre	Mr. M Mastaglio	Mr. C Mitchell	70469
				SURVEY DATE: 19/12/2019

SAMPLE NO.	LOCATION & DESCRIPTION	[Cl] ppm	SAMPLE TYPE	pH	°C	REMARKS
1	Room 8 (G/05) Sink	<0.2	Lp	7.6	62.3	Flow – 25.3°C – 64.7°C. Return – 25.0°C – 49.2°C.

From: Colin Mitchell
Sent: 19 December 2019 14:02
To: 'Mastaglio, Michael' <Michael.Mastaglio@nhslothian.scot.nhs.uk>
Cc: Strachan, Ian <Ian.Strachan@nhslothian.scot.nhs.uk>; McKechnie, Ian <Ian.McKechnie@nhslothian.scot.nhs.uk>
Subject: East Calder HC

Hi Michael,

Please see attached photos from the visit to East Calder today.
The first two are Flow and Return pipe before running the outlet (25.0°C and 25.3°C).
The next photo is the temperature recorded after 3 minutes of flushing, the temperature was below 50°C after 1 minute.
The last two show the flow and return temps after flushing of the tap (64.7°C and 49.2°C).
This confirms satisfactory storage temperatures are now being achieved however there is still an issue with circulation.
As always, we will be in contact if the lab have anything to report.

Should you require any further advice or information, please do not hesitate to contact us.

Regards,

Colin Mitchell

Senior Technical Services Engineer

Westfield Caledonian
4 Mollins Court
Cumbernauld
G68 9HP

Tel. 01236 786300
Fax. 01236 786301
Mob. 07876 440984

NHS LOTHIAN

East Calder Health Centre
Livingston

Water Safety Risk Assessment
(Engineering)

Waterborne Microorganisms

(Including Legionella, P. Aeruginosa and other Pathogens)

March 2021

CONTENTS

Risk Assessment Survey Date: 4th March 2021

Prepared By	Authorised By	Issued To
Colin Mitchell	William Leitch	M Mastaglio

The Author may be contacted regarding the report content as follows;
Email : colinmitchell@west-cal.co.uk
Tel : 01236 786 300

SUMMARY

This summary relates to a survey and risk assessment carried out on the water services within East Calder Health Centre, East Calder for NHS Lothian. The survey was carried out by Westfield Caledonian's Senior Technical Services Engineer, Colin Mitchell, on 4th March 2021.

Sixteen water system components and outlets were subject to our numerical risk analysis methods which included the CWS tanks, gas fired water heaters, drinking water outlets, and a number of representative components on the distribution systems. Of the sixteen points assessed, three achieved a Low/Medium risk rating, with the remainder in the Low risk category. In general elevated risk ratings have been avoided due to the acceptable operating and hygienic conditions observed with the CWS tanks. Only one gas fired water heater was in operation during the survey, with the other isolated from the live systems, however high hot water temperatures were recorded throughout the building, providing an effective thermal control regime to prevent the growth of micro-organisms. Poor circulation was however identified in the tertiary loop supplying the Health Education Room and recommendations have been made to improve this to prevent water at low temperature back-contaminating the live system. One CWS tank is kept drained and isolated although this has been done in a manner to prevent the creation of dead legs. No rarely used outlets were identified and it was reported that housekeeping staff run all outlets on as part of their daily task schedule.

The Water Safety Plan WSP is still in draft format at this time, and a number of recommendations have been made in order to ensure that effective management of the control scheme is achieved. The Maintenance Task Schedule was inspected and although no auditable records were yet logged on the new software, the Maintenance Tasks were inspected to determine if these were suitable and sufficient. NHS Lothian are utilising SFG20 which is a web based library of maintenance tasks for specific components used in the water systems. However, when checking the suitability of these Tasks it was noted that several plant assets were incorrectly identified and/or the assigned SFG20 Maintenance Task was wrong. As such there are significant gaps in the monitoring programme and it is recommended that a review be carried out by a competent person to ensure the asset list and associated Maintenance Tasks are correct.

INTRODUCTION

This report relates to an assessment of the risk of infection from waterborne micro-organisms within East Calder Health Centre, East Calder. Westfield Caledonian's Senior Technical Services Engineer, Colin Mitchell undertook this assessment on 4th March 2021.

The objective was to assess the design, installation, condition and mode of operation of the water systems, with respect to the risk to the quality of the water within the systems, and the subsequent infection risk for the users. Having identified all risk affecting factors, a review of the control scheme currently in place was carried out to determine both its suitability and effectiveness in adequately controlling the presented risks. The system assessment survey and control scheme review, was carried out in a manner consistent with the guidance given in *BS8580:2019 Water Quality – Risk Assessments for Legionella Control – Code of Practice* (ACoP) (L8) and HSE Guidance Document HSG 274.
The requirements of current Scottish Healthcare Technical Memoranda are also considered.

The formal, quantitative risk assessments address aspects of the system design and condition which may compromise the water quality and affect the risk of user infection. A numerical value is derived which is deemed to be representative of the risk, with additional values listed to demonstrate the reduction in risk which can be achieved should the recommendations contained within this report be implemented. A third numerical value is also listed which gives the risk score from the previous assessment, to enable a quantification of the reduction in risk which has been achieved. The subsequently derived recommendations are of two types, namely Remedial Actions, or Control Measures.
The remedial actions are designed to alter the system configuration such that inherent water quality compromising characteristics are removed, or to facilitate the implementation of subsequent control measures.

Susceptibility of individuals is an important factor that should be taken into account when undertaking a risk assessment. These aspects include, but are not exclusive to, patients suffering from cancer or kidney disease, where a significant number of elderly patients are involved, or where immunosuppressant drugs are used. As this building provides consultancy and clinical procedures for potentially elderly patients this aspect has been applied to all outlets to which patients may be exposed, but not to staff areas.

INTRODUCTION

Scope and Exclusions

The survey has been undertaken in accordance with the recommendations of the ACoP L8, HSG 274 (Parts 1, 2 & 3) and BS 8580:2019, and covers all water systems within the building. The survey has been undertaken on a non-destructive and non-intrusive basis, so is limited to those items in plain sight that may be safely accessed. Whilst all efforts have been made to identify any potential dead legs associated with the systems assessed therefore, the complex nature of pipework installations, much of which are hidden within buildings, prevents this from being a fully complete and accurate list.

For the same reasons, it is neither practical nor possible to assess all materials used in the construction of complex multi-component systems such as those covered by this document. It should therefore be noted that not all materials present can or have been assessed for their suitability of use. Westfield Caledonian cannot be accountable for any omissions to this report resulting from information, data, systems or plant not made readily and reasonably accessible by the Client. Please note that this Risk Assessment only addresses one of many requirements of the ACoP L8 and is therefore not alone sufficient to ensure complete compliance with the law.

The aspects addressed in this survey include those which will encourage system contamination by *Pseudomonas aeruginosa.* However with respect to managing the risk of infection from this organism it is recognised that control is generally through clinical procedure. Accordingly, the IPC team should be referred to for *Pseudomonas aeruginosa* risk assessment control measures development.

SYSTEM DESCRIPTION & ASSET REGISTER

System Description

Building Name:	**East Calder Health Centre**
Building Address:	**147 Main St, East Calder, Livingston**
Building Use:	**Health Centre**
Augmented Care Areas:	**None**
Number of Floors:	**2**
Number of Basements:	**0**
Estimated No of Occupants:	**15 Staff - 20 Patients**
Susceptible Individuals:	**Potentially Susceptible Patients**

East Calder Health Centre is of two-storey construction and provides primary and preventive care services. The Mains water service (MWS) enters the building in the ground floor boiler room and rises vertically to supply two cold water service (CWS) storage tanks located at high level within the 1st floor plantroom. A branch is taken off the rising Main at high level on the ground floor and runs along the main corridor before branching to supply the staff toilets and kitchen on the 1st floor.

Cold water downservice supplies are provided from CWS tank no.1 located at high level within the 1st floor plantroom. CWS tank no.2 is kept drained and isolated ready to be used should cleaning of CWS tank no.1 be required. Two separate supplies are taken from each CWS tank, one to supply a cold feed to the two gas fired water heaters located within the ground floor plantroom and the other to provide cold water downservices. Pipework runs along the main corridor at high level on the ground floor, with branches taken off adjacent to each room which contains a wash hand basin (whb) or sink, and also to supply the toilet areas. The second branch drops to the boiler room area to supply the two vertical direct gas fired water heaters (DGFWH).

SYSTEM DESCRIPTION & ASSET REGISTER

Domestic hot water services (DHWS) within the East Calder Health Centre are supplied by the two vertical DGFWHs situated within the boiler room on the ground floor. Hot water is delivered via a two pipe system which runs at high level on the ground floor.

An extension has been built to the left of the building that provides additional Consulting Rooms. Each room has a single sink and all outlets are mains fed with electric point of use water heaters located under each sink.

This system description should be read in conjunction with schematic drawing ref 5261.

SYSTEM DESCRIPTION & ASSET REGISTER

ASSET ID	ASSET DESCRIPTION	MANUFACTURER	Model/Capacity	Serial Number	LOCATION	APPLICABLE PPMS
	MWS & CWDS Distribution Systems					Monthly Cold Water Temperatures Weekly SUP Flushing
	DHWS Distribution System					Monthly Hot Water Temperatures Weekly SUP Flushing
0005010399	CWS Tank	Balmoral	1000L		Roofspace	Six Monthly CWS Storage Tanks
0005010400	CWS Tank	Balmoral	1000L		Roofspace	None
0005011878	Gas Fired Water Heater	Andrews	136L		Boiler/Plantroom	Monthly Calorifiers – No Stratification Annual Calorifiers & Cylinders
0005011879	Gas Fired Water Heater	Andrews	136L		Boiler/Plantroom	Monthly Calorifiers – No Stratification Annual Calorifiers & Cylinders
8500196352	DHWS Circulation Pump	Grundfos	UP 20-40 N 150		Boiler/Plantroom	None
-	Electric Point of Use Water Heater	Heatrae Sadia	Multipoint 10		Extension Consulting Room 1	Monthly Electric Point of Use Heater
-	Electric Point of Use Water Heater	Heatrae Sadia	Multipoint 10		Extension Consulting Room 2	Monthly Electric Point of Use Heater
-	Electric Point of Use Water Heater	Heatrae Sadia	Multipoint 10		Extension Consulting Room 3	Monthly Electric Point of Use Heater
See TMV Schedule	TMVs					Six Monthly Servicing

ASSESSMENT FINDINGS

Source Water

A public Mains Water Service (MWS) enters the main plant room and is provided with a stop cock and drain down facility. No check valve was identified and this may be requested by the water authority to comply with the Water Byelaws.

MWS Inlet with Stop Cock and Drain Point

Cold Water Service (CWS) Storage Tanks

The two CWS tanks are provided at high level within the 1st floor plantroom are of modern pre-insulated sectional construction and are considered to be fully Byelaw compliant. The risk of contaminant ingress is deemed to be low as the overflow pipework is suitably screened and the tanks are provided with a securely fitting lid. The tanks are arranged in parallel although CWS tank no.2 is kept drained and isolated. This will increase turnover through the online tank and remove the risks associated with hydraulic imbalance that often occurs where tanks are arranged in parallel. No Dead Legs have been created as a result of this, as isolation valves are suitably located on the MWS and both downservice systems from CWS tank No.2. Internal inspection of CWS tank no.1 revealed acceptable hygienic conditions, although moderate sediment was observed at the base. A satisfactory contents temperature was also recorded, suggesting that sufficient turnover is occurring to prevent excessive heat gain.

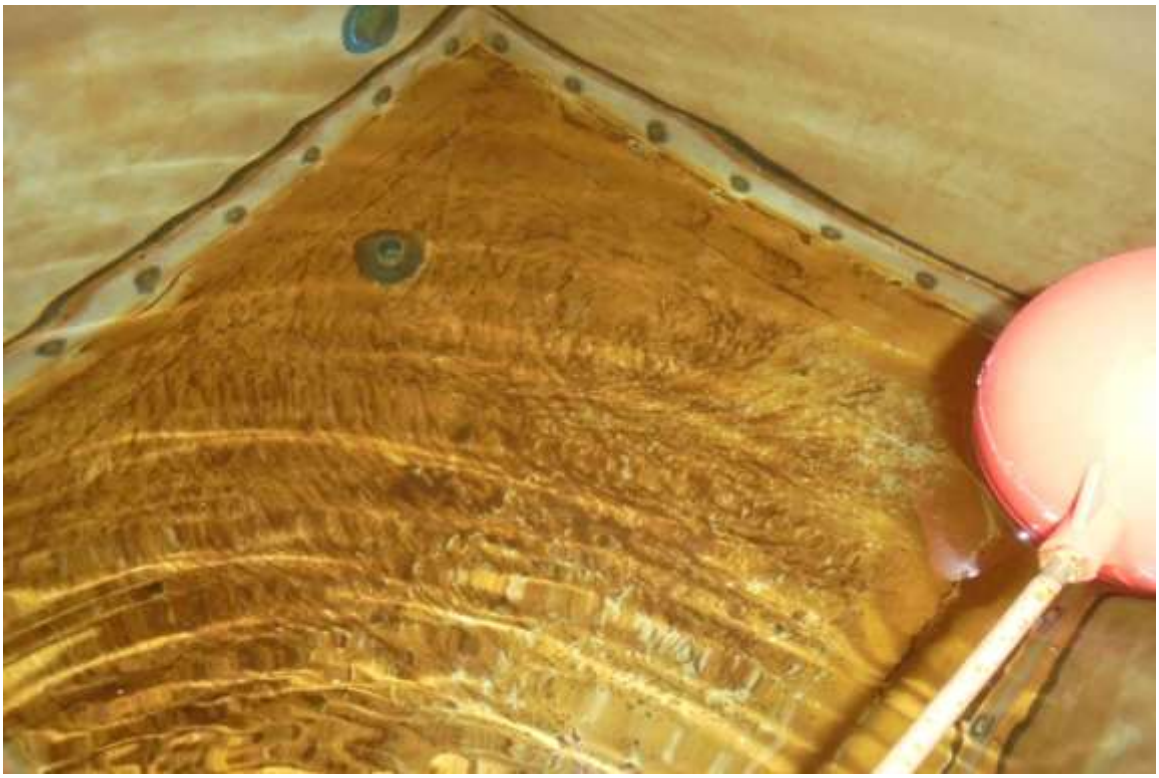
ASSESSMENT FINDINGS

We have no specific recommendations with respect to the CWS tanks at this time, other than that ongoing monitoring be continued, with the results of tests and inspections used to determine the need for future remedial action.

The following photographs illustrate the conditions observed.

Roofspace CWS Tank – Pre-Insulated Sectional Construction

ASSESSMENT FINDINGS



CWS Tank No.1 – Acceptable Condition with Moderate Sediment at Base

CWS Tank No.1 – Contents Temperature 7.5°C

ASSESSMENT FINDINGS

CWS Tank No.1 – Drained and Isolated

Domestic Hot Water Service (DHWS)

Westfield Caledonian recommends that hot water be generated and stored in excess of 60°C, to ensure that outlet temperatures at uncontrolled locations remain between 55°C and 60°C throughout the premises. This is also a requirement of Scottish Healthcare Technical Memorandum (SHTM) 04-01. The HSE Guidance Document HSG274 also states that a minimum system return temperature of 55°C should be maintained within healthcare premises.

Domestic hot water throughout the premises is supplied by two direct gas fired water heaters located in the plantroom, although gas fired water heater No.2 was offline at the time of the survey and was isolated from the live systems, in such a way as to avoid the creation of dead legs. A sample was collected from the drain point of the operational water heater and this was clear and free from sediment and at a satisfactory temperature. The mode of operation of these water heaters, with heat source at the base, prevents thermal stratification occurring and ensures the entire contents are pasteurised. Annual flushing of the drain valves should however be carried out, to remove sediment and waterborne contamination which may accumulate, given time.

ASSESSMENT FINDINGS

Hot water is distributed throughout the building via a two pipe system, with circulation assisted by a pump installed on the flow pipe in the plantroom. The contents gauge indicated a temperature of 65°C and utilising a contact probe, a satisfactory return temperature was also recorded in the plantroom. Satisfactory flow and return temperatures were also recorded at the extremity point on the circulation system at high level within Consultant Room 8. Hot water outlet temperatures recorded throughout the building, at untempered outlets and at the inlet to thermostatically controlled outlets, were sufficiently high to prevent the growth of micro-organisms. However, poor circulation was identified in the tertiary circulation loop supplying the Health Education Room sink. Although a satisfactory hot water outlet temperature was recorded within one minute of flushing this outlet, the return temperature did not achieve the minimum temperature of 55°C. It is recommended that steps be taken to improve circulation through this loop as it currently represents a dead leg, with water in the return pipework held at a suitable temperature for the growth of micro-organisms.

Although hot water outlet temperatures were sufficiently high to provide an effective thermal control regime these were generally in excess of 60°C and represent an increased scald risk to users. Suitable “Hot Water” signage has been provided at untempered outlets and outlets intended for use by the public are thermostatically controlled to prevent scalding. It is however recommended that the storage temperature be lowered slightly to reduce the risk of user scalding. Monthly temperature monitoring should be carried out to ensure the untempered outlet temperatures (or supply temperatures to thermostatic mixers) is at least 55°C, with the thermostatic controls adjusted as necessary. All TMVs should also be subject to six monthly temperature checks and operational adjustment as required by the manufacturer and in accordance with Performance Specification D08.

The following photographs illustrate the conditions observed.

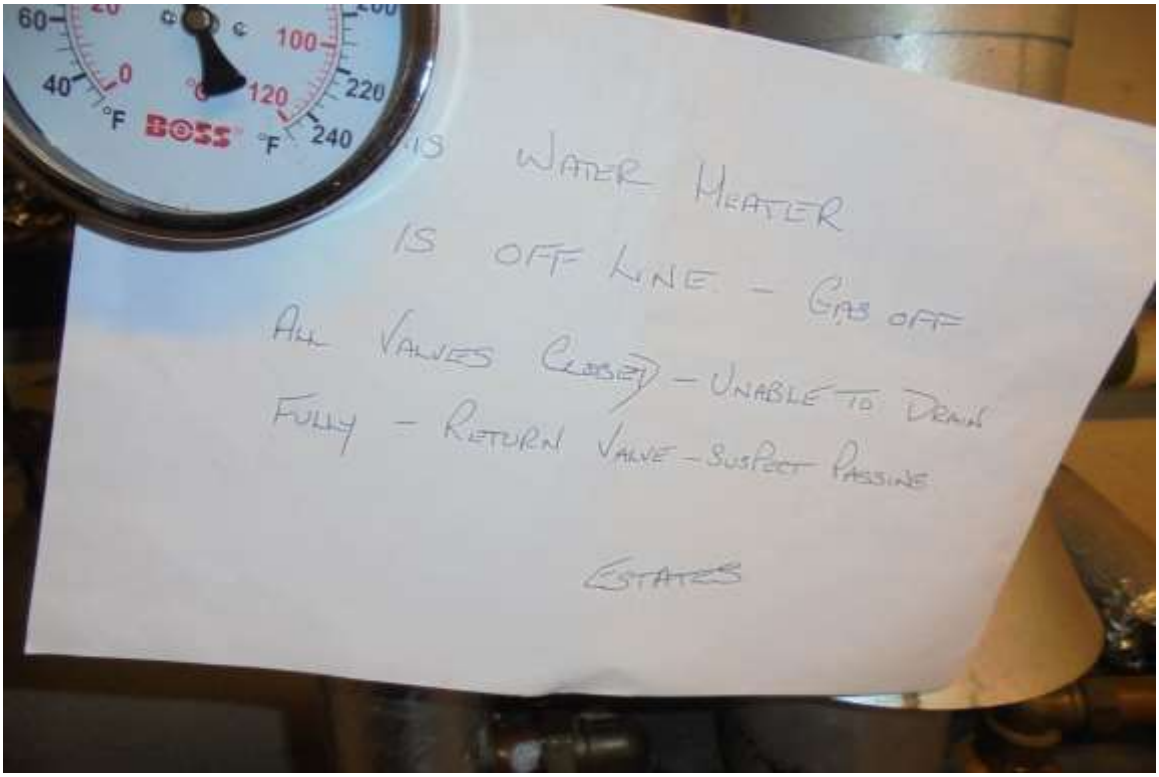
ASSESSMENT FINDINGS

Plantroom DHWS Gas Fired Water Heaters – General Arrangement

DHWS Gas Fired Water Heater No.1 - Storage Temperature Approximately 65°C

ASSESSMENT FINDINGS

DHWS Gas Fired Water Heater No.1 – Drain Sample Clear and at Satisfactory Temperature



DHWS Gas Fired Water Heater No.2 Offline

ASSESSMENT FINDINGS

Plantroom Principle Loop Return Temperature Satisfactory

DSR Sink - Hot Water Outlet Temperature Satisfactory

ASSESSMENT FINDINGS

1st Floor Staff Room Sink - Hot Water Outlet Temperature Satisfactory

Health Education/Physio Room - Tertiary Loop Flow Temperature Too Low (<55°C)

ASSESSMENT FINDINGS

Health Education/Physio Room - Tertiary Loop Return Temperature Too Low (<55°C)

Health Education/Physio Room Sink - Hot Water Outlet Temperature Satisfactory

ASSESSMENT FINDINGS

Health Education/Physio Room - Tertiary Loop Flow Temperature Satisfactory After Flushing Outlet

Health Education/Physio Room - Tertiary Loop Return Temperature Too Low (<55°C) After Flushing Outlet

ASSESSMENT FINDINGS

Public Toilet WHB - Hot Water Outlet Temperature Satisfactory Thermostatic Control

Public Toilet WHB - Supply Temperature to TMV Satisfactory (>55°C)

ASSESSMENT FINDINGS

Flow Temperature to Consultant Room 8 Satisfactory

Return Temperature from Consultant Room 8 Satisfactory

ASSESSMENT FINDINGS

Consultant Room 8 Sink - Hot Water Outlet Temperature Satisfactory

Mains fed, electric under-sink points of use water heater are provided in each of the Consulting Rooms within the extension wing. Where these are used, a minimum temperature of 55°C is required in healthcare premises. The temperature recorded at the extension Consultant Room 2 sink was satisfactory although monthly temperature monitoring should be used to ensure all three water heaters operate within the desired temperature range and determine the need for adjustment of the thermostatic controls.

The following photographs illustrate the conditions observed.

ASSESSMENT FINDINGS

Extension Consultant Room 2 Under-Sink Electric Water Heater Provided

Extension Consultant Room 2 Sink - Hot Water Outlet Temperature Satisfactory

ASSESSMENT FINDINGS

Cold Water Temperatures

Bacteria, including *Legionella,* multiply most rapidly in warm water, but not in hot or cold water. Westfield Caledonian recommends that cold water is stored and distributed at below 20°C, as above this limit micro-organisms will begin to proliferate. It is also considered good practice to have water supplied to extremity outlets at temperatures no more than 2°C above the source temperature, to ensure that internal heat gain will not compromise the bacteriological safety of the supplied water.

Cold water outlet temperatures recorded throughout the building compared well with the storage temperature recorded within the CWS tank, and were well below the recommended upper limit of 20°C. This suggests that sufficient turnover is occurring through the distribution systems to prevent excessive heat gain. It is however recommended that monthly temperature monitoring at extremity locations be utilised to determine the need for further remedial actions or control measures, such as including outlets in a flushing programme.

The following photographs illustrate typical cold water outlet temperatures recorded during the visit.

ASSESSMENT FINDINGS

DSR Sink – Cold Water Outlet Temperature Satisfactory

1st Floor Staff Room Sink – Cold Water Outlet Temperature Satisfactory

ASSESSMENT FINDINGS

Health Education/Physio Room Sink – Cold Water Outlet Temperature Satisfactory

Public Toilet WHB - Cold Water Outlet Temperature Satisfactory

ASSESSMENT FINDINGS

Consultant Room 8 Sink - Cold Water Outlet Temperature Satisfactory

Extension Consultant Room 2 Sink - Cold Water Outlet Temperature Satisfactory

ASSESSMENT FINDINGS

Aerosol Generators

There are no shower facilities or aerosol generators within the building and as such the risks associated with aerosol generation are considered to be low.

Dead Legs

One of the most significant contributing factors to the risk of bacteriological contamination occurring in domestic water systems is the existence of dead legs. Westfield Caledonian differentiates between Actual and Effective dead legs, with the former typically being sections of pipework originally installed to serve either removed or redundant plant items or outlets. An Effective dead leg may be defined as a pipework section which supplies rarely used or emergency service outlets which, whilst requiring to be retained, rarely experiences water throughput.

No Dead Legs were observed during the survey although it was noted that the MWS supply to the redundant Bib Tap in the Bin Store has now been physically disconnected at the branch point in the plantroom. As previously stated CWS tank no.2 is kept drained and isolated although this has not resulted in the creation of any Dead Legs as isolation valves are suitably located on the MWS and on both downservice systems from CWS tank No.2.

A MWS branch has been taken in the ground floor plantroom to supply the heating system pressurisation unit. Although a check valve was installed prior to the connection to the pressurisation unit, this should be installed at the branch point to prevent back-contamination. The flexible quick-fill connection should also be physically disconnected when not in use.

Effective dead legs are also created by any rarely used outlets or outlets within unoccupied areas. It was reported that all outlets are used on a regular basis, however housekeeping staff flush all outlets on a daily basis as part of housekeeping procedures. Records of this is simply a check box which is signed and dated and this is covered in more detail in the next section of this report.

ASSESSMENT FINDINGS

Drinking Water

Drinking water is provided by the MWS connected Staff Kitchen sink and as such it is considered that NHS Lothian have complied with their statutory obligation to provide a wholesome supply of drinking water.

General Hygiene

Scale is not only unsightly, but can provide a harbour and nutrient source for the sustenance and proliferation of bacteria that may cause contamination of the water supply. On this occasion, outlets were generally in good clean hygienic condition and free from scale accumulations. However, it is recommended that all outlets be regularly cleaned utilising clean, disposable cloths and appropriate de-scaling and sanitising agents in a manner to prevent cross-contamination. It is important that the risks presented by fouling with scale is recognised and that regular visual inspection of all faucets is carried out and appropriate cleaning activities implemented if and when deemed required. Where tap inserts or flow straighteners are provided, these should also be removed and cleaned on an annual basis as they represent area where dirt and debris can be trapped and encourage the growth of micro-organisms.

Flexible Connections

The NHS National Services Scotland safety action notice reference SAN (SC) 09/03 states that flexible hoses used in potable water systems should be identified and risk assessed for the possibility of contamination with harmful micro-organisms. Reports indicate that high levels of *Pseudomonas aeruginosa* and *Legionella* bacteria have been found in water samples collected from water outlets fed by flexible hoses. The safety action notice indicates that the use of flexible hoses constructed from EPDM to link between hard pipework and equipment should not be utilised. Where flexible hoses must be used (e.g. on essential equipment such as Arjo baths) they must be lined with a suitably alternative to EPDM, as well as being WRAS approved. No flexible connections were identified as part of this survey.

Open Evaporative Cooling Systems

There are no Evaporative Cooling towers on site and as such the risks associated with widespread aerosol transmission are minimal.

ASSESSMENT FINDINGS

Other Services

In addition to domestic water systems, occasions may arise where a health risk is presented from waterborne micro-organisms from other services. These include fire suppression systems such as sprinklers where aerosols are released into the air, and care should be taken during testing of these systems. In addition, condensate may be created from cooling and humidification processes in HVAC systems which could result in aerosols being released into the supply air. There were no additional systems identified during the assessment survey and as such there are no additional risks presented.

MANAGEMENT SYSTEM AND CONTROL SCHEME REVIEW

Management and Control of Risk (WSP)

As inadequate management, lack of training and poor communication have all been identified as contributing factors in outbreaks of the *Legionella* disease, the importance of an appropriate management structure is stressed. This structure, which is one of the foremost requirements of the HSE Approved Code of Practise (L8), should detail the responsibilities allocated to specific individuals and monitor the effectiveness of the Control Measures undertaken at the prescribed intervals. NHS Lothian have adopted the SHTM 04-01 model of a Water Safety Plan (WSP) to facilitate the management of the risks associated with water systems. This is currently still in draft format and a number of recommendations have been made as a result of this assessment in order for the WSP to satisfy all the requirements.

A Management Structure has been defined, which details the positions and contact details of all personnel involved in the control scheme. Roles and responsibilities have also been defined for each person, and although it was not clear if Authorised and Responsible Persons have been nominated in writing and this should be confirmed. The WSP states that the Water Safety Group meet on a quarterly basis and the outcomes of this feed into the Senior Management Water Safety Group to ensure effective liaison between the Duty Holder, the Responsible Person, and the Water Safety Group. However, it is unclear which Facilities Representatives attend these meetings and it is recommended that an Authorised Person responsible for each site attends all forthcoming meetings. It was reported that the last few scheduled Water Safety Group meetings have been cancelled and it is important that these go ahead, to satisfy the requirement for communication up the Management Structure. A Training Matrix is provided to ensure all persons have the relevant training required for their role and regular refresher training is also scheduled through this. Training records for Michael Mastaglio, Tom Cunningham and Graham Lawson were inspected and these were up-to-date.

In the Introduction of the WSP it states that Section 4 details the “safe operation of the system and all appropriate Maintenance Procedures” however Section 4 details the Maintenance Procedures only and as such there was no statement of correct and safe operation of the water systems.

MANAGEMENT SYSTEM AND CONTROL SCHEME REVIEW

It is recommended that a statement be added to the WSP document, describing that temperature is the main control parameter used to prevent the growth of micro-organisms and that water is to be maintained below 20°C and above 55°C to achieve this.

Although an Incident Plan has been documented, this is limited to instances when cold water storage temperatures have been recorded in excess of 20°C and does not consider a failure of the hot water system. It is recommended that the Incident Plan be updated to include actions to take when there is a break in the thermal control regime and should include carrying out a thermal disinfection of the system. Although the WSP covers actions to take following Legionella sampling and has included the HSG 274 Part 2 Table 2.3 there is no documentation for action to take following an outbreak of Legionellosis. It is recommended that Appendix 2.3 of HSG 274 Part 2 be referenced or added to the Incident Plan to comply with the requirements of this guidance.

The Maintenance Task Schedule on Agility was reviewed however no records were available for inspection as it has only gone live this month and historical records on the previous Backtraq system have been archived, although can be viewed if requested in advance. NHS Lothian have adopted SFG20 which is a web based library of maintenance tasks. The Maintenance Task Schedule lists the SFG20 Task Code and the frequency at which maintenance is required for each relevant component on the water systems. However, when checking the suitability of these Tasks it was noted that several assets were incorrectly identified and/or the assigned SFG20 Maintenance Task was wrong. A list of Control Measures has been devised as a result of this Risk Assessment and it should be ensured that all of these are incorporated into the Maintenance Task Schedule to suitably manage the risks associated with water quality deterioration and monitor the control scheme. A review of the asset lists and associated Maintenance Tasks should be undertaken by a competent person to ensure these are accurate and suitable.

Rarely used outlets have not been listed although it was reported that domestic staff flush all outlets on a daily basis as part of their housekeeping tasks. A record of this is kept on their daily task schedule although is simply a check box which is signed and dated. This is considered to be insufficient to suitably control the risks associated with rarely used outlets and relies on the individual having appropriate knowledge of the building and all outlets.

MANAGEMENT SYSTEM AND CONTROL SCHEME REVIEW

It is recommended that a schedule of rarely used outlets be devised, with these flushed on at least a twice weekly basis by domestic staff. This schedule should then be signed and dated and incorporated into the Maintenance Task Schedule so records are available for future audits. The schedule should be regularly reviewed and updated, taking into account changes in occupancy and building usage. Any areas which become completely unoccupied should be notified to Estates, who will then take on responsibility for implementing the twice weekly flushing programme.

The Remedial Action Plan on Agility was reviewed and although Job Cards have been raised for the majority of these, they have not been closed out or marked as Completed. A number of these have been outstanding for over 12 months and it is recommended that the Remedial Actions raised in this Risk Assessment be added to the Remedial Action Plan and that these be completed and signed off in a timely manner.

It is recommended that condition monitoring, sampling and audits be carried out on an annual basis, and that the Risk Assessment is reviewed every two years, or more regularly if condition audits or annual WSG reviews deem necessary.

MANAGEMENT SYSTEM AND CONTROL SCHEME REVIEW

Management Structure		
Position	**Name, Address Tel. No.**	**Position**
Statutory Duty Holder	Jim Crombie	Deputy Chief Executive
Designated Person (Water)	George Curley	Director of Facilities/General Manager (Estates)
Responsible Person	Tommy Logan	Head of Estates
Regional Responsible Person	Ian McKechnie *	Estates Manager
Authorised Persons	Ian Strachan * Michael Mastaglio Rae Jarvis	Estates Sector Manager Estates Sector Manager Estates Sector Manager
Authorising Engineer	Dennis Kelly	Legionella Control International Ltd
Microbiologist	Karen MacSween	Lead Microbiologist
Infection Control	Lindsay Guthrie	Lead Infection Control
Competent Persons	Plumbers/Engineers	

Water Safety Group Comprises:

Site Management Representative

Facilities Representative *

Associate Medical Director

Health & Safety Officer

IPCN Representative

Domestic Services Representative

Clinical Nurse Manager

RCN Steward/Mental Health Partnership Rep

Assurance Manager

MANAGEMENT SYSTEM AND CONTROL SCHEME REVIEW

Appraisal Question		Yes, No or NA	Comment/Action Required
1	Is there a current Written Scheme or Water Safety Plan (WSP) in place?	Yes	WSP is in Draft format
2	Are details of the Management Structure (Water Safety Group) provided, with names, positions, contact details?	Yes	Names, positions and email addresses provided.
3	Have Authorised & Responsible Persons been informed in writing?	U/K	Unknown - requested confirmation.
4	Are the responsibilities of all involved personnel clearly defined?	Yes	Roles & Responsibilities document on "K" drive.
5	Are all relevant personnel represented in the Water Safety Group.	No	Ensure all Authorised Persons are represented at WSG meetings.
6	Is there effective liaison between the Duty Holder, the Responsible Person, and the Water Safety Group?	Yes	Water Safety Group meet quarterly and the outcomes feed into the Senior Management Water Safety Group. Last few meeting cancelled, ensure these continue.
7	Is a procedure in place to ensure that personnel with a responsibility under Written Scheme receives sufficient training and regular refresher training?	Yes	Training Matrix for all staff available and includes scheduled refresher training.
8	Is there evidence available in the WSP of the competency of service providers and contractor staff?	Yes	3.12 of WSP All Contractors are engaged through NHS Lothian contractor framework and checked by Procurement.
9	Are training records available in the WSP?	Yes	Training records are detailed in Section 3.2 of the WSP and kept on Shared "K" drive. Checked Training records for several named personnel, all available.
10	Does the organization have an up to date and current policy document?	Yes	
11	Is normal plant operation and a description of the correct and safe operation of the plant defined?	No	A statement of correct and safe operation of the water systems should be added to the WSP document.
12	Are system control parameters defined - chemical or thermal as applicable?	No	Add a statement that temperature is the main control strategy for reducing the risk from waterborne micro-organisms.
13	Are there differing plant operating cycles (continuous, batch, seasonal etc.)	No	-
14	Are Method statements (procedures) for commissioning and shut-down defined.	Yes	Utilising SFG20 for maintenance which details procedures for each plant item.

MANAGEMENT SYSTEM AND CONTROL SCHEME REVIEW

Appraisal Question		Yes, No or NA	Comment/Action Required
15	Are Method statements (procedures) for bringing stand-by plant into operation at least weekly defined.	NA	
16	Does the WSP include an incident plan?	No	Incident Plan covers elevated (>20°C) cold water storage temperatures only. WSP covers Positive Legionella results. Recommended that Incident Plan includes Failure of Main Plant items, i.e. hot water generators. Also action to take in the event of an outbreak of Legionellosis.
17	Is there an up to date and current Control Procedures document (logbook)?	Yes	Transferred from Backtraq to Agility in March 2021.
18	Is there information on the Control Procedures that are in place, and a schedule.	Yes	Maintenance Task Schedule on Agility reviewed. A number of assets have been identified incorrectly or the assigned Maintenance Tasks are incorrect and unsuitable.
19	Are all recommended Control Procedures included	No	All Control Measures recommended in the Risk Assessment to be incorporated into Maintenance Task Schedule.
20	Is a schedule of rarely used outlets defined and is flushing of these outlets recorded	No	No RUO defined. All outlets flushed by domestic staff daily. Outlets in unoccupied Buildings/Wards flushed twice weekly.
21	Are there written method statements for relevant Control Procedures?	Yes	SFG20 details each Control Procedure.
22	Are action levels defined for these Control Procedures?	Yes	
23	Are analytical tests, operational checks and inspections to be carried out, their frequency and any resulting corrective actions defined.	Yes	WSP 3.3 Defines all required Maintenance Tasks and Analytical Tests including TVC, Legionella and pseudomonas sampling.
24	Remedial actions to be taken in the event that the scheme is shown not to be effective or control limits are exceeded.	Yes	Formal Documentation detailing actions to be taken when analytical tests are out with limits for Legionella, Pseudomonas and TVC.
25	Is equipment used to carry out Maintenance Tasks calibrated on a suitable schedule.	Yes	WSP 2.5 All equipment used for measurement of temperature to be calibrated at least annually.

MANAGEMENT SYSTEM AND CONTROL SCHEME REVIEW

Appraisal Question		Yes, No or NA	Comment/Action Required
26	Does logbook contain record of results with date and signatures?	No	No Records in place at date of audit due to no PPMs having been issued for the first month. Results of all Maintenance Tasks are to be recorded and signed electronically and held on Agility.
27	Does this contain defects log for out of specification findings (temperature) again with date and signature?	Yes	Incident Report Record Form 004 used to record out of specification findings.
28	Actions required from the results obtained and a log of actions taken with date and signature.	Yes	Non-conformance report created, with Details of Non-Conformance, Remedial Action Plan, Root Cause Analysis and Verification of Corrective Action
29	Is there an audit trail that allows for remedial actions to be tracked through to completion?	Yes	Remedial Action Plan assigns a Job Card No. for each Remedial Action which can be tracked.
30	Are remedial actions completed, signed and dated in a timely manner?	No	Inspected Agility Remedial Action Plan, some Remedial Actions remain outstanding.
31	Are the cleaning and disinfection procedures completed by in house staff?	Yes	Flow straighteners, strainers, TMVs and showers are cleaned and disinfected by in-house staff. CWS Tank cleaning sub-contracted.
32	Are staff trained and competent to complete cleans and disinfections?	Yes	In-house staff are experienced in cleansing and disinfection. Formal training planned but delayed due to Covid-19.
33	Are cleaning and disinfection Method Statements, including system specific details provided.	Yes	SFG20 details cleaning. Checked Method Statement for RL Building Services CWS Tank disinfection.
34	Are completion certificates available for any disinfection procedures that have been undertaken in the last 12 months?	Yes	Held on “K” Drive. Checked RL Building Services CWS Tank disinfection.
35	COSHH information on any chemicals used on site?	Yes	
36	Up-to-date schematic drawings.	Yes	

SUMMARY OF RISKS

Assessed Point		Risk Scores		
Description	**Ref.**	**Cur.**	**Prev.**	**Rec.**
Public Toilet (359/G/38) WHB Hot	5261/10	19	-	19
1st Floor Staff Room MWS (359/1/15)	5261/11	19	22	19
Public Toilet (359/G/38) WHB Cold	5261/09	17	-	17
CWS Tank No. 1	5261/01	16	15	14
Ground Floor DSR (359/G/49) Sink Cold	5261/05	15	15	15
Health Education/ Physio (359/G/36) Sink Cold	5261/07	15	-	15
Health Education/ Physio (359/G/36) Sink Hot	5261/08	15	-	13
Consultant Room 8 (359/G/05) Sink Cold	5261/13	15	18	15
Extension Consultant Room 2 Sink Cold	5261/15	15	19	15
1st Floor Staff Room DHWS (359/1/15)	5261/12	13	19	13
Ground Floor DSR (359/G/49) Sink Hot	5261/06	13	13	13
Consultant Room 8 (359/G/05) Sink Hot	5261/14	13	19	13
Extension Consultant Room 2 Sink Hot	5261/16	13	19	13
Gas Fired Water Heater No. 1	5261/03	12	13	12
CWS Tank No. 2	5261/02	-	-	-
Gas Fired Water Heater No. 2	5261/04	-	-	-

Risk Ratings	Score
High	>22
High/Med	20-22
Low/Med	17-19
Low	<17

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 16

Source Description	:	CWS Tank 1
Assessment Justification	:	Cold Water Storage
Assessor	:	Mr C Mitchell
Date	:	4th March 2021
Date of Previous	:	19th December 2017
pH	:	7.6
FRC	:	<0.1 ppm
Temp 1	:	7.5°C
Temp 2	:	-

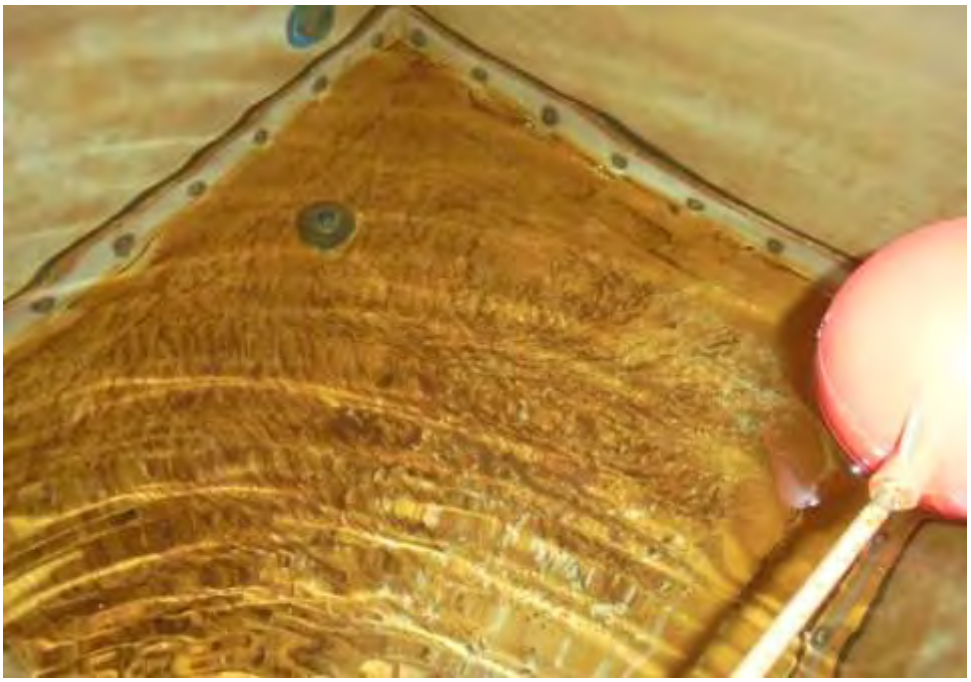
High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/01

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	2	2	Mains Water Supply.
B	**Supply System**	**1**	1	1	
C	**Point Condition**	**3**	2	1	Light sediment.
D	**Turnover**	**2**	2	2	Daily.
E	**Incubation**	**3**	3	3	Temperature <20°C.
F	**Acidity**	**3**	3	3	
G	**Exposed Populace**	**1**	1	1	
H	**Infection Risk**	**1**	1	1	
TOTALS		**15**	15	14	



WATER QUALITY RISK ASSESSMENT

ASSESSMENT TOTAL 0

Source Description	:	CWS Tank 2
Assessment Justification	:	Cold Water Storage
Assessor	:	Mr C Mitchell
Date	:	19th December 2017
Date of Previous	:	25th February 2016
pH	:	-
FRC	:	-
Temp 1	:	-
Temp 2	:	-

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/02

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	-	-	-	
B	**Supply System**	-	-	-	
C	**Point Condition**	-	-	-	
D	**Turnover**	-	-	-	
E	**Incubation**	-	-	-	
F	**Acidity**	-	-	-	
G	**Exposed Populace**	-	-	-	
H	**Infection Risk**	-	-	-	
TOTALS		**0**	**0**	0	**Drained and isolated.**

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 12

Source Description : Gas Fired Water Heater No. 1
Assessment Justification : Hot Water Generation & Storage
Assessor : Mr C Mitchell
Date : 4th March 2021
Date of Previous : 19th December 2017
pH : 7.6
FRC : <0.1 ppm
Temp 1 : 62.1°C Drain
Temp 2 : 63.2°C Return

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/03

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	**2**	2	Supplied from CWS Tank Ref. 5261/01.
B	**Supply System**	**1**	**1**	1	
C	**Point Condition**	**1**	**2**	1	Drain Sample Clear
D	**Turnover**	**2**	**2**	2	Daily turnover.
E	**Incubation**	**1**	**1**	1	Drain sample >55°C
F	**Acidity**	**3**	**3**	3	
G	**Exposed Populace**	**1**	**1**	1	
H	**Infection Risk**	**1**	**1**	1	
TOTALS		**12**	13	12	

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 14

Source Description	:	Gas Fired Water Heater No. 2
Assessment Justification	:	Hot Water Generation & Storage
Assessor	:	Mr C Mitchell
Date	:	4th March 2021
Date of Previous	:	19th December 2017
pH	:	
FRC	:	
Temp 1	:	
Temp 2	:	

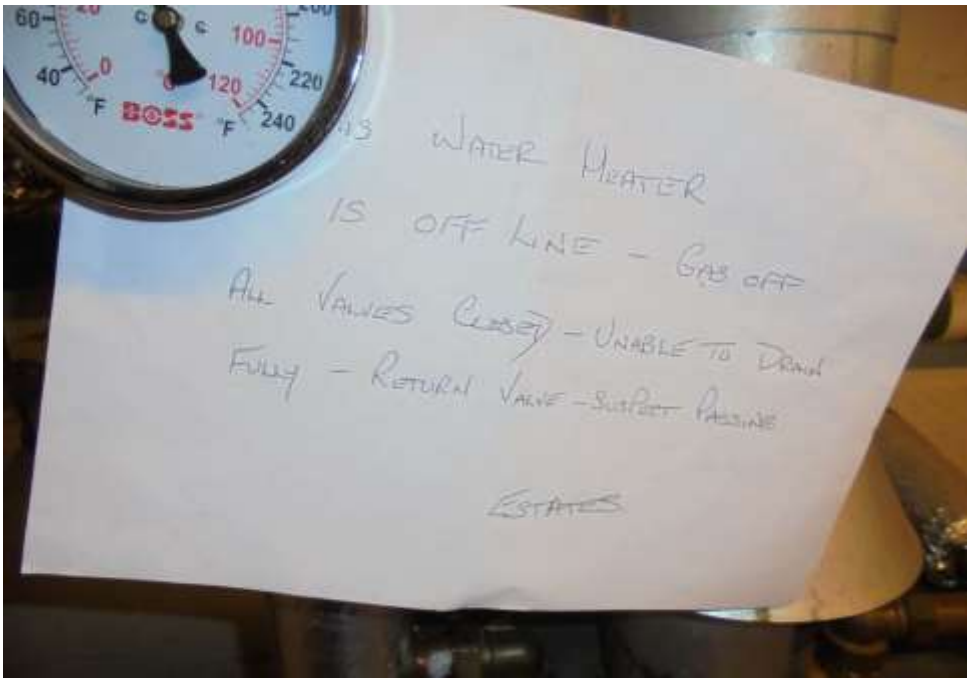
High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/04

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	-	-	-	
B	**Supply System**	-	-	-	
C	**Point Condition**	-	-	-	
D	**Turnover**	-	-	-	
E	**Incubation**	-	-	-	
F	**Acidity**	-	-	-	
G	**Exposed Populace**	-	-	-	
H	**Infection Risk**	-	-	-	
TOTALS		**0**	**0**	0	**Drained and isolated.**



WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 15

Source Description : Ground Floor DSR (359/G/49) Sink Cold

Assessment Justification : Sentinel Point

Assessor : Mr C Mitchell

Date : 4th March 2021

Date of Previous : 19th December 2017

pH : 7.6

FRC : <0.1 ppm

Temp 1 : 7.6°C

Temp 2 : -

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/05

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	2	2	Supplied from CWS Tank Ref. 5261/01.
B	**Supply System**	**1**	1	1	
C	**Point Condition**	**1**	1	1	
D	**Turnover**	**2**	2	2	Daily turnover.
E	**Incubation**	**3**	3	3	Temperature <20°C.
F	**Acidity**	**3**	3	3	
G	**Exposed Populace**	**2**	2	2	Normal use.
H	**Infection Risk**	**1**	1	1	
TOTALS		**15**	15	15	

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 13

Source Description	:	Ground Floor DSR (359/G/49) Sink Hot
Assessment Justification	:	Sentinel Point
Assessor	:	Mr C Mitchell
Date	:	4th March 2021
Date of Previous	:	19th December 2017
pH	:	7.6
FRC	:	<0.1 ppm
Temp 1	:	65.8 °C
Temp 2	:	

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/06

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	2	2	Supplied from DGFWH Ref. 5261/03.
B	**Supply System**	**1**	1	1	
C	**Point Condition**	**1**	1	1	
D	**Turnover**	**2**	2	2	Daily turnover.
E	**Incubation**	**1**	1	1	Temperature >60°C - Scald hazard.. Scald hazard.
F	**Acidity**	**3**	3	3	
G	**Exposed Populace**	**2**	2	2	Normal use.
H	**Infection Risk**	**1**	1	1	
TOTALS		**13**	13	13	

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 15

Source Description	:	Health Education/ Physio Room (359/G/36) Sink Cold
Assessment Justification	:	Sentinel Point
Assessor	:	Mr C Mitchell
Date	:	4th March 2021
Date of Previous	:	19th December 2017
pH	:	7.6
FRC	:	<0.1 ppm
Temp 1	:	8.6°C
Temp 2	:	

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/07

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	-	2	Supplied from CWS Tank Ref. 5261/01.
B	**Supply System**	**1**	-	1	
C	**Point Condition**	**1**	-	1	
D	**Turnover**	**2**	-	2	Daily.
E	**Incubation**	**3**	-	3	Temperature <20°C.
F	**Acidity**	**3**	-	3	
G	**Exposed Populace**	**2**	-	2	
H	**Infection Risk**	**1**	-	1	
TOTALS		**15**	-	15	

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 15

Source Description	:	Health Education/ Physio Room (359/G/36) Sink Hot
Assessment Justification	:	Sentinel Point
Assessor	:	Mr C Mitchell
Date	:	4th March 2021
Date of Previous	:	19th December 2017
pH	:	7.6
FRC	:	<0.1 ppm
Temp 1	:	64.0°C
Temp 2	:	

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/08

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	-	2	Supplied from DGFWH Ref. 5261/03.
B	**Supply System**	**3**	-	1	Poor Circulation
C	**Point Condition**	**1**	-	1	
D	**Turnover**	**2**	-	2	Daily
E	**Incubation**	**1**	-	1	Temperature >60°C - Scald hazard.. Scald hazard.
F	**Acidity**	**3**	-	3	
G	**Exposed Populace**	**2**	-	2	
H	**Infection Risk**	**1**	-	1	
TOTALS		**15**	-	13	

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 17

Source Description : Public Toilet (359/G/38) WHB Cold
Assessment Justification :
Assessor : Mr C Mitchell
Date : 19th December 2017
Date of Previous : 25th February 2016
pH : 7.4
FRC : <0.1 ppm
Temp 1 : 8.6°C
Temp 2 :

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/09

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	-	**2**	Supplied from CWS Tank Ref. 5261/01. And DGFWH Ref. 5261/03
B	**Supply System**	**1**	-	**1**	
C	**Point Condition**	**1**	-	**1**	
D	**Turnover**	**2**	-	**2**	Daily.
E	**Incubation**	**3**	-	3	Temperature <20°C.
F	**Acidity**	**3**	-	**3**	
G	**Exposed Populace**	**2**	-	**2**	
H	**Infection Risk**	**3**	-	**3**	Potentially Susceptible Users
TOTALS		**17**	-	17	

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 19

Source Description : Public Toilet (359/G/38) WHB Cold
Assessment Justification :
Assessor : Mr C Mitchell
Date : 19th December 2017
Date of Previous : 25th February 2016
pH : 7.4
FRC : <0.1 ppm
Temp 1 : 41.2°C
Temp 2 : 62.0°C Inlet to TMV

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/10

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	-	**2**	Supplied from CWS Tank Ref. 5261/01. And DGFWH Ref. 5261/03
B	**Supply System**	**1**	-	**1**	
C	**Point Condition**	**1**	-	**1**	
D	**Turnover**	**2**	-	**2**	Daily.
E	**Incubation**	**5**	-	5	Temperature <50°C and >20°C. Thermostatic Control
F	**Acidity**	**3**	-	**3**	
G	**Exposed Populace**	**2**	-	**2**	
H	**Infection Risk**	**3**	-	**3**	Potentially Susceptible Users
TOTALS		**19**	-	19	

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 19

Source Description : 1st Floor Staff Room (359/1/15) Sink Cold
Assessment Justification : Rarely Used Outlet
Assessor : Mr C Mitchell
Date : 4th March 2021
Date of Previous : 19th December 2017
pH : 7.6
FRC : <0.1 ppm
Temp 1 : 6.5
Temp 2 :

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/11

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	**2**	2	Supplied from Mains water service.
B	**Supply System**	**1**	**1**	1	
C	**Point Condition**	**1**	**1**	1	
D	**Turnover**	**2**	**2**	2	Daily.
E	**Incubation**	**3**	**3**	3	Temperature <20°C.
F	**Acidity**	**3**	**3**	3	
G	**Exposed Populace**	**2**	**2**	2	
H	**Infection Risk**	**5**	**5**	5	Drinking Water/. Culinary Use
TOTALS		**19**	22	**19**	

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 13

Source Description : 1st Floor Staff Room (359/1/15) Sink Hot
Assessment Justification : Sentinel Point
Assessor : Mr C Mitchell
Date : 4th March 2021
Date of Previous : 19th December 2017
pH : 7.6
FRC : <0.1 ppm
Temp 1 : 65.7°C
Temp 2 :

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/12

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	**2**	2	Supplied from DGFWH Ref. 5261/03.
B	**Supply System**	**1**	**3**	1	
C	**Point Condition**	**1**	**1**	1	
D	**Turnover**	**2**	**2**	2	Daily.
E	**Incubation**	**1**	**1**	1	Temperature >60°C - Scald hazard..
F	**Acidity**	**3**	**3**	3	
G	**Exposed Populace**	**2**	**2**	2	
H	**Infection Risk**	**1**	**5**	1	
TOTALS		**13**	19	13	

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 15

Source Description : Consultant Room 8 (359/G/05) Sink Cold
Assessment Justification : Sentinel Point
Assessor : Mr C Mitchell
Date : 4th March 2021
Date of Previous : 19th December 2017
pH : 7.6
FRC : <0.1 ppm
Temp 1 : 9.1°C
Temp 2 :

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/13

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	**2**	2	Supplied from CWS Tank Ref. 5261/01. And DGFWH Ref. 5261/03
B	**Supply System**	**1**	**2**	1	
C	**Point Condition**	**1**	**1**	1	
D	**Turnover**	**2**	**3**	2	Daily.
E	**Incubation**	**3**	**4**	3	Temperature <20°C.
F	**Acidity**	**3**	**3**	3	
G	**Exposed Populace**	**2**	**2**	2	
H	**Infection Risk**	**1**	**1**	1	
TOTALS		**15**	18	15	

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 13

Source Description : Consultant Room 8 (359/G/05) Sink Hot
Assessment Justification :
Assessor : Mr C Mitchell
Date : 4th March 2021
Date of Previous : 19th December 2017
pH : 7.6
FRC : <0.1 ppm
Temp 1 : 62.6°C
Temp 2 :

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/14

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	**2**	2	Supplied from DGFWH Ref. 5261/03.
B	**Supply System**	**1**	**2**	1	Poor Circulation
C	**Point Condition**	**1**	**1**	1	
D	**Turnover**	**2**	**3**	2	Daily.
E	**Incubation**	**1**	**5**	1	Temperature >60°C - Scald hazard..
F	**Acidity**	**3**	**3**	3	
G	**Exposed Populace**	**2**	**2**	2	
H	**Infection Risk**	**1**	**1**	1	
TOTALS		**13**	19	13	

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 15

Source Description : Extension Consultant Room 2 Sink Cold
Assessment Justification : Sentinel Point
Assessor : Mr C Mitchell
Date : 4th March 2021
Date of Previous : 19th December 2017
pH : 7.6
FRC : <0.1 ppm
Temp 1 : 7.5°C
Temp 2 :

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/15

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	2	2	POUH via MWS
B	**Supply System**	**1**	3	1	Effective dead leg.
C	**Point Condition**	**1**	1	1	
D	**Turnover**	**2**	2	2	Daily.
E	**Incubation**	**3**	5	3	Temperature <20°C.
F	**Acidity**	**3**	3	3	
G	**Exposed Populace**	**2**	2	2	Normal use.
H	**Infection Risk**	**1**	1	1	
TOTALS		**15**	19	15	

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 13

Source Description : Extension Consultant Room 2 Sink Hot
Assessment Justification : Sentinel Point
Assessor : Mr C Mitchell
Date : 4th March 2021
Date of Previous : 19th December 2017
pH : 7.6
FRC : <0.1 ppm
Temp 1 : 56.1°C
Temp 2 :

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/16

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	2	2	POUH via MWS
B	**Supply System**	**1**	3	1	Effective dead leg.
C	**Point Condition**	**1**	1	1	
D	**Turnover**	**2**	2	2	Daily.
E	**Incubation**	**1**	5	1	Temperature >55°C.
F	**Acidity**	**3**	3	3	
G	**Exposed Populace**	**2**	2	2	Normal use.
H	**Infection Risk**	**1**	1	1	
TOTALS		**13**	19	13	

REMEDIAL ACTION PLAN

Service	Remedial Action	Date Added	Priority	Status	Target Date	Date Complete
Management & Competency	Ensure Authorised & Responsible Persons been informed in writing	March 2021	**3**	New	3 Months	
	Ensure all Authorised Persons are represented at future WSG meetings.	March 2021	**3**	New	3 Months	
	Future WSG meetings to go ahead as planned to ensure effective liaison between the Duty Holder, the Responsible Person, and the Water Safety Group.	March 2021	**3**	New	3 Months	
	Ensure remedial actions completed, signed and dated in a timely manner.	March 2021	**3**	New	3 Months	
Water Safety Plan	A statement of correct and safe operation of the water systems should be added to the WSP document.	March 2021	**2**	New	1 Month	
	Add a statement that temperature is the main control strategy for reducing the risk from waterborne micro-organisms.	March 2021	**2**	New	1 Month	
	Update Incident Plan to include Failure of Main Plant items and action to take in the event of an outbreak of Legionellosis.	March 2021	**2**	New	1 Month	
Monitoring & Records	Wrongly identified assets and/or incorrectly assigned Maintenance Tasks	March 2021	**2**	New	1 Month	
	Schedule of rarely used outlets to be devised, identifying all outlets which require to be flushed on a twice weekly basis.	March 2021	**3**	New	3 Months	

REMEDIAL ACTION PLAN

Service	Remedial Action	Date Added	Priority	Status	Target Date	Date Complete
Gas Fired Water Heater	Contents gauges to be adjusted/replaced to provide an accurate reading.	December 2017	**3**	Complete		
	Storage temperatures to be increased to at least 60°C.	December 2019	**2**	Complete		
	Storage temperature to be lowered slightly to minimise the risk of scalding.	October 2020	**3**	Outstanding	3 Months	
DHWS System	Investigate poor circulation to Room 8 (G/05) and if necessary replace/upgrade circulation pump.	December 2017	**2**	Complete		
	Investigate poor circulation to Health Education Room.	March 2021	**2**	New	1 Month	
Electric Point of Use Heaters	Repair/Replace water heater in Consulting Room 3 and ensure all water heater set to deliver hot water at 55°C.	December 2017	**2**	Complete		
	Adjust thermostatic controls to achieve an outlet temperature of at least 55°C following a period of low demand.	December 2019	**2**	Complete		Consulting Room 2 Temperature Satisfactory

REMEDIAL ACTION PLAN

Service	Remedial Action	Date Added	Priority	Status	Target Date	Date Complete
Dead Legs	Completely remove redundant MWS branch to Bin Store back to branch point on live system.	December 2017	**2**	Complete		
	Install a double check valve on MWS at the branch point to heating system pressurisation unit.	December 2017	**2**	Outstanding	1 Month	
	Physically disconnect flexible quick-fill connection to heating system pressurisation unit under normal operation.	December 2017	**2**	Outstanding	1 Month	

REMEDIAL ACTION PLAN

Priority	Target Timescale	Description
1	Immediately	A wholly unsatisfactory arrangement which requires immediate attention. May represent a failure of the control scheme resulting in conditions suitable for the growth of micro-organisms. Requires urgent investigation and/or remedial action.
2	As Soon As Reasonably Practicable (No later than 1 Month)	Remedial Work required to reduce the risks to a satisfactory level.
3	In a Timely Manner (No later than 3 Months)	Minor remedial work which is often simple and inexpensive and can reduce the risks to a satisfactory level.
4	At First Available Opportunity (No Later than 6 Months)	Improvements that can be carried out during Planned Preventative Maintenance activities to reduce the risks associated with water quality deterioration.

CONTROL MEASURES

Service	Control Measure	Frequency	Procedure Reference*
Gas Fired Water Heaters	Purge any debris in the base of the calorifier to a suitable drain. Collect the initial flush from the base of hot water heaters to inspect clarity, quantity of debris and temperature.	Annually.	**32-06 - 8**
	Check storage temperatures (thermostat settings should modulate as close to 60°C as practicable without going below 60°C). Check calorifier return temperature is not below 55°C.	Monthly.	**SHTM 04-01 - 3**
Hot Water Services	Take temperatures at return leg of principal loop (sentinel point) to confirm they are at a minimum of 55°C. Temperature measurements should be taken on the surface of metallic pipework.	Monthly.	**SHTM 04-01 - 5**
	Take temperatures at return legs of subordinate loops to confirm they are at a minimum of 55°C, temperature measurements should be taken on the surface pipes.	Quarterly (on a rolling monthly rota).	**SHTM 04-01 - 6**
	Take temperatures at a representative selection of outlets to confirm they are at a minimum of 55°C to create a temperature profile of the whole system over a defined time period. Temperatures can be taken from untempered outlets or at the inlet to thermostatic mixing valves/taps.	Representative selection of outlets considered on an annual basis on a monthly rota.	**SHTM 04-01 - 7**
Electric Point of Use Heater	Check water temperatures to confirm the heater operates at 55°C-60°C or check the installation has a high turnover.	Monthly.	**SHTM 04-01 - 8**

CONTROL MEASURES

Service	Control Measure	Frequency	Procedure Reference*
Cold Water Tanks	Inspect cold water storage tank overflow, warning and vent pipes to ensure they are intact and screens free from damage or blockages.	Annually.	**56-02**
	Inspect tank internal surfaces for signs of sediment, corrosion or bio-fouling and carry out hygienic maintenance works where necessary.	Annually.	**56-02**
	Check the tank water temperature remote from the ball valve and the incoming mains temperature. Record the maximum temperatures of the stored and supply water recorded by fixed maximum/minimum thermometers where fitted.	Annually (Summer) or as indicated by the temperature profiling.	**SHTM 04-01 - 14**
Cold Water Services	Check temperatures at sentinel taps (typically those nearest to and furthest from the cold tank, but may also include other key locations on long branches to zones or floor levels). These outlets should be below 20°C within two minutes of running the cold tap. To identify any local heat gain, which might not be apparent after one minute, observe the thermometer reading during flushing.	Monthly.	**SHTM 04-01 - 11**
	Take temperatures at a representative selection of other points to confirm they are below 20°C to create a temperature profile of the whole system over a defined time period. Peak temperatures or any temperatures that are slow to fall should be an indicator of a localised problem.	Representative selection of outlets considered on an annual basis on a monthly rota.	**SHTM 04-01 - 12**
Strainers	Remove strainer, clean and de-scale.	Annually.	**SHTM 04-04 - 3**

CONTROL MEASURES

Service	Control Measure	Frequency	Procedure Reference*
System Conditions	Check pipework and thermal insulation to ensure it is intact and free from damage leaks and corrosion.	Annually.	-
	Inspect all outlets for signs of contamination and scale and clean where necessary, using clean disposable cloths and appropriate sanitising/descaling agents.	Annually	-
Infrequently Used Outlets	Infrequently used equipment within a water system (i.e. not used for a period equal to or greater than seven days) should be included on the flushing regime. Flush the outlets until the temperature at the outlet stabilises and is comparable to supply water and purge to drain. Sustain and log this procedure once started.	Twice Weekly.	-
TMVs	Inspect, clean, de-scale and disinfect any strainers or filters associated with TMVs. To maintain protection against scald risk, TMVs require routine maintenance carried out by competent persons in accordance with the manufacturer's instructions. There is further information in HSG 274 paragraphs 2.152-2.168.	Six Monthly.	**SHTM 04-04**

Controls Measures incorporate those outlined in HSG274 Table 2.1, together with additional measures identified by Risk Assessment.

APPENDIX I:

BIBLIORAPHY

APPENDIX I– BIBLIORAPHY

1. Health and Safety at Work Act 1974
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17. CIBSE TM13 Minimising the risk of Legionnaire's Disease 2013
18. Water Regulations Advisory Scheme (WRAS) Water Regulations Guide 2004
19. Water Regulations Advisory Scheme (WRAS) Water Fittings and Materials Guide 2005
20. Health Technical Memorandum 04-01: Supplement Performance specification D08: thermostatic mixing valves (healthcare premises) 2015
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25. Pool Water Treatment Advisory Group (PWTAG) document 'Swimming Pool Water Treatment and quality standards' 2009
26. BSRIA Application Guide to Legionellosis AG19/2000: Operation and Maintenance
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APPENDIX II:

AUTHORS CV

NHS Lothian
East Calder Health Centre
Livingston

March 2021

CURRICULUM VITAE

COLIN MITCHELL

CONTACT ADDRESS	Westfield Caledonian 4 Mollins Court Cumbernauld T: 01236 786300 F: 01236 786301 E: cmitchell@west-cal.co.uk
NATIONALITY	British – born Kirkcaldy.
EDUCATION	**2000 - 2004: Heriot Watt University, Edinburgh.** BEng Hons Mechanical Engineering. Subjects Included: Fluid Mechanics, Thermodynamics, Strength of Materials, Materials Science, Machine Dynamics and Engineering Science **1994 - 2000: Secondary education at Kirkland High School and Community College.** 8 Standard Grades all at Credit level: Math's, English, Biology, Graphical Communication, French, History, Geography, P.E., 7 Highers: Math's, English, Physics, Graphical Communication, Craft & Design, Technology Studies, P.E.
GENERAL INFORMATION	• Associate member of the Institute of Mechanical Engineers (AMIMechE). • Member of Water Management Society (MWMSoc) • QCS Approved Internal QMS Auditor • City and Guilds – Risk Assessment for Legionella Control in Water Systems WH004
WORK EXPERIENCE	**2015-Present** Westfield Caledonian. Title – Senior Technical Services Engineer Reporting to Technical Manager **2006-2015** Westfield Caledonian. Title – Senior Technical Services Engineer Reporting to Technical Manager The company's core business activity is providing a broad base of clients, onshore and offshore, with air and water quality monitoring and management.

Main Job Functions

- Water Quality Compliance Audits and Risk assessments (Legionella and etc.)
- Water Quality Sampling
- Indoor Air Quality (IAQ) Testing
- Internal QMS Auditing.

Main Job Activities:

- Responsible for carrying out risk assessments on water distribution systems within a range of buildings, devising and implementing control measures, including but not exclusively; Hospitals, Schools, Laboratories, Industrial premises.
- To schedule and perform site visits and carry out inspection testing and sampling.
- Liaise with clients, client's contractors and other representatives.
- To write detailed reports from laboratory results, measurements recorded from on-site testing and visual inspections.
- The preparation of reports and the drawing of plans and diagrams relating to reporting.
- The presentation of reports to clients, either individually or in group sessions.
- The provision of advice to clients, both verbally and in writing where applicable.
- To ensure that I am conversant with all current authoritative publications and relevant legislation relating to my client base.
- Ensuring that site activities are properly implemented and completed on time and within budget in line with the QMS.

Training:

- City and Guilds Risk Assessment for Legionella Control in Water systems WH004
- In-house training of all aspects affecting Water Quality Monitoring and Management, including Legionnaires' disease and the Approved Code of Practice.
- On-site training period shadowing senior engineer, gaining experience in building services design and distribution systems.
- Knowledge of relevant water byelaws, regulations and legislation.
- Gained experience of HVAC systems including parameters and limits affecting Indoor Air Quality and comfort conditions.
- Training in Company Procedures:
  - Microbiological Sampling of Water
  - Legislation and Regulation
  - Assessment of Domestic Water Systems and Treatment
  - Risk Assessment Theory and Reporting
  - Cleaning and Disinfection Techniques
  - Interpreting and Reporting Results
  - Record Keeping
  - Corrective/Remedial Actions & Control Measures

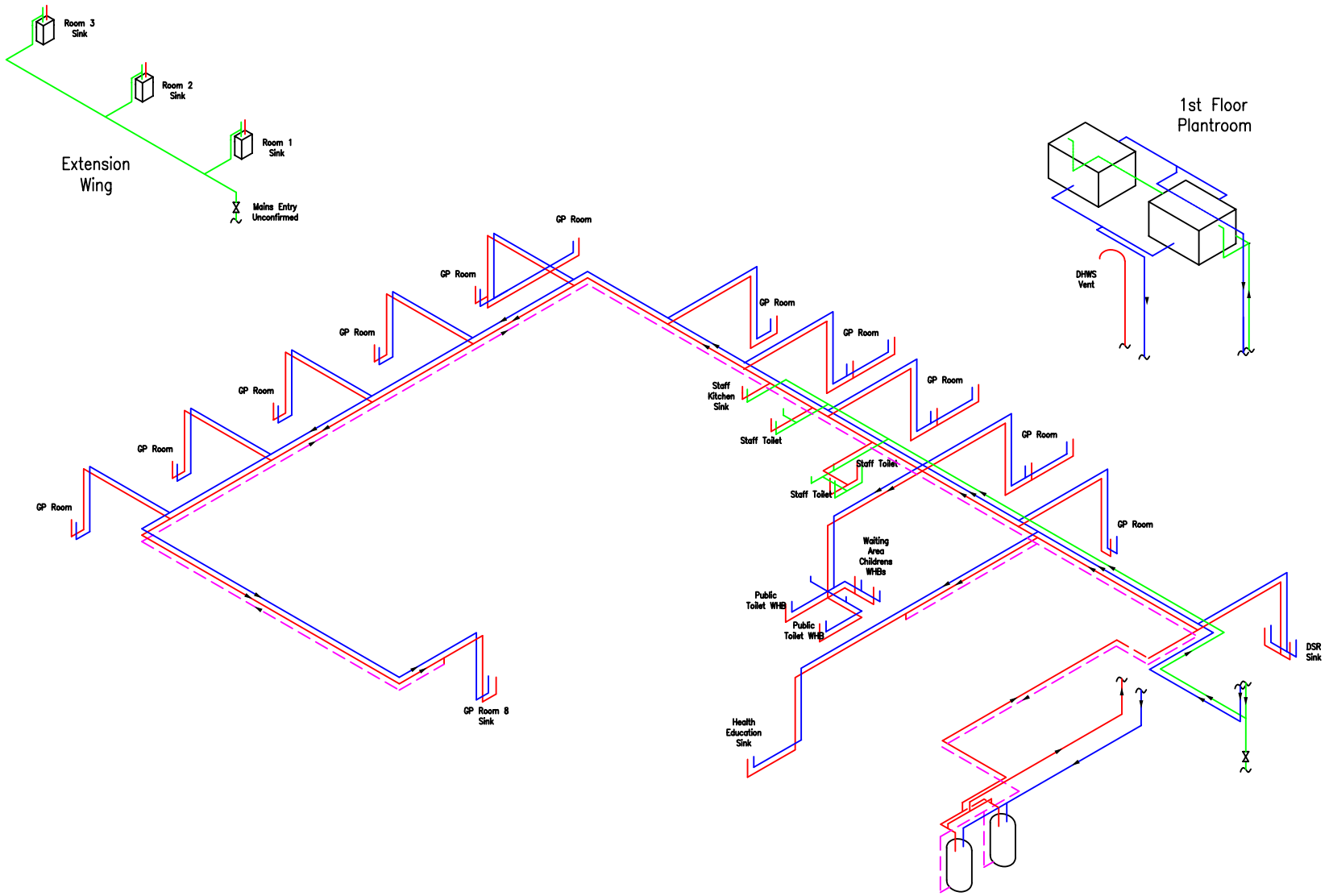
2004 – 2006: The National Design Consultancy.

Main Job Activities:

- Work included travelling to sites in Scotland, Northern Ireland and the North of England. Carrying out a survey of the Building Fabric and Building Services at each property. Also checking that the Risk Assessments, Safety Method Statements and Safe Systems of Work were valid and up to date, as well as any certificates and service records for all equipment and machinery on site. There would be a meeting with the site manager where any health and safety issues would be brought up.

APPENDIX III:

SCHEMATIC DRAWING



Westfield Caledonian

LEGEND

DOMESTIC HOT WATER SERVICE - DHWS

MAINS WATER SERVICE - MWS

COLD WATER DOWN SERVICE - CWDS

FLOW DIRECTION ARROW

SERVICES TO APPLIANCES OR AREAS

ISOLATION VALVE (NOT ALL SHOWN)

PUMP WITH FLOW DIRECTION

TITLE
Domestic Water Systems
Schematic Layout

Whilst every effort has been made to ensure this schematic is representative of the systems present at time of survey, access restrictions mean that the exact configuration may differ from that shown.

CLIENT
NHS LOTHIAN

SITE
East Calder Health Centre
East Calder

ISSUE	REVISION	ENG	DATE

DATE	SCALE
MARCH 2021	NTS
DRAWN: CM / CHECKED: JB	APPROVED
DRG. No. S261 Sht.1 of 1	ISSUE A

NHS LOTHIAN
East Calder Health Centre
East Calder

WATER SAFETY PLAN
Review and Audit Report

November 2022

CONTENTS

Prepared By	Authorised By	Issued To
Graham Sutherland	Colin Mitchell	Michael Mastaglio

The Author may be contacted regarding the report content as follows;

Email : grahamsutherland@west-cal.co.uk

Tel : 01236 786 300

INTRODUCTION

NHS Lothian manage the health risks associated with water systems on their premises through an integrated Water Safety Plan (WSP). The NHS Lothian Water Safety Policy requires WSPs to be reviewed and audited at frequencies of 6 or 12 months, depending on the risk factors assigned to an individual property or system. This document describes the findings of the WSP audit carried out at East Calder Health Centre, on 10th November 2022 by Westfield Caledonian's Technical Services Engineer, Graham Sutherland.

The Audit includes a review of the systems' condition and operation, the effectiveness and suitability of applied control measures, and the status of the Remedial Action Plan (RAP) which was derived from the original system risk assessment and subsequent reviews. The risk assessment findings are also reviewed to ensure they are still representative of the prevailing conditions at the time of the audit. The records relating to the applied control measures are audited, and the efficacy of the WSP is assessed through inspection processes and sample retrieval and analysis, the results of which are also reported in this document.

WATER SYSTEM CONDITION AUDIT

Cold Water Service (CWS) Tanks

The CWS tanks are located at high level within the 1st floor plantroom and CWS tank No.2 continues to be drained and isolated and this has been done so in a way to minimise the creation of dead legs within the system. The tanks are of a modern GRP construction and can be considered fully Byelaw complaint. Internal inspection of CWS tank No.1 revealed light sediment at the base of the vessel. The storage temperature recorded was comfortably below the recommend upper limit of 20°C and compared favourably with the MWS reference temperature recorded at the 1st floor staffroom kitchen sink. Therefore, we have no recommendations regarding cold water storage at this time.

Hot Water Generation & Storage

Westfield Caledonian recommends that hot water be generated and stored in excess of 60°C, to ensure that outlet temperatures at uncontrolled locations remain between 55°C and 60°C throughout the premises. Healthcare Technical Memorandum (HTM) 04-01 and HSE Guidance Document HSG274 state that a minimum system return temperature of 55°C should be maintained within healthcare premises.

Domestic hot water is provided by two gas fired water heaters located in the ground floor plantroom. Upon inspection discovered that water heater No.2 was again offline, drained and isolated. The contents gauge on water heater No.1 indicated a storage temperature of greater than 60°C which was confirmed utilising a thermal couple on the flow pipe within the plantroom. A sample was collected from the drain point with subsequent laboratory analysis confirming the presence of *Legionella Species* at a concentration of 529 CFU/l. This reiterates the importance that the GFWH is subject to annual flushing via the drain point on the vessel to purge any sedimental accumulations which are inevitable given time, and give a nutrient source for microorganism growth, such as *Legionella Pneumophila*.

Satisfactory return temperatures were recorded in the plantroom and at high level in the Secretarial office G/09, although poor circulation was identified in the tertiary loops supplying the Health Education room and Baby Changing Area. It may be necessary to install additional balancing valves to improve circulation within these loops, to ensure hot water is maintained above 55°C throughout the distribution system.

WATER SYSTEM CONDITION AUDIT

Within the extension at the rear of the building HeatStore under-sink water point of use water heaters are located in each of the three Consultation Rooms. These are considered low risk components as there is minimal storage and water turnover is high. However, upon inspection revealed the water heater to be supplying hot water below 50°C and it is recommended that the thermostatic controls be adjusted to deliver hot water at a minimum of 50°C, and temperatures should be verified following a period of low demand.

Hot water outlet temperatures recorded throughout the building were found to be above the recommended limits and can be considered satisfactory. It can be concluded that the thermal control regime is operating effectively within the premises. Monthly temperature monitoring activities should be carried out to ensure satisfactory flow and return temperatures can be maintained and determine the need for further remedial work. Temperature monitoring records should then be retained for audit purposes.

Cold Water Temperatures

Bacteria, including *Legionella,* multiply most rapidly in warm water, but less so in hot or cold water. Westfield Caledonian recommends that cold water is stored and distributed at below 20°C, as at higher temperatures, microorganism growth is encouraged. It is also considered good practice to have water supplied to extremity outlets at temperatures no more than 2°C above the source temperature, to ensure that internal heat gain will not compromise the bacteriological safety of the supplied water.

Cold water outlet temperatures recorded during the survey were generally satisfactory, although the WHB in Consulting Room 8 recorded a temperature of greater than 20°C despite extensively flushing the outlet. This is believed to be caused by low usage although it was reported that all outlets are in regular use and are flushed by housekeeping staff.

WATER SYSTEM CONDITION AUDIT

Showers and Aerosol Generators

There are no shower facilities within the building and as such the risk associated with these outlets is low.

Dead Legs

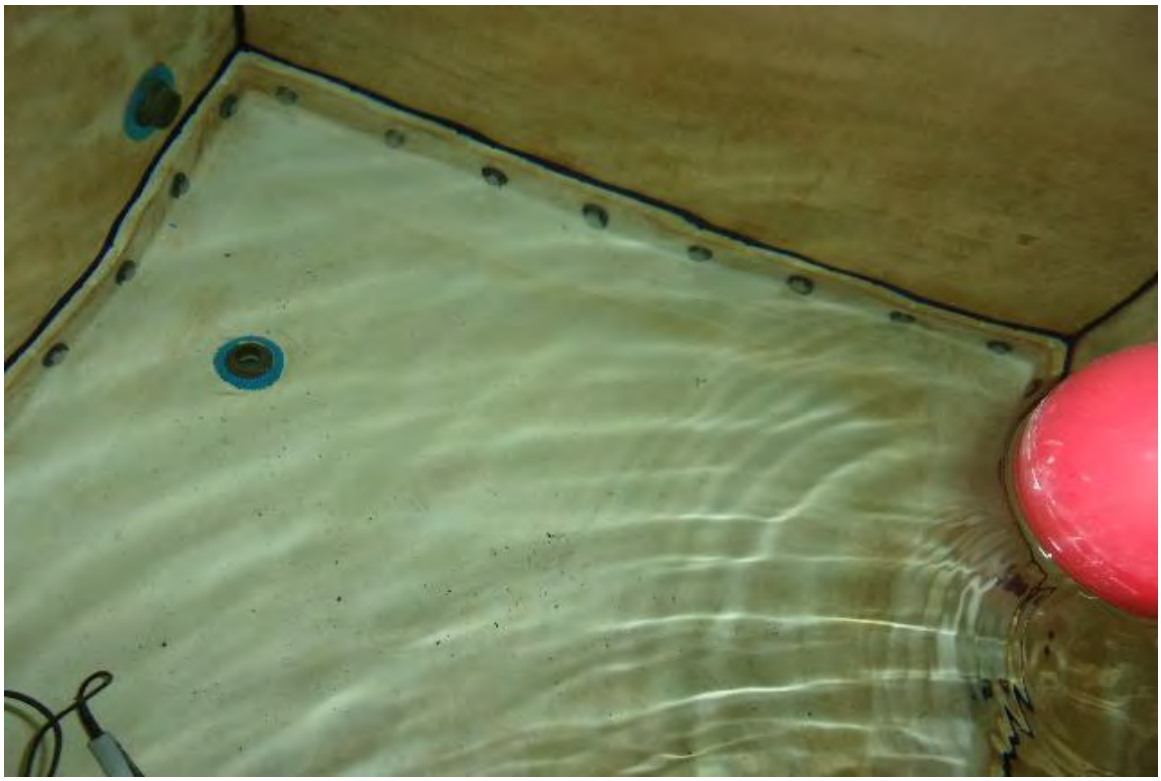
No actual dead legs were identified during the survey, although it should be recognised that effective dead legs exist within the plantroom. A branch is taken from the MWS to supply the heating system pressurisation unit. This branch lies stagnant when the quick fill connection is not in operation, thus increasing the risk of contaminating the live system. Therefore, it is recommended to install a double check valve at the branch point. The flexi connection should also be disconnected when not in operation.

Effective dead legs are also created by any rarely used outlets. As previously stated, all outlets are believed to be in regular use, however, should occupancy levels change and outlets are identified as experiencing low turnover, these outlets should be included into a twice weekly flushing programme. This programme should be subject to regular review, taken into account any changes in building usage/ occupancy. Records of such flushing activities should then be retained for audit purposes, to demonstrate the steps taken by NHS Lothian to control the risks associated with Legionella.

Drinking Water

Drinking water is provided within East Calder Health Centre by a MWS connected sink within the 1st floor Staff kitchen and outlets within Consulting Rooms within the extension. The 1st floor kitchen sink is suitably identified as “Drinking Water” however should outlets within Consulting Rooms be intended as drinking water, then these should be suitably identified for Health and Safety Purposes.

PHOTOGRAPHIC RECORD



CWS Tank No. 1 – Light Sediment at Base

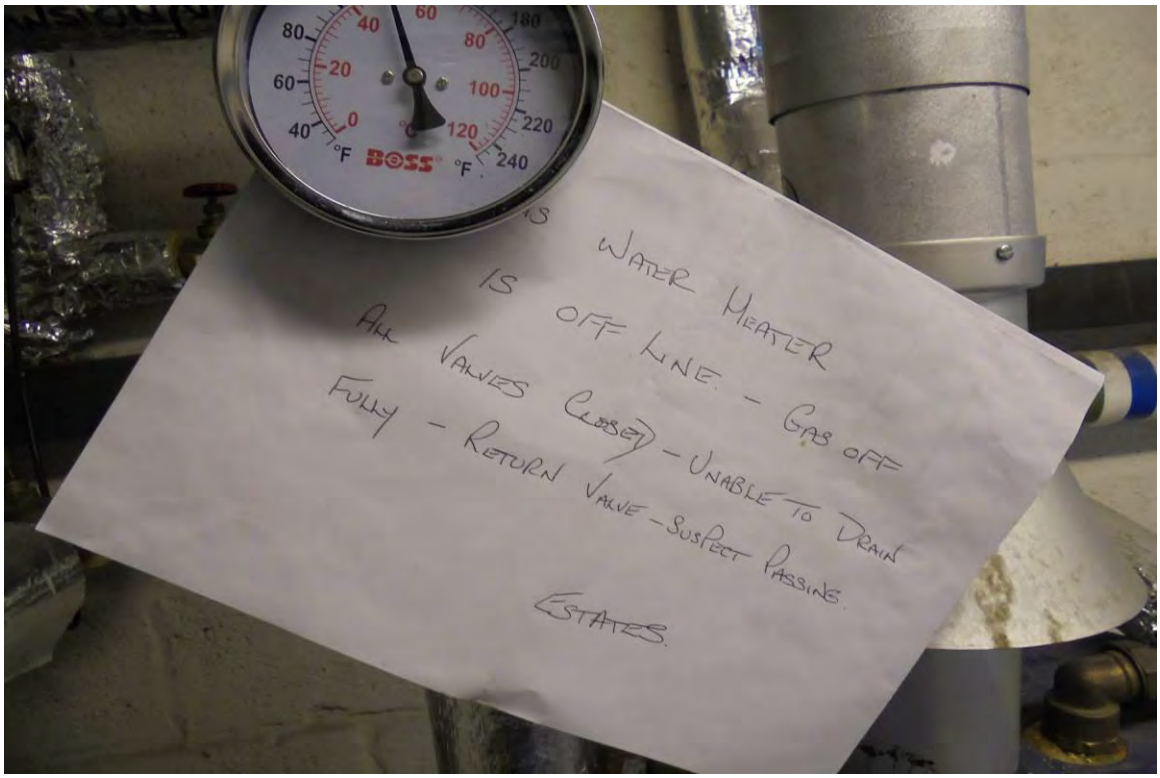
CWS Tank No. 1 – Contents Temperature at 11.5°C

PHOTOGRAPHIC RECORD

CWS Tank No. 2 – Drained and Isolated

Plantroom Gas Fired Water Heaters – General Arrangement

PHOTOGRAPHIC RECORD



Gas Fired Water Heater No. 2 – Offline

Gas Fired Water Heater No. 1– Contents Temperature approx. 62°C

PHOTOGRAPHIC RECORD

Gas Fired Water Heater No. 1 – Drain Sample Containing Light Sediment and at Satisfactory Temperature

Plantroom Return Temperature Satisfactory

PHOTOGRAPHIC RECORD

1st Floor Staff Room Kitchen Sink - Cold Water Outlet Temperature Satisfactory

1st Floor Staff Room Sink - Hot Water Outlet Temperature Satisfactory

PHOTOGRAPHIC RECORD

Consultant Room 1 (G/55) Sink - Cold Water Outlet Temperature Satisfactory

Consultant Room 1 (G/55) Sink – Hot Water Outlet Temperature Unsatisfactory (<50°C)

PHOTOGRAPHIC RECORD

Secretarial Office (G/09) Hot Water Flow Temperature Satisfactory

Secretarial Office (G/09) Hot Water Return Temperature Satisfactory

PHOTOGRAPHIC RECORD

Baby Changing Area Hot Water Return Temperature Too Low (<55°C)

Store Room (G/34) Hot Water Return Temperature Too Low (<55°C)

PHOTOGRAPHIC RECORD

Secretarial Office (G/09) WHB – Cold Water Outlet Temperature Slightly Elevated (>20°C)

Secretarial Office (G/09) WHB – Blended Outlet Temperature Satisfactory

PHOTOGRAPHIC RECORD

Consultant Room 2 (G/14) Sink - Cold Water Outlet Temperature Satisfactory

Consultant Room 2 (G/14) Sink - Hot Water Outlet Temperature Satisfactory

PHOTOGRAPHIC RECORD

Cleaners Cupboard (G/49) Sink – Cold Water Outlet Temperature Satisfactory

Cleaners Cupboard (G/49) Sink – Hot Water Outlet Temperature Satisfactory

REMEDIAL ACTION PLAN REVIEW

Service	Remedial Action	Date Added	Priority	Status	Target Date	Date Complete
Dead Legs	Install a double check valve on MWS at the branch point to heating system pressurisation unit.	December 2017	**2**	Outstanding	1 Month	
	Physically disconnect flexible quick-fill connection to heating system pressurisation unit under normal operation.	December 2017	**2**	Outstanding	1 Month	

WATER SAMPLE ANALYSIS RESULTS

Legionella Sample Analysis

Six samples were collected from the cold water storage, hot water storage and distribution system and tested specifically for the *Legionella* bacterium. Subsequent laboratory analysis confirmed the presence of *Legionella Species* at two locations, the GFWH drain at a concentration of 529 cfu/l, and Consulting Room (G/14) at a concentration of 1,706 cfu/l. This was confirmed and reported in an email on 21/11/22 with recommendations to cary out a thermal disinfection of the system. Following remedial actions Westfield Caledonian returned to site on November 24th 2022 to conduct further investigative sampling with subsequent laboratory analysis confirmed the presence of Legionella Species at Consulting Room G/12 WHB Hot, at a concentration of 194 cfu/l. Further remedial work is scheduled to be undertaken and follow up sampling will confirm the effectiveness of these remedial actions.

TVC Sample Analysis

A further five samples were collected from the domestic Mains water supplies (MWS) and downservice distribution outlets to determine the TVC levels as well as confirm the absence of the indicator organisms, coliforms and faecal *E.coli*. Subsequent laboratory analysis returned results which can be regarded as satisfactory, and we have no recommendations with regards to sample analysis results at this time other than the monitoring programme be continued to determine the need for future remedial action.

WATER SAMPLE ANALYSIS RESULTS (LEGIONELLA)

Client Name and Site Address	**Report To:**	**Job No.:**
NHS Lothian East Calder Health Centre East Calder	M. Mastaglio **Surveyor:** G. Sutherland	5261-17-1 **Page No. 1 of 1**

Sampling Date	**Date to Lab**	**Analysis Commenced**	**Analysis Completed**
10/11/2022	10/11/2022	10/11/2022	21/11/2022

Analysis performed at Westfield Caledonian's UKAS accredited testing laboratory No. 4042

			Positive	
Sample No.	**Source Description**	**Result** (Note 1)	**Type** (Note 2)	**CFU Count** (Note 3)
1	CWS Tank Contents	ND		
2	359/G/09 WHB Mixer	ND		
3	359/G/55 Sink Hot	ND		
4	359/G/14 Sink Hot	**Positive**	**L.sp**	**1,706**
5	Plantroom Gas Fired Water Heater	**Positive**	**L.sp**	**529**
6	359/G/49 Sink Hot	ND		

Note 1. ND: No *Legionella* detected (<20CFU/1000ml)
Note 2. Lp = *Legionella pneumophila*, SG = Serogroup, L.Sp. = *Legionella* Species
Note 3. Estimated CFU count in 1000 ml based on portion of concentrated sample analysed, or *CFU count in volume filtered

PAGE NO	CLIENT NAME & SITE ADDRESS	CONTACT(S) NAME & TEL NO	SURVEYOR	JOB NO.
1	NHS Lothian East Calder Health Centre East Calder	M. Mastaglio	G. Sutherland	5261-17-1
				SURVEY DATE: 10/11/2022

SAMPLE NO.	LOCATION & DESCRIPTION	[Cl] ppm	SAMPLE TYPE	pH	°C	REMARKS
1	CWS Tank Contents	<0.2	Lp	7.4	11.5	Light sediment.
2	359/G/09 WHB Mixer	<0.2	Lp	7.4	42.4	
3	359/G/55 Sink Hot	<0.2	Lp	7.4	42.7	Cold – 10.6°C.
4	359/G/14 Sink Hot	<0.2	Lp	7.4	63.0	
5	Plantroom Gas Fired Water Heater	<0.2	Lp	7.4	59.0	Flow – 59.6°C. Return – 59.8°C. Sediment in sample.
6	359/G/49 Sink Hot	<0.2	Lp	7.4	61.6	

POTABLE WATER SAMPLE ANALYSIS

Client Name and Site Address	**Report To:**	**Job No.:**
NHS Lothian East Calder Health Centre East Calder	M. Mastaglio **Surveyor:** G. Sutherland	5261-17-1 **Page No. 1 of 1**

Sampling Date	**Date to Lab**	**Analysis Commenced**	**Analysis Completed**
10/11/2022	10/11/2022	10/11/2022	13/11/2022

Analysis performed at Westfield Caledonian's UKAS accredited testing laboratory No. 4042

Sample No.	**Source Description**	**2 Day 37°C TVC/ml**	**3 Day 22°C TVC/ml**	**Coliforms cfu/100ml**	**E. coli cfu/100ml**	**Other ***
1	CWS Tank Contents	3	0	0	0	
7	Staff Room Kitchen Sink Cold	4	0	0	0	
8	359/G/09 WHB Mixer	0	2	0	0	
9	359/G/14 Sink Cold	3	2	0	0	
10	359/G/49 Sink Cold	1	0	0	0	

GUIDE LEVELS
2 day 37°C and 3 Day 22°C TVC (Total Viable Counts) should show no significant increase.
Coliforms and *E.coli* should not be present (i.e. 0cfu in 100ml).
*Other - *Pseudomonas aeruginosa* should not be present (i.e. 0cfu in 100ml).
**Other- *Enterococci* should not be present (i.e. 0cfu in 100 ml).

PAGE NO	CLIENT NAME & SITE ADDRESS	CONTACT(S) NAME & TEL NO	SURVEYOR	JOB NO.
1	NHS Lothian East Calder Health Centre East Calder	M. Mastaglio	G. Sutherland	5261-17-1
				SURVEY DATE: 10/11/2022

SAMPLE NO.	LOCATION & DESCRIPTION	[Cl] ppm	SAMPLE TYPE	pH	°C	REMARKS
1	CWS Tank Contents	<0.2	TVC	7.4	11.5	Light sediment.
7	Staff Room Kitchen Sink Cold	<0.2	TVC	7.4	10.8	Hot – 63.7°C.
8	359/G/09 WHB Mixer	<0.2	TVC	7.4	23.2	
9	359/G/14 Sink Cold	<0.2	TVC	7.4	13.1	
10	359/G/49 Sink Cold	<0.2	TVC	7.4	11.9	

APPENDIX: IROR

From: Colin Mitchell
Sent: 21 November 2022 13:43
To: 'Mastaglio, Michael' <Michael.Mastaglio@nhslothian.scot.nhs.uk>
Cc: Stewart, Robert <robert.stewart8@nhslothian.scot.nhs.uk>; McLeary, Heather <Heather.McLeary@nhslothian.scot.nhs.uk>; 'InfectionControl@nhslothian.scot.nhs.uk' <InfectionControl@nhslothian.scot.nhs.uk>
Subject: East Calder

Hi Michael,

Analysis of the samples collected from East Calder Health Centre is now complete and the Lab have confirmed the presence of Legionella Species in two samples.
These were collected from the Gas Fired Water Heater drain point and 359/G/14 Sink Hot (Pre Flush Sample).
All other samples collected were free from the organism, suggesting the contamination is not system wide and may possibly be down to low usage.

Should you require any further advice or information, please do not hesitate to contact us.

Regards,

Colin Mitchell

Senior Technical Services Engineer

Westfield Caledonian
4 Mollins Court
Cumbernauld
G68 9HP

Tel. 01236 786300
Fax. 01236 786301
Mob. 07876 440984

NHS LOTHIAN

East Calder Health Centre
Livingston

Water Safety Risk Assessment
(Engineering)

Waterborne Microorganisms

(Including Legionella, P. Aeruginosa and other Pathogens)

October 2023

CONTENTS

Risk Assessment Survey Date: 17th October 2023

Prepared By	Authorised By	Issued To
Michael Compston	Colin Mitchell	M Mastaglio

The Author may be contacted regarding the report content as follows;
Email : colinmitchell@west-cal.co.uk
Tel : 01236 786 300

SUMMARY

This summary relates to a survey and risk assessment carried out on the water services within East Calder Health Centre, East Calder for NHS Lothian. The survey was carried out by Westfield Caledonian's Senior Technical Services Engineer, Colin Mitchell, on 17th October 2023.

Seventeen water system components and outlets were subject to our numerical risk analysis methods which included the CWS tanks, gas fired water heaters, drinking water outlets, and a number of representative components on the distribution systems. Of the seventeen points assessed, two achieved a High/Medium risk rating, with the remainder in the Low/Medium and Low risk categories. In general elevated risk ratings have been avoided due to the acceptable operating and hygienic conditions observed with the CWS tanks. Only one gas fired water heater was in operation during the survey, with the other isolated from the live systems, however high hot water temperatures were recorded throughout the building, providing an effective thermal control regime to prevent the growth of micro-organisms. Poor circulation was however identified in the tertiary loop supplying the Health Education Room and recommendations have been made to improve this to prevent water at low temperature back-contaminating the live system. One CWS tank is kept drained and isolated although this has been done in a manner to prevent the creation of dead legs. No rarely used outlets were identified and it was reported that housekeeping staff run all outlets as part of their daily task schedule.

The Water Safety Plan WSP is still in draft format at this time, and a number of recommendations have been made in order to ensure that effective management of the control scheme is achieved. The Maintenance Task Schedule was inspected and although no auditable records were yet logged on the new software, the Maintenance Tasks were inspected to determine if these were suitable and sufficient. NHS Lothian are utilising SFG20 which is a web based library of maintenance tasks for specific components used in the water systems. However, when checking the suitability of these Tasks it was noted that several plant assets were incorrectly identified and/or the assigned SFG20 Maintenance Task was wrong. As such there are significant gaps in the monitoring programme and it is recommended that a review be carried out by a competent person to ensure the asset list and associated Maintenance Tasks are correct.

INTRODUCTION

This report relates to an assessment of the risk of infection from waterborne micro-organisms within East Calder Health Centre, East Calder. Westfield Caledonian's Senior Technical Services Engineer, Colin Mitchell undertook this assessment on 17th October 2023.

The objective was to assess the design, installation, condition and mode of operation of the water systems, with respect to the risk to the quality of the water within the systems, and the subsequent infection risk for the users. Having identified all risk affecting factors, a review of the control scheme currently in place was carried out to determine both its suitability and effectiveness in adequately controlling the presented risks. The system assessment survey and control scheme review, was carried out in a manner consistent with the guidance given in *BS8580:2019 Water Quality – Risk Assessments for Legionella Control – Code of Practice* (ACoP) (L8) and HSE Guidance Document HSG 274.
The requirements of current Scottish Healthcare Technical Memoranda are also considered.

The formal, quantitative risk assessments address aspects of the system design and condition which may compromise the water quality and affect the risk of user infection. A numerical value is derived which is deemed to be representative of the risk, with additional values listed to demonstrate the reduction in risk which can be achieved should the recommendations contained within this report be implemented. A third numerical value is also listed which gives the risk score from the previous assessment, to enable a quantification of the reduction in risk which has been achieved. The subsequently derived recommendations are of two types, namely Remedial Actions, or Control Measures.
The remedial actions are designed to alter the system configuration such that inherent water quality compromising characteristics are removed, or to facilitate the implementation of subsequent control measures.

Susceptibility of individuals is an important factor that should be taken into account when undertaking a risk assessment. These aspects include, but are not exclusive to, patients suffering from cancer or kidney disease, where a significant number of elderly patients are involved, or where immunosuppressant drugs are used. As this building provides consultancy and clinical procedures for potentially elderly patients this aspect has been applied to all outlets to which patients may be exposed, but not to staff areas.

INTRODUCTION

Scope and Exclusions

The survey has been undertaken in accordance with the recommendations of the ACoP L8, HSG 274 (Parts 1, 2 & 3) and BS 8580:2019, and covers all water systems within the building. The survey has been undertaken on a non-destructive and non-intrusive basis, so is limited to those items in plain sight that may be safely accessed. Whilst all efforts have been made to identify any potential dead legs associated with the systems assessed therefore, the complex nature of pipework installations, much of which are hidden within buildings, prevents this from being a fully complete and accurate list.

For the same reasons, it is neither practical nor possible to assess all materials used in the construction of complex multi-component systems such as those covered by this document. It should therefore be noted that not all materials present can or have been assessed for their suitability of use. Westfield Caledonian cannot be accountable for any omissions to this report resulting from information, data, systems or plant not made readily and reasonably accessible by the Client. Please note that this Risk Assessment only addresses one of many requirements of the ACoP L8 and is therefore not alone sufficient to ensure complete compliance with the law.

The aspects addressed in this survey include those which will encourage system contamination by *Pseudomonas aeruginosa.* However with respect to managing the risk of infection from this organism it is recognised that control is generally through clinical procedure. Accordingly, the IPC team should be referred to for *Pseudomonas aeruginosa* risk assessment control measures development.

SYSTEM DESCRIPTION & ASSET REGISTER

System Description

Building Name:	**East Calder Health Centre**
Building Address:	**147 Main St, East Calder, Livingston**
Building Use:	**Health Centre**
Augmented Care Areas:	**None**
Number of Floors:	**2**
Number of Basements:	**0**
Estimated No of Occupants:	**15 Staff - 20 Patients**
Susceptible Individuals:	**Potentially Susceptible Patients**

East Calder Health Centre is of two-storey construction and provides primary and preventive care services. The Mains water service (MWS) enters the building in the ground floor boiler room and rises vertically to supply two cold water service (CWS) storage tanks located at high level within the 1st floor plantroom. A branch is taken off the rising Main at high level on the ground floor and runs along the main corridor before branching to supply the staff toilets and kitchen on the 1st floor.

Cold water downservice supplies are provided from CWS tank no.1 located at high level within the 1st floor plantroom. CWS tank no.2 is kept drained and isolated ready to be used should cleaning of CWS tank no.1 be required. Two separate supplies are taken from each CWS tank, one to supply a cold feed to the two gas fired water heaters located within the ground floor plantroom and the other to provide cold water downservices. Pipework runs along the main corridor at high level on the ground floor, with branches taken off adjacent to each room which contains a wash hand basin (WHB) or sink, and also to supply the toilet areas. The second branch drops to the boiler room area to supply the two vertical direct gas fired water heaters (DGFWH).

SYSTEM DESCRIPTION & ASSET REGISTER

Domestic hot water services (DHWS) within the East Calder Health Centre are supplied by the two vertical DGFWHs situated within the boiler room on the ground floor. Hot water is delivered via a two pipe system which runs at high level on the ground floor.

An extension has been built to the left of the building that provides additional Consulting Rooms. Each room has a single sink and all outlets are mains fed with electric point of use water heaters located under each sink.

New temporary cabins have been installed, externally to provide four more Consulting Rooms, these are supplied by mains to a single WHB in each of the four consulting rooms. Hot water is provided by point of use heaters.

This system description should be read in conjunction with schematic drawing ref 5261.

SYSTEM DESCRIPTION & ASSET REGISTER

ASSET ID	ASSET DESCRIPTION	MANUFACTURER	Model/Capacity	Serial Number	LOCATION	APPLICABLE PPMS
	MWS & CWDS Distribution Systems					Monthly Cold Water Temperatures Weekly SUP Flushing
	DHWS Distribution System					Monthly Hot Water Temperatures Weekly SUP Flushing
0005010399	CWS Tank	Balmoral	1000L		Roofspace	Six Monthly CWS Storage Tanks
0005010400	CWS Tank	Balmoral	1000L		Roofspace	None
0005011878	Gas Fired Water Heater	Andrews	136L		Boiler/Plantroom	Monthly Calorifiers – No Stratification Annual Calorifiers & Cylinders
0005011879	Gas Fired Water Heater	Andrews	136L		Boiler/Plantroom	Monthly Calorifiers – No Stratification Annual Calorifiers & Cylinders
8500196352	DHWS Circulation Pump	Grundfos	UP 20-40 N 150		Boiler/Plantroom	None
-	Electric Point of Use Water Heater	Heatrae Sadia	Multipoint 10		Extension Consulting Room 1	Monthly Electric Point of Use Heater
-	Electric Point of Use Water Heater	Heatrae Sadia	Multipoint 10		Extension Consulting Room 2	Monthly Electric Point of Use Heater
-	Electric Point of Use Water Heater	Heatrae Sadia	Multipoint 10		Extension Consulting Room 3	Monthly Electric Point of Use Heater
See TMV Schedule	TMVs					Six Monthly Servicing

SYSTEM DESCRIPTION & ASSET REGISTER

ASSET ID	ASSET DESCRIPTION	MANUFACTURER	Model/Capacity	Serial Number	LOCATION	APPLICABLE PPMS
-	Electric Point of Use Water Heater	Heatrae Sadia	Multipoint 15		Porto Cabin Consulting room 1	Monthly Electric Point of Use Heater
-	Electric Point of Use Water Heater	Heatrae Sadia	Multipoint 15		Porto Cabin Consulting room 2	Monthly Electric Point of Use Heater
-	Electric Point of Use Water Heater	Heatrae Sadia	Multipoint 15		Porto Cabin Consulting room 3	Monthly Electric Point of Use Heater
-	Electric Point of Use Water Heater	Heatrae Sadia	Multipoint 15		Porto Cabin Consulting room 4	Monthly Electric Point of Use Heater

ASSESSMENT FINDINGS

Source Water

A public Mains Water Service (MWS) enters the main plant room and is provided with a stop cock and drain down facility. No check valve was identified and this may be requested by the water authority to comply with the Water Byelaws.

MWS Inlet with Stop Cock and Drain Point

Cold Water Service (CWS) Storage Tanks

The two CWS tanks are provided at high level within the 1st floor plantroom are of modern pre-insulated sectional construction and are considered to be fully Byelaw compliant. The risk of contaminant ingress is deemed to be low as the overflow pipework is suitably screened and the tanks are provided with a securely fitting lid. The tanks are arranged in parallel although CWS tank no.2 is kept drained and isolated. This will increase turnover through the online tank and remove the risks associated with hydraulic imbalance that often occurs where tanks are arranged in parallel. No Dead Legs have been created as a result of this, as isolation valves are suitably located on the MWS and both downservice systems from CWS tank No.2. Internal inspection of CWS tank no.1 revealed acceptable hygienic conditions, although Light sediment was observed at the base.

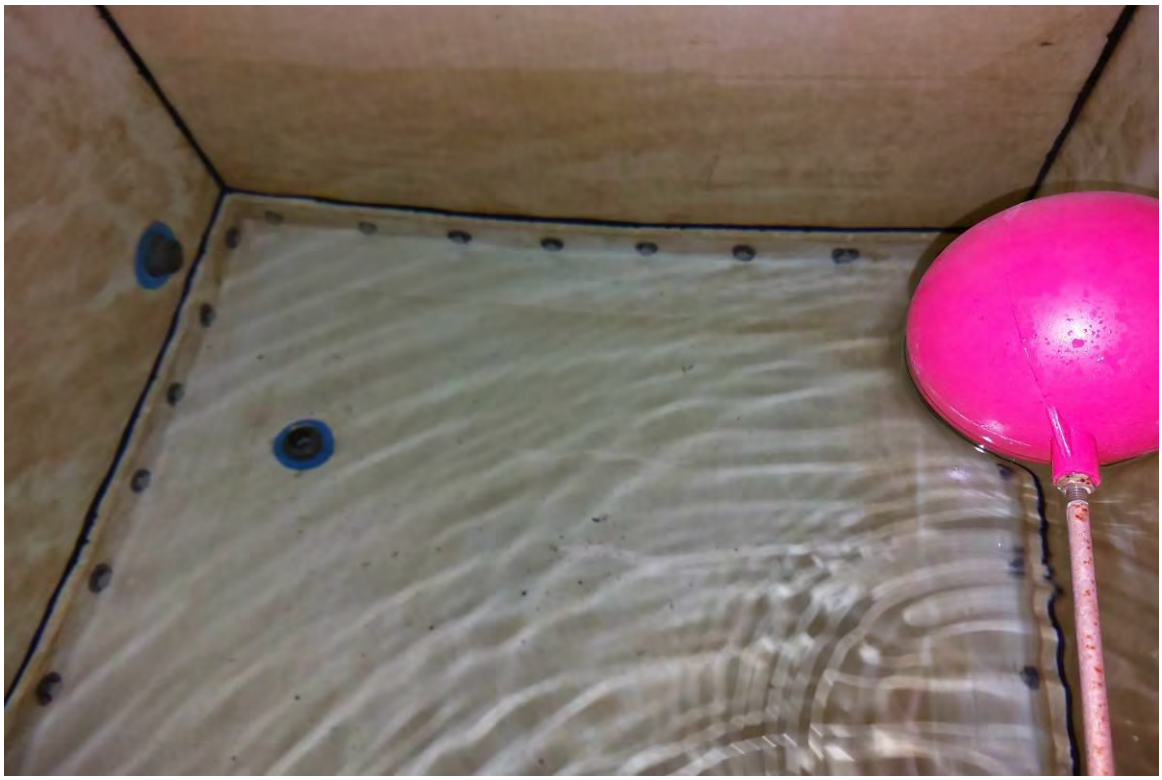
ASSESSMENT FINDINGS

A satisfactory contents temperature was also recorded, suggesting that sufficient turnover is occurring to prevent excessive heat gain. We have no specific recommendations with respect to the CWS tanks at this time, other than that ongoing monitoring be continued, with the results of tests and inspections used to determine the need for future remedial action.

The following photographs illustrate the conditions observed.

Roofspace CWS Tank – Pre-Insulated Sectional Construction

ASSESSMENT FINDINGS



CWS Tank No.1 – Acceptable Condition with Moderate Sediment at Base

CWS Tank No.1 – Contents Temperature 11.2°C

ASSESSMENT FINDINGS

Domestic Hot Water Service (DHWS)

Westfield Caledonian recommends that hot water be generated and stored in excess of 60°C, to ensure that outlet temperatures at uncontrolled locations remain between 55°C and 60°C throughout the premises. This is also a requirement of Scottish Healthcare Technical Memorandum (SHTM) 04-01. The HSE Guidance Document HSG274 also states that a minimum system return temperature of 55°C should be maintained within healthcare premises.

Domestic hot water throughout the premises is supplied by two direct gas fired water heaters located in the plantroom, although gas fired water heater No.2 was offline at the time of the survey and was isolated from the live systems, in such a way as to avoid the creation of dead legs. A sample was collected from the drain point of the operational water heater and this was clear and free from sediment and at a satisfactory temperature. The mode of operation of these water heaters, with heat source at the base, prevents thermal stratification occurring and ensures the entire contents are pasteurised. Annual flushing of the drain valves should however be carried out, to remove sediment and waterborne contamination which may accumulate, given time.

Hot water is distributed throughout the building via a two-pipe system, with circulation assisted by a pump installed on the flow pipe in the plantroom. The contents gauge indicated a temperature of 65°C and utilising a contact probe, a satisfactory return temperature was also recorded in the plantroom. Satisfactory flow and return temperatures were also recorded at the extremity point on the circulation system at high level within Consultant Room 8. Hot water outlet temperatures recorded throughout the building, at untempered outlets and at the inlet to thermostatically controlled outlets, were sufficiently high to prevent the growth of micro-organisms. However, poor circulation was identified in the tertiary circulation loop supplying the Health Education Room sink. Although a satisfactory hot water outlet temperature was recorded within one minute of flushing this outlet, the return temperature did not achieve the minimum temperature of 55°C. It is recommended that steps be taken to improve circulation through this loop as it currently represents a dead leg, with water in the return pipework held at a suitable temperature for the growth of micro-organisms.

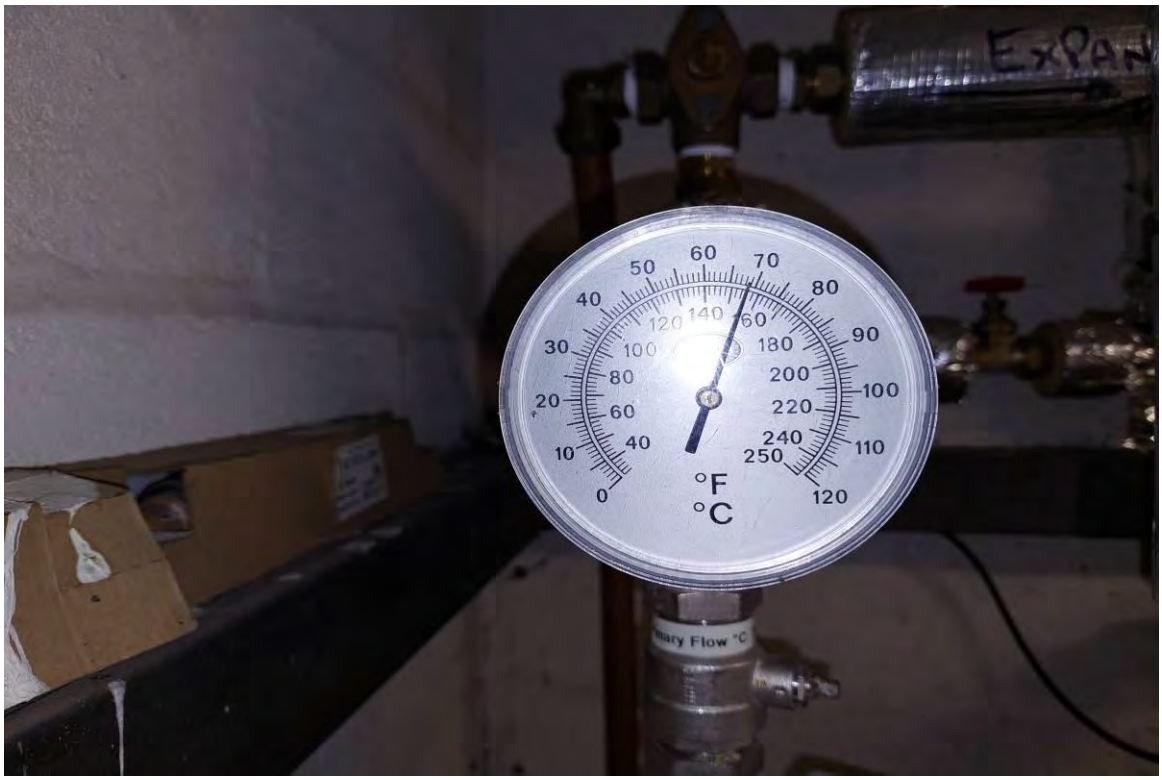
ASSESSMENT FINDINGS

Although hot water outlet temperatures were sufficiently high to provide an effective thermal control regime these were generally in excess of 60°C and represent an increased scald risk to users. Suitable "Hot Water" signage has been provided at untempered outlets and outlets intended for use by the public are thermostatically controlled to prevent scalding. It is however recommended that the storage temperature be lowered slightly to reduce the risk of user scalding. Monthly temperature monitoring should be carried out to ensure the untempered outlet temperatures (or supply temperatures to thermostatic mixers) is at least 55°C, with the thermostatic controls adjusted as necessary. All TMVs should also be subject to six monthly temperature checks and operational adjustment as required by the manufacturer and in accordance with Performance Specification D08.

The following photographs illustrate the conditions observed.

Plantroom DHWS Gas Fired Water Heaters – General Arrangement

ASSESSMENT FINDINGS



DHWS Gas Fired Water Heater No.1 - Storage Temperature Approximately 68°C

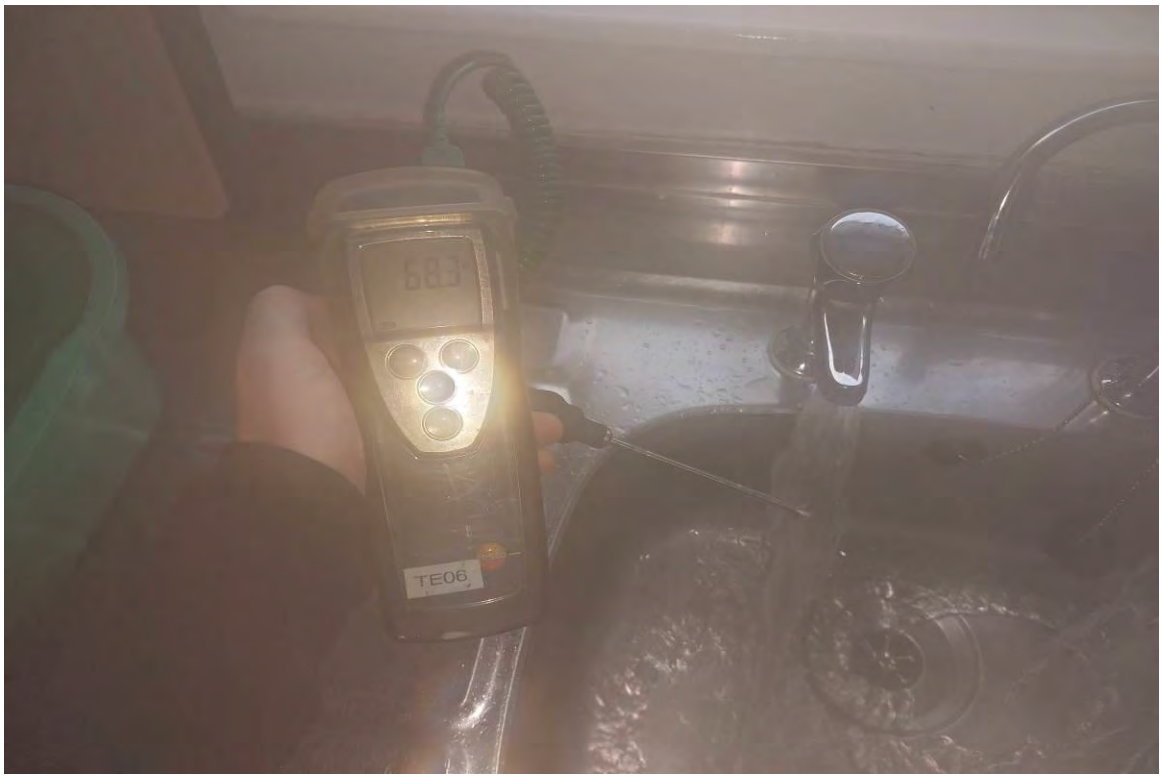
DHWS Gas Fired Water Heater No.1 – Drain Sample Light Sediment and at Satisfactory Temperature

ASSESSMENT FINDINGS

Plantroom Principle Loop Return Temperature Satisfactory

DSR Sink - Hot Water Outlet Temperature Satisfactory

ASSESSMENT FINDINGS



1st Floor Staff Room Sink - Hot Water Outlet Temperature Satisfactory

Health Education/Physio Room - Tertiary Loop Flow Temperature Too Low (<55°C)

ASSESSMENT FINDINGS

Health Education/Physio Room - Tertiary Loop Return Temperature Too Low (<55°C) Ineffective Circulation

Health Education/Physio Room Sink - Hot Water Outlet Temperature Satisfactory

ASSESSMENT FINDINGS

Flow Temperature to Consultant Room 8 Satisfactory

Return Temperature from Consultant Room 8 Satisfactory

ASSESSMENT FINDINGS

Public Toilet WHB - Hot Water Outlet Temperature Satisfactory Thermostatic Control

Public Toilet WHB - Supply Temperature to TMV Satisfactory (>55°C)

ASSESSMENT FINDINGS

Consultant Room 8 Sink - Hot Water Outlet Temperature Satisfactory

Mains fed, electric under-sink points of use water heater are provided in each of the Consulting Rooms within the extension wing. Where these are used, a minimum temperature of 55°C is required in healthcare premises. The temperature recorded at the extension Consultant Room 2 sink was satisfactory although monthly temperature monitoring should be used to ensure all three water heaters operate within the desired temperature range and determine the need for adjustment of the thermostatic controls.

The following photographs illustrate the conditions observed.

ASSESSMENT FINDINGS

Extension Consultant Room 3 Under-Sink Electric Water Heater Provided

Extension Consultant Room 3 Sink - Hot Water Outlet Temperature Satisfactory

ASSESSMENT FINDINGS

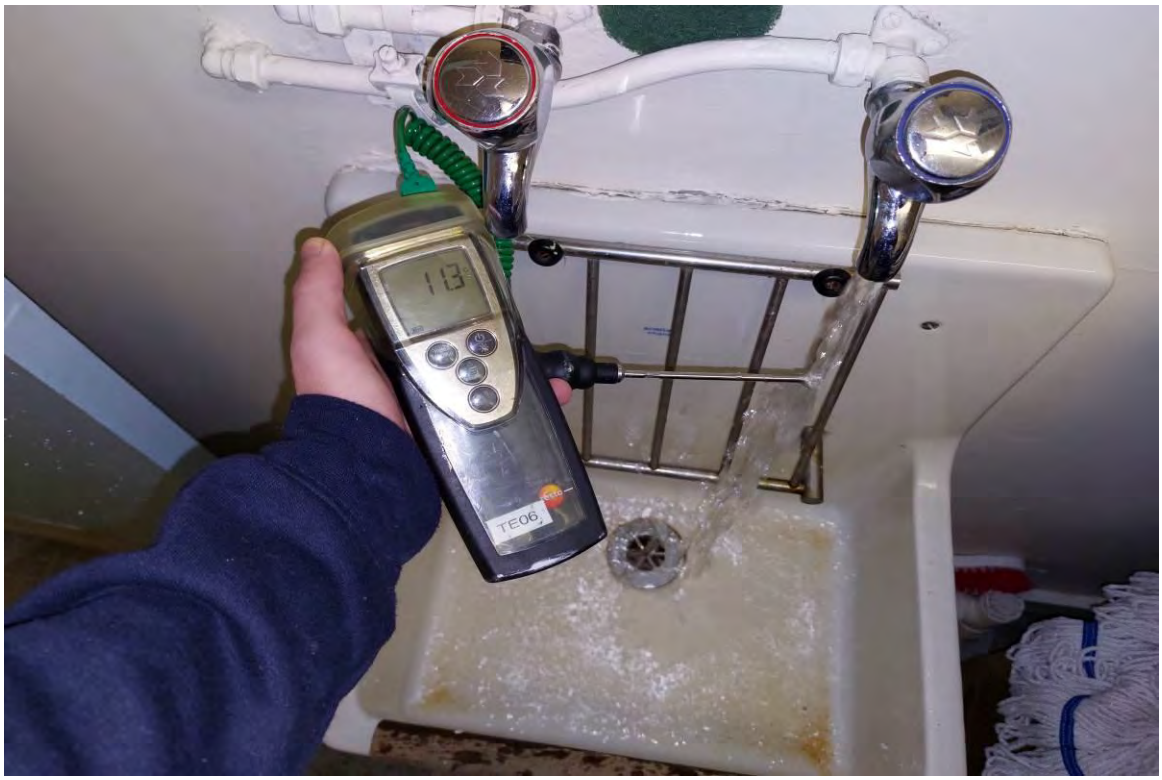
Cold Water Temperatures

Bacteria, including *Legionella,* multiply most rapidly in warm water, but not in hot or cold water. Westfield Caledonian recommends that cold water is stored and distributed at below 20°C, as above this limit micro-organisms will begin to proliferate. It is also considered good practice to have water supplied to extremity outlets at temperatures no more than 2°C above the source temperature, to ensure that internal heat gain will not compromise the bacteriological safety of the supplied water.

Cold water outlet temperatures recorded throughout the building compared well with the storage temperature recorded within the CWS tank, and were well below the recommended upper limit of 20°C. This suggests that sufficient turnover is occurring through the distribution systems to prevent excessive heat gain. It is however recommended that monthly temperature monitoring at extremity locations be utilised to determine the need for further remedial actions or control measures, such as including outlets in a flushing programme.

The following photographs illustrate typical cold water outlet temperatures recorded during the visit.

ASSESSMENT FINDINGS



DSR Sink – Cold Water Outlet Temperature Satisfactory

1st Floor Staff Room Sink – Cold Water Outlet Temperature Satisfactory

ASSESSMENT FINDINGS

Health Education/Physio Room Sink – Cold Water Outlet Temperature Satisfactory

Public Toilet WHB - Cold Water Outlet Temperature Satisfactory

ASSESSMENT FINDINGS

Consultant Room 8 Sink - Cold Water Outlet Temperature Satisfactory

Extension Consultant Room 3 Sink - Cold Water Outlet Temperature Satisfactory

ASSESSMENT FINDINGS

Aerosol Generators

There are no shower facilities or aerosol generators within the building and as such the risks associated with aerosol generation are considered to be low.

Dead Legs

One of the most significant contributing factors to the risk of bacteriological contamination occurring in domestic water systems is the existence of dead legs. Westfield Caledonian differentiates between Actual and Effective dead legs, with the former typically being sections of pipework originally installed to serve either removed or redundant plant items or outlets. An Effective dead leg may be defined as a pipework section which supplies rarely used or emergency service outlets which, whilst requiring to be retained, rarely experiences water throughput.

No Dead Legs were observed during the survey although it was noted that the MWS supply to the redundant Bib Tap in the Bin Store has now been physically disconnected at the branch point in the plantroom. As previously stated, CWS tank no.2 is kept drained and isolated although this has not resulted in the creation of any Dead Legs as isolation valves are suitably located on the MWS and on both downservice systems from CWS tank No.2.

A MWS branch has been taken in the ground floor plantroom to supply the heating system pressurisation unit. Although a check valve was installed prior to the connection to the pressurisation unit, this should be installed at the branch point to prevent back-contamination. The flexible quick-fill connection should also be physically disconnected when not in use.

Effective dead legs are also created by any rarely used outlets or outlets within unoccupied areas. It was reported that all outlets are used on a regular basis, however housekeeping staff flush all outlets on a daily basis as part of housekeeping procedures. Records of this is simply a check box which is signed and dated and this is covered in more detail in the management and control of risk section of this report.

ASSESSMENT FINDINGS

Drinking Water

Drinking water is provided by the MWS connected Staff Kitchen sink and as such it is considered that NHS Lothian have complied with their statutory obligation to provide a wholesome supply of drinking water.

General Hygiene

Scale is not only unsightly, but can provide a harbour and nutrient source for the sustenance and proliferation of bacteria that may cause contamination of the water supply. On this occasion, outlets were generally in good clean hygienic condition and free from scale accumulations. However, it is recommended that all outlets be regularly cleaned utilising clean, disposable cloths and appropriate de-scaling and sanitising agents in a manner to prevent cross-contamination. It is important that the risks presented by fouling with scale is recognised and that regular visual inspection of all faucets is carried out and appropriate cleaning activities implemented if and when deemed required. Where tap inserts or flow straighteners are provided, these should also be removed and cleaned on an annual basis as they represent area where dirt and debris can be trapped and encourage the growth of micro-organisms.

Flexible Connections

The NHS National Services Scotland safety action notice reference SAN (SC) 09/03 states that flexible hoses used in potable water systems should be identified and risk assessed for the possibility of contamination with harmful micro-organisms. Reports indicate that high levels of *Pseudomonas aeruginosa* and *Legionella* bacteria have been found in water samples collected from water outlets fed by flexible hoses. The safety action notice indicates that the use of flexible hoses constructed from EPDM to link between hard pipework and equipment should not be utilised. Where flexible hoses must be used (e.g. on essential equipment such as Arjo baths) they must be lined with a suitably alternative to EPDM, as well as being WRAS approved. No flexible connections were identified as part of this survey.

Open Evaporative Cooling Systems

There are no Evaporative Cooling towers on site and as such the risks associated with widespread aerosol transmission are minimal.

ASSESSMENT FINDINGS

Other Services

In addition to domestic water systems, occasions may arise where a health risk is presented from waterborne micro-organisms from other services. These include fire suppression systems such as sprinklers where aerosols are released into the air, and care should be taken during testing of these systems. In addition, condensate may be created from cooling and humidification processes in HVAC systems which could result in aerosols being released into the supply air. There were no additional systems identified during the assessment survey and as such there are no additional risks presented.

MANAGEMENT SYSTEM AND CONTROL SCHEME REVIEW

Management and Control of Risk (WSP)

As inadequate management, lack of training and poor communication have all been identified as contributing factors in outbreaks of the *Legionella* disease, the importance of an appropriate management structure is stressed. This structure, which is one of the foremost requirements of the HSE Approved Code of Practise (L8), should detail the responsibilities allocated to specific individuals and monitor the effectiveness of the Control Measures undertaken at the prescribed intervals. NHS Lothian have adopted the SHTM 04-01 model of a Water Safety Plan (WSP) to facilitate the management of the risks associated with water systems. This is currently still in draft format and a number of recommendations have been made as a result of this assessment in order for the WSP to satisfy all the requirements.

A Management Structure has been defined, which details the positions and contact details of all personnel involved in the control scheme. Roles and responsibilities have also been defined for each person, and although it was not clear if Authorised and Responsible Persons have been nominated in writing and this should be confirmed. The WSP states that the Water Safety Group meet on a quarterly basis and the outcomes of this feed into the Senior Management Water Safety Group to ensure effective liaison between the Duty Holder, the Responsible Person, and the Water Safety Group. However, it is unclear which Facilities Representatives attend these meetings and it is recommended that an Authorised Person responsible for each site attends all forthcoming meetings. It was reported that the last few scheduled Water Safety Group meetings have been cancelled and it is important that these go ahead, to satisfy the requirement for communication up the Management Structure. A Training Matrix is provided to ensure all persons have the relevant training required for their role and regular refresher training is also scheduled through this. Training records for Michael Mastaglio, Tom Cunningham and Graham Lawson were inspected and these were up-to-date.

In the Introduction of the WSP it states that Section 4 details the “safe operation of the system and all appropriate Maintenance Procedures” however Section 4 details the Maintenance Procedures only and as such there was no statement of correct and safe operation of the water systems.

MANAGEMENT SYSTEM AND CONTROL SCHEME REVIEW

It is recommended that a statement be added to the WSP document, describing that temperature is the main control parameter used to prevent the growth of micro-organisms and that water is to be maintained below 20°C and above 55°C to achieve this.

Although an Incident Plan has been documented, this is limited to instances when cold water storage temperatures have been recorded in excess of 20°C and does not consider a failure of the hot water system. It is recommended that the Incident Plan be updated to include actions to take when there is a break in the thermal control regime and should include carrying out a thermal disinfection of the system. Although the WSP covers actions to take following Legionella sampling and has included the HSG 274 Part 2 Table 2.3 there is no documentation for action to take following an outbreak of Legionellosis. It is recommended that Appendix 2.3 of HSG 274 Part 2 be referenced or added to the Incident Plan to comply with the requirements of this guidance.

The Maintenance Task Schedule on Agility was reviewed however no records were available for inspection as it has only gone live this month and historical records on the previous Backtraq system have been archived, although can be viewed if requested in advance. NHS Lothian have adopted SFG20 which is a web based library of maintenance tasks. The Maintenance Task Schedule lists the SFG20 Task Code and the frequency at which maintenance is required for each relevant component on the water systems. However, when checking the suitability of these Tasks it was noted that several assets were incorrectly identified and/or the assigned SFG20 Maintenance Task was wrong. A list of Control Measures has been devised as a result of this Risk Assessment and it should be ensured that all of these are incorporated into the Maintenance Task Schedule to suitably manage the risks associated with water quality deterioration and monitor the control scheme. A review of the asset lists and associated Maintenance Tasks should be undertaken by a competent person to ensure these are accurate and suitable.

Rarely used outlets have not been listed although it was reported that domestic staff flush all outlets on a daily basis as part of their housekeeping tasks. A record of this is kept on their daily task schedule although is simply a check box which is signed and dated. This is considered to be insufficient to suitably control the risks associated with rarely used outlets and relies on the individual having appropriate knowledge of the building and all outlets.

MANAGEMENT SYSTEM AND CONTROL SCHEME REVIEW

It is recommended that a schedule of rarely used outlets be devised, with these flushed on at least a twice weekly basis by domestic staff. This schedule should then be signed and dated and incorporated into the Maintenance Task Schedule so records are available for future audits. The schedule should be regularly reviewed and updated, taking into account changes in occupancy and building usage.

The Remedial Action Plan on Agility was reviewed and although Job Cards have been raised for the majority of these, they have not been closed out or marked as Completed. A number of these have been outstanding for over 12 months and it is recommended that the Remedial Actions raised in this Risk Assessment be added to the Remedial Action Plan and that these be completed and signed off in a timely manner.

Tt is recommended that condition monitoring, sampling and audits be carried out on an annual basis, and that the Risk Assessment is reviewed every two years, or more regularly if condition audits or annual WSG reviews deem necessary.

MANAGEMENT SYSTEM AND CONTROL SCHEME REVIEW

Management Structure		
Position	**Name, Address Tel. No.**	**Position**
Statutory Duty Holder	Jim Crombie	Deputy Chief Executive
Designated Person (Water)	George Curley	Director of Facilities/General Manager (Estates)
Responsible Person	Tommy Logan	Head of Estates
Regional Responsible Person	Robert Stewart	Estates Manager
Authorised Persons	Michael Mastaglio Rae Jarvis	Estates Sector Manager Estates Sector Manager Estates Sector Manager
Authorising Engineer	Dennis Kelly	Legionella Control International Ltd
Microbiologist	Karen MacSween	Lead Microbiologist
Infection Control	Lindsay Guthrie	Lead Infection Control
Competent Persons	Plumbers/Engineers	

Water Safety Group Comprises:

Site Management Representative

Facilities Representative

Associate Medical Director

Health & Safety Officer

IPCN Representative

Domestic Services Representative

Clinical Nurse Manager

RCN Steward/Mental Health Partnership Rep

Assurance Manager

MANAGEMENT SYSTEM AND CONTROL SCHEME REVIEW

Appraisal Question		Yes, No or NA	Comment/Action Required
1	Is there a current Written Scheme or Water Safety Plan (WSP) in place?	Yes	WSP is in Draft format
2	Are details of the Management Structure (Water Safety Group) provided, with names, positions, contact details?	Yes	Names, positions and email addresses provided.
3	Have Authorised & Responsible Persons been informed in writing?	U/K	Unknown - requested confirmation.
4	Are the responsibilities of all involved personnel clearly defined?	Yes	Roles & Responsibilities document on "K" drive.
5	Are all relevant personnel represented in the Water Safety Group.	No	Ensure all Authorised Persons are represented at WSG meetings.
6	Is there effective liaison between the Duty Holder, the Responsible Person, and the Water Safety Group?	Yes	Water Safety Group meet quarterly and the outcomes feed into the Senior Management Water Safety Group. Last few meeting cancelled, ensure these continue.
7	Is a procedure in place to ensure that personnel with a responsibility under Written Scheme receives sufficient training and regular refresher training?	Yes	Training Matrix for all staff available and includes scheduled refresher training.
8	Is there evidence available in the WSP of the competency of service providers and contractor staff?	Yes	3.12 of WSP All Contractors are engaged through NHS Lothian contractor framework and checked by Procurement.
9	Are training records available in the WSP?	Yes	Training records are detailed in Section 3.2 of the WSP and kept on Shared "K" drive. Checked Training records for several named personnel, all available.
10	Does the organization have an up to date and current policy document?	Yes	
11	Is normal plant operation and a description of the correct and safe operation of the plant defined?	No	A statement of correct and safe operation of the water systems should be added to the WSP document.
12	Are system control parameters defined - chemical or thermal as applicable?	No	Add a statement that temperature is the main control strategy for reducing the risk from waterborne micro-organisms.
13	Are there differing plant operating cycles (continuous, batch, seasonal etc.)	No	-
14	Are Method statements (procedures) for commissioning and shut-down defined.	Yes	Utilising SFG20 for maintenance which details procedures for each plant item.
15	Are Method statements (procedures) for bringing stand-by plant into operation at least weekly defined.	NA	

MANAGEMENT SYSTEM AND CONTROL SCHEME REVIEW

Appraisal Question		Yes, No or NA	Comment/Action Required
16	Does the WSP include an incident plan?	No	Incident Plan covers elevated (>20°C) cold water storage temperatures only. WSP covers Positive Legionella results. Recommended that Incident Plan includes Failure of Main Plant items, i.e. hot water generators. Also action to take in the event of an outbreak of Legionellosis.
17	Is there an up to date and current Control Procedures document (logbook)?	Yes	Transferred from Backtraq to Agility in March 2021.
18	Is there information on the Control Procedures that are in place, and a schedule.	Yes	Maintenance Task Schedule on Agility reviewed. A number of assets have been identified incorrectly or the assigned Maintenance Tasks are incorrect and unsuitable.
19	Are all recommended Control Procedures included	No	All Control Measures recommended in the Risk Assessment to be incorporated into Maintenance Task Schedule.
20	Is a schedule of rarely used outlets defined and is flushing of these outlets recorded	No	No RUO defined. All outlets flushed by domestic staff daily. Outlets in unoccupied Buildings/Wards flushed twice weekly.
21	Are there written method statements for relevant Control Procedures?	Yes	SFG20 details each Control Procedure.
22	Are action levels defined for these Control Procedures?	Yes	
23	Are analytical tests, operational checks and inspections to be carried out, their frequency and any resulting corrective actions defined.	Yes	WSP 3.3 Defines all required Maintenance Tasks and Analytical Tests including TVC, Legionella and pseudomonas sampling.
24	Remedial actions to be taken in the event that the scheme is shown not to be effective or control limits are exceeded.	Yes	Formal Documentation detailing actions to be taken when analytical tests are out with limits for Legionella, Pseudomonas and TVC.
25	Is equipment used to carry out Maintenance Tasks calibrated on a suitable schedule.	Yes	WSP 2.5 All equipment used for measurement of temperature to be calibrated at least annually.
26	Does logbook contain record of results with date and signatures?	No	No Records in place at date of audit due to no PPMs having been issued for the first month. Results of all Maintenance

MANAGEMENT SYSTEM AND CONTROL SCHEME REVIEW

Appraisal Question		Yes, No or NA	Comment/Action Required
			Tasks are to be recorded and signed electronically and held on Agility.
27	Does this contain defects log for out of specification findings (temperature) again with date and signature?	Yes	Incident Report Record Form 004 used to record out of specification findings.
28	Actions required from the results obtained and a log of actions taken with date and signature.	Yes	Non-conformance report created, with Details of Non-Conformance, Remedial Action Plan, Root Cause Analysis and Verification of Corrective Action
29	Is there an audit trail that allows for remedial actions to be tracked through to completion?	Yes	Remedial Action Plan assigns a Job Card No. for each Remedial Action which can be tracked.
30	Are remedial actions completed, signed and dated in a timely manner?	No	Inspected Agility Remedial Action Plan, some Remedial Actions remain outstanding.
31	Are the cleaning and disinfection procedures completed by in house staff?	Yes	Flow straighteners, strainers, TMVs and showers are cleaned and disinfected by in-house staff. CWS Tank cleaning sub-contracted.
32	Are staff trained and competent to complete cleans and disinfections?	Yes	In-house staff are experienced in cleansing and disinfection. Formal training planned but delayed due to Covid-19.
33	Are cleaning and disinfection Method Statements, including system specific details provided.	Yes	SFG20 details cleaning. Checked Method Statement for RL Building Services CWS Tank disinfection.
34	Are completion certificates available for any disinfection procedures that have been undertaken in the last 12 months?	Yes	Held on “K” Drive. Checked RL Building Services CWS Tank disinfection.
35	COSHH information on any chemicals used on site?	Yes	
36	Up-to-date schematic drawings.	Yes	

SUMMARY OF RISKS

Assessed Point		Risk Scores		
Description	**Ref.**	**Cur.**	**Prev.**	**Rec.**
Consulting Room 8 WHB Cold	5261/13	21	15	17
1st Floor Staff Kitchen Sink Cold (MWS)	5261/11	20	19	19
Male Public Toilet (359/G/39) WHB Hot	5261/10	19	19	19
Health Education/Physio (359/G/36) Sink Cold	5261/07	18	15	15
Health Education/Physio (359/G/36) Sink Hot	5261/08	18	15	13
Male Public Toilet (359/G/39) WHB Cold	5261/09	17	17	17
Portacabin Consulting Room 4	5261/17	17	-	17
Consulting Room 8 WHB Hot	5261/14	16	13	15
Extension Consulting Room 3 Sink Cold	5261/15	16	15	16
CWS Tank 1	5261/01	15	16	14
Ground Floor DSR (359/G/49) Sink Cold	5261/05	15	15	15
Extension Consulting Room 3 Sink Hot (359/G/57)	5261/16	14	13	13
Gas Fired Water Heater 1	5261/03	13	12	12
Ground Floor DSR (359/G/49) Sink Hot	5261/06	13	13	13
1st Floor Staff Kitchen Sink Hot (DHWS)	5261/12	13	13	13
CWS Tank 2	5261/02	-	-	-
Gas Fired Water Heater 2	5261/04	-	-	-

Risk Ratings	Score
High	>22
High/Med	20-22
Low/Med	17-19
Low	<17

WATER QUALITY RISK ASSESSMENT

ASSESSMENT TOTAL 15

High >22
High Med. 20-22
Low Med. 17-19
Low <17

Source Description : CWS Tank 1
Assessment Justification : Cold Water Storage
Assessor : Mr C Mitchell/Mr M Compston
Date : 17th October 2023
Previous Date : -
pH : 7.5
FRC : <0.1
Temp 1 : 11.2°C
Temp 2 :

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/01

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	2	2	Mains Water Supply.
B	**Supply System**	**2**	1	1	Effective Dead Legs – HSPU.
C	**Point Condition**	**1**	3	1	
D	**Turnover**	**2**	2	2	Daily.
E	**Incubation**	**3**	3	3	Temp <20°C.
F	**Acidity**	**3**	3	3	
G	**Exposed Populace**	**1**	1	1	
H	**Infection Risk**	**1**	1	1	
TOTALS		**15**	15	14	

WATER QUALITY RISK ASSESSMENT

ASSESSMENT TOTAL 0

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Source Description : CWS Tank 2
Assessment Justification : Cold Water Storage
Assessor : Mr C Mitchell/Mr M Compston
Date : 17th October 2023
Previous Date : -
pH : 7.5
FRC : <0.1
Temp 1 :
Temp 2 :

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/02

	Aspect	Cur.	Prev.	Rec.	Remarks
A	Supply Water	-	-	-	
B	Supply System	-	-	-	
C	Point Condition	-	-	-	
D	Turnover	-	-	-	
E	Incubation	-	-	-	
F	Acidity	-	-	-	
G	Exposed Populace	-	-	-	
H	Infection Risk	-	-	-	
TOTALS		-	-	-	Drained and Isolated

WATER QUALITY RISK ASSESSMENT

ASSESSMENT TOTAL 13

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Source Description : Gas Fired Water Heater 1
Assessment Justification : Hot Water Generation & Storage
Assessor : Mr C Mitchell/Mr M Compston
Date : 17th October 2023
Previous Date : -
pH : 7.5
FRC : <0.1
Temp 1 : 62.9°C
Temp 2 : 56.7°C

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/03

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	2	2	Supplied from CWS Tank Ref. 5261-01.
B	**Supply System**	**1**	1	1	
C	**Point Condition**	**2**	1	1	Draw off discoloured.
D	**Turnover**	**2**	2	2	Daily
E	**Incubation**	**1**	1	1	Temperature >55°C
F	**Acidity**	**3**	3	3	
G	**Exposed Populace**	**1**	1	1	
H	**Infection Risk**	**1**	1	1	
TOTALS		**13**	12	12	

WATER QUALITY RISK ASSESSMENT

ASSESSMENT TOTAL 0

High		>22
High Med.		20-22
Low Med.		17-19
Low		<17

Source Description : Gas Fired Water Heater 2
Assessment Justification : Hot Water Generation & Storage
Assessor : Mr C Mitchell/Mr M Compston
Date : 17th October 2023
Previous Date : -
pH : 7.5
FRC : <0.1
Temp 1 :
Temp 2 :

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/04

	Aspect	Cur.	Prev.	Rec.	Remarks
A	Supply Water	-	-	-	
B	Supply System	-	-	-	
C	Point Condition	-	-	-	
D	Turnover	-	-	-	
E	Incubation	-	-	-	
F	Acidity	-	-	-	
G	Exposed Populace	-	-	-	
H	Infection Risk	-	-	-	
TOTALS		-	-	-	Drained & Isolated

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 15

Source Description	:	Ground Floor DSR (359/G/49) Sink Cold
Assessment Justification	:	Sentinel Outlet (Nearest)
Assessor	:	Mr C Mitchell/Mr M Compston
Date	:	17th October 2023
Previous Date	:	-
pH	:	7.5
FRC	:	<0.1
Temp 1	:	11.3°C
Temp 2	:	

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/05

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	2	2	Supplied from CWS Tank Ref. 5261-01.
B	**Supply System**	**1**	1	1	
C	**Point Condition**	**1**	1	1	
D	**Turnover**	**2**	2	2	Daily.
E	**Incubation**	**3**	3	3	Temp <20°C.
F	**Acidity**	**3**	3	3	6.2 - 6.6 or 7.2 - 9.1.
G	**Exposed Populace**	**2**	2	2	Normal use.
H	**Infection Risk**	**1**	1	1	
TOTALS		**15**	15	15	

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 13

Source Description	:	Ground Floor DSR (359/G/49) Sink Hot
Assessment Justification	:	Sentinel Outlet (Nearest)
Assessor	:	Mr C Mitchell/Mr M Compston
Date	:	17th October 2023
Previous Date	:	-
pH	:	7.5
FRC	:	<0.1
Temp 1	:	66.6°C
Temp 2	:	

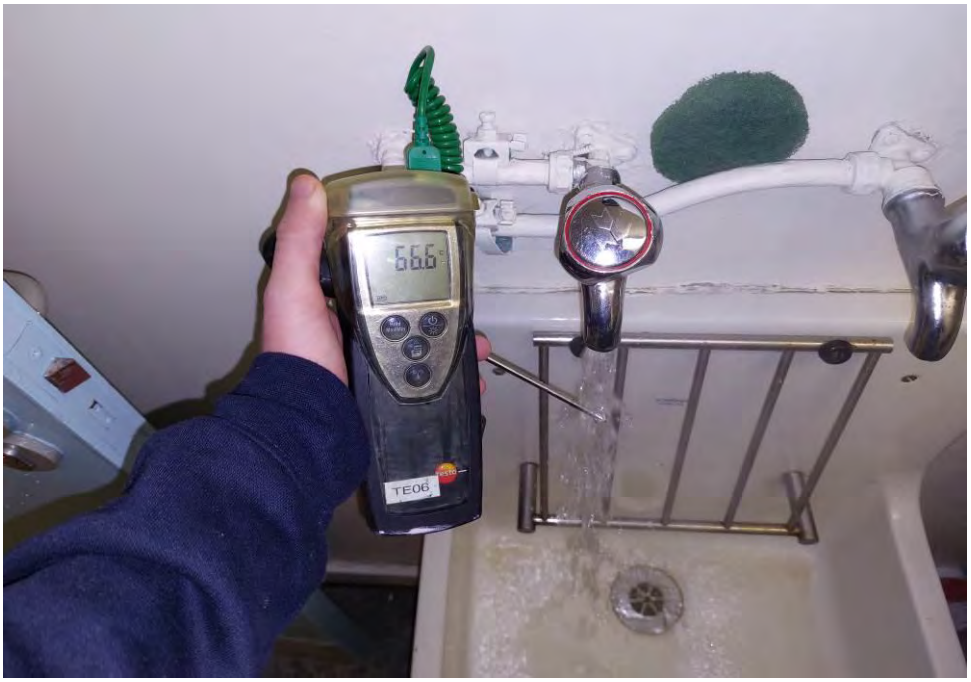
High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/06

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	2	2	Supplied from DHWS Ref. 5261-03.
B	**Supply System**	**1**	1	1	
C	**Point Condition**	**1**	1	1	
D	**Turnover**	**2**	2	2	Daily
E	**Incubation**	**1**	1	1	Temp >60°C - Scald hazard.
F	**Acidity**	**3**	3	3	
G	**Exposed Populace**	**2**	2	2	
H	**Infection Risk**	**1**	1	1	
TOTALS		**13**	13	13	



WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 18

Source Description	:	Health Education/Physio (359/G/36) Sink Cold
Assessment Justification	:	Sentinel Outlet (Furthest)
Assessor	:	Mr C Mitchell/Mr M Compston
Date	:	17th October 2023
Previous Date	:	4th March 2021
pH	:	7.5
FRC	:	<0.1
Temp 1	:	12.1°C
Temp 2	:	

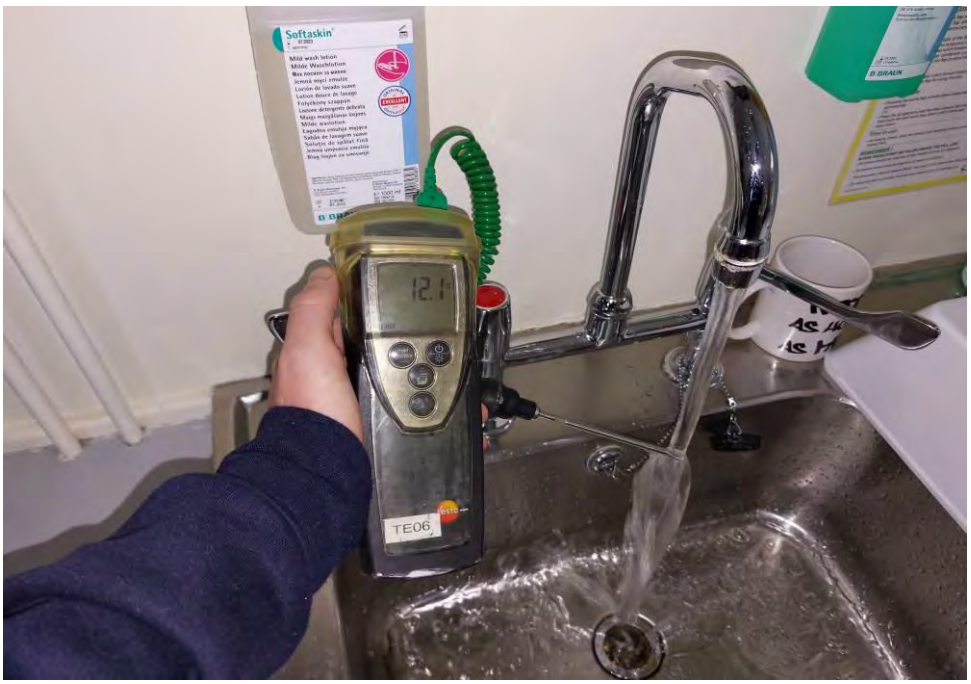
High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/07

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	2	2	Supplied from CWS Tank Ref. 5261-01.
B	**Supply System**	**1**	1	1	
C	**Point Condition**	**1**	1	1	
D	**Turnover**	**6**	2	3	
E	**Incubation**	**3**	3	3	Temperature <20°C
F	**Acidity**	**3**	3	3	
G	**Exposed Populace**	**1**	2	1	
H	**Infection Risk**	**1**	1	1	
TOTALS		**18**	15	15	



WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 18

Source Description	:	Health Education/Physio (359/G/36) Sink Hot
Assessment Justification	:	Sentinel Outlet (Furthest)
Assessor	:	Mr C Mitchell/Mr M Compston
Date	:	17th October 2023
Previous Date	:	4th March 2021
pH	:	7.5
FRC	:	<0.1
Temp 1	:	66.8°C
Temp 2	:	

High >22
High Med. 20-22
Low Med. 17-19
Low <17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/08

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	2	2	Supplied from DHWS Ref. 5261-03.
B	**Supply System**	**3**	1	1	Ineffective Hot Water Circulation. Pipework Partially Insulated.
C	**Point Condition**	**1**	1	1	
D	**Turnover**	**6**	2	3	
E	**Incubation**	**1**	3	1	Temperature >55°C
F	**Acidity**	**3**	3	3	
G	**Exposed Populace**	**1**	2	1	
H	**Infection Risk**	**1**	3	1	
TOTALS		**18**	15	13	

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 17

High	>22	
High Med.	20-22	
Low Med.	17-19	
Low	<17	

Source Description : Male Public Toilet (359/G/39) WHB Cold
Assessment Justification : Public Use
Assessor : Mr C Mitchell/Mr M Compston
Date : 17th October 2023
Previous Date : 4th March 2021
pH : 7.5
FRC : <0.1
Temp 1 : 12.2°C
Temp 2 :

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/09

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	2	2	Supplied from CWS Tank Ref. 5261-01.
B	**Supply System**	**1**	1	1	
C	**Point Condition**	**1**	1	1	
D	**Turnover**	**2**	2	2	
E	**Incubation**	**3**	3	3	Temperature <20°C
F	**Acidity**	**3**	3	3	
G	**Exposed Populace**	**2**	2	2	Normal use.
H	**Infection Risk**	**3**	3	3	At risk patients/populace.
TOTALS		**17**	17	17	

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 19

Source Description	:	Male Public Toilet (359/G/39) WHB Hot
Assessment Justification	:	Bottled Water
Assessor	:	Mr C Mitchell/Mr M Compston
Date	:	17th October 2023
Previous Date	:	4th March 2021
pH	:	7.5
FRC	:	<0.1
Temp 1	:	38.7°C
Temp 2	:	64.9°C (Inlet)

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/10

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	2	2	Supplied from DHWS Ref. 5261-03.
B	**Supply System**	**1**	1	1	
C	**Point Condition**	**1**	1	1	
D	**Turnover**	**2**	2	2	
E	**Incubation**	**5**	5	5	Temp >20°C and <50°C. Thermostatically controlled.
F	**Acidity**	**3**	3	3	
G	**Exposed Populace**	**2**	2	2	
H	**Infection Risk**	**3**	3	3	
TOTALS		**19**	19	19	

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 20

High	>22	
High Med.	20-22	
Low Med.	17-19	
Low	<17	

Source Description : 1st Floor Staff Kitchen Sink Cold (MWS)
Assessment Justification : Drinking Water/Culinary Uses
Assessor : Mr C Mitchell/Mr M Compston
Date : 17th October 2023
Previous Date : 4th March 2021
pH : 7.5
FRC : <0.1
Temp 1 : 11.2°C
Temp 2 :

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/11

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	2	2	Mains Water Supply.
B	**Supply System**	**2**	1	1	Effective Dead Legs – HSPU.
C	**Point Condition**	**1**	1	1	
D	**Turnover**	**2**	2	2	Daily.
E	**Incubation**	**3**	3	3	Temp <20°C.
F	**Acidity**	**3**	3	3	
G	**Exposed Populace**	**2**	2	2	
H	**Infection Risk**	**5**	5	5	Drinking Water - Ingestion Risk.
TOTALS		**20**	19	19	

WATER QUALITY RISK ASSESSMENT **ASSESSMENT TOTAL 13**

High		>22
High Med.		20-22
Low Med.		17-19
Low		<17

Source Description : 1st Floor Staff Kitchen Sink Hot (DHWS)
Assessment Justification :
Assessor : Mr C Mitchell/Mr M Compston
Date : 17th October 2023
Previous Date : 4th March 2021
pH : 7.5
FRC : <0.1
Temp 1 : 68.3°C
Temp 2 :

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/12

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	2	2	Supplied from DHWS Ref. 5261-03.
B	**Supply System**	**1**	1	1	
C	**Point Condition**	**1**	1	1	
D	**Turnover**	**2**	2	2	Daily.
E	**Incubation**	**1**	1	1	Temp >60°C - Scald hazard.
F	**Acidity**	**3**	3	3	
G	**Exposed Populace**	**2**	2	2	
H	**Infection Risk**	**1**	1	1	
TOTALS		**13**	13	13	

WATER QUALITY RISK ASSESSMENT

ASSESSMENT TOTAL 21

High >22
High Med. 20-22
Low Med. 17-19
Low <17

Source Description : Consulting Room 8 WHB Cold
Assessment Justification :
Assessor : Mr C Mitchell/Mr M Compston
Date : 17th October 2023
Previous Date : 4th March 2021
pH : 7.5
FRC : <0.1
Temp 1 : 21.3°C
Temp 2 : 14.5°C

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/13

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	2	2	Supplied from CWS Tank Ref. 5261-01.
B	**Supply System**	**3**	1	2	Pipework Not Insulated. Long Supply Line.
C	**Point Condition**	**1**	1	1	
D	**Turnover**	**4**	2	3	
E	**Incubation**	**5**	3	3	Temperature >20°C.
F	**Acidity**	**3**	3	3	
G	**Exposed Populace**	**2**	2	2	
H	**Infection Risk**	**1**	1	1	
TOTALS		**21**	15	17	

WATER QUALITY RISK ASSESSMENT

ASSESSMENT TOTAL 16

High >22
High Med. 20-22
Low Med. 17-19
Low <17

Source Description : Consulting Room 8 WHB Hot
Assessment Justification :
Assessor : Mr C Mitchell/Mr M Compston
Date : 17th October 2023
Previous Date : 4th March 2021
pH : 7.5
FRC : <0.1
Temp 1 : 66.3°C
Temp 2 :

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/14

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	2	2	Supplied from DHWS Ref. 5261-03.
B	**Supply System**	**2**	1	2	Pipework Not Insulated. Long Supply Line.
C	**Point Condition**	**1**	1	1	
D	**Turnover**	**4**	2	3	
E	**Incubation**	**1**	1	1	Temperature >55°C
F	**Acidity**	**3**	3	3	
G	**Exposed Populace**	**2**	2	2	
H	**Infection Risk**	**1**	1	1	
TOTALS		**16**	13	15	

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 16

Source Description	:	Extension Consulting Room 3 Sink Cold
Assessment Justification	:	Sentinel Outlet
Assessor	:	Mr C Mitchell/Mr M Compston
Date	:	17th October 2023
Previous Date	:	4th March 2021
pH	:	7.5
FRC	:	<0.1
Temp 1	:	12.3°C
Temp 2	:	

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/15

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	2	2	Mains Water Supply.
B	**Supply System**	**2**	3	2	Effective Dead Legs.
C	**Point Condition**	**1**	1	1	
D	**Turnover**	**2**	2	2	
E	**Incubation**	**3**	5	3	Temperature <20°C
F	**Acidity**	**3**	3	3	
G	**Exposed Populace**	**2**	2	2	
H	**Infection Risk**	**1**	1	1	
TOTALS		**16**	19	16	

WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 14

Source Description	:	Extension Consulting Room 3 Sink Hot (359/G/57)
Assessment Justification	:	Point-of-Use Heater
Assessor	:	Mr C Mitchell/Mr M Compston
Date	:	17th October 2023
Previous Date	:	4th March 2021
pH	:	7.5
FRC	:	<0.1
Temp 1	:	58.6°C
Temp 2	:	

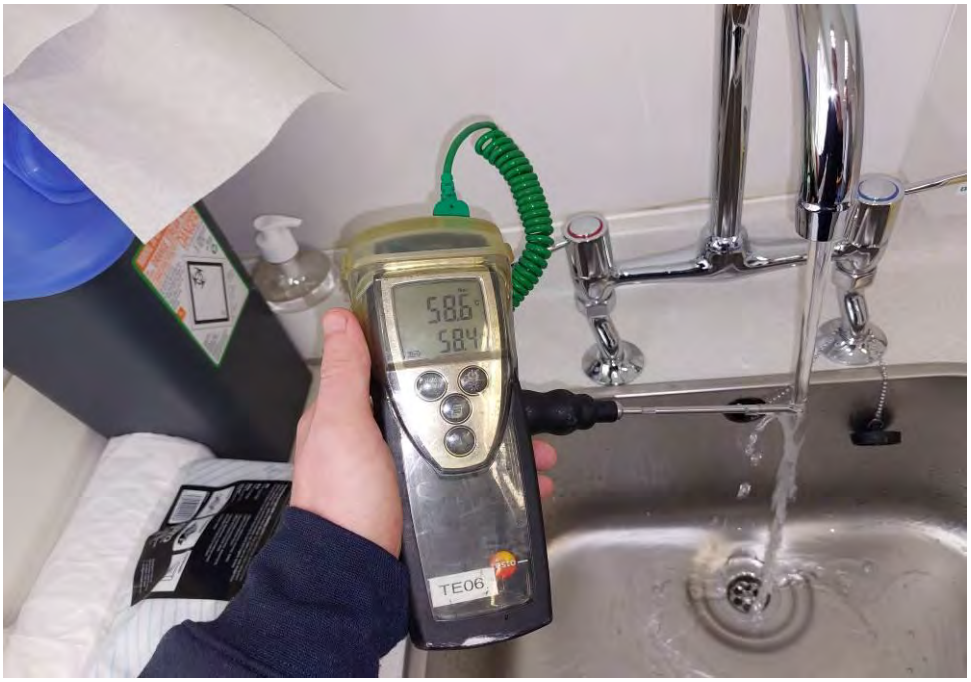
High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/16

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	2	2	Supplied from POUH.
B	**Supply System**	**2**	1	1	Effective Dead Legs.
C	**Point Condition**	**1**	1	1	
D	**Turnover**	**2**	2	2	Daily.
E	**Incubation**	**1**	1	1	Temperature >55°C
F	**Acidity**	**3**	3	3	
G	**Exposed Populace**	**2**	2	2	
H	**Infection Risk**	**1**	1	1	
TOTALS		**14**	13	13	



WATER QUALITY RISK ASSESSMENT — ASSESSMENT TOTAL 17

Source Description	:	Portacabin Consulting Room 4 Mixer
Assessment Justification	:	Point-of-Use Heater
Assessor	:	Mr C Mitchell/Mr M Compston
Date	:	17th October 2023
Previous Date	:	4th March 2021
pH	:	7.5
FRC	:	<0.1
Temp 1	:	44.6°C
Temp 2	:	58.3°C

High	>22
High Med.	20-22
Low Med.	17-19
Low	<17

Client: NHS Lothian

Site: East Calder Health Centre
East Calder

Reference: 5261/16

	Aspect	Cur.	Prev.	Rec.	Remarks
A	**Supply Water**	**2**	-	2	Supplied from POUH.
B	**Supply System**	**1**	-	1	
C	**Point Condition**	**1**	-	1	
D	**Turnover**	**2**	-	2	
E	**Incubation**	**5**	-	5	Temp >20°C and <50°C. Thermostatically controlled.
F	**Acidity**	**3**	-	3	
G	**Exposed Populace**	**2**	-	2	
H	**Infection Risk**	**1**	-	1	
TOTALS		**17**	-	17	

REMEDIAL ACTION PLAN

Service	Remedial Action	Date Added	Priority	Status	Target Date	Date Complete
Gas Fired Water Heater	Storage temperature to be lowered slightly to minimise the risk of scalding.	October 2023	**3**	New	3 Months	
DHWS System	Investigate poor circulation to Health Education Room.	March 2021	**2**	Outstanding	1 Month	
Dead Legs	Install a double check valve on MWS at the branch point to heating system pressurisation unit.	December 2017	**2**	Outstanding	1 Month	
	Physically disconnect flexible quick-fill connection to heating system pressurisation unit under normal operation.	December 2017	**2**	Outstanding	1 Month	
Effective dead legs	Ensure flushing of rarely used outlets is carried out, Legionella positive result from Porto cabins highlights the need for regular flushing	October 2023	**3**	New	Ongoing	

REMEDIAL ACTION PLAN

Priority	Target Timescale	Description
1	Immediately	A wholly unsatisfactory arrangement which requires immediate attention. May represent a failure of the control scheme resulting in conditions suitable for the growth of micro-organisms. Requires urgent investigation and/or remedial action.
2	As Soon As Reasonably Practicable (No later than 1 Month)	Remedial Work required to reduce the risks to a satisfactory level.
3	In a Timely Manner (No later than 3 Months)	Minor remedial work which is often simple and inexpensive and can reduce the risks to a satisfactory level.
4	At First Available Opportunity (No Later than 6 Months)	Improvements that can be carried out during Planned Preventative Maintenance activities to reduce the risks associated with water quality deterioration.

CONTROL MEASURES

Service	Control Measure	Frequency	Procedure Reference*
Gas Fired Water Heaters	Purge any debris in the base of the calorifier to a suitable drain. Collect the initial flush from the base of hot water heaters to inspect clarity, quantity of debris and temperature.	Annually.	**32-06 - 8**
	Check storage temperatures (thermostat settings should modulate as close to 60°C as practicable without going below 60°C). Check calorifier return temperature is not below 55°C.	Monthly.	**SHTM 04-01 - 3**
Hot Water Services	Take temperatures at return leg of principal loop (sentinel point) to confirm they are at a minimum of 55°C. Temperature measurements should be taken on the surface of metallic pipework.	Monthly.	**SHTM 04-01 - 5**
	Take temperatures at return legs of subordinate loops to confirm they are at a minimum of 55°C, temperature measurements should be taken on the surface pipes.	Quarterly (on a rolling monthly rota).	**SHTM 04-01 - 6**
	Take temperatures at a representative selection of outlets to confirm they are at a minimum of 55°C to create a temperature profile of the whole system over a defined time period. Temperatures can be taken from untempered outlets or at the inlet to thermostatic mixing valves/taps.	Representative selection of outlets considered on an annual basis on a monthly rota.	**SHTM 04-01 - 7**
Electric Point of Use Heater	Check water temperatures to confirm the heater operates at 55°C-60°C or check the installation has a high turnover.	Monthly.	**SHTM 04-01 - 8**

CONTROL MEASURES

Service	Control Measure	Frequency	Procedure Reference*
Cold Water Tanks	Inspect cold water storage tank overflow, warning and vent pipes to ensure they are intact and screens free from damage or blockages.	Annually.	**56-02**
	Inspect tank internal surfaces for signs of sediment, corrosion or bio-fouling and carry out hygienic maintenance works where necessary.	Annually.	**56-02**
	Check the tank water temperature remote from the ball valve and the incoming mains temperature. Record the maximum temperatures of the stored and supply water recorded by fixed maximum/minimum thermometers where fitted.	Annually (Summer) or as indicated by the temperature profiling.	**SHTM 04-01 - 14**
Cold Water Services	Check temperatures at sentinel taps (typically those nearest to and furthest from the cold tank, but may also include other key locations on long branches to zones or floor levels). These outlets should be below 20°C within two minutes of running the cold tap. To identify any local heat gain, which might not be apparent after one minute, observe the thermometer reading during flushing.	Monthly.	**SHTM 04-01 - 11**
	Take temperatures at a representative selection of other points to confirm they are below 20°C to create a temperature profile of the whole system over a defined time period. Peak temperatures or any temperatures that are slow to fall should be an indicator of a localised problem.	Representative selection of outlets considered on an annual basis on a monthly rota.	**SHTM 04-01 - 12**
Strainers	Remove strainer, clean and de-scale.	Annually.	**SHTM 04-04 - 3**

CONTROL MEASURES

Service	Control Measure	Frequency	Procedure Reference*
System Conditions	Check pipework and thermal insulation to ensure it is intact and free from damage leaks and corrosion.	Annually.	-
	Inspect all outlets for signs of contamination and scale and clean where necessary, using clean disposable cloths and appropriate sanitising/descaling agents.	Annually	-
Infrequently Used Outlets	Infrequently used equipment within a water system (i.e. not used for a period equal to or greater than seven days) should be included on the flushing regime. Flush the outlets until the temperature at the outlet stabilises and is comparable to supply water and purge to drain. Sustain and log this procedure once started.	Twice Weekly.	-
TMVs	Inspect, clean, de-scale and disinfect any strainers or filters associated with TMVs. To maintain protection against scald risk, TMVs require routine maintenance carried out by competent persons in accordance with the manufacturer's instructions. There is further information in HSG 274 paragraphs 2.152-2.168.	Six Monthly.	**SHTM 04-04**

Controls Measures incorporate those outlined in HSG274 Table 2.1, together with additional measures identified by Risk Assessment.

APPENDIX I:

BIBLIORAPHY

APPENDIX I– BIBLIORAPHY

1. Health and Safety at Work Act 1974
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9. Approved Code of Practice and Guidance: Legionnaires' Disease The control of legionella bacteria in water systems (L8) 2013
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17. CIBSE TM13 Minimising the risk of Legionnaire's Disease 2013
18. Water Regulations Advisory Scheme (WRAS) Water Regulations Guide 2004
19. Water Regulations Advisory Scheme (WRAS) Water Fittings and Materials Guide 2005
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25. Pool Water Treatment Advisory Group (PWTAG) document 'Swimming Pool Water Treatment and quality standards' 2009
26. BSRIA Application Guide to Legionellosis AG19/2000: Operation and Maintenance
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NHS Lothian
East Calder Health Centre
Livingston

October 2023

APPENDIX II:

SAMPLE ANALYSIS RESULTS

WATER SAMPLE ANALYSIS RESULTS (LEGIONELLA)

Client Name and Site Address	**Report To:**	**Job No.:**
NHS Lothian East Calder Health Centre	M. Mastaglio **Surveyor:** C. Mitchell/M. Compston	5261/17/2 **Page No. 1 of 1**

Sampling Date	**Date to Lab**	**Analysis Commenced**	**Analysis Completed**
17/10/2023	17/10/2023	18/10/2023	29/10/2023

Analysis performed at Westfield Caledonian's UKAS accredited testing laboratory No. 4042

				Positive	
Sample No.	**Source Description**	**Sample Type**	**Result** (Note 1)	**Type** (Note 2)	**CFU Count** (Note 3)
1	Gas Fired Water Heater Drain	Pre-Flush	ND		
2	CWS Tank No.1	Dip	ND		
3	Health Education Room Sink Hot	Pre-Flush	ND		
4	Male Public Toilet G/39 WHB Hot	Pre-Flush	Positive	**L.sp**	**3,142**
5	Extension Consulting Room 3 G/57 Sink Hot	Pre-Flush	ND		
6	New Portacabin Consulting Room 4 WHB Mixer	Pre-Flush	Positive	**L.sp**	**57**
7	Consulting Room 8 G/05 Sink Hot	Pre-Flush	ND		

Note 1. ND: No *Legionella* detected (<20CFU/1000ml)
Note 2. Lp = *Legionella pneumophila*, SG = Serogroup, L.Sp. = *Legionella* Species
Note 3. Estimated CFU count in 1000 ml based on portion of concentrated sample analysed, or *CFU count in volume filtered

PAGE NO	CLIENT NAME & SITE ADDRESS	CONTACT(S) NAME & TEL NO	SURVEYOR	JOB NO.
1	NHS Lothian East Calder Health Centre	M. Mastaglio	C. Mitchell/M. Compston	5261/17/2 SURVEY DATE: 17/10/2023

SAMPLE NO.	LOCATION & DESCRIPTION	[Cl] ppm	SAMPLE TYPE	pH	°C	REMARKS
1	Gas Fired Water Heater Drain	<0.2	Pre-Flush	7.6	64.9	Slightly discoloured.
2	CWS Tank No.1	<0.2	Dip	7.6	11.2	
3	Health Education Room Sink Hot	<0.2	Pre-Flush	7.6	66.8	
4	Male Public Toilet G/39 WHB Hot	<0.2	Pre-Flush	7.6	38.7	Inlet to TMV @ 64.9°C.
5	Extension Consulting Room 3 G/57 Sink Hot	<0.2	Pre-Flush	7.6	58.6	
6	New Portacabin Consulting Room 4 WHB Mixer	<0.2	Pre-Flush	7.6	44.6	Inlet to mixer hot @ 58.3°C.
7	Consulting Room 8 G/05 Sink Hot	<0.2	Pre-Flush	7.6	66.3	

POTABLE WATER SAMPLE ANALYSIS

Client Name and Site Address	**Report To:**	**Job No.:**
NHS Lothian East Calder Health Centre	M. Mastaglio **Surveyor:** C. Mitchell/M. Compston	5261/17/2 **Page No. 1 of 1**

Sampling Date	**Date to Lab**	**Analysis Commenced**	**Analysis Completed**
17/10/2023	17/10/2023	18/10/2023	21/10/2023

Analysis performed at Westfield Caledonian's UKAS accredited testing laboratory No. 4042

Sample No.	**Source Description**	**Sample Type**	**2 Day 37°C TVC/ml**	**3 Day 22°C TVC/ml**	**Coliforms cfu/100ml**	**E. coli cfu/100 ml**	**Other ***
1	CWS Tank No.1	Dip	0	0	0	0	
2	1st Floor Staff Kitchen Sink	Post-Flush	1	1	0	0	
3	Ground Floor DSR Sink Cold	Post-Flush	1	1	0	0	
4	Health Education Room Sink Cold	Post-Flush	0	0	0	0	
5	Extension Consulting Room 3 G/57 Sink Cold	Post-Flush	0	2	0	0	
6	Consulting Room 8 G/05 Sink Cold	Post-Flush	0	0	0	0	

GUIDE LEVELS
2 day 37°C and 3 Day 22°C TVC (Total Viable Counts) should show no significant increase.
Coliforms and *E.coli* should not be present (i.e. 0cfu in 100ml).
*Other - *Pseudomonas aeruginosa* should not be present (i.e. 0cfu in 100ml).
**Other- *Enterococci* should not be present (i.e. 0cfu in 100 ml).

PAGE NO	CLIENT NAME & SITE ADDRESS	CONTACT(S) NAME & TEL NO	SURVEYOR	JOB NO.
1	NHS Lothian East Calder Health Centre	M. Mastaglio	C. Mitchell/M. Compston	5261/17/2 SURVEY DATE: Date

SAMPLE NO.	LOCATION & DESCRIPTION	[Cl] ppm	SAMPLE TYPE	pH	°C	REMARKS
1	CWS Tank No.1	<0.2	Dip	7.6	11.2	
2	1st Floor Staff Kitchen Sink	<0.2	Post-Flush	7.6	11.2	
3	Ground Floor DSR Sink Cold	<0.2	Post-Flush	7.6	11.3	
4	Health Education Room Sink Cold	<0.2	Post-Flush	7.6	12.1	
5	Extension Consulting Room 3 G/57 Sink Cold	<0.2	Post-Flush	7.6	12.3	
6	Consulting Room 8 G/05 Sink Cold	<0.2	Post-Flush	7.6	21.3	Cold water too warm.

APPENDIX III:

SCHEMATIC DRAWING

Procedure Reference	Operation
5.1	FAILURE OF WATER SYSTEM CONTROL MEASURES
5.2	POSITIVE LEGIONELLA TEST RESULT
5.3	EMERGENCY REPAIRS
5.4	DISINFECTION OF WATER SYSTEM
5.5	DOMESTIC FLUSHING

THE FOLLOWING PAGES DESCRIBE OUT-OF-SPECIFICATION TEST RESULT AND / OR WHERE *LEGIONELLA* HAS BEEN IDENTIFIED AND/OR BACTERIA COUNTS BEING INEXCESS OF THE RECOMMENDED LIMITS IN THE WATER SYSTEM ARE IDENTIFIED.

The Health and Safety at Work Act places a duty on employers to ensure, so far as is reasonably practicable, the maintenance of safe working conditions without risks to health, not only to employees, but also to the general public.

The risk to personnel associated with the presence of *Legionella* depends on a number of variables and may be quite low. However, since the actions to eradicate it are straightforward and reasonably practicable, it would be wise to put them in hand without delay if *Legionella* has been identified.

When analysis confirms that the levels of bacteriological contamination are in excess of acceptable limits, and/or the presence of Coliforms or *E.coli* is identified, the procedures recommended in this section should be applied.

5.1 Failure of Water System Control Measures:

Where any reported test result, non-compliance issue or defect is made known which affects the integrity of the water system and indicates the failure of Control Measures and / or increased risk of Legionella the following procedures shall be followed and duly recorded within Section 2.3 of this document and brought to the attention of the relevant Infection Control Team, Assurance team and Water Management Group.

IN ALL CASES A NON-CONFORMANCE REPORT SHOULD BE OPENED BY THE ASSURANCE TEAM TO DOCUMENT AND CONTROL ACTIONS.

5.2 Positive Legionella Test Result

Microbiological Sampling (Legionella)
Sampling requirements and frequency are to be formulated by St Michael's Hospital and Water Safety Plan/Written Scheme should be updated as appropriate.

Legionella testing may be required:

- In systems where the temperature control regimes are not consistently achieved, frequent testing e.g. weekly should be carried out to provide early warning of loss of control. Once the system is brought back under control as demonstrated by monitoring, the frequency of testing should be reviewed.
- Weekly checks are recommended until the system is brought under control;
- When an outbreak is suspected or has been identified;
- In wards with at-risk patients

As a minimum, samples should be taken as follows:

- From the cold-water storage and the furthermost outlet from the tank, on every loop;
- From the calorifier flow, or the closest tap to the calorifier, and the furthermost tap on the hot water service circulating system (these should be identified on sentinel outlet register);
- Additional samples should be taken from the base of the calorifier via drain valves;
- From areas where the target control parameters are not met (i.e. where temperatures are below 55°c for hot water systems or ≥20°c for cold water systems);
- From areas subject to low usage, stagnation, excess storage capacity, dead legs, excessive heat loss, crossflow from the water system or other anomaly.
- High Risk Patient Areas
- Additional random samples may also be considered appropriate where systems are known to be susceptible to colonisation.

The temperature control regime is the preferred strategy for reducing the risk from *Legionella* and other waterborne organisms in water systems. This will require monitoring on a regular basis.

HSG 274 Part 2 Table 2.3 Actions to be taken following Legionella sampling in hot and cold water systems in healthcare premises with susceptible patients

Legionella bacteria (cfu/Litre)	**Recommended Actions**
Not detected or up to 100cfu/l	In healthcare, the primary concern is protecting susceptible patients, so any detection of Legionella should be investigated and, if necessary, the system resample to aid interpretation of the results in line with the mentoring strategy and risk assessment
>100cfu/l and up to 1000 cfu/l	Either: • If the minority of sample are positive, the system should be resampled. If similar results are found again, review the control measures and risk assessment to identify any remedial actions necessary or • If the majority of samples are positive, the system may be colonised, albeit at a low level. An immediate review of control measures and a risk assessment should be carried out to identify any other remedial action required. Disinfection of the system should be considered
>1000cfu/l	The system should be resample and an immediate review of the control measures and risk assessment carried out to identify any remedial actions, including possible disinfection of the system. Retesting should take place a few days after disinfection and at frequent intervals thereafter until a satisfactory level of control is achieved

Communication pathway for Legionella results from water samples:

Water samples are sent to; UKASS-accredited laboratories which provide this service for NHS and other organisations that manage buildings. Reports will come back initially to the estates department.

Negative water samples are recorded as part of the documentation of Legionella control. If they are related to investigation of an "incident" such as a clinical case or a previous positive sample then these results are communicated to those managing that incident.

The information on the report which needs to be communicated is:

- Date of sampling
- Location and type of water outlet
- Identification of the organism, (Legionella pneumophila with or Legionella species other than L pneumophila.)
- Count of organisms per Litre.

Estates will

- Inspect the system and take further action in accordance with HSE guidance and locally agreed procedures
- Inform Charge Nurse and or Clinical Nurse Manager of the Clinical Area concerned if appropriate of any control measures being taken/required
- Inform Area Manager for the Sector if appropriate.

The results of this initial risk assessment must be communicated to all those noted above and also to the Facilities Area Manager for the site involved.

The Infection Control Manager for Infection Prevention and Control will inform NHS Lothian

If there is impact on patient care then an Incident Management Team (IMT) may be convened to assess the risk and further actions.

5.3 Emergency Repairs

Emergency repairs may be required at any time and should be undertaken by trained and competent personnel. Such repairs can vary from a simple repair to a section of pipe work, replacement of a component or major burst or loss of service. In all such cases the integrity and safety of the water distribution system must be maintained at all times. All repairs will be raised through the Estates Helpdesk process through Agility; this will be assigned to trained and competent personnel to attend.

5.4 Disinfection of Water System and Components

There are a number of different chemical and thermal disinfection methods available ALL of which shall be undertaken by trained and competent personnel in strict accordance with all Statutory Requirements, Safety Precautions and Manufacturers Instructions.

Disinfection - is the process of destroying or inactivating Pathogenic organisms and is generally applied to the water supply.

Sterilisation – is the process of destroying or inactivating all Organic Life Forms and is generally applied to all systems of transmission and storage materials.

In ALL instances no matter what disinfection method is employed, due regard shall be taken of patient groups, specialist equipment and processes which may be sensitive to the disinfection process being used – eg Renal Dialysis patients **must not** be exposed to Silver Hydrogen Peroxide chemicals as such the RO Water Treatment Plant and Dialysis Machines must be disconnected from the water system until the disinfection process is completed.

Silver Hydrogen Peroxide should NOT be used for a period of 90 days or longer, as required by the Drinking Water Inspectorate.

The disinfection process may be required for the following situations:

REPAIRS -	Repair fittings and exposed pipe ends should be clean and disinfected before use. Such items should be sprayed with a suitable disinfection solution such as a Sodium Hypochlorite @ strength of 1000 mg/l (1000ppm) with a minimum contact time of 5 minutes or equal and approved.
MINOR ALTERATIONS -	Pipework should be cleaned internally by spraying with a suitable disinfection solution such as a Sodium Hypochlorite @ strength of 1000 mg/l (1000ppm) or where pipes are long and internal surfaces cannot be reached with sprays then a swab soaked in a solution of 50mg/l (50ppm) with a contact time of one hour or equal and approved.
NEW SUPPLY PIPEWORK -	Pipes are filled with a solution such as a Sodium Hypochlorite @ strength of 20 mg/l (20ppm) with a contact time of 24 hours. Or Sodium Hypochlorite and water at strength of 50mg/l (50ppm) for a contact period of one hour. Minimum free chlorine after one hour – 30mg/l (30ppm) or equal and approved
SYSTEM DISINFECTION -	This will include water storage tanks and possibly the water distribution system. The advice and use of Legionella Control Association (LCA) approved contractors will be used for this purpose

5.5 Domestic Flushing

The domestic staff is required to run (flushing) of water outlets (taps and Showers) will take place on a daily basis during the cleaning of the room or facility. The length of the process must be sufficient ensure the supply of fresh water to the outlet. The water will be run a minimum period of 3 minutes.

Where Domestic Staff cannot access a room or facility for cleaning and outlet run through (due to clinical or operations reasons) this must be reported to the clinical teams and the Domestic Supervisor. This will be recorded on the Completion of Tasks weekly sheet.