The Royal Wolverhampton NHS Trust

Water Safety Policy
OP 79

Contents

1.0 Policy Statement

The aim of this Policy is to instruct staff on structured processes and reporting schedules, for the management and control of water namely Legionellosis, including legionnaires disease, in compliance with current guidelines (HTM's, HGN's, Model Engineering Specifications and Approved Codes of Practice), legislation and water supply regulations. The Trust also has a general duty under the health and safety at work act, reference must be made to HS 01 for the management of health and safety.

As required by the Health and Safety Commissions (2013) Approved Code of Practice (L8) and HSWA, the Trust will undertake to:

1. Appoint a person to be managerially responsible
2. Identify and assess sources of risk
3. Prepare a scheme for preventing, reducing or controlling the risk
4. Implement manage and monitor precautions
5. Keep records of the precautions implemented and will do so for each of the health care premises within the Trust's control

2.0 Definitions

Trust's premises:	For the purpose of this Policy, Trust premises comprise of all properties whether owned or occupied by the Trust under lease or other Service Level Agreements (SLAs). Where the management of buildings/areas occupied by Trust staff and/or patients is carried out by others, the requirements of this Policy remain applicable although implementation of the site specific risk management requirements is managed by local policies. It remains therefore, the Trust's responsibility to ensure that the requirements of this Policy are notified to and complied with by all other parties described above.
AE:	Authorising Engineer
BS:	British Standard
COSHH:	Control of Substances Hazardous to Health
DIPC:	Director of Infection Prevention and Control
HBN:	Health Building Note
HSWA:	Health and Safety at Work Act
HTM:	Health Technical Memorandum
IP:	Infection Prevention
IPCG:	Infection Prevention and Control Group
PPM:	Planned Preventative Maintenance
SLA:	Service Level Agreement
WHO:	World Health Organisation
WSG:	Water Safety Group
WSP:	Water Safety Plan

3.0 Accountabilities

It is expected that this Water Safety Policy will be complied with by all Trust's employees, consultants and by all appointed contractors, in whatsoever capacity, with or without contractual agreements. Furthermore, this Policy will be used in conjunction with current version of the Trust's Water Safety Plan (WSP).

It is the responsibility of the Trust Management Committee to authorise the ratification of this Water Safety Policy.

The Trust delegates responsibility for the implementation of this policy to the Chief Executive. The Chief Executive will:

1. Have overall responsibility for ensuring compliance with all statutory regulations.
2. Appoint, in writing, a Trust Water Safety Group (WSG) consisting of responsible persons from all pertinent departments to take implementation responsibility for the control of 'Water Safety' and to be legally accountable, on a joint and several liability basis, for assessing and controlling identified risks from Legionella and Pseudomonas aeruginosa and Safe Hot Water Management Programmes.

General:

3. **Responsible Person (Estates)** will have responsibility for the management of site specific deputy responsible persons, appointed by the WSG, who will have overall management responsibility for the control of the domestic hot and cold water services and to be responsible for assessing and controlling identified risks from Legionella and Pseudomonas aeruginosa on a particular site or area of the Trust.

4. **Site Specific or Deputy Responsible Persons (Estates)** Site specific responsibility will be devolved to the site specific deputy responsible person, appointed by the WSG, who will have management responsibility for the control of the domestic hot and cold water services and to be responsible for assessing and controlling identified risks from Legionella and Pseudomonas aeruginosa on a particular site or area of the Trust.

5. **Director of Infection Prevention Consultant (DIPC**) is the person nominated by management to advise on infection prevention policy and on the maintenance of “water safety".

6. **Manager of the Capital Developments Department** Accountability for the design, installation and commissioning of water systems and equipment lies with this person. Further responsibilities are delegated to other professionals within the Trust and, where applicable, external consultants.

7. **Divisional management teams** will support water safety and the Trusts water usage evaluation process by nominating divisional WSG none core members and Compass users at ward or department level to complete water flushing and usage evaluation as described within attachment 1. Compass users or divisional leads must also notify Estates Management where areas are planned to lie vacant for more than four days or where changes are planned to occupation and / or type of use of any facilities / areas under their control via Compass or rwh-tr.Waterflushing@nhs.net or the WSG. Thiswill

allow Estates Department to take the required risk management precautions and implement all appropriate processes and procedures.

8. **Legionella Log Book** will be maintained by the site responsible and deputy responsible person's legionella. The log book will ensure that precautions continue to be carried out and that adequate information is available for checking what is done in practice, this record must be kept and maintained for at least five years showing the information specified in the ACOP.

   Precautionary measures and treatments, monitoring results and remedial work must be logged and signed or electronically fulfilled by the person who has carried out the work. Sufficient information must be recorded to show what measures have been taken and how they have been monitored. The Trust utilizes two proprietary electronic data collection and management systems – Planet FM and is in the process of moving all water safety management to the Compass system which will act as the Legionella log book for the Trust.

9. All contractors involved in the control of "water safety" and for assessing and controlling identified risks from Legionella and Pseudomonas aeruginosa and safe hot water management programmes will be suitably qualified and accredited to required standards (i.e. the Legionella Control Association) and will need to demonstrate and provide evidence of training appropriate to their activities. However, where a specialist contractor is required to carry out emergency remedial works and does not meet the membership criteria listed above, the contractor may be employed by the Trust being authorised by the responsible person or DIPC.

10. Where there is any change in the personnel listed in the WSG membership, the new members must be made aware, in writing, of the type and extent of their responsibility in relation to this Water Safety Policy and receive appropriate training where necessary which will be monitored by the chair of the WSG.

11. The Trust must be able to demonstrate it has identified all the relevant factors, has instituted corrective or preventative action and is monitoring the implemented plans.

12. The WSG will have overall responsibility for implementing and auditing water safety management & control programme and safe hot water management across the Trust.

4.0 Policy Detail

This is a specialist operational policy and includes the operational procedures for the management of water systems. It applies to all Trust employees on all Trust premises.

4.1	Usage Evaluation / Flushing – Brief step by step guide of how to use the Compass system for recording flushing	Attachment 1
4.2	Water Safety Group – General operational procedures, membership and roles of responsible persons (ToR)	Attachment 2
4.3	Water Safety Plan - Part A – General Precautions	Attachment 3
4.4	Water Safety Plan - Part B – Maintenance Arrangements	Attachment 4
4.5	Water Safety Plan - Part C – Capital Development & Water Systems Modifications	Attachment 5
4.6	Water Safety Plan - Part D – Contingency Measures	Attachment 6

5.0 Financial Risk Assessment

1	Does the implementation of this Policy require any additional Capital resources	No
2	Does the implementation of this Policy require additional revenue resources	No
3	Does the implementation of this Policy require additional manpower	No
4	Does the implementation of this Policy release any manpower costs through a change in practice	No
5	Are there additional staff training costs associated with implementing this Policy which cannot be delivered through current training programs or allocated training times for staff.	No
	Other comments	

6.0 Equality Impact Assessment

There are no adverse effects of this Policy to any ethnic or diverse group.

7.0 Maintenance

The WSG will be responsible for the maintenance and review of this Policy in accordance with national guideline and best practice at least every three years

8.0 Communication and Training

The WSG via the Divisional management team will ensure that staff, under their supervision, who are involved in, or associated with water safety management inclusive of control and safe hot water management undertake – three yearly training courses as detailed within the WSP to ensure they are kept updated on new developments in the management and control of water services.

Training will be carried out to ensure staff can fulfil the performance of their specific duties. Attendance will be recorded and maintained ready for inspection if required within their department personal file.

In order to allow the associated persons to act as effectively and cost-effectively as possible, all relevant and associated members of staff must be offered scheduled and appropriate training. The training must cover relevant topics such as:

1. General knowledge on water safety management & control and safe hot water
2. Management
3. Legal responsibilities
4. The WSP
5. COSHH
6. On-going monitoring
7. On-going maintenance
8. Disinfection procedures
9. On-going inspections
10. Logging required
11. Emergency procedures

Staff with specific responsibilities for actions to control the “risk” must be given additional training in how to carry out those particular tasks.

Deputies must receive equivalent training to the person whose function they are covering. The training required will vary from individual to individual according to their background and responsibilities.

Individual records must be kept for these staff, and staff must not be allowed to perform their duties without supervision until their training is completed. The level of knowledge must be regularly assessed and must be programmed and continuous rather than sporadic. Divisional / Group management will be responsible for maintaining records locally within personal files of individuals training.

Training for the utilisation of the flushing module within Compass will be recorded and provided as required to all departmental users by the Estates Management department. Requests for new user accounts should be made through the WSG or via the Estates helpline.

9.0 Audit Process

Criteria	Lead	Monitoring Method	Frequency	Committee
The Trust's legionella risk consultants to assess Legionellosis management & control procedures implemented across the Trust to assess compliance with the approved Code of Practice L8 and the Department of Health Technical Memorandum HTM 04-01	WSG	Report to WSG Compass system	Half Yearly	IPCG/H&S Group
WSG will instruct the Trust's Authorising Engineer (Water) to audit the Legionellosis Management & Control procedures implemented across their site to assess compliance with the approved Code of Practice L8 and the Department of Health Technical Memorandum HTM 04-01 Part A and B	WSG	Report to WSG Compass System	Yearly	IPCG/H&S Group
Each Departmental Responsible Person will carry out spot checks and action non-compliances in relation to their input to Compass and water safety	WSG	WSG Compass System	Monthly	IPCG/H&S Group

10 References

The Trust, in implementing this Policy, will use as a general source of practical guidance, the documents listed below:

1. Health & Safety Commission Approved Code of Practice & Guidance 2013 - The Control of Legionella bacteria in water systems (L8)
2. Health and Safety at Work etc., Act 1974, Sections 2, 3 and 4 (HSW)
3. The Management of Health and Safety at Work Regulations 1992 and The Health and Safety (Miscellaneous Amendments) Regulations 2002
4. Control of Substances Hazardous to Health Regulations 2002, Regulation 6 (COSHH)
5. The Public Health (Infectious Diseases) Regulations 1988
6. The Water Supply (Water fittings) Regulations 1999
7. The Water Supply (Water Quality) Regulations 2016

8. BS 1710 – 2014 - Specification for identification of pipeline services
9. BS 8558:2015 provides complimentary guidance to BS EN 806. It is a guide to the design, installation, testing, operation and maintenance of services supplying water for domestic use within buildings and their curtilages
10. BS EN 806-5:2012 Specification for installations inside buildings conveying water for human consumption - Operation and maintenance
11. BS EN 806-1:2000 Specifications for installations inside buildings conveying water for human consumption -General
12. BS EN 806-2:2005 Specifications for installations inside buildings conveying water for human consumption – Design
13. BS EN 806-3:2006 Specifications for installations inside buildings conveying water for human consumption - Pipe sizing. Simplified method
14. BS EN 806-4:2010 Specifications for installations inside buildings conveying water for human consumption – Installation
15. Food Safety Act 1990
16. HTM 04-01 Part A, B & C inclusive of thermostatic mixing valves
17. Heating and ventilation systems HTM 03-01: Specialised ventilation for healthcare premises
18. Decontamination in primary care dental practices HTM 01-05
19. PWTAG – Swimming pool water guidance – Treatment & quality standards for pools and spas: 2017
20. Health Building Note 13 – Sterile Service Departments – 2004
21. Public Health England (PHE) – Examining food, water and environmental samples from healthcare environments – Microbiological Guidelines: 2013
22. BS7592:2008 – Sampling for Legionella bacteria in water systems – Code of practice
23. World Health Organisation (WHO) – Water Safety in buildings: 2011
24. BS 8580-1:2019 – Water Quality – Risk assessments for Legionella Control – Code of Practice

Part A - Document Control

Policy number and Policy version: **Water Safety policy** OP79	**Policy Title** **September 2022 Version 5.0**	**Status:** Final		**Author:** **Head of Estates** **Chief Officer Sponsor:** **Chief Operating Officer**
Version / Amendment History	Version	Date	Author	Reason
	V1	Dec 08	Head of Estates	Compliance to ACOP L8
	V2	Oct 11	Head of Estates	Compliance to ACOP L8
	V3	Jun 14	Head of Estates	Compliance to ACOP & HTM 04 01 Addendum
	V4	Sept 19	Head of Estates	Compliance to ACOP & HTM 04
	V4.1	Nov. 2022	Head of Estates	Extension
	V5.0	September 2022	Head of Estates	3 Year Review
Intended Recipients: Trustwide				
Consultation Group / Role Titles and Date: This Policy is adapted from national guidance principally:ACOP L8, Health Technical Memorandum 00, 03 & 04, World Health Organisation – Water Safety in Buildings. Health & Safety Steering Group (HSSG) Water Safety Group (WSG) Director of Infection Prevention and Control (DIPC) / Infection Prevention Control Group (IPCG) Infection Prevention Team				
Name and date of Trust level group where reviewed	IPCG – November 2022 HSSG – November 2022 Policy Group – March 2023 WSG – October 2022			
Name and date of final approval committee	Trust Management Committee March 2023			
Date of Policy issue	April 2023			
Review Date and Frequency (standard review frequency is 3 yearly unless otherwise indicated – see section 3.8.1 of Attachment 1)	3 Yearly - March 2026			

Training and Dissemination: This Policy will be launched onto the operational policy suite on the Trust Intranet. Senior managers will be informed at the WSG and IPCG. Staff will be informed of the operational policy suite at induction.	
Publishing Requirements: Can this document be published on the Trust's public page: Yes	
To be read in conjunction with: Water Safety Plan as attachment to this policy.	
Initial Equality Impact Assessment (all policies): Completed Yes Full Equality Impact assessment (as required): Completed NA If you require this document in an alternative format e.g., larger print please contact Policy Administrator 8904	
Monitoring arrangements and Committee	WSG/IPCG
Document summary/key issues covered. The aim of this Policy is to introduce a structured procedure and reporting schedule, for the management and control of Legionella, hygiene, 'safe' hot water, cold water and drinking water systems including Pseudomonas Aeruginosa.	
Key words for intranet searching purposes	
High Risk Policy? **Definition:** • Contains information in the public domain that may present additional risk to the public e.g. contains detailed images of means of strangulation. • References to individually identifiable cases. • References to commercially sensitive or confidential systems. If a policy is considered to be high risk it will be the responsibility of the author and chief officer sponsor to ensure it is redacted to the requestee.	**No**

The Royal Wolverhampton
NHS Trust

Ref: OP79 Water Safety Policy

Attachment 1

Water Safety Policy

COMPASS USAGE EVALUATION AND PROGRAMMED FLUSHING USER GUIDE
USER INSTRUCTIONS

Version:	1.1
Ratified by:	Mike Koumi – Authorised Engineer Water
Date ratified:	September 2022
Name of originator/authors:	Joanna Macve, Tom Butler, Steve Brooks
Name of responsible committee/individual:	Water Safety Group
Date issued:	October 2019
Review date:	March 2026
Target audience:	Trust staff
Equality Impact Assessment:	Yes
This process is effective for all employees of the Royal Wolverhampton NHS Trust, Patients, Visitors and Contractors	

Version Control

Water Safety Policy – Attachment 1 – Compass Usage Evaluation and Programmed Flushing User Guide User Guide					
Reference/ version.	2022	**Category:**	**n/a**	**Version:**	1.1
Document purpose:	Supporting the RWT NHS Trust Water Safety Policy Document OP79 and WSP defining general precautions taken for usage evaluation / flushing in support of OP79 WSP.				
Intended for use by:	Direct and indirect Staff				
Author(s) responsible for document upkeep	Tom Butler & Steve Brooks				
Consultation process	Water Safety Group, Health and Safety Steering Group, Infection and Prevention Group				
Sponsoring Director:	Gwen Nuttal				
Approved by:	TMC				
Dated:	2019 (Schedule as Policy Issue)				
To be reviewed before:	2026 (Schedule as Policy Issue)				
Implementation arrangements:	Estates Managers, Supervisors, Health & Safety Representatives, Health & Safety Officers, Staff and Contractors.				

Monitoring Arrangements:	The implementation and effectiveness of this plan will be reviewed on an ongoing basis through the Water Safety Group and Health & Safety Steering Group, by checking whether the process is being used and receiving feedback on current effectiveness and possible future revisions.

VALIDITY STATEMENT

This document is due for review on the latest date shown above. After this date, the process documents may become invalid. The electronic copy of this document is the only version that is maintained. Printed copies may not be relied upon to contain the latest updates and amendments.

CONTENTS

1.0 INTRODUCTION – FLUSHING INFREQUENTLY USED OUTLETS

Stagnation of water and the risk from waterborne bacteria growing and proliferating in peripheral parts of any water system including outlets is high due to the ideal breeding grounds stagnation creates. Flushing allows water through the system to avoid stagnation and the associated risk of proliferation of waterborne bacteria.

Taps or outlets that are at risk of stagnation are classified as infrequently used outlets which may also include dead legs off the system. To mitigate this risk the WSG promotes the use of the Compass system to record flushing of infrequently used outlets at for at least two minutes twice per week.

Estates management administers the Compass system which details all water outlets within the Trust by area. Each area (ward / department / building) has designated users of the system who complete usage evaluations as described in section 2.1.

The compass system allows the WSG to manage and monitor flushing on a monthly basis to ensure systems do not stagnate and that good water turnover is achieved within all of its buildings. The system also allows additional flushing to be facilitated where there are high-risk patients or failures of control measures which may require more frequent flushing indicated by the WSG or risk assessment.

Training is provided by estates management to all new and existing users of the system on request to rwh-tr.Waterflushing@nhs.net or as the WSG monitors inactivity / low flushing returns from any area. Areas that become inactive or as deemed necessary by the WSG will be supported by Estates management to implement usage evaluation and train additional / new users on the system.

2.0 COMPASS USAGE EVALUATION SYSTEM

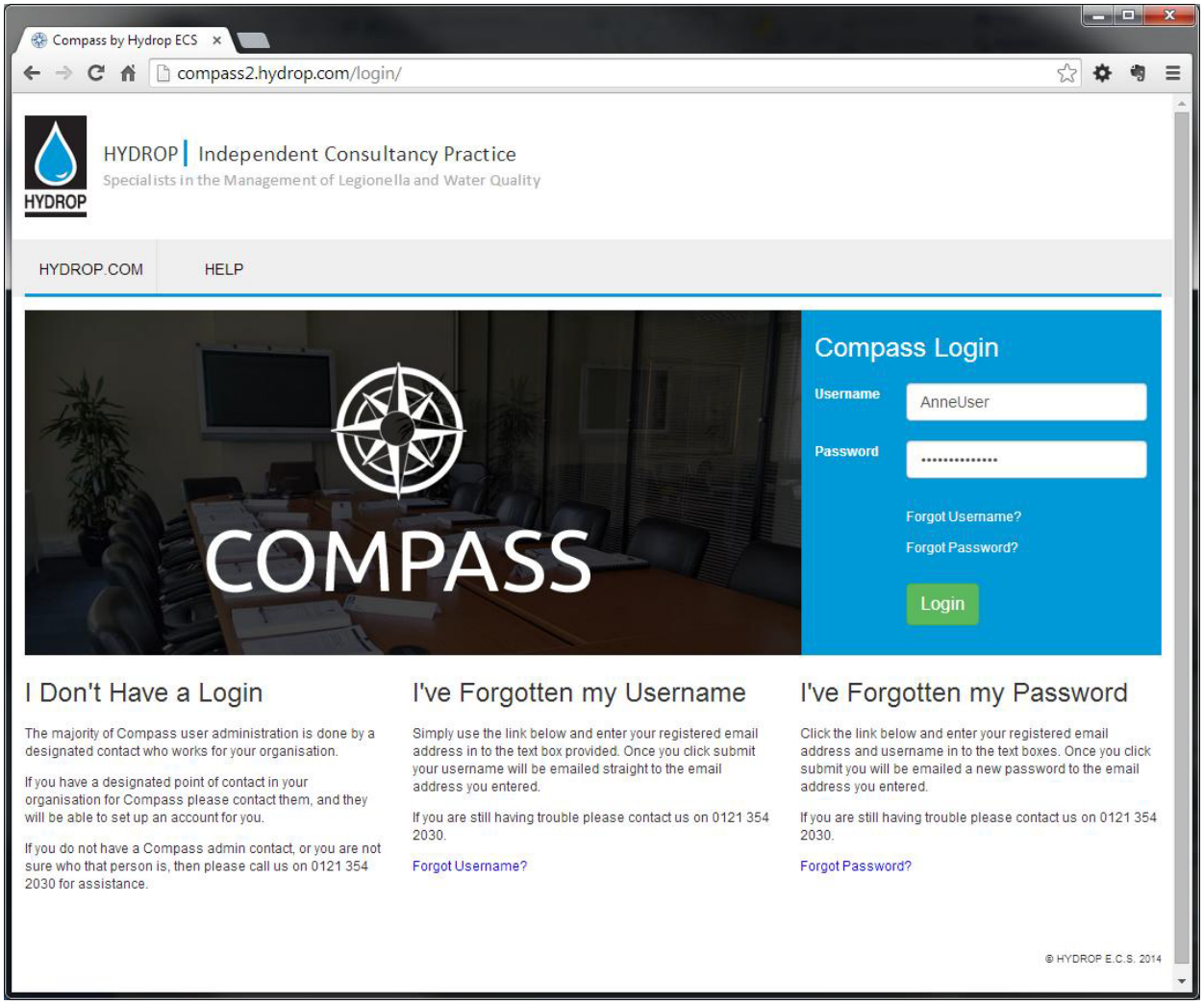
2.1 Login Screen

When you receive your login username and password you can access Compass using the internet http://compass2.hydrop.com/.

Once you are on the COMPASS login page you will need to enter your username and password that was set by the Estates management department that will have been sent to you when you were signed up to use the system. Please see section 4 for new users.

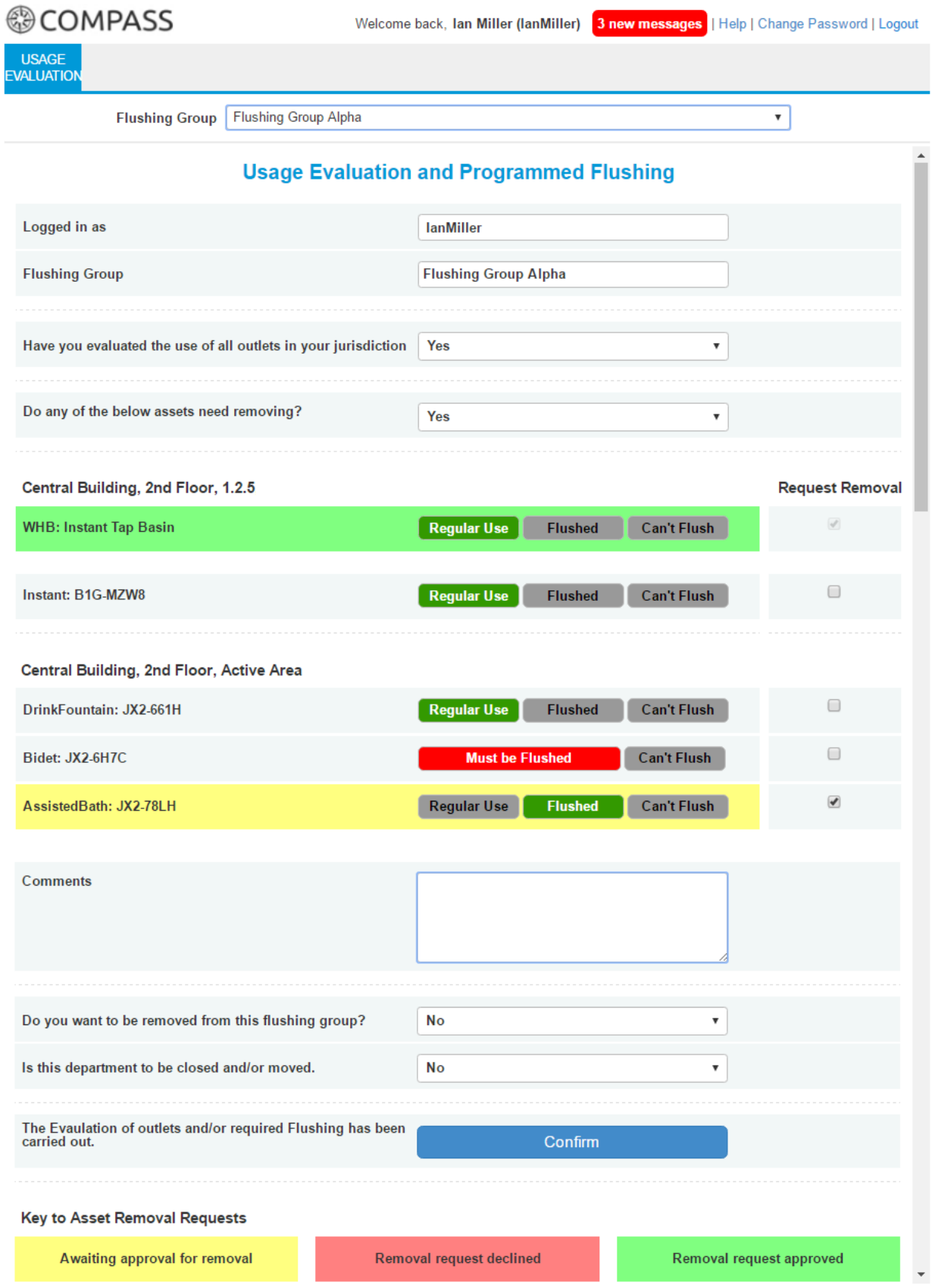
If you have forgotten your username or password you can use the “Forgot Username” and “Forgot Password” features to request a reminder email or to reset your password. This process is automated and the fastest way to rest your password.

Once you have entered your details press the login button and you will be able to access your flushing tasks.



2.2 Completed the Evaluation Form

Once logged in you can access your flushing groups and complete the tasks that are open for that day.



Please follow the steps below to complete the flushing tasks assigned to you:

1. Select the group to complete
2. Answer the “Have you evaluated...” question. (Remember to give a reason if you answer “No”)
3. If you click “Yes” the Compass software automatically assumes that all outlets are flushed regularly or if an outlet is not used regularly you will need to flush it manually (run outlet for two minutes).
4. Assets that always need to be flushed will be highlighted in red. 

    a. Click on the “Must be flushed” button to tell the system that it has been flushed. The button will turn green and say “Flushed today” 

5. If you want an asset to be removed, click in the remove check box for that outlet to send the request.
6. Enter any comments you want to make.
7. Click on the “Confirm” button to submit the form and confirm the task has been completed.

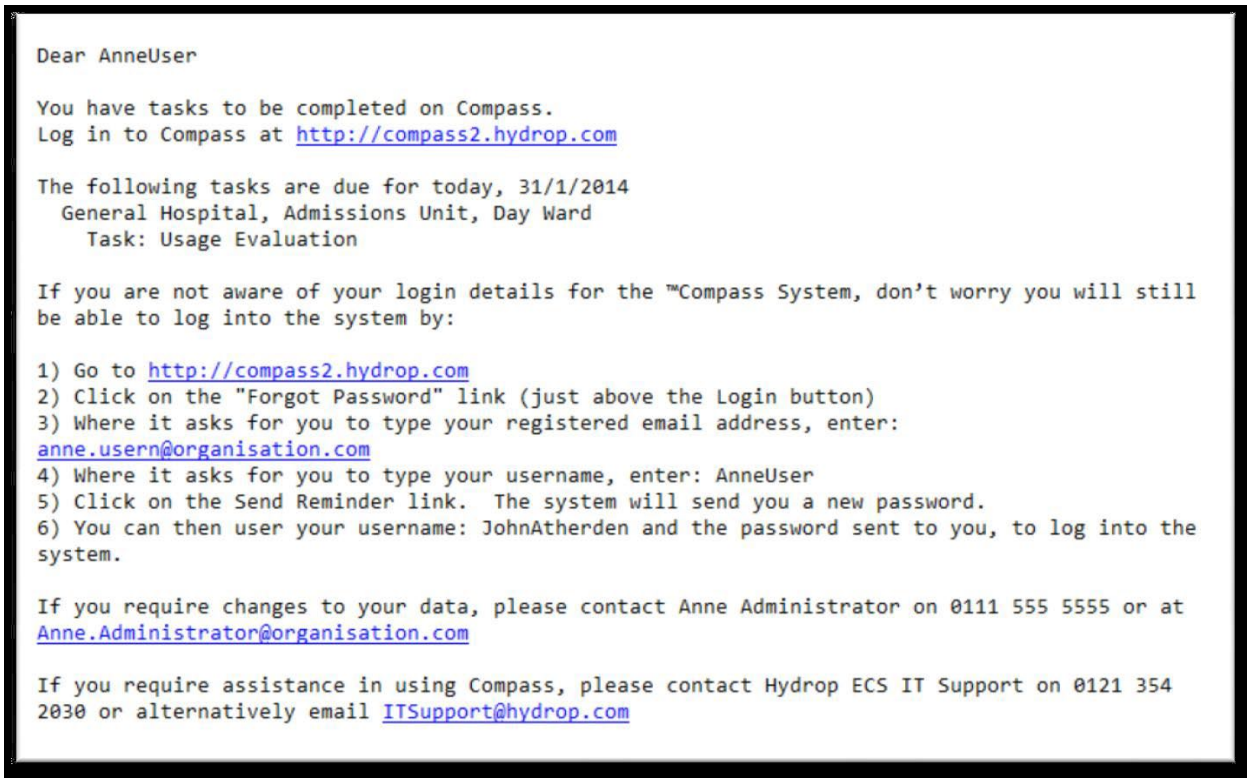
2.3 Programmed Flushing

If the “Programmed Flushing” button is highlighted, it means that the Estates Department has requested that some outlets need to be flushed irrespective of the results of the “usage valuation” process.

1. Click on “Programmed Flushing” button, this will open a new window which lists all outlets to be flushed.
2. You can indicate that the outlet has been flushed by simply clicking on ‘Flushed’ button. Click on ‘Finish’ to close the screen.

2.4 Reminder Notification Email

When a task is due the system will send an email notification out to you to remind you to log in. The email contains all of the information you will need to identify which task is required, as well as a link to the site.



Dear AnneUser

You have tasks to be completed on Compass.
Log in to Compass at http://compass2.hydrop.com

The following tasks are due for today, 31/1/2014
General Hospital, Admissions Unit, Day Ward
Task: Usage Evaluation

If you are not aware of your login details for the ™Compass System, don't worry you will still be able to log into the system by:

1) Go to http://compass2.hydrop.com
2) Click on the "Forgot Password" link (just above the Login button)
3) Where it asks for you to type your registered email address, enter: anne.usern@organisation.com
4) Where it asks for you to type your username, enter: AnneUser
5) Click on the Send Reminder link. The system will send you a new password.
6) You can then user your username: JohnAtherden and the password sent to you, to log into the system.

If you require changes to your data, please contact Anne Administrator on 0111 555 5555 or at Anne.Administrator@organisation.com

If you require assistance in using Compass, please contact Hydrop ECS IT Support on 0121 354 2030 or alternatively email ITSupport@hydrop.com

The main features of the e-mail are as follows:

- A list of the tasks that need to be completed and the date the task is for.
- A hyperlink to the Compass website login page.
- Instructions on how to reset your password if you have forgotten what it is.

3.0 UPDATE, ADD OR REMOVE USER LOGINS

To update, add or remove a user login an email is required to be sent to the Estates Department (rwh-tr.Waterflushing@nhs.net) with the following information:-

User Name:

User Email:

Action Required: (New User/Remove User/Update Flushing Location/Update User Details)

Updating Flushing Location

Please provide exact working location (e.g. ward C21 / Hollybush House 1st Floor) or if you required the same access as a colleague please advise of their name and email also with a request to copy their login access. If you are moving location you will also need to advise of the area you will no longer flush and the staff member taking over flushing in that area.

If you are unsure
or have any queries relating to flushing or water safety
please do not hesitate to contact the Estates Department for help
via extension 8999 or

rwh-tr.Waterflushing@nhs.net

The Royal Wolverhampton NHS Trust

Ref: OP79 Water Safety Policy

Attachment 2

Water Safety Policy

General Operational Procedures, Membership and Roles of Responsible Persons

Version:	1.1
Ratified by:	Mike Koumi – Authorised Engineer Water
Date ratified:	September 2022
Name of originator/authors:	Joanna Macve, Tom Butler, Steve Brooks
Name of responsible committee/individual:	Water Safety Group
Date issued:	October 2019
Review date:	March 2026
Target audience:	Trust staff
Equality Impact Assessment:	Yes
This process is effective for all employees of the Royal Wolverhampton NHS Trust, Patients, Visitors and Contractors	

Version Control

Water Safety Policy – Attachment 2 – General operational procedures, membership and roles of responsible persons					
Reference/ version.	2022	**Category:**	**n/a**	**Version:**	1.1
Document purpose:	Supporting the RWT NHS Trust Water Safety Policy Document OP79 and WSP defining general precautions, membership and roles within the WSG forming the group's terms of reference as part of OP79 WSP.				
Intended for use by:	Direct and indirect Staff				
Author(s) responsible for document upkeep	Tom Butler & Steve Brooks				
Consultation process	Water Safety Group, Health and Safety Steering Group, Infection and Prevention Group				
Sponsoring Director:	Gwen Nuttal				
Approved by:	TMC				
Dated:	2019 (Schedule as Policy Issue)				
To be reviewed before:	2026 (Schedule as Policy Issue)				
Implementation arrangements:	Estates Managers, Supervisors, Health & Safety Representatives, Health & Safety Officers, Staff and Contractors.				
Monitoring Arrangements:	The implementation and effectiveness of this plan will be reviewed on an ongoing basis through the Water Safety Group and Health & Safety Steering Group, by checking whether the process is being used and receiving feedback on current effectiveness and possible future revisions.				

VALIDITY STATEMENT

This document is due for review on the latest date shown above. After this date, the process documents may become invalid. The electronic copy of this document is the only version that is maintained. Printed copies may not be relied upon to contain the latest updates and amendments.

CONTENTS

1.0 WATER SAFETY GROUP (WSG) – ROLE OF THE GROUP & ITS OPERATIONAL PROCEDURES

The following attachment forms the terms of reference for the water safety group, its general operational procedures, membership and roles of responsible persons.

The WSG has two groups of members reflecting strategic and operational water safety, this allows the WSG more time to focus on the items important to that group and water safety within the Trust.

- The WSG will be accountable to the Infection Prevention & Control Group (IPCG)
- The purpose of the WSG is to accept ownership of strategic risk management for water safety management and to monitor and advise on water safety across the Trust in line with the Trust's Water Safety Plan (WSP)
- To ensure that suitable and sufficient delivery of water safety management in compliance with all current future standards and requirements

1.1 Water Safety Group Procedures

- The group will appoint a secretary to prepare agendas, keep minutes and deal with any other matters concerning the administration of the group.
- Any member of Trust staff may raise an issue with the chair/deputy chair, normally by written submission. The chair will decide whether or not the issue shall be included in the group's business. The individual raising the matter may be invited to attend.
- The WSG will meet on a monthly basis holding operational agendas with a strategic quarterly meeting.
- The Group may require the attendance of any director, or member of staff, and the production of any document it considers relevant to the aims and objectives of the group.
- Extraordinary meetings of the group may be called by the chair or working parties comprising of group or co-opted members may be formed. Any such working parties formed will be required to operate within the terms of reference of the WSG.

1.2 Water Safety Group Duties and Responsibilities

The WSG will:

- Be legally accountable, on a joint and several liability basis, for assessing and controlling identified risks from Legionella and Pseudomonas aeruginosa safe hot water management programmes
- Accept management responsibility for water safety inclusive of Legionella, Pseudomonas aeruginosa and other water born bacteria
- Appoint people into positions of departmental responsibility

- Ensure the preparation of all relevant risk assessments (legionella and pseudomonas Aeruginosa), documentation, works specifications, pre-planned maintenance programmes and policies are prepared for the group
- Ensure the ratification of all relevant documentation, pre-planned maintenance programmes, policies, water systems and associated fittings designs
- Monitor and report upon the efficacy of all implemented Planned Preventative Maintenance (PPM) and all other water safety related procedures implemented by all relevant departments
- Monitor and reporting upon the efficacy of all consultants and contractors commissioned on water safety related projects
- Provide liaison between all other associated teams, such as the Infection Prevention (particularly in an outbreak situation) and outside agencies including Public Health England, Health & Safety Executive and any other appropriate bodies
- Monitor and report upon the efficacy of all training programmes implemented for associated staff
- Investigate and authorise all new constructions and refurbishment projects with regards to water safety
- Authorise occupation and re-occupation of buildings/areas by patients
- Prepare a control report for all pending system changes/alterations

1.3 Water Safety Group Review Group

- The group will review its terms of reference (this attachment of policy) annually to ensure that it remains fit for purpose and is best facilitated to discharge its duties.

Any amendments will be proposed to the IPCG.

2.0 WATER SAFETY GROUP MEMBERSHIP – LEAD ROLES WITHIN THE GROUP

Core membership of the WSG will comprise of the following Trust officers, who will have lead responsibilities as identified:

- Director of Infection Prevention and Control (DIPC)
- Head of Estates (Responsible Person) (Chair)
- Deputy Responsible Person or persons
- Capital Development Representative
- Facilities Representative
- Medical Physics Representative
- Health & Safety Co-Ordinator
- Infection Prevention Nurse

None core members:

- Consultant microbiologist
- Clinical representative
- Community representative

Membership by invitation will comprise of the following external officers who will support and advise the Trust officers as required and will comprise of but not limited to the following:

- Trust Authorising Engineer (water)
- Incumbent external independent water safety consultants
- Incumbent chlorine dioxide contractor / consultant
- Incumbent water treatment / water hygiene contractors

Membership of the WSG will be reviewed annually to ensure that it best reflects the requirements of governance within the Trust. If core members cannot attend a representative must be sent, other Trust employees and appropriate external consultants/contractors may be co-opted for specific projects or sub-groups.

A quorum of either strategic or operational groups will consist of not less than four core members of the WSG including:

- Director of Infection Prevention and Control (DIPC)
- Head of Estates (Responsible Person) (Chair)
- Deputy Responsible Person or Deputy
- Capital Development Representative

3.0 WSG RESPONSIBLE PERSONS – ROLES OF PERSONS APPOINTED TO THE GROUP

3.1 Members of the Water Safety Group

General members of the WSG and persons not listed below will:

- Assist the WSG in the implementation and management of water safety inclusive of Legionella, Pseudomonas aeruginosa and other water born bacteria and Safe Hot Water Management Programmes, across the Trust
- Ensure that there is a proactive approach to organising, planning, controlling and reviewing Health & Safety. Further Health & Safety responsibilities of general managers are given access to the Trust's Health & Safety Policy
- Ensure that the appropriate staff, under their control, are given suitable information, instruction and training with regard to water systems
- Notify the site specific Responsible Person (Water) of any changes to period and/or type of use of any sections/areas under their control
- Notify the site specific Responsible Person (Water) of any section/areas shut-downs or vacations of sections/areas under their control

3.2 Director of Infection Prevention or Representative

The DIPC will:

- Assist the WSG and the site Estates deputy Responsible Persons (Water) in the implementation and management of water safety inclusive of Legionella, Pseudomonas aeruginosa and other water born bacteria and safe hot water management programmes, across the Trust
- Assess all areas of occupation by the Trust and designate level of risk to patients from Legionella and Pseudomonas aeruginosa or other water organism
- Assist the WSG with the strategic and operational management of water microbiological sampling
- Agree the contents of this Policy and agree any amendment

3.3 Estates Responsible Person

The Estates Responsible Persons will:

- Supervise the site deputy Responsible Person (Water)
- Ensure that the site deputy Responsible Person (Water) have received the necessary training as it affects their duties
- Advise the site deputy Responsible Person (Water) on all matters relating to the management & control of water safety and safe hot water management and ensure that they are informed of all changes, or proposed changes, in the legislation/recommendations relating to legionellosis or Pseudomonas aeruginosa which may affect the Trust, in general, and the buildings under their control, specifically
- Together with the site Responsible Person (Water), consider each risk assessment report and ensure the design, arrangement, implementation and management of all necessary remedial works required to allow the systems to

comply with the current and relevant guidelines and legislation, and to ensure minimisation or control of the prevailing risk
- Deputise for the site Deputy Responsible Person (Water) in their absence

3.4 Estates Deputy Responsible Person

The Site Deputy Responsible Persons will:

- Have overall responsibility for the management of water safety management & control and safe hot water management programme, across the Trust
- Together with the Trust Responsible Persons (Estates), consider each risk assessment report and ensure the design, arrangement, implementation and management of all necessary remedial works required to allow the systems to comply with the current and relevant guidelines and legislation, and to ensure minimisation or control of the prevailing risk
- Ensure that all new or significantly altered water systems are notified to the Trust Responsible Person (Water) in order to allow for these systems to be properly risk assessed
- Operate and enforce permit and procedural standards set up within WSP and Trust documentation
- Ensure that, where appropriate, such systems are included in the legionellosis management & control and safe hot water management programme
- Ensure the design, arrangement, implementation and management of all Preventative Maintenance Programmes (PPM) required allowing the systems to comply with the current and relevant guidelines and legislation, and to ensure minimisation or control of the prevailing risk
- Implement, maintain and manage an electronic Log-Book system which operates a ‘Defect-Log’ designed to allow for the correct and timely management of any faults/shortfalls identified during PPM visits and retain all data for five years
- Consider the Log-Book and ‘Defect-Log’ and Advise the Trust Responsible Person, of the status of the water safety management & control and safe hot water management programme
- Regularly audit the locally implemented water safety management & control and safe hot water management programme
- Consider the efficacy of all contractors commissioned on water safety management & control and safe hot water management related projects
- Assess the training needs of staff involved in the Legionellosis or Pseudomonas aeruginosa management & control and safe hot water management programme and facilitate training as required
- Ensure personal training records are kept up to date
- Deputise for the Trust Responsible Person (Estates) in their absence

3.5 Capital Development Representative

Capital development representative will:

- Ensure that, all new and altered water systems, including minor and major modifications/refurbishments, comply with the requirements of BS 8558:2011, L8, HTM 04-01, HTM 03-01 and HTM 01-05. In this respect, at the design stage

the consulting engineer will liaise with Trust's appointed Legionella Control Consultants
- Ensure that the specification, and the consulting engineer's competence and interpretation of the requirements are suitably assessed and confirmed
- Ensure that all contractors' competence and their interpretation of the requirements are suitably assessed and confirmed
- Ensure the Clerk of Works' competence and interpretation of the requirements
- Notify the water undertaker of any proposed installation of water fittings and to have the water undertakers' consent before installation commences, as required by the Water Supply (Water Fittings) Regulations 1999. It is a criminal offence to install or use water fittings without their prior consent. This will be enforced for all new systems including major modifications/refurbishments
- Ensure that all specific issues around quality control of the works on site, are suitably managed
- Ensure that the site installation and commissioning procedures are addressed as part of the commission process. These will include all relevant sections as described in HTM 04-01 Section 16 and within BS 8558:2011
- Operate and enforce permit and procedural standards set up within WSP and Trust documentation
- Will ensure that operating and maintenance manuals are provided for all building services installation, including commissioning data, disinfection certificates and biological analysis results. These will include all relevant sections as described in HTM 04-01 Sections 18 and within BS 8558:2011
- Will ensure that while areas are under a contractor's control that a member of the Capital Team completes the required element of the electronic log-book system
- To inform the estates officer information of any forthcoming schemes so that electronic Compass database can be amended for the Capital Team to record flushing activity in the respective areas
- To be the lead on permit to open the area for new, refurbished and adapted installations following capital schemes
- Will ensure adequate water quality sampling is completed prior to opening any facility as agreed by the WSG and DIPC

In addition where there are specific issues around quality control of the works on site, the site installation and commissioning procedures, these will need to be addressed as part of the commissioning phase.

The designer / project manager will also ensure the specification for any works is agreed, and the consulting engineer's competence and interpretation of the requirements are fully understood:

- The contractor's competence and his interpretation of the requirements
- The engineer / plumber's competence and interpretation with respect to site conditions, the existing and new installation and commissioning requirements
- The CoW's competence and interpretation of the requirements
- Ensure that operating and maintenance manuals will be provided in accordance with the Estates Capital Investment System (ECIS) and comply with the requirements of BSRIA's Application Guide 1/87: Operational and Maintenance Manuals for building services installations

3.6 Facilities Representative

Facilities representative will:

- Support the WSG in the development and audit of cleaning standards within the Trust have specialist knowledge, training and experience of cleaning and facilities standards
- Assist the WSG in the implementation and management of water safety inclusive of Legionella, Pseudomonas aeruginosa and other water born bacteria and Safe Hot Water Management Programmes, across the Trust
- Ensure that the staff, under their control, are given suitable information, instruction and training with regard to water safety particularly surrounding infection prevention and Pseudomonas Aeruginosa.
- Notify the WSG or site specific Responsible Person (Water) of any changes to period and/or type of use of any sections/areas under their control
- Notify the site specific Responsible Person (Water) of any section/areas shut-downs or vacations of sections/areas under their control

3.7 Medical Physics Representative

Medical Physics representative will:

- Support the WSG in the development and audit of water safety within the Trust have specialist knowledge, training and experience of decontamination plant and medical physics equipment standards
- Assist the WSG in the implementation and management of water safety inclusive of Legionella, Pseudomonas aeruginosa and other water born bacteria and Safe Hot Water Management Programmes, across the Trust
- Ensure that the staff, under their control, are given suitable information, instruction and training with regard to water safety particularly surrounding renal and decontamination and legionella, Pseudomonas Aeruginosa and mico bacteria.
- Notify the WSG or site specific Responsible Person (Water) of any changes to period and/or type of use of any sections/areas under their control
- Notify the site specific Responsible Person (Water) of any section/areas shut-downs or vacations of sections/areas under their control

3.8 Health & Safety Co-ordinator

Health and safety Co-ordinator will:

- Support the WSG in the development and audit of water safety within the Trust have specialist knowledge, training and experience of health and safety legislation
- Provide wider communication with Trust governance teams for the management of risk and provide advice for the management of water safety risks
- Assist the WSG in the implementation and management of water safety inclusive of Legionella, Pseudomonas aeruginosa and other water born bacteria and Safe Hot Water Management Programmes, across the Trust

- Inform the WSG of any Trust alerts relating to water safety and support the management of any such alerts via governance teams
- Notify the WSG or site specific Responsible Person (Water) of any changes to period and/or type of use of any sections/areas under their control
- Notify the site specific Responsible Person (Water) of any section/areas shut-downs or vacations of sections/areas under their control

3.9 Infection Prevention Nurse

Infection and Prevention nurse will:

- Assist the WSG in the implementation and management of water safety inclusive of Legionella, Pseudomonas aeruginosa and other water born bacteria and safe hot water management programmes, across the Trust
- Ensure that the staff, under their control, are given suitable information, instruction and training with regard to water safety particularly surrounding legionella and Pseudomonas Aeruginosa.
- Notify the WSG or site specific Responsible Person (Water) of any changes to period and/or type of use of any sections/areas under their control
- Notify the site specific Responsible Person (Water) of any section/areas shut-downs or vacations of sections/areas under their control
- Inform the WSG of any Trust alerts relating to water safety and support the management of any such alerts with clinical teams

3.10 Trust Authorising Engineer (Water)

Trust Authorising Engineer will:

- Act as an independent professional adviser to the healthcare organisation. The AE must be appointed by the organisation with a brief to provide services in accordance with Health Technical Memoranda guidance. This may vary in accordance with the specialist service being supported
- Act as assessor and make recommendations for the appointment of Responsible Persons, monitor the performance of the service, and provide an annual audit to the WSG. To carry out this role effectively, particularly with regard to audit, it is preferable that the AE remains independent of the operational structure of the Trust

3.11 Trust External Independent Water Safety Consultants

Trust external independent water safety consultants will:

- Supply training, advice and assistance in all Legionellosis management & control and safe water management matters, including the PPM programme, log-book system and all relevant management manuals
- Carry out a system and process audit, as instructed by the WSG
- In conjunction with the appointed design engineer contribute to the design process, ensure all water and air systems, implicated within the design remit, comply with the requirements of L8, HTM 04-01 and BS 8558:2011. Provide design compliance certificate

- If deemed necessary by the WSG Carry out a risk assessment, to establish the risk during the construction phase of large projects and advise on the control measures which need to be established
- If deemed necessary by the WSG Carry out audits and monitoring during construction, to ensure upon completion, the scheme complies with the requirements. Upon completion, verify the installation as compliant with the above requirements with respect to installation, commissioning. Provide compliance/verification certificate
- Carry a risk assessment advising the in-use risk, and identify any control measures that need to be established
- Provide electronic copies of the above certificates and risk assessment to appointed representatives of the Trust

The Royal Wolverhampton NHS Trust

Ref: OP79 Water Safety Policy

Attachment 3

Water Safety Plan

Part A

General Precautions

Version:	1.1
Ratified by:	Mike Koumi – Authorised Engineer Water
Date ratified:	September 2022
Name of originator/authors:	Joanna Macve, Tom Butler, Steve Brooks
Name of responsible committee/individual:	Water Safety Group
Date issued:	January 2019
Review date:	March 2026
Target audience:	Trust staff
Equality Impact Assessment:	Yes
This process is effective for all employees of the Royal Wolverhampton NHS Trust, Patients, Visitors and Contractors	

Version Control

Water Safety Plan - Part A – General Precautions					
Reference/ version.	2022	**Category:**	**n/a**	**Version:**	1.1
Document purpose:	Supporting the RWT NHS Trust Water Safety Policy Document OP79 and WSP Defining the general precautions taken for the management of water forming part of the Trust written scheme and water safety plan for The Royal Wolverhampton Hospital NHS Trust				
Intended for use by:	Direct and indirect Staff				
Author(s) responsible for document upkeep	Tom Butler & Steve Brooks				
Consultation process	Water Safety Group, Health and Safety Steering Group, Infection and Prevention Group				
Sponsoring Director:	Gwen Nuttal				
Approved by:	TMC				
Dated:	2019 (Schedule as Policy Issue)				
To be reviewed before:	2026 (Schedule as Policy Issue)				
Implementation arrangements:	Estates Managers, Supervisors, Health & Safety Representatives, Health & Safety Officers, Staff and Contractors.				
Monitoring Arrangements:	The implementation and effectiveness of this plan will be reviewed on an ongoing basis through the Water Safety Group and Health & Safety Steering Group, by checking whether the process is being used and receiving feedback on current effectiveness and possible future revisions.				

VALIDITY STATEMENT

This document is due for review on the latest date shown above. After this date, the process documents may become invalid. The electronic copy of this document is the only version that is maintained. Printed copies may not be relied upon to contain the latest updates and amendments.

CONTENTS

1.0 STRUCTURE & GUIDANCE

The Water Safety Plan is designed to be a series of easy reference specific guides to water safety inclusive of safe hot water within the Trust for our staff and contractors explaining in brief how water is managed, systems maintained and developed within the Trust properties.

This plan is a key attachment to operational policy 79 and must be read in conjunction with this document and its attachments. Water Safety Plans (WSP) are recommended by Health Technical Memorandum 04-01 and a written scheme is required by Approved Code of Practice L8 (ACOP L8). The combined WSP and written scheme provide best practice and a holistic approach to the management of water systems.

The WSP is a living document. It is kept under continual review by the Water Safety Group (WSG) to ensure adequate assessment and control of risks is in place. The content of the WSP is a fixed monthly agenda item of the WSG ensuring the document is maintained reflecting best practice.

The WSP has four parts A-D, this section part A provides general guidance reference the Trust's Management & Control programme for: The control of Legionella, hygiene, 'safe' hot water, cold water and drinking water systems including Pseudomonas aeruginosa – advice for augmented care units. Each part of the WSP can be considered in isolation, however part A should always be read first to provide general background information and precautions in line with OP79. The table below shows the parts of the WSP and targeted departments they are aimed for:

Part No.	Document Title	Targeted Departments						
		Estates	Capital	IPC	Nursing	Medical Physics	Facilities	Med Micro.
A	OP 79 Attachment 3 **General Precautions**	✓	✓	✓	✓	✓	✓	✓
B	OP 79 Attachment 4 **Maintenance Arrangements**	✓		✓				✓
C	OP 79 Attachment 5 **Capital Development & Water System Modifications**		✓	✓				✓
D	OP 79 Attachment 6 **Contingency Measures**	✓	✓	✓	✓		✓	

Please refer to the relevant part for guidance or where insufficient information is found within this plan reference should and will be made to best practice within HTM 04 and statutory guidance within ACOP L8, however interpretation of guidance and clarifications required reference the management of water within the Trust must be directly from the Water Safety Group.

Special notes are highlighted in blue across all parts of the WSP to give emphasis to pertinent information relevant to the section being considered where appropriate

This plan must also be read in conjunction with the Trust's Health and Safety policy HS01 and supplementary information in relation to COSHH.

For information reference medical equipment please refer to HS11 & HS12 that provide detailed arrangements for the management of medical devices.

Reference should also be made to section 4.5 of this plan which details further Trust policy and procedure which should be considered with this plan.

The scope of this WSP shall extend but not be limited to:

- Domestic Cold Water Services - Storage and Distribution
- Domestic Hot Water Services - Generation Storage and distribution
- Faucets, showers, bib taps, etc.
- Thermostatic Mixing Valves (TMV)/Thermostatic Mixing Taps (TMT)/Thermal Stop Taps
- Drinking Fountains
- Vending Machines
- Emergency Showers/ Eye Washers
- Dental Chairs
- Nebulisers
- Humidified incubators
- Wet Air Conditioning
- Adiabatic coolers
- Portable humidifiers
- Ground/Floor wash vehicles
- Other systems considered to pose a risk
- Mobile Screening Vehicles
- Hydrotherapy pools
- Birthing pools

The WSP does not provide specific guidance for management of water quality for specialist water systems used for cleaning of surgical instruments or medical devices e.g. Endoscopy Water or CSSD supplies which have their own stringent procedures and standards in place.

This Water Safety Plan (WSP) has a controlled circulation and the validity statement on page two must be noted.

2.0 INTRODUCTION

2.1 Background & Waterborne Pathogens:

Historically legionella has been the main focus for water safety, legionella having legal standing with dedicated guidance in the form of ACOP L8 written to prevent proliferation of legionella. However other pathogens of concern are being found in healthcare or large water systems if not managed correctly including:

- Pseudomonas aeruginosa
- Mycobacteria
- Stenotrophomonas

These may have particular pathogenicity in certain circumstances and specialist microbiological advice may be needed to manage these pathogens if evidence of any proliferation occurs.

Currently Legionella and Pseudomonas aeruginosa remain the pathogens with the highest risk of proliferation in Trust systems if development, construction, installation commissioning and maintenance of hot and cold water systems is not managed correctly and the good practice from legionella and Pseudomonas aeruginosa control is ignored which is normally sufficient to ensure a healthy system.

2.2 Legionellosis

Legionellosis is the collective name given to the illnesses caused by legionella bacteria. This includes the most serious pneumonia-like Legionnaires' disease, as well as the less serious conditions of Pontiac fever and Lochgoilhead fever.

Legionnaires' disease is a potentially fatal form of pneumonia and everyone is susceptible to infection. However, some people are at higher risk, including:

- anyone with an impaired immune system / augmented care areas
- people suffering from chronic respiratory or kidney disease
- people over 45 years of age
- smokers and heavy drinkers

The bacterium Legionella pneumophila and related bacteria are common in natural water sources such as rivers, lakes and reservoirs, but usually in low numbers. Since legionella bacteria are widespread in the environment, they may also contaminate and grow in purpose-built water systems such as hospital mechanical hot and cold water systems or even equipment that uses water or is cleaned with any contaminated water supply.

Any water system that has the right environmental conditions could potentially be a source for legionella bacteria growth. There is a reasonably foreseeable legionella risk if:

- Water droplets are produced, e.g. showers and aerosols and if any staff, contractors, residents, visitors etc are more susceptible to infection due to age,

illness, a weakened immune system etc and whether they could be exposed to any contaminated water droplets.
- the water is between 20–45 °C
- water is stored or re-circulated
- there are sources of nutrients such as rust, sludge, scale and organic matters / conditions are likely to encourage bacteria to multiply

2.3 Pseudomonas aeruginosa

Pseudomonas aeruginosa is a gram-negative bacterium, commonly found in wet or moist environments. It is commonly associated with disease in humans with the potential to cause infections in almost any organ or tissue, especially in patients compromised by underlying disease, age or immune deficiency. As a pathogen the significance of Pseudomonas aeruginosa is exacerbated by its resistance to antibiotics, virulence factors and its ability to adapt to a wide range of environments and nutrients.

Pseudomonas aeruginosa thrives in relatively nutrient-poor environments such as water systems at a range of different temperatures and can exist as planktonic cells in water or as biofilms where mixed populations of bacteria are bound to surfaces. Biofilms can become detached to contaminate the water phase or flow. It is also classed as an opportunistic pathogen that can colonise and cause infection in patients who are immunocompromised or whose defences have been breached (for example, via a surgical site, tracheostomy or indwelling medical device such as a vascular catheter). In most cases, colonisation will precede infection. Some colonised patients will remain well but can act as sources for colonisation and infection of other patients. As a microorganism that is often found in water, the more frequent the direct or indirect contact between a susceptible patient and contaminated water, and the greater the microbial contamination of the water, then the higher the potential for patient colonisation or infection.

Contaminated water in a healthcare setting can transmit Pseudomonas aeruginosa to patients through the following ways:

- direct contact with the water through:
  - ingesting
  - bathing
  - contact with mucous membranes or surgical site
  - through splashing from water outlets or basins (where the flow from the outlet causes splash back from the surface)

- inhalation of aerosols from respiratory equipment, devices that produce an aerosol or open suctioning of wound irrigations

- medical devices/equipment rinsed with contaminated water

- indirect contact via healthcare workers' hands following washing of hands in contaminated water, from surfaces contaminated with water or from contaminated equipment such as reusable wash-bowls or refillable spray cleaning bottles

It is generally accepted in the case of Legionella that the source of bacteria in hot and cold water systems is the incoming water supply and that it becomes a problem where there is a failure of the recommended control measures (for example, maintenance of temperatures or water treatment regimes). In contrast to Legionella, the origin of Pseudomonas aeruginosa is less certain and its presence is particularly evident within the last two metres before the point of discharge.

Devices fitted to, or close to, the tap outlet (for example mixing valves, solenoids or outlet fittings) may exacerbate the problem by providing the conditions and nutrients that support microbial growth (for example, appropriate temperatures, a high surface-area-to-volume ratio or a high surface area for oxygenation of water, and leaching of nutrients from materials such as ethylene propylene diene monomer (EPDM)). The source, therefore, could be:

- the incoming water supply from the water provider

- the water supply within the building (both from the storage and distribution system), usually within biofilms

- the wastewater system

- external retrograde contamination from:

    - clinical areas due to the discarding of patient secretions or where medical equipment may have been washed in the wash-hand basin
    - outlet users where hands may have been contaminated by Pseudomonas aeruginosa
    - poor hygiene or processes during cleaning, resulting in contamination from the drain or surrounding environment to the outlet fitting
    - splash back from contaminated drains
    - contaminated cloths/mops etc

While Legionella control is, in the main, associated with poor engineering configuration and maintenance, with limited evidence of patient-to-patient or patient-to-outlet transfer, Pseudomonas aeruginosa may be transferred to and from outlets and the water from both patients and staff.

Suspected Pseudomonas aeruginosa waterborne infections normally require additional investigations to determine the source and interventions from infection control specialists and microbiologists supported by the WSG.

Therefore the traditional temperature control regime / strategy for reducing the risk from Legionella and for reducing the growth and colonisation of other waterborne organisms within water systems may not be sufficient on its own to prevent growth of Pseudomonas aeruginosa and other waterborne pathogens, controls are necessary to manage the water system before and after the outlet.

3.0 GOVERNANCE ARRANGEMENTS

Operational policy 79 details the structured processes and reporting schedules, for the management and control of Legionellosis, including Legionnaires disease, in compliance with current guidelines (HTM's, HGN's, Model Engineering Specifications and Approved Codes of Practice), legislation and water supply regulations.

This is achieved by:

- Appointing a person to be managerially responsible
- Identifying and assessing sources of risk
- Preparing a scheme for preventing, reducing or controlling the risk
- Implementing, managing and monitoring precautions
- Keeping records of the precautions implemented for each of the health care premises within the Trust's control

Within the policy detail general duties, role of the WSG, membership of the WSG, duties and responsibilities and record keeping inclusive of the WSP are attached to the main policy which serve to fulfil the duties the Trust has reference water safety.

The Trust has also developed an engineering standards document and sanitaryware specification to ensure materials, quality and systems are installed in line with best practice and experience the Estates and WSG have gathered over a considerable period.

3.1 The Water Safety Group:

The WSG is a multidisciplinary group formed to oversee the commissioning, development, implementation and review of the WSP. The aim of the WSG is to ensure the safety of all water used by patients, staff and visitors, and to minimise the risk of infection associated with waterborne pathogens and or scalding by immersion.

The WSG provides a forum in which people with a range of competencies can be brought together to share responsibility and take collective ownership for ensuring it identifies water-related hazards, assesses risks, identifies and monitors control measures and develops incident protocols.

The WSG achieve this in a number of ways:

- Having appropriate ownership, expertise and competence available through the WSG to ensure the delivery of safe water for all users thought the organisation.
- Production and ongoing management / monitoring of a Trust Water Safety policy OP 79 and its supporting water safety plan (WSP) that provides a holistic approach to management of water for all users so that it is safe for all users including those most at risk of waterborne infections as a consequence of their illness or treatment.
- Determining vulnerabilities of patients
- By reviewing new and existing risk assessments and ensuring all tasks indicated by risk assessments have been allocated and accepted ensuring the best use of resources available
- By reviewing new builds, refurbishments, modifications and equipment are designed, installed, commissioned and maintained to the required standards in

line with the Trust engineering standards ensuring the best use of resources available
- By reviewing maintenance, monitoring procedures and performance
- By reviewing clinical, environmental monitoring data and ensuring surveillance is completed as required
- By agreeing and reviewing remedial measures and actions, and ensuring an action plan is in place, with agreed deadlines, to ensure any health risks pertaining to water quality and safety are addressed
- Facilitating training and communication on water-related issues
- Monitoring water treatment to provide an appropriate response to out-of-target parameters (that is, failure to dose or overdosing of the system)

Please see OP79 attachment 2 for further information

3.2 The Water Safety Plan:

The WSP is a living document. It is kept under continual review by the Water Safety Group (WSG) to ensure best practice, adequate assessment and control of risks are in place. The content of the WSP is a fixed monthly agenda item of the WSG ensuring the document is maintained reflecting best practice.

The Trust WSP includes the written scheme as required by ACOP L8 for the management and control of legionella. The aim of the WSP is to provide a holistic risk-management approach to the safety of water and establishes good practices in local water usage, distribution and supply for all users so that water is safe for all including those at most risk of waterborne infections as a consequence of their illness or treatment.

The WSP has four parts A-D the table below shows the parts of the WSP and targeted departments they are aimed for:

Part No.	Document Title	Targeted Departments						
		Estates	Capital	IPC	Nursing	Medical Physics	Facilities	Med Micro.
A	OP 79 Attachment 3 **General Precautions**	✓	✓	✓	✓	✓	✓	✓
B	OP 79 Attachment 4 **Maintenance Arrangements**	✓		✓				✓
C	OP 79 Attachment 5 **Capital Development & Water System Modifications**		✓	✓				✓
D	OP 79 Attachment 6 **Contingency Measures**	✓	✓	✓	✓		✓	

Where insufficient information is found within this plan reference should and will be made to best practice within HTM 04 and statutory guidance within ACOP L8, however interpretation of guidance and clarifications required reference the management of water within the Trust must be directly from the Water Safety Group.

The diagram below (Figure 1) illustrates the WSG / WSP approach to water management:

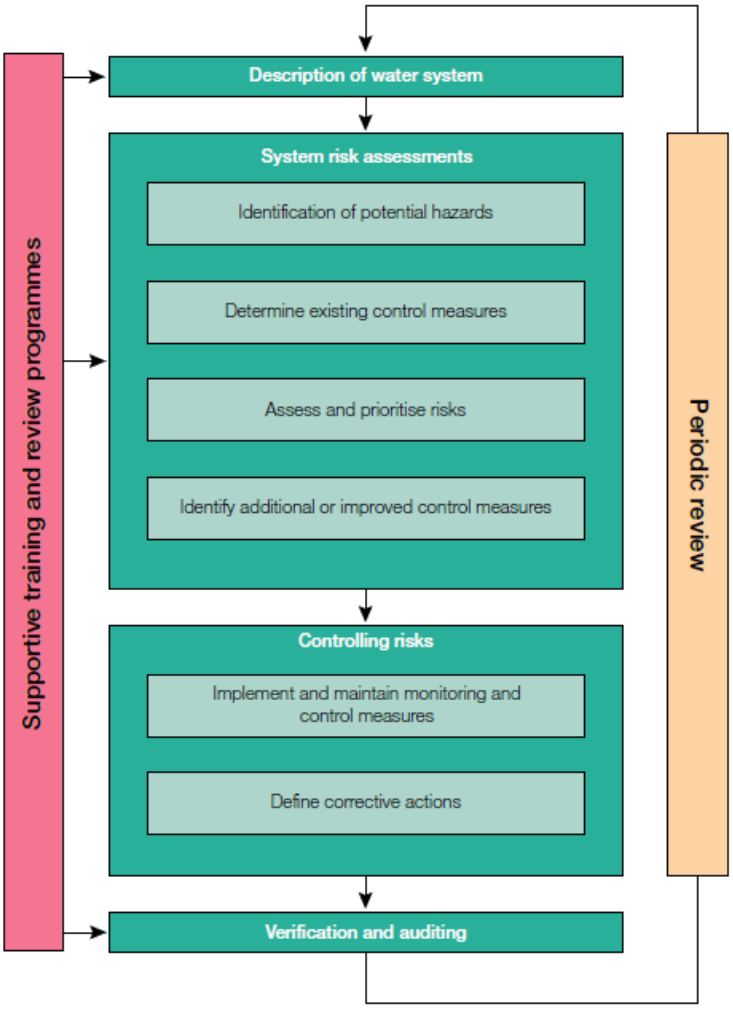


Figure 1: Documentation of management procedures (adapted from figure 4.1 in the WHO's water safety in buildings)

The WSP achieves this in a number of ways:

- Provides guidance to avoid conditions that support growth of microorganisms, including Legionella and Pseudomonas aeruginosa
- By documenting out how systems are safely operated, maintained, monitored and control measures applied to prevent or minimise risk associated with the system inclusive of water treatment regimes and the correct operation of the water system. The WSP also forms the Legionella Written Scheme detailing the following over and above the WSP and OP79:

    - analytical tests, including microbiological testing, other operational checks, inspections and calibrations carried out, their frequency and any resulting corrective actions
    - remedial action taken in the event that the scheme is shown not to be effective, including control scheme reviews and any modifications made
    - health and safety information, including details on storage, handling, use and disposal of any chemical used in both the treatment of the system and testing of water

  - incident plan, which covers the following situations: major plant failure, e.g. chemical system failure
  - very high levels or repeat positive water analyses for Legionella;
  - an outbreak of legionellosis, suspected or confirmed as being centered at the site
  - an outbreak of legionellosis, the exact source of which has yet to be confirmed, but which is believed to be centered in an area which includes the site

- By documenting out how records are maintained and how information from maintenance and monitoring is acted upon
- By linking to and in support of the Trust engineering standards document reference water safety and engineering standards required within the Trust
- By integrating with the Compass system to ensure risk assessments are managed up-to-date schematic plans are in place and any defects that may arise from any assessment are reviewed and prioritised as part of the WSG actions
- By detailing how new builds, refurbishments, modifications and equipment are designed, installed and commissioned in line with the Trust engineering standards
- By providing guidance to ensure the release of water spray is controlled
- By providing guidance to ensure water cannot stagnate anywhere in the system by regular movement of water in all sections of the systems and by keeping pipe lengths as short as possible, and/or removing redundant pipework / deadlegs and flushing
- By providing guidance the Trust do not use materials that harbor bacteria and other microorganisms or provide nutrients for microbial growth inclusive of a sanitaryware specification
- By providing guidance to keep water systems and the water in them clean

3.3 Trust Engineering Standards:

The Trust has developed a detailed mechanical and electrical engineering standards document that details the design and workmanship / materials standards that the engineering design consultants / design contractors / designers / installers are required to adhere to in developing any design, specifying the installation, installing, commissioning and setting to work of any of the engineering services to new or remodelled accommodation at any of the Trust owned and managed facilities and sites.

These standards should also be utilised for owners of leased or non-Trust owned buildings which are occupied by the Trust as a minimum standard.

A copy of these standards is available on request from the Estates Management Helpline or WSG, they can also be found on the Trust Intranet for reference.

3.4 Trust Sanitaryware Specification:

The management and quality of the Trust's sanitaryware has a direct impact on water quality particularly Pseudomonas aeruginosa. The WSG has spent a considerable amount of time developing a detailed brochure containing the outlets / water controlling devices and ceramic / stainless steel devices that can only be used within Trust owned properties and buildings.

The products within the sanitaryware specification are approved by the WSG and:

- Minimize stagnation
- Minimize splashing
- Minimize waste water
- Minimize potential for pathogenic growth by having smooth internals or are designed to minimize risk
- Have been approved by IP
- Meet Trust engineering standards
- Utilize approved materials and have necessary WRAS approvals
- Have been thoroughly trialed by the Trust
- Are of a high quality

Any new sanitaryware installed not listed within the sanitaryware specification or approved by the WSG will have to be removed and replaced with an approved product.

A copy of the sanitaryware specification is available on request from the Estates Management Helpline or WSG or as an appendix to part C of this WSP, it can also be found on the Trust Intranet for reference.

4.0 PATIENT RISK CATEGORISATION

4.1 Assessed Patient Risk Categorisation:

Patient risk must be considered when managing patients in the event of reported Legionella or Pseudomonas aeruginosa contamination in the system and when compiling a water safety risk assessments and will be the driver for the development of specific and pertinent risk management strategies for each clinical area.

Augmented care settings will include but not be limited to:

- Where patients are severely immunosuppressed because of disease or treatment - this will include transplant patients and similar heavily immunosuppressed patients during high-risk periods in their therapy
- Where patients are cared for in units where organ support is necessary, for example critical care (adult paediatric and neonatal), renal, respiratory (may include cystic fibrosis units) or other intensive care situations
- Where patients have extensive breaches in their dermal integrity and require contact with water as part of their continuing care, such as in those units caring for burns.

It is the responsibility of infection prevention to inform the WSG and carry out an assessment of all areas to determine the clinical risk posed by the type of patient occupying each area. The result of the assessment will be used to determine the extent and type of management procedures and processes employed locally to ensure control of Legionella, Pseudomonas aeruginosa and any other pathogens of concern.

4.2 Patients at High risk of Legionella Infection

The following table lists the areas deemed high patient risk from legionella infection by the WSG:

Department	Risk Categorisation
CHU	High
Renal	High
Deanesly Ward	High
Durnall	High
Critical Care Unit	High
Cystic Fibrosis Unit	High
Davey Unit	High
All other clinical areas will be subject to on-going clinical surveillance and water sampling as deemed necessary by the WSG. When results suggest areas of increased contamination an assessment and investigation of water and management practices will be carried out in order to establish any risk management requirements	

4.3 Pseudomonas aeruginosa

The following areas have been deemed as high Pseudomonas aeruginosa patient risk by the WSG being classed as augmented where patients are severely immunosuppressed during high risk periods in therapy:

Department	Risk Categorisation
CHU	Augmented
ICCU	Augmented
NNU	Augmented
SCBU	Augmented
Renal Dialysis Unit	Augmented
Renal, Pond Lane, Cannock, New Cross Hospital	Augmented
Deanesly	Augmented
Durnal	Augmented
Delivery	Augmented
Cystic Fibrosis	Augmented
Davey Unit	Augmented
These areas will be subject to on-going clinical surveillance and six monthly water sampling When results suggest areas of increased contamination a assessment and investigation of water and management practices will be carried out in order to establish any risk management requirements	

There is no fixed definition of “augmented care”, individual providers / WSG’s normally define particular areas as augmented where water quality must be of a higher microbiological standard than what is normally considered acceptable.

The water quality required will be dependent on both the type of patient and its intended use. Most care that is designated as augmented will be that where medical/nursing procedures render the patients susceptible to invasive disease from environmental and opportunistic pathogens such as Pseudomonas aeruginosa and other alert organisms as detailed within section 4.1.

4.4 Legionella & Pseudomonas aeruginosa contingency arrangements

For contingency arrangements in the event of positive water samples being received or in the event of a confirmed outbreak please refer to part D of this WSP for further guidance.

The WSG / RP /D PR must always be consulted if contingency measures are deployed

5.0 MICROBIOLOGICAL CONTROL METHODS

Management of water systems and sanitaryware to reduce the risk of microbial growth including opportunistic pathogens such as Legionella and Pseudomonas aeruginosa is vital to patient safety and system health. It requires on-going maintenance and surveillance of control measures employed.

The methods used for bacterial control used by the Trust are:

- Temperature
- Oxidising biocide (Chlorine Dioxide) (New Cross & Cannock Chase Hospitals only)
- Flushing
- Cleaning
- Bacterial Contamination Monitoring - Water bacterial analysis sampling
- Hyper Chlorination

Temperature control remains the main control method used across all Trust properties for bacterial control however all control methods hold equal importance as they all have an important part to play in water safety as arranged by the WSG. Control methods also act to supplement each other in the event of high or low temperatures or where systems are complex and design issues may be present etc.

The plant and equipment used in the Trust's buildings which contain water can affect the overall water supply and health of the system or atmosphere and must be installed, maintained and monitored in line with general guidance within this plan

5.1 Temperature:

The Trust employs a temperature control regime as the primary method of Legionella / bacteria control in line with ACOP L8 within its domestic water systems. This is achieved by maintaining temperatures of:

- Cold water at temperatures or Cold Water Services (CWS) Distribution within 2ºC of incoming mains temperature or ideally < 20ºC depending on ambient conditions.

  This will depend on the temperature of water supplied to the Trust which can approach the maximum threshold of 25ºC in summer periods

- Stored hot water at 60ºC or greater
- Hot Water Services (HWS) Flow at 60ºC or greater
- HWS Return at 55ºC or greater
- HWS Distribution at all outlets at 55ºC or greater

5.2 Oxidising biocide (Chlorine dioxide - ClO2):

In addition to Temperature Control the Trust uses on-line dosing of the oxidising biocide Chlorine dioxide (ClO2) for Legionella control on its large complex hospital sites as a secondary control measure:

- New Cross Hospital
- Cannock Chase Hospital

ClO2 is an oxidising biocide / disinfectant that, when used correctly, has been shown to be effective at controlling both Legionella and biofilm growth in hot and cold water systems. It is used to aid Legionella control where maintaining a conventional temperature regime is difficult across expansive systems or where the removal of all dead legs and little used outlets is impractical.

ClO2 where used in the Trust is produced on site from a chlorite-based precursor using a ClO2 generator or dosing system by reaction with one or more other chemical precursors or by a catalytic oxidation process. Chlorine Dioxide is injected proportionally into various parts of the system to provide a background level of ClO2 at:

- Point of injection – between 0.2 and 0.8ppm

0.8ppm is considered as the maximum allowed level at point of injection and it is only allowed at this level at this point in order to allow for the minimum level to be achieved at the point of delivery i.e. outlet

Any level fluctuations must only be tolerated within this range
care must be exercised to ensure that the level of ClO2 at the nearest outlet does not exceed 0.5ppm

- Point of delivery (measured at sentinel outlets) – between 0.20 and 0.5ppm

5.2.1 CLO2 Recommended Daily Level (MRDL)

The WSG is aware of anecdotal evidence which suggests that some infants and young children who drink water containing ClO2 in excess of the Maximum Recommended Daily Level (MRDL) - 0.8mg/l (ppm) could experience nervous system effects. Similar effects may occur in foetuses of pregnant women who drink water containing ClO2 in excess of the MRDL. Some people may experience anaemia. This evidence also suggests that violations of the MRDL may harm human health based on short-term exposures. Certain groups, including foetuses, infants, and young children, may be especially susceptible to nervous system effects from excessive ClO2 exposure. There are no obvious symptoms, but ClO2 can affect development of the nervous system.

The WSG will ensure that a facility for CLO2 free water is available within the neonatal area for water, juice, and formula preparation. Young children and pregnant women should not prepare drinks with tap water which is treated with ClO2, instead where practicable a separate non-treated supply or a designated outlet fitted with a suitable activated carbon filter designed to remove the presence of ClO2 at the point of delivery should be provided for this purpose.

ClO2 and its breakdown products chlorite and chlorate can be deleterious to renal dialysis patients and will be removed, where possible, from the water supply to these units using localised filtration. Alternatively, where practicable, these areas will be supplied with ClO2 free water.

5.3 Shot-dosing (Hyper-chlorination):

During specific circumstances, when either methods of bacterial control are shown, by the various PPM programme monitoring tasks, to be failing, the water quality can be recovered and maintained by the use of shot-dosing of a suitable disinfecting agent, the levels of which must be maintained within the recommended limits for achieving disinfection as specified within the current edition of BS8558:2011: Clause 5.2.3 Flushing and Disinfection and L8 – The Control of Legionella bacteria in water systems – Approved Code of Practice & Guidance 2013. The WSG will recommend and implement such arrangements once all other options have been exhausted.

Sodium hypochlorite is the only chemical approved by the WSG for hyper-chlorination

Where there is a valid need for alternative disinfection / cleaning agent such as Silver stabilised Hydrogen Peroxide a written proposal outlining the reasons why an alternative disinfection agent is needed for use, the proposed disinfection agent, COSHH sheets, risk assessment and methodology must be presented to the Estates Department Responsible Person and or WSG for written authorisation.

Silver stabilised Hydrogen Peroxide has been successfully used for cleaning of systems but can only be used by specialists

Alternative disinfection agents will not be used without prior written consent from the Estates Department Responsible Person

Hyper chlorination is also utilised for cleaning of new systems, fittings and pipework before use to ensure cleanness of water, please see part C attachment 5 for further information.

5.4 Flushing - Infrequently used outlets

Stagnation of water and the risk from waterborne bacteria growing and proliferating in peripheral parts of any water system including outlets is high due to the ideal breeding grounds stagnation creates.

Taps or outlets that are at risk of stagnation are classified as infrequently used outlets which may also include dead legs off the system. To mitigate this risk the WSG promotes the use of the Compass system to record flushing of infrequently used outlets at for at least two minutes twice per week.

Flushing allows water through the system to avoid stagnation and the associated risk of proliferation of waterborne bacteria.

The compass system allows the WSG to manage and monitor flushing on a monthly basis to ensure systems do not stagnate and that good water turnover is achieved within all of its buildings. The system also allows additional flushing to be facilitated where there are high-risk patients or failures of control measures which may require more frequent flushing indicated by the WSG or risk assessment.

The WSG will ensure that:

- All outlets assessed and deemed to be 'disused' will be considered for removal from the system ensuring that their removal does not create dead-legs.
- When assessed and deemed "infrequently/inadequately used", all taps shall be flushed at least 2 x weekly for a minimum of two minutes.

  The WSG may arrange daily flushing if deemed necessary.
- If the outlet is fitted with a Point of Use (POU) filter, the filter will not be removed in order to flush the tap unless the manufacturer's instructions advise otherwise.
- Where practicable, taps which are programmed to flush automatically will be monitored and the automatic flushing information will be recorded on the building management system.

5.5 Cleaning

Hotel Services clean and de-scale all sinks and taps according to the frequencies as per the risk classification outlined in the National Specification for Cleanliness in the NHS 2007.

Cleaning of clinical wash-hand basins, taps and shower heads is undertaken in a way that does not allow cross-contamination from a bacterial source to outlet inclusive of descaling.

Please see Part B reference birthing pools and cleaning.

5.6 Bacterial Contamination Monitoring - Water bacterial analysis sampling:

Bacterial contamination monitoring is routinely used as a precautionary measure to assure the WSG that control measures in place are effective and systemic bacterial levels are under control. Water sampling is also used to inform the WSG of the condition of new systems prior to occupation to ensure water quality is safe for the intended patient group (See part C for further guidance).

Information collated over time also allows the WSG to analyse trends and act upon changes in normal environmental water conditions.

Sample locations and frequency is determined by the WSG, with support from Infection Prevention, and instructed to the Estates or Capital developments departments, who will arrange for the collection of samples in accordance with WSP 27.

Where routine sampling is used for monitoring bacterial control measures in place for systems the WSG are only considering systemic contamination

Where sampling is used for monitoring local bacterial contamination / water quality or to monitor local procedures the WSG are only considering Localised bacterial contamination

If localised monitoring indicates a wider issue further post sampling will be carried out under the guidance of the WSG

Localised contamination:

- Is detected by collecting and analysing a 'pre-flush' sample consisting of the unadulterated collection of a sample of the water present at the outlet or within a pool.

  This is normally achieved by running the tap without flushing or cleaning the tap and collecting the water dispensed or via direct sampling from the body of water within birthing pools etc.

Systemic contamination:

- Is detected by collecting and analysing a 'post-flush' sample consisting of the water collected following spraying the outlet with a disinfectant.

  This is normally achieved by using a solution equivalent to 1% sodium hypochlorite, leaving disinfectant in contact with the tap for at least 2 minutes then flushing the outlet for another 2 minutes before collecting the sample.

These two types of samples are essential for the WSG to determine the location of any contamination detected and appropriate remedial corrective action required to remove the identified bacterial contamination.

If deemed necessary by the WSG ad-hoc sampling can also be carried out designed to suit the prevailing status of all water quality management control parameters and patient care. Microbiological Sampling must be carried out in accordance with:

- PHE "Examining food, water and environmental samples from healthcare environments - Microbiological Guidelines: April 2013" and BS 7592:2008 Sampling for Legionella bacteria in water systems – Code of practice

  In addition, samples must be collected by suitably qualified personnel and in accordance with UKAS ISO/IEC 17025 (for sample collection) or UKAS ISO/IEC17020 (as part of the risk assessment process).

The following table provides a schedule of routine sampling arranged by the WSG and clarifies under what circumstances samples are taken, please refer to Part C of the WSP reference sampling new build and modifications to existing systems:

Type	Sampling & Contamination	Annual Frequency & Flush	Location	Supporting Information
Food Quality	Outlet **Systemic**	2 Post	Central Processing Unit Outlet within food preparation area New Cross Hospital	To food hygiene regulations Monitoring: Aluminum, Copper, Calcium, Iron, Magnesium, Manganese, Lead, Zinc, Alkalinity, Chloride, Fluoride, Total Organic Carbon, Ammonia, Carbon, Nitrite, Nitrate, Total Hardness, Turbidity, Conductivity, pH, Taste & Odour.
Legionella	Sentinel points **Systemic**	2 Post	High risk areas	Sampling will be phased over 12 months providing a broad indication of any systemic legionella activity
	Birthing Pools **Localised**	4 Filled pool	Maternity	Pool water when filled In accordance with Pool Water Treatments Advisory Group
	Hydrotherapy Pools **Localised**	4 Filled pool	Cannock Chase Hospital	
	Adiabatic Cooler drain **Localised**	6 From internal tank / drain	IT Hubs – IT Main Server & Deanesly Data Centre	Samples taken from May - October
Pseudomonas Aeruginosa	All clinically used outlets **Localised**	2 Pre	Augmented care areas	Sampling will be phased over 12 months providing a broad indication of local and systemic contamination *No routine Pseudomonas spp samples will be collected unless specifically requested by the WSG / DIPC*
	Birthing Pools **Localised**	12 Filled Pool	Maternity	Pool water to be sampled when filled in accordance with Pool Water Treatments Advisory Group No routine Pseudomonas spp samples will be collected unless specifically requested by the WSG / DIPC
	Hydrotherapy Pools **Localised**	52 Filled pool	Cannock Chase Hospital	
TVCC	Hydrotherapy Pools **Localised**		Cannock Chase Hospital	
Escherichia coli	Hydrotherapy Pools **Localised**		Cannock Chase Hospital	
	Birthing Pools **Localised**	12 Filled Pool	Maternity	
Coliforms	Hydrotherapy Pools **Localised**	52 Filled pool	Cannock Chase Hospital	
	Birthing Pools **Localised**	12 Filled Pool	Maternity	

Sampling will also be carried out:

- As part of the WSP processes detailed in part B-C of the WSP
- Following specific request by the WSG, IP or IPCG
- Following notification of failure of microbiological control measures if deemed necessary by the WSG (temperature, CLO2, Usage evaluation etc)
- Changes to the system
- Resampling following positive biological results
- During an outbreak or suspected outbreak of Legionnaires disease instructed by the investigating officer or WSG or IPCG

The sample locations, type and frequency of sample is determined and monitored by the WSG / IPCG

Samples are collected as described in Process No. 27 Microbiological sample collection protocol 27 Microbiological sample collection protocol

Arrangements for decontamination processes / washer disinfector areas detailed within separate decontamination guidance.

5.7 Additional measures for Pseudomonas aeruginosa management and control:

As required by the current version of HTM 04 the processes and procedures below aim to ensure that levels of Pseudomonas aeruginosa are controlled and maintained within the parameters described within HTM 04 and will include but not be limited to:

- A clinical assessment to identify those settings where patients are at significant risk from Pseudomonas aeruginosa contamination associated with water use and its distribution system;
- Implementation of suitable and sufficient processes for:
    - Hand-wash protocols
    - Waste patient fluid management
    - Sanitary facilities cleaning and hygiene management
    - Medical equipment cleaning and disinfection management
    - Usage evaluation and flushing protocols
    - Designing and installing facilities in accordance with Department of Health 'Performance requirements for building elements used in healthcare facilities Version: 0.6: England'
- An engineering risk assessment of the water system
- Operational monitoring of control measures
- Links to clinical surveillance which can offer an early warning of poor water quality
- Plans for the sampling and microbiological testing of water in identified at-risk units.

5.8 Patient contact (Augmented Care areas):

For direct contact with patients, sterile or water of a known satisfactory quality must be used, that is:

- water where testing has shown absence of Pseudomonas aeruginosa; or
- water supplied through a point-of-use (POU) filter; or
- sterile water (for example, for skin contact for babies in neonatal intensive care units)

- The WSG will advise areas where there may be direct or non-direct water contact from outlet with patients. This may also include reviewing the need for the outlets / showers and their potential removal
- For patient hygiene, single-use wipes shall be considered
- Rigorous reinforcement of standard infection control practices, including refresher training, shall be implemented
- Patient contact equipment (for example, showers, tap handles, incubators, humidifiers, nebulisers and respiratory equipment) shall:
    - Ensure the use of single-use equipment where appropriate, this will not be reused.
    - For non-single use equipment shall be cleaned and processed according to manufacturer's instructions with sterile or water of a known satisfactory quality (see above)

  - Use single-use detergent wipes for cleaning incubators. If a disinfectant is used, it is important that it will not cause damage to the materials being cleaned
  - Manufacturers' instructions must be followed. Disinfectants must not be used to clean incubators while occupied. Incubators should be damp dusted on the exterior daily using single use detergent wipes
  - Removal of fogging and rainout, whilst occupied, should be achieved by using a clean dry hand towel

- All other uses of water on augmented care units must be considered (for example, the use of ice machines, drinking water fountains, bottled water dispensers, wet shaving of patients who have a central venous catheter inserted into the jugular vein and washing patients with indwelling devices) and appropriate action / changes to operational procedures taken upon consultation with the WSG and IP
- All patient equipment must be stored clean, dry and away from potential splashing with water
- All preparation areas for aseptic procedures and drug preparation and any associated sterile equipment must not be located where they are at risk of splashing/contamination from water outlets
- All outlets on augmented care units must be flushed regularly. If the outlet is fitted with a POU filter, the filter shall not be removed in order to flush the tap unless the manufacturer's instructions advise otherwise. Records must be maintained of flushing on the compass system. Where taps can be programmed to flush automatically; such flushing shall be recorded on the building management or water safety management system Compass
- TMVs/TMTs and associated components must be serviced regularly, including descale and decontamination
- TMTs with blending integral to the body of the tap/shower must be considered instead of TMVs, as they always draw cold water through every time the outlet is used, thus helping to minimize the risk of stagnation
- Accurate records and drawings, which cover all the hot and cold-water systems, should be accurately maintained and updated following any modification.
- All services should be properly labelled such that the individual services can be easily identified
- Staff who are engaged in the installation, removal and replacement of outlets and associated pipework and fittings must be suitably trained to prevent contamination of the outlet and water system.

5.9 Further Trust Guidance and Policy

Microbiological control methods associated to water safety are also associated with best practice within wider Trust guidance and policy, reference should be made to the policies listed below ensuring standards of cleanness and safety are continually maintained protecting the health, safety & welfare of patients, employees, members of the public and the environment:

- Hand-Wash Protocol - IP01 - Hand Hygiene
- Patient Waste Fluid Management - IP19 - Blood and body fluid spillage management
- HS11 Management of Medical Devices Policy
- HS12 Decontamination of Re-useable Medical Devices

- Trust's current cleaning delivery plan
- Birthing Pool guidelines
- Dental services guidance for special care dental service
- Renal process management

  The management and use of water for renal applications inclusive of Haemodialysis is vital for protecting the health, safety & welfare of patients, employees, members of the public and the environment. Best practice from the association of renal technologists is used with guidance from HTM and British standards which are available from the renal department as required

  - BS EN ISO 13959:2015
    Water for hemodialysis and related therapies

  - BS EN ISO 26722:2015
    Water treatment equipment for hemodialysis applications and related therapies

6.0 SCALDING CONTROL METHODS

Scalding control methods in all Trust premises whether owned or occupied by the Trust or under lease or other Service Level Agreements (SLAs) will be based on a suitable and sufficient risk assessment.

Where full body immersion is required in patient areas patients must always be protected from scalding by the installation of Type 3 Thermostatic Mixing Valve (TMVs) and/or Thermostatic Mixing Taps (TMTs) which is compliant with:

- HTM 04-01 / D 08 thermostatic mixing valves (Healthcare Premises)

- BS7942:2011 - Thermostatic mixing valves for use in care establishments - Requirements and test methods

The temperature from all such outlets must be measured on a regular basis (see WSP part B / OP79 attachment 4 for further information) providing water at:

- 41^{o}C (+1^{o}C) for showers
- 41^{o}C (+1^{o}C) for basins
- 44^{o}C(+1^{o}C) for baths
- 38^{o}C (+1^{o}C) for bidets

For further information reference maintenance please see WSP part B / OP79 attachment 4 for further information.

Scalding control in non-full-body immersion and in non-patient or supervised areas which are fitted with standard mixer or bib outlets is to be achieved by general ‘Warning! Hot Water’ notices to indicate and warn users of the potential of scalding. Temperature limiting or thermal stop taps will also be considered in areas of low risk or supervised patient areas.

The use of TMVs and TMTs should be minimised by use of risk assessment in line with requirements of HTM 04 and only used as assessed by the WSG where the risk of scalding is considered to be high. TMVs/TMTs can be removed if already fitted following risk assessment and specific derogation from the WSG.

It is the Trust’s policy, however, that TMVs/TMTs will be removed, where practicable, and only following risk assessment confirmation that it is safe to do so. Removal of any TMVs/TMTs must only be carried out following review by the WSG.

7.0 RISK ASSESSMENTS

Risk assessments are a key part of water management and control. Traditionally risk assessments have been referred to as Legionella risk assessments however the scope of these now include all aspects of water safety including best practice from all elements of microbiological control.

The objective of a water safety or Legionella risk assessment incorporating all aspects of water safety is to identify and evaluate potential sources of risk and must:

- Identify how exposure to Legionella or other water borne pathogens is to be prevented; or
- if prevention is not reasonably practicable, the particular means by which the risk from exposure to Legionella or other water borne pathogens is to be minimised

The assessment will also provide assurance that compliance is continual not notional and enables valid decisions to be made about:

- The risk to health, i.e. whether the potential for harm to health from exposure is reasonably foreseeable unless adequate precautionary measures are taken
- What control measures are to be implemented to minimise the risk from exposure to Legionella
- Existing monitoring or corrective / preventative actions and plans are effective

The Trust utilise Hydrop a leading independent specialist in the management of Legionella and water safety to complete water related risk assessments in all properties owned and managed by the Trust. The WSG also utilise an electronic water quality risk management system “Compass” which provides real time risk management and log book system which is replacing the existing paper and Planet FM systems allowing the WSG to:

- Prioritise risks from assessments across all Trust owned and maintained properties
- Manage / control these risks on priority
- Maintain records
- Plan maintenance in accordance to risk or statutory requirements

Some elements of the Planet FM system may remain in use to facilitate labour management and KPI reporting however the long term vision for the WSG is to fully utilise Compass.

Areas not maintained or owned by the Trust may not utilise the Compass system and in such cases risk assessments must be carried out by an independent specialist registered with the legionella control association. As assessments are completed these must be sent to the WSG for review, where defects or detail of the risk assessment require attention the WSG works with the service provider to resolve any issue or defects in line with policy and this WSP.

Risk Assessments are to be periodically reviewed by the WSG to ensure the validity of each document. The WSG do not endorse the biannual review of assessments on the properties it owns or maintains as previously stipulated by ACOP L8, risk assessments

in these areas are continually in review utilising the compass systems and any changes to the original assessment would be recorded as an appendix to the original assessment. Where deemed necessary by the WSG, a revision to a risk assessment or a new risk assessment will be commissioned under the following circumstances lead by the responsible / deputy responsible person water where:

- There have been changes to the plant or water or its use
- There have been changes to the use of the building in which it is installed
- The availability of new information about risks or control measures is made available
- There have been changes to key personnel
- The results of checks indicating that control measures are no longer effective are made available.

Where the assessment demonstrates that there is no reasonably foreseeable risk or that risks are insufficient and unlikely to increase, no further assessment or measures are necessary. However, should the situation change, the assessment should be reviewed by the WSG and any necessary changes implemented.

Areas not owned or managed by the Trust not utilising the compass system would need regular risk assessment reviews by the maintenance provider in line with ACOP L8.

Following risk assessment the data and information gathered must be used by the WSG to undertake risk analysis of water safety priorities including remedial works and a strategic plan which is to be used to inform the capital or PPM program for the respective Trust or service provider to allow for the correct scheduling / priority of all proposed works as detailed below:

- List all buildings in priority order of non-compliance and potential risk.
- Devise a management programme for the minimisation of risks so that an action plan identifying resources and timescales is drawn up.
- Develop water safety schemes / program to minimise risk in order of priority giving consideration to cost, patient groups and difficulty.
- Manage the programme and identify compliance failures for remedial action.
- Review the programme of the action plan at regular intervals and record progress in implementing the work.

The assessment must also inform the Planned Preventive Maintenance (PPM) Programmes to ensure the type of works, the frequency of works and all relevant works specifications are in line with statutory guidance and in line with WSPs in place.

For all buildings / areas assessed to be of moderate risk or higher, the risk assessor must verbally highlight to the relevant responsible person what the issues are and issue a written report to both the responsible / deputy responsible person and WSG indicating any necessary immediate corrective and remedial actions in the immediate / short / medium / long term that need to be carried out.

7.1 Special Requirements for Legionella Risk Assessment

Water safety risk assessments must incorporate the requirements of legionella risk assessment compliant with UKAS ISO/IEC 17020:2012, BS8580:2019 and ACoP (L8)

and will be carried out by the Trust's externally appointed specialist independent advisor on all buildings currently owned and managed by the Trust. Buildings not owned or managed by the Trust must have a suitable and sufficient assessment in place carried out by an independent specialist compliant with UKAS ISO/IEC 17020:2012, BS8580:2010 and ACoP (L8) registered with the legionella control association.

Risk assessments must include all process and equipment, such as medical equipment including:

- portable humidifiers
- humidified incubators
- nebulisers etc
  and not just on the domestic water system

In order for these requirements to be achieved, departments other than Estates, such as Medical Engineering and Infection Prevention, nursing etc must be involved in the process which is normally facilitated through the providers WSG.

Systems which are susceptible of colonisation by Legionella, and which incorporate means for creating and disseminating water droplets, must be identified within the assessment, and the risk they present must be assessed. Risks will be assessed not just for the routine operation of the system, but also in unusual circumstances such as:

- Breakdown
- abnormal operation
- design
- installation
- commissioning

HSE Guidance Notes, appropriate HTMs and British Standards described in this plan should be fully applied when completing any assessment which must include the following:

- Cold Water Services – Storage
- Cold Water Services – Distribution
- Hot Water Services - Hot Water Generation and Storage
- Hot Water Services – Distribution
- TMVs and TMTs
- Showers and associated shower heads
- Adiabatic coolers
- Air Conditioning
- Nebulisers Water sources used
- Dental Chairs Water sources used
- Humidified incubators Water sources used

- Other systems:

    - Type of unit
    - Potential to cause an aerosol
    - Potential of aerosol being inhaled
    - Physical condition units and associated plant

    - Location, design, configuration and accessibility of all units
    - Water Treatment Programmes in place and their efficacy (if applicable)
    - Maintenance Programme and Hygiene Standards employed

- Review of management, maintenance, monitoring and record keeping:
    - Presence of and adequacy of all implemented Monitoring, Maintenance and record keeping in place
    - Programmes in place by all relevant departments
    - Presence of and adequacy of all implemented Auditing Programmes in place.

- Schematic diagrams and photographic representation
    - Schematic diagrams shall be produced for each system surveyed and will include schematic representation of all major distributions and associated plant installation/configuration. The schematic diagrams will be based on a non-intrusive surveys and existing drawings and information.
    - Electronic photographs must be included in the report to illustrate the status and condition of the system surveyed and to evidence high risk problems identified during the survey process.

All areas listed above must be measured and expressed numerically indicating the contribution of each area to the overall Risk.

7.2 Special Requirements for Pseudomonas aeruginosa Risk Assessments

A Pseudomonas aeruginosa risk assessment compliant with HTM 04 - 01 must be carried out incorporating all designated augmented care units, in order to identify and assess the risk of Pseudomonas aeruginosa infections from work activities and water sources within the designated areas and organise any necessary precautionary measures.

The Pseudomonas aeruginosa risk assessment will be reviewed and/or updated on an annual basis and/or when there are significant changes to statutory standards, operational requirements and when there are significant changes to a designated area's domestic water and work activities. This process will be managed and supervised by the WSG.

- Pseudomonas aeruginosa risk assessment will identify potential microbiological hazards caused by Pseudomonas aeruginosa and other opportunistic pathogens, the hazardous events and risks that may arise during storage, delivery and use of water in augmented care settings.

- The assessment will identify actions to minimise risks and ensure that appropriate sampling, monitoring and clinical surveillance arrangements are in place.

- Risk assessments will be led by the DIPC, a consultant microbiologist or the IP team representative and should consider:

    - Susceptibility of patients from each type of water use (including ice)
    - Scalding risk

- Clinical practice where water may come into contact with patients and their invasive devices
- Cleaning of patient equipment
- Disposal of blood, body fluids and patients' wash-water
- the maintenance and cleaning of wash-hand basins and associated taps, specialist baths and other water outlets
    - change in use (for example, clinical area changed to office accommodation or vice-versa) due to refurbishment or operational necessity
    - other devices that increase/decrease the temperature of water (for example, ice-making machines, water chillers) which may not be appropriate in augmented care settings
    - engineering assessment of water systems, including correct design installation, commissioning, maintenance and verification of the effectiveness of control measures
    - underused outlets
    - flushing policy
    - the unnecessary use of flexible hoses and any containing inappropriate lining materials
    - sampling, monitoring and testing programme
    - the need for outlets at wash-hand basins that use sensor operation and TMVs/TMTs (remote/ integral)
    - education and training

- Although not under the category of augmented care, situations will arise where surgical wounds may become contaminated from water outlets such as showers. Similarly the practice of soaking leg ulcers or syringing ears may require consideration of the microbiological quality of water used and will require local assessment.

- The likelihood of hazardous events is influenced by the size and complexity of the water system and can be exacerbated by poor or over complicated design, construction, commissioning, operation and maintenance.

- Once potential hazards and hazardous events have been identified, the severity of risk will be assessed so that priorities for risk management can be established. The risk assessment will consider the likelihood and severity of hazards and hazardous events in the context of exposure (type, extent and frequency) and the vulnerability of those exposed. Although many hazards may threaten water quality, not all will represent a high risk. The aim will be to distinguish between high and low risks so that attention can be focused on mitigating risks that are more likely to cause harm to susceptible patients who are within augmented care areas.

8.0 INSPECTION MONITORING AND FAULT MANAGEMENT

8.1 Planned Maintenance Programme:

In order to ensure that the devised risk management programme is effective in minimising or controlling the risk of Legionellosis, the Trust (or others on its behalf) will undertake planned preventive maintenance (PPM). The actual frequency of the tasks adopted, is reviewed by the WSG and form part B of this WSP. PPM is based on statutory guidance and a number of other factors such as the type of building, type of occupants and history of the plant/system etc.

For the detailed planned preventative maintenance task specifications and associated processes employed across the various Trust owned and managed buildings please refer to part B of this WSP / attachment 4 of OP79. Where facilities are leased or Trust staff or patients attend non Trust managed buildings the water safety procedures in place must be equal to or better than the requirements of OP79 and statutory legislation. The WSG aim to review procedures in place in non-Trust owned or maintained facilities as deemed necessary by the WSG.

8.2 Mobile Screening / Dental Vehicles

Within the community a mobile dental service is provided which allows some dental procedures to be completed close to home. The management of this facility is detailed within:

- Dental Services guidance for special care Dental

The vehicles are maintained by the Trust fleet management service and operated from community sites. Facilities at these sites must allow for:

- A suitable water supply point, provided from a wholesale water source, for topping-up the vehicle fresh water tank. This supply point must not be a dead leg and must be fitted with suitable back-flow prevention devices to allow for compliance with the relevant Water Regulations. This supply is subject to regular flushing when not in use and the flushing recorded on Compass.

- The water supply is sampled periodically as per section 5.6.

- Annual disinfection of the fresh water tank and associated pipework / outlets is as described in WSP Part B / OP79 attachment 4. If the vehicle is not put into use immediately following disinfection, the water facilities of the vehicle must be flushed in line with requirements of Compass.

- The hose used to connect the water supply to the vehicle(s) storage tank is kept clean, safe and dry and must be thoroughly flushed for five minutes before each use. The hose must not be left connected to the vehicle's tank but must be disconnected and only re-connected when required to top-up the vehicle's tank.

- The screen wash bottles must be cleaned and filled with fresh wash fluid before each use

- The vehicle not being put into use and the supply not being used if any biological analysis sample results indicate bacterial levels outside the acceptable parameters as described in WSP part D or OP79 attachment 6 - Contingency Arrangements.

Vehicles must not be put into use until water analysis results received indicate bacterial levels are within the acceptable limits

8.3 Ad-hoc Risk Management and Control Processes:

The Trust (or others on its behalf) will, in addition to the planned preventative maintenance programme undertake maintenance as required. The execution of such tasks will depend on a number of criteria sanctioned by the responsible / deputy person and or WSG such as: the condition of systems; the status of control measures; biological activity etc. For additional information please refer to part B of this WSP / attachment 4 of OP79.

8.4 Contingency Management:

When water quality management and control parameters have been breached and cannot be maintained, the Trust (or others on its behalf), will ensure that the detailed processes and procedures described in part D of this WSP or attachment 6 of OP79 - Contingency Measures are followed in order to enable the failing parameters to be brought back into control.

8.5 Instrument Calibration:

Temperature and ClO2 measurement equipment and water sampling equipment for carrying out monitoring works will be calibrated on an annual basis and the certification of calibration appropriately provided and appropriately retained in the Planet FM system and or Compass System.

Calibration service providers shall be accredited via UKAS calibration and accredited to ISO 17025.

Temperature measurement equipment used by ward staff shall be held by the ward manager and should be maintained by them in a good condition.

9.0 WATER SYSTEM AND PLANT DESIGN INSTALLATION AND MAINTENANCE

Management of water systems and associated end-of-line fittings to reduce the risk of microbial growth including opportunistic pathogens such as legionella species and Pseudomonas aeruginosa is vital to patient safety. It requires on-going maintenance and surveillance of control measures employed.

Plant and equipment used in the Trust buildings which have water in the system and can affect the water supply or the atmosphere must be approved by the WSG and must be monitored regularly and:

- Be carefully designed so as to minimise aerosols and the material used in construction must not harbour or provide nutrients for bacteria. They must be designed to be readily drained and cleaned.
- Must be maintained in a clean and sound condition being easily and safely accessible.
- Be clearly labelled
- Must be maintained by ensuring the systems are kept in a good condition or by either regular cleaning and disinfecting on a regular dosage of water treatment
- Records kept of maintenance performed and the results obtained.

For detailed water systems and plant design, installation and management specifications see part B of this WSP / attachment 4 of OP79.

10.0 DESIGN INSTALLATION AND COMMISSIONING OF REFURBISHED AND NEW-BUILD FACILITES

The design, installation and commissioning of all new-builds and refurbished areas will be carried out in accordance with the Trust procedures for capital schemes and in accordance to the requirements and specifications detailed in part C of this WSP or attachment 5.

Plant and water systems will be designed and constructed to be safe, without risks to health when used. Such hazards maybe of a physical, chemical or microbial nature such as the risks associated with colonisation and growth of legionella bacteria within the water system.

The type of system installed depends on the size and configuration of the building and the needs of the occupants but the water systems must comply with the recommendations with the WSP. The design, installation, commissioning and hand-over of the hot and cold water services, new, extended or refurbished, in any of the Trust's premises must also comply with all current legislation and guidance documents, British Standards and Best Practices.

The Royal Wolverhampton NHS Trust

Ref: OP79 Water Safety Policy

Attachment 4

Water Safety Plan

Part B

Maintenance Arrangements

Version:	1.1
Ratified by:	Mike Koumi – Authorised Engineer Water
Date ratified:	September 2022
Name of originator/authors:	Joanna Macve, Tom Butler, Steve Brooks
Name of responsible committee/individual:	Water Safety Group
Date issued:	January 2019
Review date:	March 2026
Target audience:	Trust staff
Equality Impact Assessment:	Yes
This process is effective for all employees of the Royal Wolverhampton NHS Trust, Patients, Visitors and Contractors	

Version Control

Water Safety Plan - Part B – Maintenance Arrangements					
Reference/ version.	2022	**Category:**	**n/a**	**Version:**	1.1
Document purpose:	Supporting the RWT NHS Trust Water Safety Policy Document OP79 and WSP Defining the general precautions taken for the management of water forming part of the Trust written scheme and water safety plan for The Royal Wolverhampton Hospital NHS Trust				
Intended for use by:	Direct and indirect Staff				
Author(s) responsible for document upkeep	Joanna Macve, Tom Butler, Steve Brooks				
Consultation process	Water Safety Group, Health and Safety Steering Group, Infection and Prevention Group				
Sponsoring Director:	Gwen Nuttall				
Approved by:	TMC				
Dated:	2019 (Schedule as Policy Issue)				
To be reviewed before:	2026 (Schedule as Policy Issue)				
Implementation arrangements:	Estates Managers, Supervisors, Health & Safety Representatives, Health & Safety Officers, Staff and Contractors.				
Monitoring Arrangements:	The implementation and effectiveness of this process will be reviewed on an ongoing basis through the Water Safety Group and Health & Safety Steering Group, by checking whether the process is being used and receiving feedback on current effectiveness and possible future revisions.				

VALIDITY STATEMENT

This document is due for review on the latest date shown above. After this date, the process documents may become invalid. The electronic copy of this document is the only version that is maintained. Printed copies may not be relied upon to contain the latest updates and amendments.

CONTENTS

1.0 STRUCTURE & GUIDANCE

The Water Safety Plan is designed to be a series of easy reference specific guides to water safety inclusive of safe hot water within the Trust for our staff and contractors explaining in brief how water is managed, systems maintained and developed within its properties.

This plan is a key attachment to operational policy 79 and must be read in conjunction with this document and its attachments. Water Safety Plans (WSP) are recommended by Health Technical Memorandum 04-01 and a written scheme is required by Approved Code of Practice L8 (ACOP L8). The combined WSP and written scheme provide best practice and a holistic approach to the management of water systems.

The WSP is a living document. It is kept under continual review by the Water Safety Group (WSG) to ensure adequate assessment and control of risks are in place. The content of the WSP is a fixed monthly agenda item of the WSG ensuring the document is maintained reflecting best practice.

The WSP has four parts A-D, this section part B provides maintenance guidance reference the Trust's Management & Control programme for: The control of Legionella, hygiene, 'safe' hot water, cold water and drinking water systems including Pseudomonas aeruginosa – advice for augmented care units. Each part of the WSP can be considered in isolation, however part A should always be read first to provide general background information and precautions in line with OP79. The table below shows the parts of the WSP and targeted departments they are aimed for:

Part No.	Document Title	Targeted Departments						
		Estates	Capital	IPC	Nursing	Medical Physics	Facilities	Med Micro.
A	OP 79 Attachment 3 **General Precautions**	✓	✓	✓	✓	✓	✓	✓
B	OP 79 Attachment 4 **Maintenance Arrangements**	✓		✓				✓
C	OP 79 Attachment 5 **Capital Development & Water System Modifications**		✓	✓				✓
D	OP 79 Attachment 6 **Contingency Measures**	✓	✓	✓	✓		✓	

Please refer to the relevant part for guidance or where insufficient information is found within this plan reference should and will be made to best practice within HTM 04 and statutory guidance within ACOP L8, however interpretation of guidance and clarifications required reference the management of water within the Trust must be directly from the Water Safety Group.

Special notes are highlighted in blue across all parts of the WSP to give emphasis to pertinent information relevant to the section being considered where appropriate

This plan must also be read in conjunction with the Trust's Health and Safety policy HS01 and supplementary information in relation to COSHH.

For information reference medical equipment please refer to HS11 & HS12 that provide detailed arrangements for the management of medical devices.

Reference should also be made to Part A Section 5.9 of the WSP which details further Trust policy and procedure which should be considered with this plan.

The scope of this WSP must extend but not be limited to:

- Domestic Cold Water Services - Storage and Distribution
- Domestic Hot Water Services - Generation Storage and distribution
- Faucets, showers, bib taps, etc.
- Thermostatic Mixing Valves (TMV)/Thermostatic Mixing Taps (TMT)/Thermal Stop Taps
- Drinking Fountains
- Vending Machines
- Emergency Showers/ Eye Washers
- Dental Chairs
- Nebulisers
- Humidified incubators
- Wet Air Conditioning
- Adiabatic coolers
- Portable humidifiers
- Ground/Floor wash vehicles
- Other systems considered to pose a risk
- Mobile Screening Vehicles
- Hydrotherapy pools
- Birthing pools

The WSP does not provide specific guidance for management of water quality for specialist water systems used for cleaning of surgical instruments or medical devices e.g. Endoscopy Water or CSSD supplies which have their own stringent procedures and standards in place.

This Water Safety Plan (WSP) has a controlled circulation and the validity statement on page two must be noted.

2.0 INTRODUCTION

2.1 Maintenance:

Management of water systems and associated end-of-line fittings to reduce the risk of microbial growth including opportunistic pathogens such as Legionella and Pseudomonas aeruginosa is vital to patient safety. Planned Preventative Maintenance - PPM and surveillance control measures employed by the WSG for the Trust are of upmost importance and must be diligently followed to protect and safeguard patients, staff, visitors and systems within the Trust.

In order to ensure the PPM program is effective in minimising or controlling water safety risks, the Trust (or others on its behalf) undertakes PPM at a frequency agreed by both the RP / DR P and WSG. The actual frequency of the tasks adopted, will depend on a number of criteria such as the type of building, type of occupants and history of the plant / system etc.

Historical data and experience has allowed the WSG to develop 'As-Required' maintenance for certain plant or equipment. This is determined by the results of each visit and is dependent on various measured parameters such as:

- Physical condition
- Biological activity (if applicable)
- Temperature
- Usage frequency etc

For the specific PPM frequencies please refer to section 4 of this WSP.

Any deviation from the guidance within this WSP is to be agreed by the WSG and by the Trust responsible person water or Authorised Engineer Water. This guidance is based upon best practice and processes and procedures adopted and approved by the WSG within the Trust.

For general information reference pathogens / Legionellosis please refer to part A before reading this document.

3.0 WATER SYSTEM AND PLANT DESIGN INSTALLATION AND MAINTENANCE

The design and selection of plant is of upmost importance and directly effects long term and ongoing maintenance and the health of any system as a whole. Reference must be made to part C of the WSP which details capital development requirements for water safety which details requirements for:

- Design
- Validation
- Installation or the build
- Accessibility for maintenance
- Commissioning
- Hand over & occupation
- Microbiological analysis etc.

The WSG has to approve all designs or system modification prior to installation as detailed within part C of this plan to ensure changes are recorded on the Compass system and risk assessments are updated as required. The WSG will also ensure that changes do not have detrimental effects elsewhere on the system which may not be considered as part of an individual project.

3.1 Ice Making Machine Guidance

Ice is defined as food under the Food Safety Act 1990 and must be made, stored and handled so that it is not contaminated, a requirement of the Food Safety (General Food Hygiene) Regulations 1995.

The WSG only allow the installation of ice making machines as detailed within the Sanitaryware specification within part C of the WSP which do not store large volumes of ice.

The estates department will facilitate servicing of ice Machines recorded on the Compass / Planet system in accordance with manufacturers' instructions but it is the responsibility of the user to complete daily / weekly / quarterly checks and cleaning as required in accordance with manufacturer's instructions.

Hygiene is of upmost importance for making and storing ice. The daily / weekly / quarterly user checks and cleaning / disinfection in line with manufacturer's recommendations are essential.

It is also the responsibility of the department utilising the equipment to provide training to ensure staff handling ice understands hazards and controls which aim to minimize any risk of contamination.

Ice machines must always be sited in a clean room, away from sources of contamination such as human waste (in sluice rooms) and cleaning chemicals and must be used in accordance with the manufacturers' instructions, as regards ambient temperatures, ventilation, water, electrical and drain connections.

3.2 Birthing Pool Guidance:

Safety and hygiene are of paramount importance using a birthing pool staff responsible for using and cleaning birthing pools must be trained locally in their use considering:

- Microbiological Safety
- Scalding Safety
- Electrical Safety
- Structural Safety

Birthing pools must only be filled with water from the building's domestic water system. Before using a birthing pool:

- Rinse the pool with cold water and allow the tap to run for a minimum of 2 minutes.
- Close-off plug and fill the birthing pool just over half-way with water from the hot tap.
- Check the water temperature and adjust temperature by adding cold water to the required level. The expectant mother must not be allowed to enter the birthing pool until the temperature of the water has been confirmed.

Following the use of the birthing pool:

- Ensure that the mother, her partner and baby have left the room before cleaning the birthing pool
- PPE must be used for cleaning the birthing pool (minimum gloves, plastic apron and appropriate eye protection
- Ensure that the room is well ventilated - open all windows if practicable
- Remove debris with net and discard via clinical waste bin - DO NOT allow solid matter down the drain
- Rinse birthing pool with shower head
- Place bucket in the birthing pool and fill with cold water (DO NOT attempt to lift bucket out of the birthing pool)
- Add sodium hypochlorite tablets to the bucket (equivalent to 10,000ppm). Use 5 x 3 strength
- Disinfect all surfaces with this solution - this solution should be applied to all surfaces and be in contact with all surfaces for a minimum of 2 minutes
- Use pink cloth to clean the outer rims of the birthing pool with the disinfectant solution
- Use a clean single-use mop for cleaning birthing pool
- Clean with detergent and rinse with shower head to remove detergent
- Discard mop head after use
- Ensure the birthing pool is dried thoroughly
- Complete cleaning log

3.3 Portable "Wet" Evaporative Cooling Point-of-use Air Conditioning Units:

These units are considered to pose a significant risk of Legionellosis because of their mode of operation, which includes the wetting of medium and the production of aerosols, which, if not maintained correctly, can increase the potential of bacterial growth and proliferation. For this reason, the Trust does not normally allow the use of these types of

portable cooling units. In extreme circumstances a permit / derogation can be granted by the WSG / IP for their use, please refer to procedure 47.

3.4 Portable air conditioning units (refrigerant type):

Only units approved by the WSG may be used on Trust premises and subject to a risk assessment prior to use.

Authorised units must be subject to a suitable and sufficient PPM programme as recommended by the manufacturer of the unit.

3.5 Portable Humidifiers:

Portable humidifiers must not be used without the permission of the ward / department manager who would need to ascertain suitability of use following an adequate risk assessment and consultation with the Water Safety Group.

All portable humidifiers approved for use must be suitably maintained in accordance with the HS12 Decontamination of Medical Devices Policy.

3.6 Steam / DHW Shut Downs:

When a site / system is subject to a steam or domestic hot water shutdown which lasts less than 24 hours, it is important to ensure the hot water is quickly purged and replaced with cold water for the duration of the works. This will ensure that hot water is not allowed to cool which would increase the potential of bacterial growth and proliferation during this process.

The microbiological impact on the system when filled with cold water during this process is lower than when hot water is allowed to cool.

In situations where the shut-down is over 24 hours the WSG or RP / D RP must be consulted as the system may need to be disinfected or pasteurised before use in high risk clinical areas.

3.7 Temperature monitoring:

Where designated sentinel outlets are fitted with TMV/TMT, the temperature of the hot and cold supply must be measured by surface (contact) temperature measurement.

If contact probe is to be used for temperature monitoring through copper pipe work, temperatures must be collected as described in BSRIA application guide AG 4/94 – Guide to Legionellosis – temperature measurements for hot and cold water services. The temperature measurements must be carried out at different times during the day in order to allow indicative temperature monitoring of the vessel during a typical daily usage profile.

3.8 Instrument Calibration:

Temperature and chemical measurement equipment and water sampling equipment for carrying out monitoring works must be calibrated on an annual basis and the certification of calibration appropriately provided and appropriately retained in the Planet/Compass System.

Calibration service providers must be accredited via UKAS calibration and accredited to ISO 17025.

Temperature measurement equipment used by ward staff must be held by the ward manager / sister.

3.9 Water Safety Log Book & Records:

The trust operates two electronic systems in properties it owns and maintains which form the legionella log book and written scheme. Currently Planet FM facilitates all maintenance and records activity and Compass records usage evaluation / risk and risk assessment.

The intention of the WSG is to fully utilise the Compass system for scheduling and facilitation of water related maintenance however the transition between the systems is complex and will be phased and monitored by the WSG. This will ensure continuity and accuracy of information during the transition.

Staff working in properties not owned or maintained by the Trust, rely on the systems and procedures provided by that facility management provider. The WSG aims to provide support to these areas and best practice from this WSP / policy in conjunction with the Trust property management team.

4.0 PPM – TASK FREQUENCIES

The following table is intended to be a guide to illustrate the frequency in which certain maintenance tasks are completed in line with best practice, guidance, ACOP and findings by the WSG. The schedules below are approved and monitored by the WSG and no changes are to be made without the approval of WSG. Items not listed below must be clarified by the WSG and or RP / DRP water:

TO BE CARRIED OUT BY ESTATES DEPARTMENT STAFF (OR OTHERS ON THEIR BEHALF)					
TASK			**FREQUENCIES** Note: Task frequencies are based on a yearly basis determined by historical findings and industry best practice as approved by the WSG.		
			AUGMENTED CARE	**GENERAL HOSPITAL BUILDINGS**	**NON-PATIENT BUILDING / DOMESTIC BUILDINGS**
Clinical Risk Evaluation Of Patients			As required led by infection prevention and liaised to responsible / deputy responsible person / WSG		
Usage Of Evaluation And Flushing			2x Weekly		
Point-Of-Use Filter Installation / Change			As Required By Manufacturer		
Hot & Cold Water Distribution	Temperature monitoring		Monthly @ Sentinel Outlets		
	Chlorine dioxide level monitoring		Monthly @ Sentinel Outlets and Source		
	General inspections of water outlets		As part of environmental audit and as required by WSG		
	Cleaning and disinfection of water outlets		As Required		
	Cleaning and disinfection of distribution system.		As Required		
Water Storage Tanks	24hr Drop-Test		Annually And As Required		
	Temperature Monitoring		When DCWS are at >20ºC		
	Visual condition inspections		Annually		
	Clean & Disinfection		As Required		
Cistern Type Water Heaters (If present)	Temperature Monitoring		Monthly	Quarterly	6 Monthly
	Inspection of cold tank		6 Monthly	Annually	
	Cleaning & Disinfection		*As Required	As Required	
	*Where tanks have been disinfected as result of identified bacterial contamination, all associated down services must be sampled for similar bacterial contamination and similarly cleaned and disinfected.				
Instant Water Heaters Water heaters of <15 litres storage capacity	Temperature Monitoring		Monthly	6 Monthly	
Low Volume Water Heaters Water heaters of >15 litres storage capacity, including Combi boilers	Temperature Monitoring		Monthly	6 Monthly	
Calorifiers I. Indirect storage Calorifiers (all vessels ≥75 litres) ii. Direct Gas fired Calorifiers iii. Plate heat exchangers Where multiple Calorifiers are linked, the monitoring must include the flow and return of EACH unit and not just the common flow & return.	Temperature Monitoring	Automatic (Where BMS is fitted)	Constant On BMS		
		Manual (Where BMS is not fitted)	Monthly		
	General Visual Inspection and Drain Sludge Flushing (All Calorifier Types)		Annually Increase to 6 monthly if evidence shows presents of sludge		
	Pasteurisation	Indirect storage Calorifiers	Annually And As Required		
		Direct Gas fired Calorifiers	As Required		
	Expansion Vessel Flushing (If not “flow-through” type)		Weekly Where reasonably practicable. Where this is not reasonably practicable, the Trust aims to replace units with “Flow-through “type units at the earliest opportunity		

TMVs/TMTs Including Shower Mixers	Temperature monitoring & general condition inspection	Fully bodied immersion Showers & Baths	Annually	
		Non-full bodied immersion – Patient areas	Annually	
		Non-full bodied immersion – Staff areas	Annually	
	Servicing (Including Fail-Safe checks)		As required to manufactures specification	
	Clean, Descale & Disinfection		As required	
	Strainer cleans and disinfections		As Required and As Part of Quarterly Servicing	
Showers	General Condition Inspection		Quarterly	
	Clean & Disinfection/Replacement		As Required	
Air Conditioning/ Air Handling	Glass Trap Cleaning		Monthly	Quarterly
	Cleaning & Disinfection of Drip Tray, Chiller Batteries and internal Surfaces		Quarterly and as required	6 Monthly and as required
	Mobile AC units clean and disinfection		Monthly	
Drinking Fountains	Clean, Descale & Disinfection		Monthly (In accordance with manufactures recommendations)	
Ice Making Machines	Clean, Descale & Disinfection		Annually (User recommended sanitation completed as manufactures guidance)	
Fire Hose Reels (When off DCWS)	Flushing		2 x Weekly	
Adiabatic Coolers	General visual inspection & operation of the spray bars and drain.		Monthly during cooling season May - October	
Drinking Fountains And Ice Making Machines	Biological Analysis		If deemed necessary by the WSG	
Dental Chairs	Reservoir emptying		Under Manufacturer's instructions by clinical dental staff	
	Cleaning and Disinfection			
Humidified Incubators	Reservoir emptying		Daily	
	Cleaning and Disinfection		After each use	
Portable Humidifiers	Reservoir emptying		Daily	
	Cleaning and Disinfection		After each use	
Hydrotherapy Pools	Residual disinfectant Measurement		Daily	
	pH Measurement			
	Water Treatment (if not continual)			
	Water Clarity Inspections			
	Automatic dosing Systems Inspections			
	Disinfectant levels in Reservoirs Measurement			
	Filters Inspections			
	Strainers Inspections			
	Backwash sand filters		Weekly	
	Clean Strainers			
	Clean filters (thoroughly)		Annual Programme	
	Check that sand filters are effective		As required Based on other measured parameters	

5.0 ESTATES MANAGEMENT WATER SAFETY PROCEDURES

In order to ensure that the Planned Preventative Maintenance Programme is effective, the Trust (or others on its behalf) must undertake certain maintenance or emergency works as required. The execution of such tasks will depend on a number of criteria such as:

- Condition of system
- Status of control measures
- Biological activity; etc.

It is vitally important that standard of workmanship and works are carried out to a high standard and the following procedures must be used to ensure standards continually maintained in line with recommendations of the WSG. The table below lists the water safety procedures approved by the WSG to maintain water safety, if procedures are not listed or further guidance is needed please refer to the WSG:

PROCEDURE	DESCRIPTION
WSP 01	Distribution & Outlet Temperature Monitoring
WSP 02	Chemical Sampling CLO2 Level Monitoring
WSP 03	Water Storage Tank Temperature Monitoring
WSP 04	Water Storage Tank – Visual General Inspection
WSP 05	Storage Calorifiers – 24hrs
WSP 06	Storage Calorifiers – Manual Temperature Monitoring
WSP 07	Storage Calorifiers – General Visual Inspection Including Draining & Flushing
WSP 08	Circulation & Destratification Pumps Visual Inspection & Servicing
WSP 09	Trace Heating Monitoring
WSP 10	Expansion Vessel Flushing (None flow through type)
WSP 11	Cistern Type Water Heater Temperature Monitoring
WSP 12	Cistern Type Water Heater – Inspection of Tank Section
WSP 13	Cistern Type Water Heater – Clean & Disinfection
WSP 14	Low Volume Water Heater @ >15 litres – Temperature Monitoring
WSP 15	Combination Boiler – Temperature Monitoring
WSP 16	Instant Water Heater @ 15< litres – Temperature Monitoring
WSP 17	Thermostatic Mixing Valves / Taps – Temperature Monitoring
WSP 18	Thermostatic Mixing Valves / Taps – General Condition Inspection & Servicing
WSP 19	Thermostatic Mixing Valves / Taps – Clean, Descale & Disinfection
WSP 20	Showers Temperature Monitoring
WSP 21	Shower Head Replacement / Clean and Disinfection
WSP 22	Safe Hot Water Bathing Protocol
WSP 23	Air Conditioning / Air Handling – Glass Trap Cleaning & Disinfection
WSP 24	Air Conditioning / Air Handling – General Inspection Clean & Disinfection
WSP 25	Adiabatic Cooler Maintenance & Monitoring
WSP 26	Hydrotherapy Pool Management
WSP 27	Microbiological Sample Collection Protocol
WSP 28	Small Size Pipe work Installation Projects & Associated Components Pre & Post Installation Cleaning and Disinfection (Not tap changes)
WSP 29	Permit – Release Into Use New Installations of Small Size Pipe work Projects & Associated Components
WSP 30	Water Storage Tank Cleaning & Disinfection
WSP 31	Certificate of Conformity – Cold Water Storage Tank Cleaning & Disinfection Spray Method
WSP 32	Certificate of Conformity – Cold Water Storage Tank Cleaning & Disinfection Soak Method
WSP 33	Water Storage Tank Drop Test
WSP 34	Domestic Water Services Disinfection
WSP 35	Certificate of Conformity – Distribution Services Disinfection
WSP 36	Calorifier Pasteurisation
WSP 38	Domestic Water Services HWS Distribution System Pasteurisation
WSP 39	Certificate of Conformity – Domestic Water Services HWS Distribution System Pasteurisation
WSP 40	Point of Use Filter Installation & Replacement
WSP 41	Dead Legs / Areas of Low Usage Evaluation & Flushing
WSP 42	Mobile Screening / Dental Vehicles Management
WSP 44	Management of Drinking Fountains
WSP 45	Notification of Closure of Facility (Ward, area, room, section of building etc)
WSP 46	Notification of Closure of Facility & Permit to Re-Occupy (Not subject to change / refurbishment)

The following pages contain the detailed procedures as listed above:

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 01 Distribution & Outlet Temperature Monitoring	
Frequency	As Specified In Section 4
Limits:	MAINS Temperature: <20ºC within 2 minute Temperature: <20ºC within 2 minute Temperature: ≥55ºC within 1 minute Blended Temperature: ≤41ºC (+/- 1ºC) for basins/showers ≤44ºC (+/- 1ºC) for baths ≤38ºC (+/- 1ºC) for bidets
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

General

Water temperatures at all outlets, both CWS and HWS, must be measured at least once annually and a representative number direct-fed Sentinel outlet (outlets not fitted with TMV or TMT) must be measured at regular intervals.

Temperatures must be measured after two and one minute at full flow respectively.

Note: Where designated sentinel outlets are fitted with TMV/TMT, the temperature of the hot and cold supply must be measured from binder points or by surface (contact) temperature measurement. If contact probe is to be used for temperature monitoring through copper pipe work, a 2°C temperature adjustment must be added to the recorded temperature before recording the temperature.

The temperature measurements must be carried out at different times during the day in order to allow indicative temperature monitoring of the vessel during a typical daily usage profile.

CWS

The outlet temperature measured after allowing the water to run for 2 minutes must not exceed 20°C. Where the temperature exceeds 20°C, the cold water temperature at the point of supply must be measured. When the supply temperature is between 18°C and 25°C, the measured outlet temperature, after running the tap for 2 minutes, must be less than 2ºC higher than that at the point of supply.
Any tap which fails this test must be reported to the Responsible Person or Deputy Responsible Person and the whole cold water system must be investigated. If the point of supply temperature exceeds 25°C, the water company must be alerted.
On each monitoring visit, the temperature of the mains water source must be measured, including any cold water storage water tank when the CWS temperature at the selected outlets tested is measured and found to exceed 20°C.

HWS

The outlet temperature measured after allowing the water to run for 1 minute must be 55°C inclusive of any allowance for temperature adjustment. Where the temperature fails to reach the required temperature, the source must be measured and adjusted as necessary, and the Responsible Person or Deputy Responsible Person (Estates) informed as soon as possible.
On each monitoring visit, the temperature of the source supply (Calorifier etc.) must be measured. This must include the "flow" and "return" temperatures of each unit in the system.

Blended Outlets

The INITIAL and MAXIMUM outlet temperature measured must NOT exceed:

41°C (+1°C) for showers.
41°C (+1°C) for washbasins.
44°C (+1°C) for bath.
38°C (+1°C) for bidets.

Where the temperature exceeds the required temperature, the source must be measured and adjusted as necessary, and the Responsible Person or Deputy Responsible Person (Estates) informed as soon as possible.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 02 Chemical Sampling CLO2 Level Monitoring	
Frequency	As Specified In Section 4
Limits:	Between 0.2 & 0.5 mg/l CLO2
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

General

Chlorine dioxide is an oxidising biocide capable of reacting with a wide range of organic substances. Levels of 0.5 mg/l can, if properly managed, be effective against planktonic and sessile legionella (biofilm) in domestic water systems. The Drinking Water Inspectorate prescribes a maximum value for total oxidants in drinking water supplies which is the combined chlorine dioxide, chlorite and chlorate concentration. This should not exceed 0.5 mg/l as chlorine dioxide.

Frequency

Using a suitably calibrated electronic chlorine dioxide comparator, the following areas are checked / monitored at regular intervals which could be remote via BMS System:

DAILY – plant alarms
DAILY - the rate of addition of chlorine dioxide to the water supply;
DAILY - the concentration of chlorine dioxide at dosing points - between 0.25 and 0.8ppm

(Note: 0.8ppm must be considered as the maximum allowed level at point of injection and it is only allowed at this level at this point in order to allow for the minimum levels to be achieved at the point of delivery).

Any level fluctuations must only be tolerated within this range and care must be exercised to ensure that the level of ClO2 at the nearest outlet does not exceed 0.5ppm.

MONTHLY - the concentration of chlorine dioxide at the sentinel taps - the concentration should be between 0.2 and 0.5 mg/l;

While chlorine dioxide is not affected by the pH or hardness of water, it is sometimes difficult to monitor chlorine dioxide samples in domestic HWS due to its increased volatility causing the chlorine dioxide reserve to be lost when taking a water sample

The results from these analyses must be forwarded to the Responsible Person or Deputy Responsible Person (Estates) with any comments or recommendations for review by the WSG.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 03 Water Storage Tank Temperature Monitoring	
Frequency	As deemed necessary by the WSG
Limits:	Incoming Mains Temperature: <20ºC Stored Water Temperature: <20ºC
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

Using a calibrated thermometer, measure and report the following:

i. Ambient (external temperature)
ii. Tank room temperature
iii. Stored water temperature (Temperature of the tanked water should be monitored via the drain point if practicable)
iv. Supply temperature

Temperature readings should be recorded from as far away from the ball cock as possible.

Care must be taken as not to contaminate the stored water by the use of unclean temperature probes.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 04 Water Storage Tank – Visual General Inspection	
Frequency	As Specified In Section 4
Limits:	Water supply (Fittings) regulations 1999
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

- Using a calibrated thermometer, measure and report the following:
    - Ambient (external temperature)
    - Tank room temperature
    - Stored water temperature (Temperature of the tanked water should be monitored via the drain point if practicable)
    - Supply temperature
- Visually inspect tank room for bird and/or rodent infestation and state amount:
  0 = none; 1 = slight and 10 = heavy
- If insulation allows for inspection of the external condition of the tank walls, inspect for corrosion pitting and leaks.
- Visually inspect internal walls of tank for signs of scale deposition, corrosion and slime deposits.
- Visually inspect tank and associated valves/pipe work for leaks.
- Visually inspect bottom of tank for sludge deposition and state amount:
  0 = none; 1 = slight and 10 = heavy
- Visually inspect water surface for; dirt, oil films, insects and state amount:
  0 = none; 1 = slight and 10 = heavy
- Visually inspect for slimy deposits on the internal walls of tank and state the color of substance and state amount;
  0 = none; 1 = slight and 10 = heavy
- Visually inspect for algae growth indicated by either green or red plant like growth on water surface
- Visually inspect the insulation for signs of wear and tear and areas where the insulation has been removed
- Visually inspect that the lid is correctly fitted and that any bolts are securely tightened.
- Visually inspect that all insect/rodent screens fitted are clear from debris so that water can flow easily.
- Visually inspect all valves for correct operation, signs of corrosion and leaks.
- Visually inspect all booster pumps fitted for correct operation.
- Indicate the date that the tank was last cleaned and disinfected and indicate whether it was disinfected as routine or due to adverse conditions.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 05 Storage Calorifiers – 24hrs Temperature Profiling	
Frequency	As deemed necessary by the WSG
Limits:	Water supply (Fittings) regulations 1999
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

Operating temperatures of storage Calorifiers must be maintained within the following limits:

- FLOW TEMPERATURE: ≥60°C
- RETURN TEMPERATURE: ≥55°C
- DRAIN TEMPERATURE: ≥55ºC
- COLD FEED TEMPERATURE: <20°C

Where the unit is monitored using BMS, collect the readings of all the temperatures listed above, for at least a 24hr period and consider the results. Adjust control parameters as necessary.

Where the unit is not monitored using BMS, attach a data-logger on the flow, return, and cold feed (as close to the unit as practicable) and collect temperature data for at least a 24hr period and consider the results. Adjust control parameters as necessary and the frequency and duration of temperature logging dependent upon results.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 06 Storage Calorifiers – Manual Temperature Monitoring	
Frequency	As deemed necessary by the WSG
Limits:	Flow Temperature: ≥60°C Return Temperature: ≥55°C Drain Temperature: ≥55°C Cold Feed Temperature: <20°C
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

- Measure and record the “Set” temperature setting of the thermostat (if fitted and calibrated). Temperature to exceed 60°C.

- Measure and record the “Flow” temperature using a contact thermometer or fitted gauge. Temperature to be taken from “Flow” pipe work as close to the Calorifier as possible. Temperature to exceed 60°C.

- Measure and record the “Return” temperature using a contact thermometer or fitted gauge. Temperature to be taken from “Return” pipe work as close to the Calorifier as possible. Temperature to exceed 55°C.

- Isolate cold feed and open drain point and measure and record temperature. Temperature to exceed 55°C.

- Measure and record the “Cold Feed” temperature using a contact thermometer or fitted gauge. Temperature to be taken from “Cold Feed” pipe work one metre from the Calorifier as possible. Temperature NOT to exceed 20°C.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 07 Storage Calorifiers – General Visual Inspection Including Drain Flushing	
Frequency	As Specified In Section 4
Limits:	No Corrosion No sludge deposits Correct temperature limits
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

- Ensure operational status of Calorifier by checking the status of the associated isolation valves.
- If the Calorifier is OFF, indicate the date it was left as standby.
- Confirm status of inlet valve and confirm status of outlet valve.
- Confirm the operational status of the circulation pump(s) and destratification pumps.
- Visually inspect Calorifier and associated valves for leaks.
- Visually inspect all pipe work for signs of corrosion and leaks, and visually inspect the condition of insulation fitted. Visually inspect all valves for correct operation, signs of corrosion and leaks. Visually inspect all pumps fitted for correct operation and leaks.
- Measure and record the temperature setting of the thermostat (if fitted).
- Measure and record the “Flow and Return” temperature using a contact thermometer or fitted gauge. Temperature to be taken from “flow” pipe work as close to the Calorifier as possible.
- Isolate CW feed and open drain point into a bucket and collect approximately the 1st liter of water discharged. Measure and record the condition, viscosity and color of this water.
- Check for color, viscosity and sludge deposition amount. Measure and record the temperature of the water collected.
- Where possible and as required using a contact thermometer, measure and record the temperature of the Calorifier at; the top, middle and bottom. If there is more than 10°C difference between the top temperature and the bottom temperature then the Calorifier is suffering from temperature stratification. If a contact thermometer cannot be used, then measure and record the difference in the “flow” temperature and the “drain” temperature.
- Visually inspect the insulation for signs of wear and tear and areas where the insulation has been removed.
- Visually inspect that any gauges fitted are operating correctly. Compare against calibrated instruments.
- Open the CW feed valve and then open the drain point allowing enough water to flow through so that any water discoloration is removed.
- Indicate the date that the Calorifier was last pasteurized and indicate whether it was disinfected as routine or due to adverse conditions.

Indicate the date of the last insurance inspection, if applicable.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 08 Circulation & Destratification Pumps Visual Inspection Servicing	
Frequency	As Specified In Section 4
Limits:	Correct Operation
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

- Check circulating pumps for adequate performance to ensure a minimum circulating temperature of 55ºC.

- In case of a standby pump being available for immediate connection into the HWS circulating system, switch on to ensure that the standby on backup pump can be brought into service.

It is not permissible to shut down the pumped circulation system. To do so will lead to the loss of the required system temperature.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 09 Trace Heating Monitoring	
Frequency	As Specified In Section 4
Limits:	Correct Operation
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

- Check electrical trace heating to ensure that it maintains the water temperature above 55ºC. Care should be taken to ensure there are no cool spots.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 10 Expansion Vessel Flushing (Non flow through type)	
Frequency	As Specified In Section 4
Limits:	Following manufacture recommendations
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

Doubts have been expressed about the desirability of using single entry expansion vessels on hot water systems. The use of single entry expansion vessels effectively form a vertical dead-leg through which there is no flow of water and concern has been expressed about the possibility of bacterial growth within the vessel.

It is considered preferable therefore, that an expansion vessel with both inlet and outlet connections should be installed, wherever practicable, so that the water content of the vessel is constantly changed. This will also allow for compliance with BS 6144 and BS 6920.

Where expansion vessels are of the single entry type they must be fitted with appropriate drain valves to facilitate flushing of the unit.

Care must be taken to avoid damage to the diaphragm.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 11 Cistern Type Water Heaters – Temperature Monitoring	
Frequency	As Specified In Section 4
Limits:	Unit Temperature: ≥60°C Outlet Temperature: ≥55°C within 1 min
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

- Measure and record the “Set” temperature setting of the thermostat (if fitted and calibrated). Temperature to be at least 60°C.

- Measure and record the temperature of the furthest outlet supplied by the unit. Temperature to be at least 55°C within 1 min.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 12 Cistern Type Water Heaters – Inspection of Tank Section	
Frequency	As Specified In Section 4
Limits:	WATER SUPPLY (FITTINGS) REGULATIONS 1999
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

- If casing allows for inspection of the external condition of the unit walls, inspect for corrosion pitting and leaks.
- Visually inspect tank and associated valves/pipe work for leaks.
- Visually inspect bottom of tank for sludge deposition and state amount:
  0 = none, 1 = slight and 10 = heavy
- Visually inspect internal walls of tank for corrosion and state amount:
  0 = none, 1 = slight and 10 = heavy
- Visually inspect water surface for; dirt, oil films, insects and state amount:
  0 = none, 1 = slight and 10 = heavy
- Visually inspect for slimy deposits on the internal walls of tank and state the color of substance and state amount:
  1 = slight and 10 = heavy
- Visually inspect for algae growth indicated by either green or red plant like growth on water surface.
- Visually inspect the insulation of the unit (if practicable) for signs of wear and tear.
- Visually inspect that the lid is correctly fitted.
- Visually inspect that all insect/rodent screens fitted are clear from debris so that water can flow easily.
- Visually inspect that the ball valves open and close correctly.
- Visually inspect all pipe work for signs of corrosion and leaks, and check the condition of insulation fitted.
- Indicate the date that the tank was last cleaned and disinfected and indicate whether it was disinfected as routine or due to adverse conditions.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 13 Cistern Type Water Heaters – Clean & Disinfection	
Frequency	As Specified In Section 4
Limits:	Minimum level of free cl initially: 50ppm Minimum level of free cl after 1hr: 30ppm Maximum level of free cl at end <1ppm
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

- Clean Tank and remove all deposits of scale, corrosion and sludge deposition using a combination of hand scraping and brushing together with application of chemicals to dissolve or soften the scale (where necessary). Vacuum out all loose debris and deposits.

- The tank section of the unit must be filled with fresh water and free chlorine solution to give a minimum free chlorine concentration of 50ppm (50mg/l).

- Draw chlorinating agent from all outlets supplied by the unit (there may only be a few outlets) and ensure the presence of at least 50ppm free chlorine at each outlet.

  After 1 hour, check and if level of free chlorine is below 30ppm (30mg/l), repeat.

  If level is >30ppm/(mg/l), after one hour flush system with fresh water to drain.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 14 Low Volume Water Heater @ >15 Litres – Temperature Monitoring	
Frequency	As Specified In Section 4
Limits:	Unit Temperature: ≥60°C Outlet Temperature: ≥55°C within 1 min
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

- Measure and record the “Set” temperature setting of the thermostat (if fitted and calibrated). Temperature to be at least 60°C.

- Measure and record the temperature of the furthest outlet supplied by the unit. Temperature to be at least 55°C within 1 min.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 15 Combination Boiler – Temperature Monitoring	
Frequency	As Specified In Section 4
Limits:	Unit Temperature: ≥60°C Outlet Temperature: ≥55°C within 1 min
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

- Measure and record the “Set” temperature setting of the thermostat (if fitted and calibrated). Temperature to be at least 60°C.

- Measure and record the temperature of the furthest outlet supplied by the unit. Temperature to be at least 55°C within 1 min.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 16 Instant Water Heater @ < 15 Litres – Temperature Monitoring	
Frequency	As Specified In Section 4
Limits:	UNIT/OUTLET TEMPERATURE: Comfort Temperature and ≤41°C if patient area and outlet is not fitted with a TMV
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

- Measure and record the “Set” temperature setting of the thermostat (if fitted and calibrated).
- Measure and record the temperature of the nearest outlet supplied by the unit.
- Measure and record the “Set” temperature setting of the thermostat (if fitted and calibrated).
- Measure and record the temperature of the furthest outlet supplied by the unit.

Units of this type, because of the limited stored water volume, do not usually need to be operated within the temperature profile and limits prescribed for larger systems (≥60oC for the ‘flow’ and (55oC for the ‘return’ and ‘outlet’) which are necessary for thermal disinfection.

It may be possible to operate these units at “safe” temperatures of ≤41.0oC although they should be switched-on at all times to ensure and encourage adequate use.

Infrequent use of these units (less than 2 x Weekly) would increase the potential of bacterial growth and proliferation (as would be the case in all infrequently used areas throughout the system – both hot and cold), although particularly in this case because of the low temperatures operated.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 17 Thermostatic Mixing Valves / Taps – Temperature Monitoring	
Frequency	As Specified In Section 4
Limits:	FROM THE TMV/TMT 41°C (+1°C) for whb 41°C (+1°C) for showers 44°C (+1°C) for baths 38°C (+1°C) for bidets TO THE TMV/TMT >55°C HWS to the TMV/TMT <20°C CWS to the TMV/TMT
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

SHOWERS, BATHS AND BIDETS

- Measure and record the "Initial" and "Final" outlet temperature, of each shower and bath fitted with a Thermostatic Mixing Valve / Tap (TMV/TMT or otherwise). The measurements must be carried out immediately and after flushing the water for 1 minute at full-flow avoiding any splashing. The "Initial" and "Final" outlet temperature measured must not exceed:
    - 41°C (+1°C) for showers
    - 44°C (+1°C) for baths
    - 38°C (+1°C) for bidets
- Where these temperatures are exceeded, the TMV/TMT must be adjusted in order to allow the unit to operate within the recommended temperature limits described above.
- Using an electronic calibrated thermometer with a suitable contact probe, measure and record the temperature of the HWS and CWS supply pipes of each TMV/TMT. The temperature of the CWS should not exceed 20°C or 2°C greater than incoming tank and the temperature & the HWS must not be less than 55°C.

SINKS AND BASINS AND OTHER NON FULL BODY IMMERSION OUTLETS

- Measure and record the "Initial" and "Final" outlet temperature, of the HOT water outlet of each sink, basin and other non-full body immersion outlets fitted with a Thermostatic Mixing Valve / Tap (TMV/TMT or otherwise). The measurements must be carried out immediately and after allowing the water to flush for 1 minute at full flow minimizing any splashing. The "Initial" and "Final" outlet temperature measured must not exceed 41°C (+1°C).
- Where these temperatures are exceeded, the TMV/TMT must be adjusted in order to allow the unit to operate within the recommended temperature limits described above.
- Using an electronic and calibrated thermometer with a suitable contact probe, measure and record the temperature of the HWS supply pipe ONLY of each TMV/TMT. The temperature of the HWS must not be less than 55°C.
- Measure and record the cold water outlets of each sink, basin and other non-full body immersion outlets fitted with a Thermostatic Mixing Valve / Tap (TMV/TMT or otherwise). The measurements must be carried out immediately and after allowing the water to flush for 2 minutes at full-flow minimizing any splashing. The outlet temperature measured must not exceed 20°C or 2°C greater than incoming tank and the temperature.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 18 Thermostatic Mixing Valves / Taps – General Condition Inspection & Servicing	
Frequency	As Specified In Section 4
Limits:	FROM THE TMV/TMT 41°C (+1°C) for whb 41°C (+1°C) for showers 44°C (+1°C) for baths 38°C (+1°C) for bidets TO THE TMV/TMT >55°C HWS to the TMV/TMT <20°C CWS to the TMV/TMT
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

- Inlet check valves (if fitted): Measure inlet pipe work surface temperature for indication of cross-flow. A more effective test can be considered if appropriate, utilising drain points positioned between isolating and check-valves.
- Temperature measurements:
    - fail-safe
    - adjustable/pre-set maximum

  Operate flow controls and measure blended temperature. Measure maximum and minimum blended temperature. For thermostat and pressure-balanced mixers, blend temperature should stabilise quickly and remain within +1°C of set value. For manual mixers, refer to commissioning data.
- Thermal shut-down (TMV/TMT): Operate mixer at blended temperature, then isolate cold supply. Valve must shut down in accordance with the manufacturer's data.
- Temperature control: Operate mixer at blended temperature, then open other local cold outlets off common supply. Measure shift in blend temperature with reference data compiled at the commissioning stage or manufacturer.
- Strainers: Isolate and visually inspect and clean as necessary.
- Flow control(s): Operate fully and check for effective closure. If time delay is incorporated, measure length of flow cycle.
- Automatic drain valve (if fitted): Check effective operation.
- Mixing valve:
    - temperature control
    - flow control(s)
    - inlet check valves

  Where specified by manufactures instructions or WSG and inspection confirms the requirement, carry out visual inspection of internal serviceable mechanisms. Clean, renew lubricate components as indicated by manufacturer's instructions.
- Service displaced units in workshop as part of rolling planned maintenance procedure.
- Supply pipe-work: Visually inspect for damage leaks, etc. and rectify.
- For all new installations, record supply pressures to allow the Responsible Person or Deputy Responsible Person to compare these pressures and temperatures to confirm agreement with commissioning data.
- Controls: Operate inlet valves and check individual flow rates of hot and cold water supplies. If valve is stripped down and reassembled all parts should be greased as recommended in the manufacturer's maintenance instructions.
- Thermostat: Check mixed water outlet setting. Ensure thermometer bulb is immersed in flowing water if measurement taken at shower head.
- Temperature limiter: Measure mixed water outlet temperature at limit safety stop. Limiter setting 41°C.
- Inlet check valves (where fitted): Check operation. Non-return valves may have been removed if operating with balanced pressure supplies).

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 19 Thermostatic Mixing Valves / Taps – Clean, Descale & Disinfection	
Frequency	As Specified In Section 4
Limits:	100ppm free chlorine for 30 minutes minimum
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

- When site conditions are found to result in scale build-up within a valve, the valve should be descaled and disinfected as per this specification at a frequency set by the WSG determined by site tests and inspections.

- Each TMV / TMT must be removed and replaced or serviced. Servicing can take place on or off site as agreed by the Responsible Person or Deputy Responsible Person.

- At the work-shop or in a suitable location, each TMV / TMT must be dismantled and physically cleaned from all scale deposits and scale deposition (using a suitable descaling solution where necessary).

- All components must be disinfected (this applies to all cleaned and new components). All components must be flushed with clean water and immersed in a Sodium Hypochlorite (100 mg/l free chlorine) for 30 minutes minimum.

- Remove components from disinfectant solution and rinse with clean water to remove presence of disinfectant.

- Reassemble, refit and test operation of valve, including fail-safe test.

- Rinse in clean water, allow to drip-dry and store in a cool and dry place.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 20 Distribution and Outlet Temperature Monitoring	
Frequency	As Specified In Section 4
Limits:	From the TMV 41°C (+1°C) for showers To the TMV >55°C HWS to the TMV <20°C CWS to the TMV
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

- Measure and record the “Initial” and “Final” outlet temperature, of each shower fitted with a Thermostatic Mixing Valve (TMV or otherwise). The measurements must be carried out immediately and after allowing the water to flush for 1 minute at full-flow respectively. The “Initial” and “Final” outlet temperature measured must not to exceed 41°C.

- Where this temperature is exceeded, the TMV must be adjusted in order to allow the unit to operate within the recommended temperature limits described above.

- Using an electronic and calibrated thermometer with a suitable contact probe, measure and record the temperature of the HWS and CWS supply pipes of each TMV. The temperature of the CWS must not exceed 20°C or 2°C greater tank incoming tank temperature and the temperature of the HWS must not be less than 55°C.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 21 Shower – Head Replacement / Clean & Disinfection	
Frequency	As Specified In Section 4
Limits:	New shower head Sodium hypochlorite (100 mg/l free chlorine) for 30 minutes minimum
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

Shower Head Replacement

- Examine shower head for signs of dirt, scale and slime deposition.
- If any of the above is considered to be significant, replace existing shower head with new, packaged shower head and dispose of the old shower head in an appropriate manner.

Shower Head Clean & Disinfection

- Each shower-head and associated hose (where fitted) must be removed from its location and replaced with a new or previously serviced shower-head. The removed unit must be taken to a suitably equipped work-shop for service.
- At the work-shop, each shower-head and associated hose must be dismantled and physically cleaned from all scale deposits and debris deposition (using a suitable descaling solution where necessary on the shower-head only).
- Rinse in clean water.
- All components must be disinfected (this applies to all cleaned and new components). All components must be flushed with clean water and immersed in a Sodium hypochlorite (100 mg/l free chlorine) for 30 minutes minimum.
- Remove components from disinfectant solution and rinse with clean water to remove presence of disinfectant.
- Allow to drip-dry and store in a cool and dry place.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 22 Safe Hot Water Bathing Protocol	
Frequency	As Specified In Section 4
Limits:	44ºC (+/- 1ºC)
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

- Access to the facility and its use must be facilitated by the assisting nursing staff.

- Patients must not be left unattended within the facility at any time.

- Baths must be filled using cold water first and made-up to temperature with hot water to achieve the required temperature which must never be in excess of 44°C (-1°C).

- Bath fill temperatures of more than 44°C (-1°C) should only be considered in exceptional circumstances where there are particular difficulties in achieving an adequate bathing temperature. If a temperature of more than 44°C (-1°C) is to be used then a safe means of preventing access to the hot water should be devised to protect vulnerable patients.

- Temperatures must be measured using a calibrated thermometer.

- All temperatures outside the recommended limits must be notified to the Estates Department, as a fault, immediately.

- Any injury to the patient during this procedure must be notified to the ward sister immediately.

- Records must be retained locally of temperature checks completed ensuring patient safety at all times.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 23 Air Conditioning / Air Handling – Glass Trap Cleaning	
Frequency	As Specified In Section 4
Limits:	Visually clean
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

- Each glass trap must be removed, dismantled and physically cleaned from all scale deposits and scale deposition (using a suitable descaling solution where necessary).

- Rinse in clean water.

- Allow to drip-dry and refit to plant or store in a cool dry place if not required.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 24 Air Conditioning / Air Handling – General Inspection / Clean	
Frequency	As Specified In Section 4
Limits:	Clean completed using warm water
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

- Report on the operational status of the unit.
- Visually inspect the condition of the external surfaces of the unit and comment.
- Visually inspect (if possible) the condition of the internal surfaces of the unit and comment. Isolate unit in order to allow for thorough internal inspection to be carried out.
- Visually inspect the condition of all traps fitted and comment.
- Visually inspect (if possible) the condition of the drip-trays of the unit and comment. If practicable, isolate unit in order to allow for thorough internal inspection of the drip-trays to be carried out. Alternatively, remove drip-trays from the system and inspect.
- Visually inspect (if possible) the condition of the eliminators of the unit and comment.
- Visually inspect (if possible) the condition of the filters fitted and comment.
- Visually inspect (if possible) the condition of the humidifier components of the unit and comment.
- Visually inspect (if possible) the condition of the Chiller battery fitted and comment.
- Visually inspect (if possible) the condition of the Heater battery and comment.
- Clean any visible deposits on internal surfaces, wash down with fresh clean water. Dry area with clean and clean cloth.

On completion of cleaning, the ductwork should not be “fogged” with chemicals

This treatment has no lasting biocidal effect and is responsible for initiating the breakdown of the galvanized coating of ductwork

This will result in accelerated corrosion of the inside of the duct, with the products of corrosion being shed into the air stream.

It will also significantly shorten service life of the AHU

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 25 Adiabatic Cooler Maintenance & Monitoring	
Frequency	As Specified In Section 4
Limits:	Manufacture Guidance
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

- All adiabatic coolers must be maintained in a good and clean condition and free from excessive corrosion and dirt deposition.

- Flexible hoses must not be used to connect the adiabatic cooler to the mains.

- Water supplies to adiabatic coolers must be treated with chlorine dioxide at >0.15 - 0.5 ppm (mg/L) chlorine dioxide.

- Levels of chlorine dioxide to be tested on a monthly basis during the cooling season.

- PPM to check the operation of the spray bars and that the drain from the tank under the cooler is running freely so as to prevent any ponding during the cooling season.

- Carry out monthly Legionella water analysis during the cooling season.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 26 Hydrotherapy Pool Management	
Frequency	As Specified In Section 4
Limits:	Pool Water Regulatory Guidance
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

This section gives basic guidance for the management of hydrotherapy pools including maintenance, testing and biological analysis. Further guidance for management of hydrotherapy pools is available in the Pool Water Treatment Advisory Group – Swimming Pool Water guidance ISBN – 978-1-5272-1666-2.

Delegated responsibilities for hydrotherapy pools management:

Pool Manager or Person acting with this responsibility

The Pool Manager is responsible for operational management of the pool and patient safety when using the pool. The Pool Manager for this Trust is defined as the Superintendent Physiotherapist.

Areas of responsibility for the Pool Manager include:

- Safety for users of the pool
- Ensuring poolside equipment and aids are suitably maintained and safe to use
- Mid-day pool observations
- Ensuring a pool log-book is in place and kept up-to-date, including any relevant information such as closures and issues with contamination.
- Testing emergency alarms are operational and reporting any faults.
- Ensuring Weekly Samples are taken and sent to the accredited laboratory
  Inclusive of (residual chlorine), pH, etc, see water sampling below
- Reporting any issues observed with the pool or its water quality to Infection Prevention and / or Responsible Person (Water Quality) as appropriate
- Taking the pool out of use if requested to do so by either of the above persons
- Taking the pool out of use if poor sample results have been identified

The Pool Manager may ask the Competent Person to take the samples on their behalf but remains responsible for ensuring that the process is being carried out and the correct methodology is being used.

Competent Person (CP)

The CP is a suitably trained and qualified person responsible for carrying out planned or reactive maintenance of the pool and / or its plant. The CP is defined as a suitably trained Estates Manager or specialist / tradesman or a specialist contractor. The CP may be trained to carry out all or some of the maintenance or testing of the pool as is appropriate to the task required.

Areas of responsibility for the Competent Person include:

- Carrying out daily pool checks
- Completing the pool log book for above checks
- Checking the plant for leaks and unusual noises or smells
- Checking the readout on the plant panel is correctly setup
- Performing a weekly backwash in accordance with manufacturers guidance
- Any required reactive maintenance of the pool or plant
- Plant general maintenance
- Informing the PM and Responsible Person of any issues found with the pool or plant
- Taking or assisting water sampling
- Annual planned maintenance of the pool and plant

Maintenance Manager (Estates)

The Maintenance Manager is responsible for management of water quality within the hydrotherapy pool and to manage the engineering aspects of the hydrotherapy pool and plant. The Maintenance Manager at this Trust is defined as the Senior Engineer which is the same as for domestic water quality management. This person will also advice the Pool Manager as required of any water or engineering issues that may prohibit its use.

The Maintenance Manager duties include:

- Monitoring water quality and chemical controls within the pool
- Arranging training as required to manage and maintain the pool
- Organising planned and reactive maintenance of the pool and plant
- Ordering Chemicals for the pool and ensuring regulations and safe working methods are followed for handling of the chemicals (i.e. COSHH, manual handling) and data sheets are provided
- Providing any PPE needed for safe management of chemicals and work on the plant
- Arranging any back washing, shock chlorination, drain/clean or hyper chlorination
- Facilitation of water sampling
- Set up and administrate any service contracts for specialist pool maintenance and keep records of service work and remedial works carried out.

Maintenance Supervisor (Estates)

The Supervisor acts as the Maintenance Manager when the Maintenance Manager is unavailable and may be given delegated responsibility for some or all of the above listed engineering duties by the Maintenance Manager.

Infection Prevention Officer (IPO) / Team

The IPO team will advise the Pool Manager and Maintenance Manager as consulted on appropriate actions to be taken in the event of any water quality issues. The IPO team at this Trust is defined as the Consultant Microbiologist and/or Infection Prevention Nurses.

The IPO team will advise on:

- Defining water quality testing & control limits in accordance with the WSP
- Agreeing appropriate actions with the PM and RP in the event of adverse microbiological results, chemical dosing failure or visible contamination of the pool water
- Confirming when the pool should be closed and reopened in the event of any of the above issues
- Request additional testing where deemed necessary
- Audit micro testing of the pool as considered necessary

Accredited Laboratory (AL) & Water Sampling

Samples are to be taken as stated in current guidance (PWTAG – Swimming Pool Water). The Laboratory must be UKAS accredited to process hydrotherapy pool specific samples and must process samples received within 24 hours of the sample being taken from the pool. The AL must provide results via email notification to the WSG / IPO, Supervisor and Maintenance Manager.

The Accredited Laboratory must routinely provide the following microbiological tests and results:

Tests	Frequency
TVC (at 37°C) in CFU/ml	Weekly
Pseudomonas aeruginosa in CFU/100ml	
Escherichia coli in CFU/100ml	
Coliforms CFU/100ml	
Legionella	Quarterly

Further sampling for other organisms (e.g. Cryptosporidium) can be carried out on discussion with the WSG following any concerns the IPO may have reference pool water quality.

Plant Room or Pool Contamination, Physical or Microbiological Failure

For various reasons the pool or plant may fail or become contaminated which may lead the pool becoming unsuitable for continued patient use or restricted to low risk patients only.

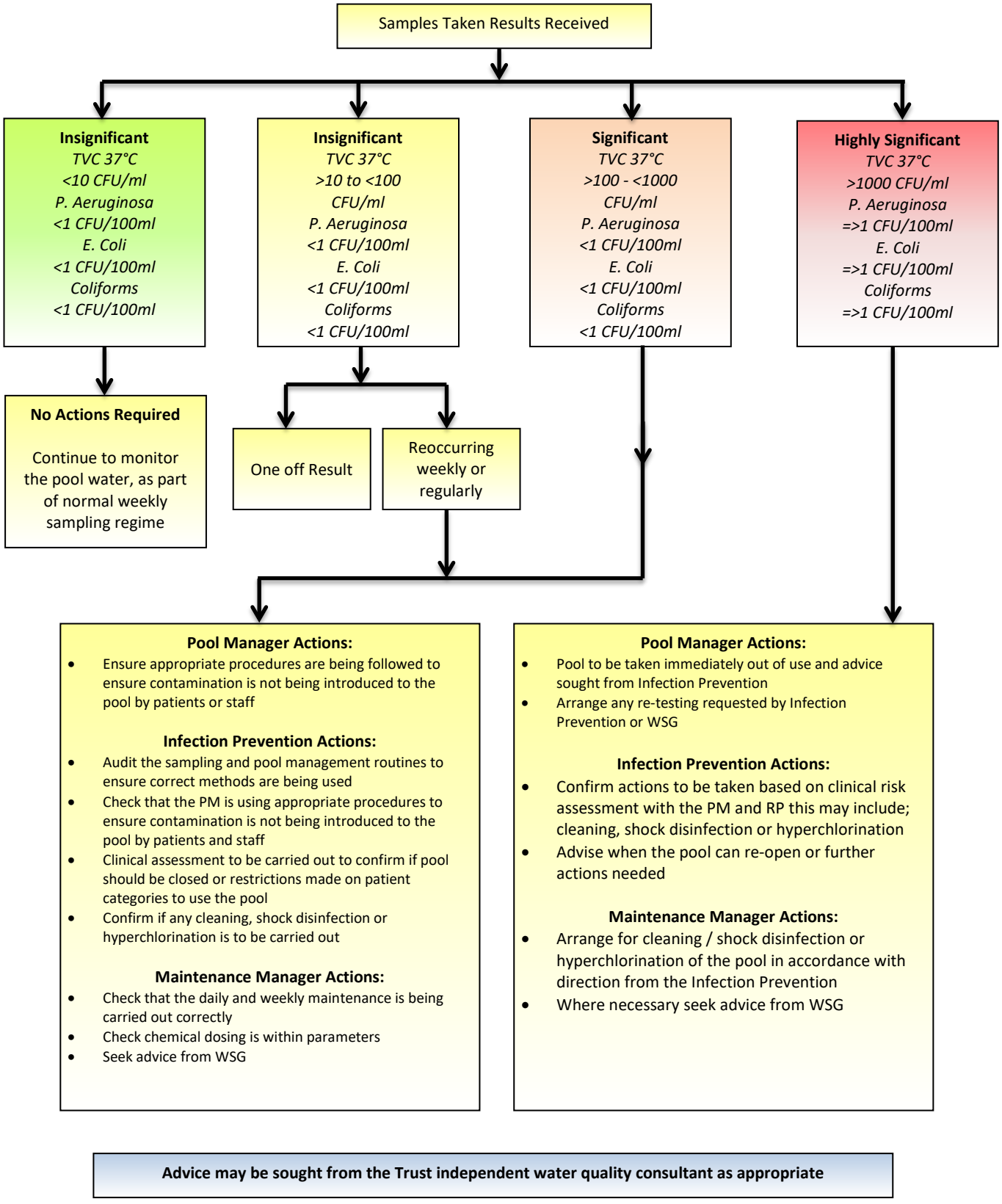
The following basic flowcharts provide guidance when cleaning, shock chlorination or hyperchlorination should be undertaken for failures due to physical or microbiological contamination and provides guidance on roles and responsibilities for the various parties involved the process.

Cleaning of the pool, shock disinfection or hyper chlorination must be carried out as required, such work would be needed due to physical contamination, microbiological failure, chemical failure or as routine cleaning as agreed with the Infection Prevention based on the individual circumstances leading to the need to carry out the work.

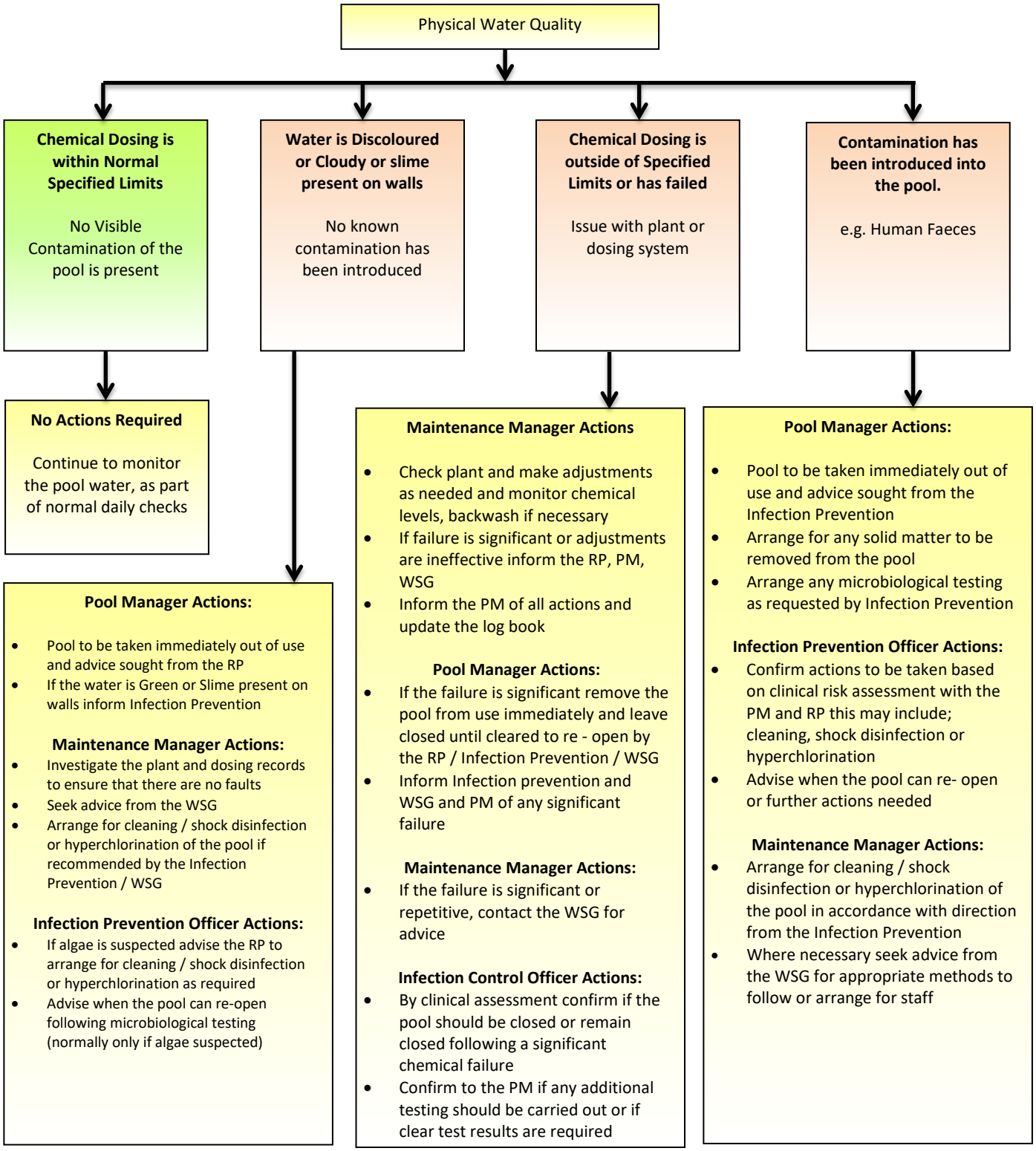
The above can only be carried out by suitably trained staff or contractor. A suitable and sufficient method statement and risk assessment must be in place before work being carried.

Infection Prevention will advise reference re-opening following works and if a clear sample re-test is required following such work before the pool can re-open.

Hydrotherapy water quality recommended actions (microbiological):



Hydrotherapy Pool Water Quality Recommended Actions (Physical):



Advice may be sought from the Trust independent water quality consultant as appropriate

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 27 Microbiological Sample Collection Protocol	
Frequency	As Required
Limits:	Microbiological Sampling must be carried out in accordance with the HPE "Examining food, water and environmental samples from healthcare environments - Microbiological Guidelines: April 2013" and BS 7592:2008 - Sampling for Legionella bacteria in water systems – Code of practice.
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

Sampling & Frequency

Microbiological sampling is either carried out routinely to ensure processes and procedures in place are effective or as needed to assure the Trust changes to systems or new builds are safe completed in line with guidance within the Trusts WSP prior to occupation or handover. How the sample is taken considers the potential source of contamination in two distinct ways to assist the WSG to determine its location:

Localised contamination:

- Is detected by collecting and analysing a 'pre-flush' sample consisting of the unadulterated collection of a sample of the water present at the outlet or within a pool.

  This is normally achieved by running the tap without flushing or cleaning the tap and collecting the water dispensed or via direct sampling from the body of water within birthing pools etc.

Systemic contamination:

- Is detected by collecting and analysing a 'post-flush' sample consisting of the water collected following spraying the outlet with a disinfectant.

  This is normally achieved by using a solution equivalent to 1% sodium hypochlorite, leaving disinfectant in contact with the tap for at least 2 minutes then flushing the outlet for another 2 minutes before collecting the sample.

Pre and Post sampling is essential for determining the location of any contamination detected and for determining the appropriate remedial corrective action required to remove the identified bacterial contamination. Where routine sampling is being completed it is normal for only pre samples to be taken and in the event of any contamination further sampling would be undertaken. When as needed sampling is undertaken for Capital works etc full pre and post samples are always required to provide assurance against systemic and localised contamination.

For all new build capital works of major adaptions to existing systems to allow for a correct level of investigative biological analysis monitoring, a statistically significant number of samples must be collected:

- **12% of outlets by type or 50% overall (pre & post)** inclusive of all designated 'sentinel' outlets
  Sampling:
  - Legionella spp
  - Pseudomonas Aeruginosa
  - TVCC
  - E. coli
  - Coliforms

If the system being modified or Capital works is being completed in an augmented care areas as detailed in section 3 then the following consideration must be made for Pseudomonas Aeruginosa and samples taken:

- **12% of outlets by type or 50% overall (pre & post)** inclusive of all designated 'sentinel' outlets
  Sampling:
  - Legionella spp
  - TVCC
  - E. coli
  - Coliforms

- **+ 100% of outlets for :**
  - **Pseudomonas Aeruginosa**

To allow for adequate 'trending' of results, at least 30% of outlets (selected by WSG), from the number of outlets discussed above, must be selected and 'fixed' so that they are sampled at each sample collect run. The remainder of samples can be made-up of randomly selected outlets.

The choice, frequency and location of sample and sampling will be made by the WSG unless dictated by IP / IPCG or by an investigating officer or for monitoring purposes by estates. All sampling is reported through the WSG who escalate any issues back through IPCG.
The following table provides a schedule of routine sampling arranged by the WSG and clarifies under what circumstances samples are taken. Clarifications are made above for capital and modifications to existing systems:

Type	Sampling & Contamination	Annual Frequency & Flush	Location	Supporting Information
Food Quality	Outlet **Systemic**	2 Post	Central Processing Unit Outlet within food preparation area New Cross Hospital	To food hygiene regulations Monitoring: Aluminum, Copper, Calcium, Iron, Magnesium, Manganese, Lead, Zinc, Alkalinity, Chloride, Fluoride, Total Organic Carbon, Ammonia, Carbon, Nitrite, Nitrate, Total Hardness, Turbidity, Conductivity, pH, Taste & Odour.
Legionella	Sentinel points **Systemic**	2 Post	High risk areas	Sampling will be phased over 12 months providing a broad indication of any systemic legionella activity
	Birthing Pools **Localised**	4 Filled pool	Maternity	Pool water when filled In accordance with Pool Water Treatments Advisory Group
	Hydrotherapy Pools **Localised**	4 Filled pool	Cannock Chase Hospital	
	Adiabatic Cooler drain **Localised**	6 From internal tank / drain	IT Hubs – IT Main Server & Deanesly Data Centre	Samples taken from May - October
Pseudomonas Aeruginosa	All clinically used outlets **Localised**	2 Pre	Augmented care areas	Sampling will be phased over 12 months providing a broad indication of local and systemic contamination *No routine Pseudomonas spp samples will be collected unless specifically requested by the WSG / DIPC*
	Birthing Pools **Localised**	12 Filled Pool	Maternity	Pool water to be sampled when filled in accordance with Pool Water Treatments Advisory Group No routine Pseudomonas spp samples will be collected unless specifically requested by the WSG / DIPC
	Hydrotherapy Pools **Localised**	52 Filled pool	Cannock Chase Hospital	
TVCC	Hydrotherapy Pools **Localised**		Cannock Chase Hospital	
Escherichia coli	Hydrotherapy Pools **Localised**		Cannock Chase Hospital	
	Birthing Pools **Localised**	12 Filled Pool	Maternity	
Coliforms	Hydrotherapy Pools **Localised**	52 Filled pool	Cannock Chase Hospital	
	Birthing Pools **Localised**	12 Filled Pool	Maternity	

Sampling will also be carried out:

- As part of the WSP processes detailed in part B-C of the WSP
- Following specific request by the WSG, IP or IPCG
- Following notification of failure of microbiological control measures if deemed necessary by the WSG (temperature, CLO2, Usage evaluation etc)
- Changes to the system
- Resampling following positive biological results
- During an outbreak or suspected outbreak of Legionnaires disease instructed by the investigating officer or WSG or IPCG

The sample locations, type and frequency of sample is determined and monitored by the WSG / IPCG

Samples are collected as described in Process No. 27 Microbiological sample collection protocol 27 Microbiological sample collection protocol

Arrangements for decontamination processes / washer disinfector areas detailed within separate decontamination guidance.

Sampling Preparation

Appropriate precautions must be taken to minimise aerosol production, as described in BS 7592:2008 (British Standards Institution, 2008). For example, running taps gently to reduce splashing; using a sterile plastic bag with one corner cut off to enclose the shower head and to funnel the water into a sampling container, not sampling on full flow etc.

In addition, some specific safety notes have been included in the sections below:

The following is a list of equipment that may be needed for sampling. The list is not intended to be exhaustive and not all items may be required for all types of sampling.

- Sterile food-grade plastic bags
- Laboratory supplied sterile sample bottles
- Labels
- Permanent waterproof marker pens and biros
- Laboratory request forms for water samples
- Nitrile (plastic) gloves
- Alcohol medical wipes
- Plastic shoe coverings
- Cool boxes with separators, temperature data-loggers and 10% by volume of frozen ice-packs (ice packs shall not be used for Legionella samples)
- Digital camera
- Digital voice recorder
- Calibrated thermometer
- Stop-watch
- Calibrated disinfectant residual measuring device

Sampling Bottles

The sample bottle required will depend upon the water sample being taken the table below shows the container / bottle required for the type of test required:

Test Required	Sample Bottles
Pseudomonas Aeruginosa **TVC / Aerobic Colony Counts** **Coliforms** **Escherichia Coli** **Environmental Mycobacteria**	**1 x sterile 100 ml plastic bottle** Containing an appropriate neutraliser to neutralise any residual disinfectant in the water i.e. Sodium Thiosulphate
Legionella **Other pathogenic bacteria such as** **Salmonella** **Campylobacter** **E. coli O157, where required**	**1 x sterile 1 litre bottle** *Or 2 x sterile 500 ml plastic bottles (as above)*

The most commonly used neutraliser, which is appropriate for chlorinated or brominated water systems and those using ozone or hydrogen peroxide, is sodium thiosulphate. For mains water, 18 mg/L sodium thiosulphate must be added. Sterile bottles should be provided by the laboratory performing the examination and should be used exclusively for bacteriological purposes.

Microbiological Sampling Collection & Submission for Analysis

Microbiological Sample collection must be carried out in accordance with UKAS 17020:2012, the HPE "Examining food, water and environmental samples from healthcare environments - Microbiological Guidelines: April 2013" and BS 7592:2008 - Sampling for Legionella bacteria in water systems – Code of practice.

The prime objective is to obtain a sample which is representative as far as possible of the water to be examined. To achieve this, certain precautions are necessary which are common to all sampling procedures for the bacteriological examination of water:

1. A suitable UKAS ISO 11731:2009 Water quality - Detection and enumeration of Legionella (or equal) accredited laboratory must be used for all samples collected for bacteriological analysis.

   The laboratory should take part in the Health Protection Agency's water external quality assessment (EQA) scheme for the isolation of Legionella from water.

   The laboratory should also apply a minimum theoretical mathematical detection limit of <*100 Legionella* bacteria/litre sample.

2. All staff undertaking bacteriological sampling must be suitably and adequately trained in the process of sample collection and be aware of the risks of *Legionellosis*.

   Staff who are likely to be more susceptible to *Legionellosis* should not undertake sampling.

   It is the responsibility of the operative's manager (this shall apply equally to Trust employees as well as to Contractor staff), to assess their risk of Legionellosis before being assigned the task of sample collection.

3. Good personal hygiene procedures, including thorough washing of hands using soap, must be adopted by the operative prior to the commencement of the exercise. A fresh pair of disposable gloves must be worn for each sample.

4. Scrupulous care must be taken to avoid accidental contamination of the sample during collection and subsequent handling. If it is thought a sample or samples may have been contaminated by touching the outlet with sample bottle or splashing or dropping cap etc the sample or samples must be disposed of and a new sample or samples taken.

When routinely sampling for Pseudomonas Aeruginosa, only pre-flush samples will be collected from outlets which have not been used in continuous use prior to sample collection

Non routine sampling will require pre and post samples

During sample collection the tap shall not be cleaned or sprayed with disinfectant solution nor flamed for any pre sample

If results of routine pre samples are positive additional post sampling will be arranged by the WSG

5. Samples must be transported by means of reducing any possible change that could occur in the bacteriological content of water between the time of sampling and examination.

   This is achieved by ensuring that the sample is not exposed to light, is kept cool insulated where possible (cool-box) and is transported to the laboratory as quickly as possible.

6. The sample must be examined as soon as possible after collection, preferably within six hours but no more than eighteen hours.

   Samples must not be taken if the laboratory cannot plate them within the above period.

Labelling Sample Bottles

Protocols for labeling, documenting, and packaging samples established by the receiving laboratory must be followed. Obtain authorisation from the laboratory before shipping samples for analysis. Each sample bottle must be correctly labeled with or referenced to paperwork or system with:

- Company or Person requesting the examination
- Samplers name
- Site
- Building
- Outlet Type (whb, sink, tank, Calorifier, etc.)
- Outlet asset number
- Exact location of sample collection in room
- Date & time
- Type of water (domestic, process, other)
- Pre or Post Flush sample
- Hot or Cold or Mixed
- Temperature
- Sample Type (Legionella, PS A, E Coli, TVCC etc)
- Comments
- Reference number if applicable

Order of collection of Samples

When a number of samples for different purposes are to be taken from the same sampling point, certain precautions are necessary:

- Samples for bacteriological examination of Pseudomonas Aeruginosa should be collected on a separate day from all other samples.

- TVCC samples to be collected after the Legionella samples for both pre and post flush samples.

- Where a single spout is present (with either a single blended supply, hot and cold, blended and cold) a single samples should be collected as applicable.

To avoid contamination, samples for bacteriological examination should be kept separate from all others. Boxes for the transport of samples should be made of materials that can be disinfected regularly. They should not be used for carrying anything other than samples of water for bacteriological examination.

Opening and filling of Sample Bottles

1. Keep the sample bottle unopened until the moment it is required for filling.

2. Never rinse out a bottle before taking a sample.

3. Loosen the cap, hold the bottle by the base in one hand and remove the cap with the other hand.

4. Retain the cap in the hand whilst the bottle is filled, and replace them immediately.

5. Finally secure the cover.

Sampling from Taps

- Good personal hygiene procedures, including thorough washing of hands using soap, must be adopted by the operative prior to the commencement of this exercise. A fresh pair of disposable gloves must be worn for each sample.
- Taps chosen for sampling should be clean, free of all attachments and in good repair. Remove all external fitting such as anti-splash devices or hoses where fitted before collecting samples.
- Any alteration of the tap setting during sampling should be avoided as it may have an adverse effect.
- When collecting a “post-flush” sample; the outlet must be disinfected inside (up the spout) and outside with a 1% solution of chlorine, and left for 2 minutes then flushed for 2 minutes, before the sample is collected. This is to ensure that there is no contamination of the water introduced from the outlet.
- Flaming of the tap is not necessary. If, however, there is an explicit instruction from WSG to do so, then flaming or alternative disinfection of the taps should be carried out with the supervision of the RP or D RP.
- Fill the bottle from a gentle stream. Avoid splashing. Ensure the sample bottle does not touch the tap. Do not touch the water as it flows into the bottle or the inside of the cap or bottle. Replace the cap.

Occasionally, when a tap is turned on, water may leak slightly between the spindle and the gland

This is liable to run down the outside of the tap and, by gaining access to the sample, cause contamination

Under such conditions, no sample for bacteriological examination should be taken until the leak has been remedied

Sampling from Taps fitted with POU filters (With the POU filter <u>removed</u>)

1. A “pre-flush” sample (first draw-off) is collected once the POU filter is removed.
2. A "post-flush sample (after flushing for at least 2 minutes) is collected with the POU still filter removed. When collecting a “post-flush” sample; the outlet must be disinfected inside (up the spout) and outside with a 1% solution of chlorine, and left for 2 minutes then flushed for 2 minutes, before the sample is collected. This is to ensure that there is no contamination of the water introduced from the outlet.
3. Fill the bottle from a gentle stream. Avoid splashing. Ensure the sample bottle does not touch the tap. Do not touch the water as it flows into the bottle or the inside of the cap or bottle. Replace the lid.
4. Re-install new POU filter as per manufacturer's instructions.

Sampling from Taps fitted with POU filters (With the POU filter <u>attached</u>) – On the instruction of the WSG / DIPC Only

1. A sample (first draw-off) is collected from the POU filter whilst attached to the tap.
2. Fill the bottle from a gentle stream. Avoid splashing. Ensure the sample bottle does not touch the tap. Do not touch the water as it flows into the bottle or the inside of the cap or bottle. Replace the cap.

Sampling from Showers (See also 'Order of collection of Samples' above)

1. Good personal hygiene procedures, including thorough washing of hands using soap, must be adopted by the operative prior to the commencement of this exercise. A fresh pair of disposable gloves must be worn for each sample.
2. Create a funnel using a clean food grade bag with a corner cut-off using a clean pair of scissors wiped with alcohol based anti-bacterial medical wipes immediately prior to use. Place the showerhead into the bag, seal the open end and put the cut corner into the sample bottle.
3. If the shower is an instant electric heated type turn the shower onto the lowest temperature where the heater is used.
4. Turn the shower on to a gentle flow and fill the bacteriological bottle(s) without rinsing, leaving a small air gap. Avoid splashing. Ensure that the sample bottle does not touch the showerhead. Replace the cap.

Sampling from Showers fitted with POU filters (With the POU filter removed)

1. A “pre-flush” sample (first draw-off) is collected once the POU filter is removed.
2. A "post-flush sample (after flushing for at least 2 minutes) is collected with the POU filter still removed.
3. If the shower is an instant electric heated type turn the shower onto the lowest temperature where the heater is used.
4. Turn the shower on to a gentle flow and fill the bacteriological bottle(s) without rinsing, leaving a small air gap. Avoid splashing. Ensure that the sample bottle does not touch the showerhead. Replace the lid.
5. Re-install new POU filter as per manufacturer's instructions.

Sampling from Showers fitted with POU filters (With the POU filter on) – On the instruction of the WSG / DIPC Only

1. A sample (first draw-off) is collected from the POU filter whilst attached to the shower. Create a funnel using a clean food grade bag with a corner cut-off using a clean pair of scissors wiped with alcohol based anti-bacterial medical wipes immediately prior to use. Place the showerhead into the bag, seal the open end and put the cut corner into the sample bottle.
2. Fill the bottle from a gentle stream. Avoid splashing. Ensure the sample bottle does not touch the tap. Do not touch the water as it flows into the bottle or the inside of the cap or bottle. Replace the cap.

Sampling from Drinking Fountains

1. When a number of samples for different purposes are to be taken from the same drinking fountain:
   - Sample collected from supply source (to be collected as close to 'T' off the supply as possible. When this is not practicable, select a direct-fed outlet as close to the unit as possible which is fed from the same supply).
   - Pre-flush sample from the tap/spout of the drinking fountain (when sampling hot and cold taps/outlets, the samples collected must be separate and not mixed).
   - Post flush sample from tap/spout of the drinking fountain (when sampling hot and cold taps/outlets, the samples collected must be separate and not mixed).
2. Taps/spouts chosen for sampling should be clean, free of all attachments and in good repair. Remove all external fitting such as anti-splash devices or hoses where fitted.
3. Any alteration of the tap/spout setting during sampling should be avoided as it may have an adverse effect.
4. When collecting a “post-flush” sample; the outlet must be disinfected inside (up the spout) and outside with a 1% solution of chlorine, and left for 2 minutes then flushed for 2 minutes, before the sample is collected. This is to ensure that there is no contamination of the water introduced from the outlet.
5. Fill the bottle from a gentle stream. Avoid splashing. Ensure the sample bottle does not touch the tap. Do not touch the water as it flows into the bottle or the inside of the cap or bottle. Replace the lid.

Sampling from Pools & Tanks

1. When sampling tanks carefully remove lid, avoiding tipping any dirt into the tank.
2. Good personal hygiene procedures, including thorough washing of hands using soap, must be adopted by the operative prior to the commencement of the sampling. A fresh pair of disposable gloves must also be worn by the operative after any lid has been removed.
3. Sampling the water must be carried out as far from the inlet as possible.
4. Collect a sample using sterile bottle(s), suitable for collecting samples for bacteriological analysis required by immersing the bottle under the surface of the water, without rinsing, leaving a small air gap. Avoid splashing.
5. Ensure that the sample bottle does not touch the tank, pool wall or other structures prior to sample collection.
6. Do not touch the water as it flows into the bottle or the inside of the cap or bottle.
7. Ensure that the sample bottle does not touch the tank, pool wall or other structures following sample collection.

Sampling from Calorifiers and other Hot Water Generation Units

1. Good personal hygiene procedures, including thorough washing of hands using soap, must be adopted by the operative prior to the commencement of this exercise. A fresh pair of disposable gloves must be worn for each sample.
2. Collect a sample using sterile bottle(s), suitable for collecting samples for bacteriological analysis, without rinsing, leaves a small air gap. Avoid splashing.
3. Ensure that the sample bottle does not touch the Calorifier or other structures.
4. Do not touch the water as it flows into the bottle or the inside of the cap or bottle.

Sampling Collected Ice from Ice Making Machines

1. Good personal hygiene procedures, including thorough washing of hands using soap, must be adopted by the operative prior to the commencement of this exercise. A fresh pair of disposable gloves must be worn for each sample.
2. Collect a sample using a wide-mouth sterile bottle(s), suitable for collecting samples for bacteriological analysis, without rinsing, leaving a small air gap. Avoid splashing.
3. Ensure that the sample bottle does not touch the icemaker or other structures.
4. Do not touch the ice as it is collected into the bottle or the inside of the cap or bottle.

Handling & Shipping of Samples

Samples must be packaged and shipped to the laboratory for analysis as soon as possible - within 6hrs and plated same day within 16 hours.

Samples need to be maintained in a condition not to alter the bacterial content, cool and not exposed to light, generally the shorter the time between sample collection/processing and sample analysis, the more reliable the analytical results will be.

Samples must be delivered to the laboratory on the day of collection. Check laboratory hours of operation—keep in mind that the laboratory might not receive samples on Saturdays, Sundays, or holidays. The integrity of chilled samples sent late on a Thursday or on a Friday could be compromised if not received by the laboratory in time to be plated.

When packaging samples for shipment to the laboratory, remember that all bottles must be protected from damage (especially glass bottles) and (or) leaking. The laboratory usually provides coolers reusable packing materials such as mesh bags, foam sleeves, and bubble wrap. Plastic bags and cardboard boxes will not be returned. Do not use foam peanuts or vermiculite.

Before shipping samples to the laboratory:

- Check that sample bottles are labelled correctly are waterproof and that information is legible.
- Tighten all bottle caps to prevent leakage.
- When shipping multiple sets of samples in the same container, label each set of sample bottles with a different letter of the alphabet (A, B, C) so that bottles of each sample set will have the same letter.
- Place all bottles from a sample set into a separate bag (such as plastic or mesh) or bind with a rubber band to keep them together.
- Pack samples carefully in the shipping container to prevent bottle damage, shipping container leakage, and sample degradation. Use adequate packing material to prevent bottle damage.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 28 Small sized pipe work installation projects & associated components pre and post installation cleaning & disinfection *Note: tap changes would not require completion of this process but would require dip-disinfection*	
Frequency	As Required
Limits:	To be used in conjunction with WSP 29 for release into use of new installations of small sized pipe work installation projects and associated components
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

i. Thoroughly clean all new pipe work to be installed.

ii. Using a suitable vessel, safely prepare a disinfectant solution of Sodium hypochlorite of 100mg/l (ppm) free chlorine.

iii. Safely immerse all cleaned pipe work and associated components (dismantled where practicable) in the disinfectant solution and leave to soak for a minimum of 30 minutes.

iv. Remove pipe work and associated components (reassemble if dismantled) from disinfectant solution and rinse with fresh clean water for a minute and allow them to drip dry in a clean, cool dry place and install within 12 hours of disinfection.

v. Thoroughly flush the new pipe work with clean mains water until tests indicate that the residual level of free chlorine is no greater than that present in the mains water supply.

vi. If deemed necessary by the WSG using a suitable sterile container, collect a water sample and submit for biological analysis. The analysis should measure the presence of contamination by general bacteria (T.V.C.C, Legionella spp and Pseudomonas aeruginosa in high risk patient areas including augmented care units, E. coli & coliforms are not normally tested for unless specifically requested by the WSG).

Sampling will only be needed on small sized pipe work where assurance cannot be provided that fittings / pipe work / materials used have been thoroughly dip chlorinated as above. Where through dip chlorination cannot be achieved in a timely manner the WSG must be consulted who will approve any testing WSG

NOTE: Samples to be collected <u>no earlier than 48 hours</u> following disinfection.

Ensure that for larger installations of pipe work &

new complete installations WSP 51 Must be completed!

All records and certificates must be issued with ‘hand-over documentation’

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 29 Permit - Release into use new Installations of small sized pipe work projects & associated components

Frequency	As deemed necessary by the WSG
Limits:	THIS IS TO BE COMPLETED BY THE RESPONSIBLE PERSON

If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.

Brief description of works undertaken

Has the work been completed?	Yes		No		When	
Work carried out by:						
Pipe work and fittings disinfected?	Yes		No		When	

	Yes	No	NA	Comments
Have all necessary works been carried out?				
TMV/TMTs commissioned correctly & set at correct temp?				
Strainers/aerators been cleaned and disinfected?				
Shower heads/hoses been cleaned and disinfected?				
Are all direct-supplied outlet CWS temps within specification?				
Are all direct-supplied outlet HWS temps within specification?				
Are all blended outlet temps within specification?				

Biological analysis been carried out?		Yes		No

If Yes; what were the results	HWS		CWS							
Location and asset	Pre	Post	Pre	Post	TVCC	E. Coli	Legionella sp.	Pseudomonas Aeruginosa	Pseudomonas spp.	Sample Result

All actions have been undertaken and installation ready for use?		Yes		No	

Date for release for use:		

Additional Notes

Responsible Person:

Signed ……	Date ……

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 30 Water Storage Tank – Cleaning & Disinfection	
Frequency	As Required
Limits:	**Complete Certificate of Conformity No:** Certificate of Conformity No. 31 Cold Water Storage Tank Cleaning and Disinfection Using Sodium hypochlorite as the disinfecting agent – Spray method **OR** Certificate of Conformity No. 32 Cold Water Storage Tank Cleaning and Disinfection Using Sodium hypochlorite as the disinfecting agent – Soaking Method
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

Sodium hypochlorite will normally be used as the hyper-chlorination disinfectant agent throughout. Where alternative disinfection agents are intended for use, a written proposal outlining the reasons why an alternative disinfection agent is proposed for use, the proposed disinfection agent, COSHH sheets, risk assessment and methodology must be presented to the Estates Department Responsible Person / WSG for written authorisation. Alternative disinfection agents must not be used without prior written consent from the Estates Department Responsible Person.

Tank Disinfection using sodium hypochlorite – Spray Method:

i. Spray all surfaces of the tank using a knapsack or garden pressure sprayer or fogger, with ready prepared 500 mg/L free chlorine solution, ensuring that all surfaces remain wet with disinfectant for at least 10 minutes. Note the requirements for personal protective equipment when spraying of fogging sodium hypochlorite solutions.
ii. When the spray disinfection is complete and the solution has been in contact with all surfaces for at least 10 minutes, thoroughly rinse all sprayed surfaces with clean water and remove any residues with pump/wet vac or flush through to drain.
iii. Refill with fresh water and put back into service. Check residual of free chlorine is below 1mg/L.

As deemed necessary by the WSG normally following any conformed contamination collect water samples as described in WSP 27 Microbiological Sample Collection Protocol and submit for biological analysis. The analysis should measure the presence of contamination by general bacteria Total Viable Colony Count – T.V.C.C., (Legionella spp and Pseudomonas aeruginosa in high risk areas including augmented care units).

Samples to be collected no earlier than 48 hours following installation.

Tank cleaning using sodium hypochlorite – Soaking Method:

i. Fix ball valve in close position.
ii. Isolate Tank from system. Outlets should be sealed from inside tank.
iii. Empty the Tank via drain-point or by using a submersible or barrel type pump, in the absence of a drain-point or should draining from drain-point is impracticable.
iv. The surfaces of the tank(s), including walls, overflow, lid, ball valve etc., should be manually cleaned and then disinfected by spraying with 500 mg/L sodium free chlorine solution using garden type pressure sprayer ensuring surfaces remain wet for 10 minutes.
v. Clean Tank and remove all deposits of scale, corrosion and sludge deposition using a combination of hand scraping and brushing together with application of chemicals to dissolve or soften the scale (where necessary). Vacuum out all loose debris and deposits.
vi. When using high-pressure jet washers to clean the internal surfaces of the Tank, suitable PPE must be used, including a positive pressure respirator. In this circumstance, the escape of aerosols must be restricted or, certainly, minimised.
vii. Where oil and grease contaminants on the tank surface are implicated, they must be removed using suitable degreasants. Where necessary (and practicable) the tank can be steam cleaned to remove grease contaminants.

Tank Disinfection using sodium hypochlorite – Soaking Method:

i. Once the disinfectant solution is adequately mixed, check that a reserve of at least 50mg/L free chlorine is given. Add more activated solution if necessary.
ii. After 1 hour soak period, check free chlorine level; if below 30mg/l, repeat step I. If level is @>30ppm as free chlorine, after one hour, dilute concentration with fresh water and put to drain, without deactivation, provided that the system volume is

less than 2m^3 and the residual less than 20mg/L as free chlorine. Where the chemical residual or volume is greater it should be deactivated.

iii. The area of the storage vessel above the water line (overflow, lid, ball valve etc.) should be manually cleaned and then disinfected by spraying with 500mg/l free chlorine solution using garden type pressure sprayer ensuring surfaces remain wet for 10 minutes.

iv. Refill with fresh water and put back into service. Check residual of free chlorine is below 1mg/l.

As deemed necessary by the WSG normally following any conformed contamination collect water samples as described in WSP 27 Microbiological Sample Collection Protocol and submit for biological analysis. The analysis should measure the presence of contamination by general bacteria Total Viable Colony Count – T.V.C.C., (Legionella spp and Pseudomonas aeruginosa in high risk areas including augmented care units).

Samples to be collected no earlier than 48 hours following installation.

Neutralisation:

Normally, Sodium hypochlorite solutions do not require neutralisation prior to disposal to foul sewer. However, if local conditions require it, 50mg/L disinfectant solutions can be neutralised before disposal with sodium bisulphite (SB) or sodium thiosulphate (ST) at the rate of 350 gm SB/m^3 or 525 gm ST/m^3 of disinfectant solution.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 31 Certificate of Conformity - Cold Water Storage Tank Cleaning and Disinfection

Using Sodium hypochlorite as the disinfecting agent – Spray method

Frequency	As Required
Limits:	THIS IS TO BE COMPLETED BY THE COMPETENT PERSON

If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.

No	Tasks	Date	Tank Asset No.	Comments	Signature
1	Tank Volume:				
2	Method of disinfection:				
3	Disinfectant used:				
4	Spray all surfaces of the tank using a knapsack or garden pressure sprayer or fogger, with ready prepared 500 mg/L Cl2 solution, ensuring that all surfaces remain wet with disinfectant for at least 10 minutes. Note the requirements for personal protective equipment when spraying of fogging Cl2 solutions.				
5	When the spray disinfection is complete and the solution has been in contact with all surfaces for at least 10 minutes, thoroughly rinse all sprayed surfaces with clean water and remove any residues with pump/wet vac or flush through to drain				
6	Refill with fresh water and put back into service. Check residual of Cl2 is below 1mg/L.				
7	Water analysis carried out (Y/N):				
8	Analysis results				
9	Date of last disinfection:				
10	Any refurbishment, improvements carried out during this disinfection:				
11	Further upgrading, refurbishment, improvements works required				

This section to be completed by the Trust Supervising Officer

Signature		Date of check	

All reported faults to be transferred to "Monthly Defect Log" for processing

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 32 Certificate of Conformity - Cold Water Storage Tank Cleaning and Disinfection

Using Sodium hypochlorite as the disinfecting agent – Soaking method

Frequency	As Required
Limits:	THIS IS TO BE COMPLETED BY THE COMPETENT PERSON

If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.

No	Tasks	Date	Tank Asset No	Comments	Signature
1	Tank Volume:				
2	Method of disinfection:				
3	Disinfectant used:				
4	Volume of disinfectant used:				
5	pH:				
6	Cl2 level (mg/L):				
7	Initial				
8	After 1 hour:				
9	Post disinfection				
10	Neutralising agent used:				
11	Amount of neutralising agent used:				
12	Water analysis carried out (Y/N):				
13	Analysis results				
14	Date of last disinfection:				
15	Any refurbishment, improvements carried out during this disinfection:				
16	Further upgrading, refurbishment, improvements works required				

This section to be completed by the Trust Supervising Officer

Signature		Date of check	

All reported faults to be transferred to "Monthly Defect Log" for processing

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 33 Water Storage Tank Drop Test	
Frequency	As Specified In Section 4
Limits:	Stored Water 24hrs Maximum
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

Cold water storage tanks must be sized and arranged so as to minimise retention time of stored water (24hrs maximum), and therefore to increase the rate of stored water exchange.

Cold water storage tanks will be subjected to a periodic “need” test which requires the user to question the presence of each unit and consider its removal if the services it supplies can be, equally well, supplied by converting the systems to domestic mains fed only.

Each unit will be subjected to a “drop-test” designed to ascertain the capacity and demand requirements of each system, in order to ensure that excessive volumes of water are not unnecessarily stored:

i. When the tank is full and not making-up, measure the height of the water level in the tank - (A); from the bottom of the tank to the level of water.

ii. During the identified period of maximum demand, isolate the supply and service to and from the tank respectively and immediately mark the level of water within the tank using a non-deleterious marker. Once the level has been marked, open the supply from the tank but continue to allow the supply to the tank to remain isolated.

iii. After one hour, re-mark the level of water within the tank using a non-deleterious marker and measure the “height” of water used in the one hour – (B).

iv. Divide the height of the water level in the tank - (A) by the “height” of water used in the one hour – (B) to calculate the total capacity of water in hours.

v. On completion of the exercise, remember to open all valves controlling supplies to and from the tank.

Note: When tanks are linked, the process above must be carried out for the “combined” volume.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 34 Domestic Water Services Disinfection	
Frequency	As Required
Limits:	Using Sodium hypochlorite as the disinfecting agent Complete Certificate of Conformity Minimum level of free Cl2 initially: 50ppm Minimum level of free Cl2 after 1hr: 30ppm Maximum level of Cl2 at end <1ppm
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

When disinfecting distribution systems in buildings, it is important to ensure that all persons in the building are notified that the distribution system is being disinfected and that the water should not be used. Outlets should be bagged and signs placed on each outlet advising of this.

Ensure that all hot water is quickly purged from the HWS system and replaced with cold water, prior to the commencement of the disinfection process.

Sodium hypochlorite will normally be used as the hyper-chlorination disinfectant agent throughout. Where alternative disinfection agents are intended for use, a written proposal outlining the reasons why an alternative disinfection agent is proposed for use, the proposed disinfection agent, COSHH sheets, risk assessment and methodology must be presented to the Estates Department Responsible Person / WSG for written authorisation.

Disinfection Using Sodium Hypochlorite

- If CWS storage vessels are associated with the system, they should be cleaned and disinfected by following Process No. 28 above before the distribution system is disinfected.
- Any water treatment equipment must be disconnected from the system. The pH of the water must be measured and must be between 5.5 and 9.0 before chlorinating solution is introduced. If pH is found to be below 5.5 the system must be drained, flushed and refilled with fresh water.
- Treated water must then be used to charge the distribution system. If a storage vessel is associated with the system, the disinfectant solution must be prepared in and supplied by this vessel. If a storage vessel is not associated with the system, a portable vessel must be used to prepare within and supply from the disinfectant solution.
- Sampling point's representative of the system must be tested using a sodium hypochlorite drop test kit to ensure 50 mg/l free chlorine throughout the system to start disinfection. The whole system must be allowed to stand charged for a minimum period of 1 hour, a representative number of samples must be taken from the distribution system and tested using a suitable test kit to ensure levels have been maintained above 30 mg/l free chlorine. All test and sampling points must be identified and the results of each test recorded.
- Where practicable, dismantle TMV/TMTs and clean strainers.
- The system must be thoroughly flushed out with clean mains water until tests indicate that the residual free chlorine concentration is no greater than 1ppm mg/l that present in the mains water supply or within the dosing limits where chlorine dioxide is dosed as an on-line biocide.
- Using a suitable sterile container, collect a water sample and submit for biological analysis. The analysis should measure the presence of contamination by general bacteria Total Viable Colony Count – T.V.C.C., (Legionella spp and Pseudomonas aeruginosa in high risk patient areas including augmented care units). Samples to be collected no earlier than 48 hours following disinfection.

Neutralisation

Normally, sodium hypochlorite solutions do not require neutralisation prior to disposal to foul sewer. However, if local conditions require it, 50 mg/l disinfectant solutions can be neutralised before disposal with sodium bisulphite (SB) or sodium thiosulphate (ST) at the rate of 350 gm SB/m3 or 525 gm ST/m3 of disinfectant solution.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 35 Certificate of Conformity - Distribution Services Disinfection

Using Sodium hypochlorite as the disinfecting agent

Frequency	As Required
Limits:	THIS IS TO BE COMPLETED BY THE COMPETANT PERSON

If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.

No	Tasks	Date	System	Comments	Signature
1	System Volume:				
2	Method of disinfection:				
3	Disinfectant used:				
4	Volume of disinfectant used:				
5	pH:				
6	Initial disinfectant level (Cl2 mg/L):				
7	After 1 hour(Cl2 mg/L):				
8	Post disinfection (Cl2 mg/L):				
9	Neutralising agent used:				
10	Amount of neutralising agent used:				
11	TMV/TMT strainers and all other strainers, aerators and flow straighteners cleaned, disinfected and replaced/renewed				
12	Water analysis carried out (Y/N)				
13	Analysis results				
14	Date of last disinfection:				
15	Any refurbishment, improvements carried out during this disinfection:				
16	Further upgrading, refurbishment, improvements works required				

This section to be completed by the Trust Supervising Officer

Signature		Date of check	

All reported faults to be transferred to "Monthly Defect Log" for processing

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 36 Calorifier Pasteurisation	
Frequency	As specified in section 4 & As Required
Limits:	Complete Certificate of Conformity Stored water temperature: ≥70oC Retention time: 1hr Minimum
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

i. Purge Calorifier via drain point and refill.

ii. Isolate all valves on the incoming and outlet sides.

iii. Ensure that the “blow” valve is capable of withstanding temperatures of up to 80°C.

iv. Bring Calorifier to 70°C (if practicable) and allow standing at this temperature for at least 1 hour.

v. Where 70°C cannot be achieved, the Calorifier must be brought to 60°C and allow to stand at this temperature for at least 2 hours.

vi. Ensure that no water is drawn from the Calorifier whilst pasteurisation in progress.

vii. Allow Calorifier to reach its normal operating temperature, >60°C, and return to service.

viii. If deemed necessary by the WSG normally following any confirmed contamination arrange for a water sample to be collected and submit for biological analysis.

The analysis should measure the presence of contamination by general bacteria (T.V.C.C, *Legionella spp* and *Pseudomonas aeruginosa* in high risk patient areas including augmented care units E. coli & coliforms are not normally tested for unless specifically requested by the WSG).

NOTE: Samples to be collected no earlier than 48 hours following disinfection.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 38 Domestic Water HWS Distribution System Pasteurisation	
Frequency	As Required
Limits:	Complete Certificate of Conformity Stored water temperature: ≥70°C Retention time: 1hr Minimum
This process must only be carried in areas which are empty of users or where the risk of scalding has been assessed, in accordance with the Trust's risk assessment process, and determined to be low	
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

i. Purge Calorifier via drain point and refill.

ii. Isolate all valves on the incoming and outlet sides.

iii. Ensure that the “blow” valve is capable of withstanding temperatures of up to 80°C.

iv. Bring Calorifier to 70°C (if practicable) and allow to stand at this temperature for at least 1 hour.

v. Where 70°C cannot be achieved, the Calorifier will be brought to 60°C and allow to stand at this temperature for at least 2 hours.

vi. Ensure that no water is drawn from the Calorifier whilst pasteurisation in progress.

vii. Whilst maintaining the Calorifier temperature at "pasteurising temperature" open all isolation valves to allow water from the Calorifier to distribute adequately throughout all parts of the system, checking at 15 minute intervals that the temperature at sentinel outlets is maintained at "pasteurising temperature".

viii. Maintain temperature throughout the system at "pasteurising temperature" and for 1 hour if at 70°C or 2 hours if at 60°C.

ix. Allow Calorifier and distribution system to reach its normal operating temperature, <60°C, and return to service.

x. Following completion of the pasteurisation process, all TMV/TMT strainers and all other strainers, aerators and flow straighteners must be removed, cleaned and disinfected and replaced/renewed.

xi. If deemed necessary by the WSG using WSP 27 collect samples in accordance to the WSG requirements and submit for biological analysis.

The analysis should measure the presence of contamination by general bacteria (T.V.C.C., Legionella spp and Pseudomonas aeruginosa in high risk patient areas including augmented care units. E. coli & coliforms are not normally tested for unless specifically requested by the WSG).

NOTE: Samples to be collected no earlier than 48 hours following disinfection.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 39 Certificate of Conformity - Domestic Water HWS Distribution System Pasteurisation

Frequency	As Required
Limits:	THIS IS TO BE COMPLETED BY THE COMPETENT PERSON

This process must only be carried in systems which are empty of users or where the risk of scalding has been assessed, in accordance with the Trust's Risk Assessment Process, and determined to be low

If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.

No	Tasks	Date	System	Comments	Signature
1	Does Risk Assessment carried out allow for this process to be carried out (Y/N) *Attach Risk Assessment*				
1	Type of heating provided:				
2	Time of beginning of process (24hr clock):				
3	Pasteurising temperature achieved:				
4	Time pasteurising temperature kept:				
5	Time of end of process (24hr clock):				
6	Inlet Valve opened:				
7	TMV/TMT strainers and all other strainers, aerators and flow straighteners cleaned, disinfected and replaced/renewed				
8	Water analysis carried out (Y/N)				
9	Analysis results				
10	Date of last disinfection:				
11	Any refurbishment, improvements carried out during this disinfection:				

This section to be completed by the Trust Maintenance Supervisor

Maintenance Manager / supervisor		Date of check	

All reported faults to be transferred to "Monthly Defect Log" for processing

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 40 Point of Use (POU) Filter Installation & Replacement	
Frequency	As Required
Limits:	In accordance with manufacturer recommendations
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

1. Outlets to be fitted with POU filters will be selected by the WSG and/or Infection Prevention and Control Group.
2. POU filters will only be fitted by suitably and adequately trained staff.
3. POU filters must be replaced according to manufacturer's instructions or when there is a significant fall in flow-rate/pressure at the outlet indicating filter blockage.
4. POU filters, when installed and/or replaced must be dated and signed and records maintained within the Planet or Compass systems of their status.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 41 Dead Legs / Areas of Low Usage & Flushing	
Frequency	TWICE WEEKLY MINIMUM
Limits:	All flushing must be recorded on the Compass system
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

Systems or individual outlets that are not frequently used allow the development of stagnant water conditions, which increase the potential of bacterial growth and proliferation, including Legionella. In order to remove any stagnation that may have developed or to stop stagnation from occurring in the first place, it is important to introduce a "flushing" programme where necessary.

The WSG have the responsibility to ensure that this requirement is implemented and systematically audited to ensure adequate and correct implementation.

The flushing programme is designed to ensure the adequate turnover of water. This is achieved by ensuring that the flushing is carried out at the specified system or outlet and for an appropriate length of time. The length of time of purging water from the system is important because it is vital to ensure that all the stagnant water has been expelled from the pipe-work and at least until "circulating" or "fresh" water is drawn from the outlet (water at temperatures exhibited throughout the rest of the system).

The flushing programme must follow the procedure outlined below:

- For all areas which are in "normal operating use", the responsibility for the Usage Evaluation and Flushing process must be that of the "user".

- For all areas which are "out of use", the responsibility for the Usage Evaluation and Flushing process must be that of the Estates Department or Capital Development department.

    i. Carry out the “Usage Evaluation” process in order to identify areas/outlets which are not used at least 2 x Weekly (daily in augmented care units) so that they can be flushed.

    ii. Ensure that the system/outlet can be flushed safely and in a tidy manner into an appropriate drain if not plumbed for drainage.

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

    iv. Ensure that "splash-back" is minimised, where practicable, by placing a sponge or another material capable of absorbing some of the force of the water against the surface of the appliance.

    v. Purge hot and the cold or the mixed water in turn for a minimum of 2 minutes or for a period of time necessary to draw water from the outlet at temperatures exhibited throughout the rest of the system.

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

    vii. Consider whether the system/outlet can be removed negating further flushing.

Flushing of outlets fitted with point of use filters (POU) must be carried out with the POU filter in place (without removing the filter). Flushing of outlets fitted with POU filters as part of remedial actions must be carried out by Estates staff who will remove the POU filter and replace with new POU filter upon completion of the flushing process.

Infrequently used outlets and dead-legs flushing process

i. Ensure that the system/outlet can be flushed safely and in a tidy manner into an appropriate drain if not plumbed for drainage.

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

iii. Ensure that "splash-back" from basins is minimised, where practicable, by placing a clean sponge or another material capable of absorbing some of the force of the water against the surface of the appliance.

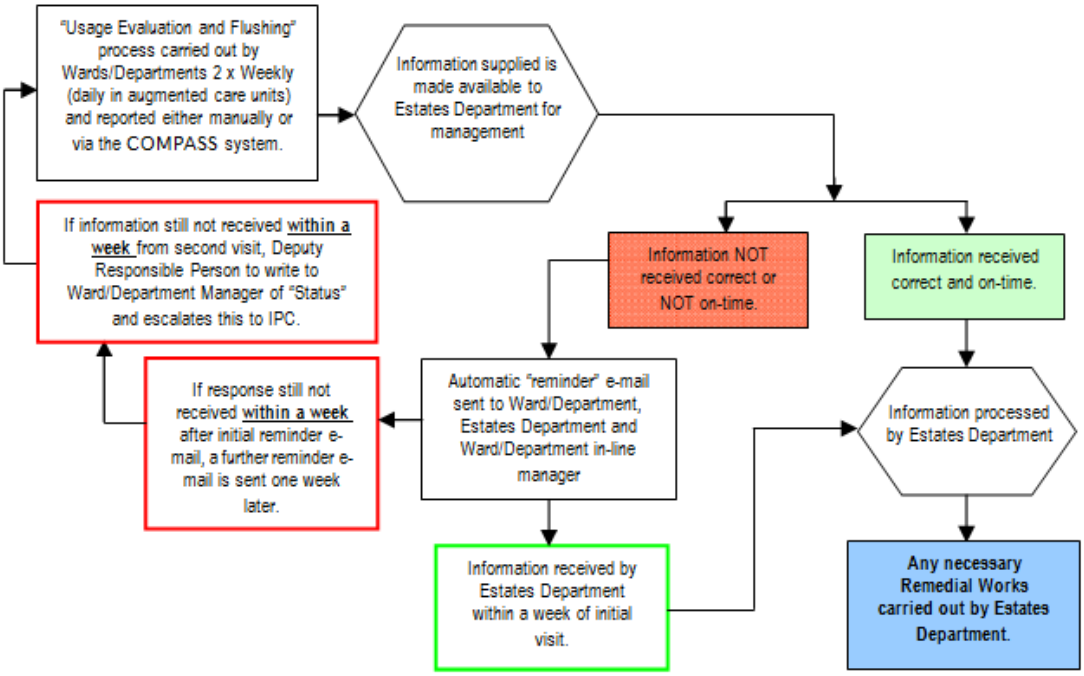
iv. Purge the hot and the cold or the mixed water in turn for a minimum of 3 minutes or for a period of time necessary to draw water from the outlet at temperatures exhibited throughout the rest of the system.

v. If a system or an area consisting of multiple outlets requires flushing, it is important to begin with the nearest outlet to the main distribution pipe-work, working progressively away from the main distribution pipe-work.

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

Consider whether the system/outlet can be removed negating further flushing.

Compass System Usage Evaluation Process



Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 42 Mobile Screening / Dental Vehicles Management	
Frequency	As Required
Limits:	In accordance to manufacture recommendations
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

This section gives basic guidance for the management of mobile vehicles including maintenance, testing and biological analysis.

1. A suitable water supply point, provided from a wholesale water source, must be made available for topping-up the vehicle(s) fresh water tank. This supply point must be regularly flushed fitted with suitable back-flow prevention devices to allow for compliance with the relevant Water Regulations. This supply will be subject to regular (weekly) flushing when not in use and the flushing process suitably recorded via Compass.

2. The outlet should be regarded as a sentinel point and routinely checked for the presence of legionella.

3. Samples must be collected in accordance with WSP 27 Microbiological sample collection protocol.

4. The fresh water tank and associated pipe work/outlets must be disinfected annually using premixed 50mg/L (ppm) sodium hypochlorite solution as described in Process No. 31 and kept empty. The disinfection process must be carried out by suitably trained and equipped personnel and adequately certified.

   If the vehicle is not put into use immediately following disinfection, the water facilities should be drain down and flushed for at least three minutes before being put back into use.

5. The hose used to connect the water supply to the vehicle(s) storage tank, which must be WRAS approved and kept clean and dry, must be thoroughly flushed for 5 minutes before each use. The hose must not be left connected to the vehicle(s) tank but must be disconnected and only re-connected when required to top-up the vehicle(s) tank. The hose must be kept with the vehicle when not in use or in a clean dry storage container on site and only used for the intended purpose.

6. The vehicle must not be put into use and the supply must not be used if any biological analysis sample results indicate bacterial levels outside the acceptable parameter limits described in WSP Book 4 - Contingency Measures. The vehicle must not be put into use until the water analysis results received indicate bacterial levels within the acceptable limits.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 44 Management of Drinking Fountains	
Frequency	As Required
Limits:	In line with manufacturer instructions
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

Request to install new drinking fountain

In order to ensure that infection prevention is assured, all new drinking fountains will only be installed upon authorisation from the WSG/Responsible Person (Estates) who may issue such authorisation following receipt of a detailed request.

- No drinking fountains will be installed without authorisation from the WSG/Responsible Person (Estates).
- Any new drinking fountains fitted without the appropriate authorisation for its installation, will be removed by the Responsible Person (Estates).

Guidance on the selection of drinking fountains

Drinking fountains approved by the WSG are listed within the Sanitaryware specification contained within part C of this WSP which comply with the below.

- Units selected must be WRAS approved and suitably approved by all relevant bodies for the use in a healthcare environment.
- In order to avoid stagnation and resultant potential increase in bacterial growth and proliferation within the unit, it is preferable that the unit selected does not have a water storage tank.
- In order to maximise bacterial growth and proliferation control, it is preferable that the unit selected does have UV bacterial control.
- In order to reduce the potential of bacterial growth and proliferation on the spout caused by the collection of scale and other debris deposits, it is preferable that the unit selected has the facility to replace the spout or the spout is easily cleaned.
- In order to reduce the potential of bacterial growth and proliferation and the build-up of biofilm in the supply connections to the unit, it is important that the unit does not require connection using EPDM flexible hose connectors as these have been shown to promote bacterial growth and proliferation and support the development of biofilm locally. Flexible connections should be by PEX hose approved by the WSG.
- In order to reduce the potential of bacterial growth and proliferation and the build-up of biofilm in the supply connections to the unit, it is important that the unit does not incorporate EPDM seals/gaskets as these have been shown to promote bacterial growth and proliferation and support the development of biofilm locally.

Installation

i. All drinking fountains must be installed by suitably qualified contractors in accordance with Estates procedures and all Water Regulations requirements / OP 79 / WSP.
ii. All drinking fountains must be installed in a proper manner and connected onto a potable water supply.
iii. All drinking fountains must be suitably disinfected in accordance with manufacturer's instructions.

Maintenance

i. All drinking fountains must be subject to a suitable contract to ensure maintenance in accordance with manufacturers' instructions. All contracts must be subject to approval by the WSG or Responsible Person (Estates).
ii. Any drinking fountains found in use without a suitably approved maintenance contract will be taken out of use, by the Responsible Person Estates, until the unit is placed under a contract.

Microbiological Screening

i. If deemed necessary due to loss of control measures the WSG may instruct the water sampling of effected fountains for the presence of TVCC, Legionella or P. Aeruginosa.
ii. Any samples must be collected in accordance with WSP 27 Microbiological Sample Collection Protocol.

It must be established that the usage is sufficient to avoid deterioration in water quality, for example, that the inlet water temperature does not exceed 20°C and that the outlet does not remain unused. It will be the responsibility of local flushers to complete usage evaluations for fountains to ensure water turnover

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 45 Notification of Closure of Facility (Facility refers to a ward, part of a ward, a room within a area, section of building etc)	
Frequency	As Required

Closure Notification of facility

If a facility is to be closed, it is the responsibility of the facility manager to notify of the impending facility closure by submitting a completed copy of WSP 46 Notification of Closure of Facility to the WSG / Responsible Person (Estates) at least one week (where practicable) prior to the Facility closure.

Temporary Closures (Closures of less than one month) where no modifications, alternations and or refurbishments are planned

During the temporary closure of a facility, where no major modifications, alterations and/or refurbishments are planned, a procedure for flushing hot and cold water systems will be instituted by the Responsible Person (Estates) in accordance with WSP 41 'Dead legs/Areas of Low Usage Evaluation and Flushing'. This process will be implemented recorded by the completion of WSP 46 'Notification of Closure of Facility and Permit to Re-occupy' by the Responsible Person (Estates). Disinfection of the domestic water services would not be required before re-occupation under these circumstances. Microbiological sampling of the domestic water services would also not be required unless expressly requested by the WSG / Trust's Consultant Microbiologist. It is important, however, to ensure that the temperature/ClO2 levels are within acceptable levels before re-occupation can be permitted.

Re-occupation must be subject to the appropriate authorisation WSP 46 'Notification of Closure of Facility and Permit to Re-occupy' signed by the Trust's Consultant Microbiologist.

Long-term Closures (Closures of more than one month) where no modifications, alterations and/or refurbishments are planned

During the long-term closure of the facility for more than one month, the system, where practicable, will be isolated from the domestic hot and cold supplies and drained.

This process will be implemented and its implementation recorded by the completion of WSP 46 'Notification of Closure of Section/Area' by the Responsible Person (Estates).

Disinfection of the domestic water services would be required before re- occupation under these circumstances and this must be carried out in accordance with WSP No. 34 'Domestic Water Services Disinfection'. Microbiological sampling of the domestic water services would also be required and this must be carried out in accordance with WSP 27 'Microbiological Sample Collection Protocol'. It is also important to ensure that the temperature/ClO2 levels are within acceptable levels before re-occupation can be permitted.

Re-occupation must be subject to the appropriate authorisation WSP 46 'Notification of Closure of Facility and Permit to Re-occupy' signed by the Trust's Consultant Microbiologist.

Where the system cannot be isolated and drained, the area must be flushed twice weekly in consultation with the Estates management department.

Closures where minor-works are planned

If the facility is subject to minor works projects (small sized pipe work and associated components installations) it is the responsibility of the Responsible Person (Estates) to ensure that the appropriate actions are taken in accordance with WSP 28 'Small sized pipe work installation projects and associated components pre and post installation cleaning and disinfection'. This process will be implemented and its implementation recorded by the completion of WSP 'Notification of Closure of Facility and Permit to Re-occupy'' by the Responsible Person (Estates).

Disinfection of the domestic distribution water services would not be required before re- occupation under these circumstances. Microbiological sampling of the domestic water services would also not be required unless expressly requested by the Trust's Consultant Microbiologist. It is important, however, to ensure that the temperature/ClO2 levels are within acceptable levels before re-occupation can be permitted.

Re-occupation must be subject to the appropriate authorisation WSP 29 'Permit for Release into Use of new installations of small sized pipe work installation projects and associated components' signed by the appropriate Responsible Person. This must be accompanied by the completed WSP 46 'Notification of Closure of Facility and Permit to Re-occupy' signed by the Trust's Consultant Microbiologist.

Closures where major works are planned

If the facility is subject to major works including modifications/refurbishments, it is the responsibility of the Project Manager to implement and record this process by the completion of WSP 46 'Notification of Closure of Facility and Permit to Re - occupy'.

Disinfection of the domestic water services would be required before re-occupation under these circumstances and this must be carried out in accordance with WSP 34 ‘Domestic Water Services Disinfection'. Microbiological sampling of the domestic water services would also be required and this must be carried out in accordance with WSP 27 Microbiological Sample Collection Protocol. It is also important to ensure that the temperature/ClO2 levels are within acceptable levels before re-occupation can be permitted.

Re-occupation must be subject to the appropriate authorisation 'Permit for Hand-over and occupation of refurbished facilities' as detailed within part C of the WSP.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 46 Notification of Closure of Facility & Permit to Re-Occupy

Where facility is not subject to modification / refurbishment

Frequency	As Required
Limits:	THIS IS TO BE COMPLETED BY THE RESPONSIBLE PERSON

If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.

Section 1

This section to be completed by Responsible / DR Person (Estates)

Notification submitted by		Date	
Facility for closure:			
All of the facility proposed for closure?	Yes/No	Specify	
Date for proposed closure		Period of closure	
Reason for proposed closure			
Will use of facility change following reopening?	Yes/No	Specify	
Date of re-occupation		Time of re-occupation	

Section 2

This section to be completed by Responsible / DR Person (Estates)

Form Received by		Date	
Is facility subject to modification/refurbishment?	Yes/No	Modification or Refurbishment	

If Facility is NOT subject to modification/refurbishment go to Section 3
If Facility IS subject to modifications/refurbishment go to Section 7

Section 3

This section to be completed by appropriate Project Manager

Period of closure	No. Days		Temporary		Long-Term	

If Facility is subject to TEMPORARY closure go to Section 4
If Facility is subject to LONG-TERM closure go to Section 5

Section 4

This section to be completed by appropriate Project Manager

Is flushing programmed?	Yes/No		Start Date		Carried out by	
Is biological analysis required prior to opening?	Yes/No		What samples are required		
			Date of planned sampling		

Re-occupation possible only if Section 8 is signed and dated by Consultant Microbiologist

Section 5

This section to be completed by Responsible / DR Person (Estates)

Is isolation and draining of system possible?	Yes/No		No, why?	

If Isolation and draining of the system is NOT possible go to Section 4
If Isolation and draining of the system IS possible go to Section 6

Section 6

This section to be completed by Responsible / DR Person (Estates)

System disinfection required prior to opening?	Yes/No		Date of planned disinfection	
Is biological analysis required prior to opening?	Yes/No		What samples are required	
			Date of planned sampling	

Re-occupation possible only if Section 8 is signed and dated by Consultant Microbiologist

Section 7

This section to be completed by appropriate Project Manager

Is facility subject to modifications/refurbishments?	Yes/No		Minor Works		Major Works	
Brief description of modifications/refurbishments					

If facility is subject to MINOR WORKS go to procedure 28 'Small sized pipe work installation projects and associated components
Pre and post installation cleaning and disinfection'.
If facility is subject to MAJOR WORKS go to part C of the WSP 'Permit for Hand-over and occupation of refurbished facilities'

Section 8

This section to be completed by Trust Consultant Microbiologist prior to occupation

Are flushing records available for inspection?	Yes/No		Specify	
Are all biological analysis results within acceptable limits?	Yes/No		Specify	
Temperatures/ClO2 levels within recommended limits?	Yes/No		Specify	
Is re-occupation approved?	Yes/No		Date of approval	
			Date of re- occupation	

Trust Consultant Microbiologist: Signed: .....

NOTE: TO ALLOW FOR RE-OCCUPATION OF FACILITY THIS FORM MUST BE SIGNED AND DATED BY TCM AND ACCOMPANIED BY ALL APPROPRIATE RECORDS AND CERTIFICATES

The Royal Wolverhampton
NHS Trust

Ref: OP79 Water Safety Policy

Attachment 5

Water Safety Plan

PART C

Capital Development
& Water Systems Modifications

Version:	1.1
Ratified by:	Mike Koumi – Authorised Engineer Water
Date ratified:	September 2022
Name of originator/authors:	Joanna Macve, Tom Butler, Steve Brooks , Peter Holland
Name of responsible committee/individual:	Water Safety Group
Date issued:	January 2019
Review date:	March 2026
Target audience:	Trust staff
Equality Impact Assessment:	Yes
This process is effective for all employees of the Royal Wolverhampton NHS Trust, Patients, Visitors and Contractors	

Version Control

Water Safety Plan – Part C – Capital Development & Water Systems Modifications					
Reference/ version.	2022	**Category:**	**n/a**	**Version:**	1.1
Document purpose:	Supporting the RWT NHS Trust Water Safety Policy Document OP79 and WSP Defining the general precautions taken for the management of water forming part of the Trust written scheme and water safety plan for The Royal Wolverhampton Hospital NHS Trust				
Intended for use by:	Direct and indirect Staff				
Author(s) responsible for document upkeep	Tom Butler, Steve Brooks & Peter Holland				
Consultation process	Water Safety Group, Health and Safety Steering Group, Infection and Prevention Group				
Sponsoring Director:	Gwen Nuttall				
Approved by:	TMC				
Dated:	2019 (Schedule as Policy Issue)				
To be reviewed before:	2026 (Schedule as Policy Issue)				
Implementation arrangements:	Estates Managers, Supervisors, Health & Safety Representatives, Health & Safety Officers, Staff and Contractors.				
Monitoring Arrangements:	The implementation and effectiveness of this process will be reviewed on an ongoing basis through the Water Safety Group and Health & Safety Steering Group, by checking whether the process is being used and receiving feedback on current effectiveness and possible future revisions.				

VALIDITY STATEMENT

This document is due for review on the latest date shown above. After this date, the process documents may become invalid. The electronic copy of this document is the only version that is maintained. Printed copies may not be relied upon to contain the latest updates and amendments.

CONTENTS

1.0 STRUCTURE & GUIDANCE

The Water Safety Plan is designed to be a series of easy reference specific guides to water safety inclusive of safe hot water within the Trust for our staff and contractors explaining in brief how water is managed, systems maintained and developed within its properties.

This plan is a key attachment to operational policy 79 and must be read in conjunction with this document and its attachments. Water Safety Plans (WSP) are recommended by Health Technical Memorandum 04-01 and a written scheme is required by Approved Code of Practice L8 (ACOP L8). The combined WSP and written scheme provide best practice and a holistic approach to the management of water systems.

The WSP is a living document. It is kept under continual review by the Water Safety Group (WSG) to ensure adequate assessment and control of risks is in place. The content of the WSP is a fixed monthly agenda item of the WSG ensuring the document is maintained reflecting best practice.

The WSP has four parts A-D, this section part C provides capital development / water system modification guidance reference the Trust's Management & Control programme for: The control of Legionella, hygiene, 'safe' hot water, cold water and drinking water systems including Pseudomonas aeruginosa – advice for augmented care units. Each part of the WSP can be considered in isolation, however part A should always be read first to provide general background information and precautions in line with OP79. The table below shows the parts of the WSP and targeted departments they are aimed for:

Part No.	Document Title	Targeted Departments						
		Estates	Capital	IPC	Nursing	Medical Physics	Facilities	Med Micro.
A	OP 79 Attachment 3 **General Precautions**	✓	✓	✓	✓	✓	✓	✓
B	OP 79 Attachment 4 **Maintenance Arrangements**	✓		✓				✓
C	OP 79 Attachment 5 **Capital Development & Water System Modifications**		✓	✓				✓
D	OP 79 Attachment 6 **Contingency Measures**	✓	✓	✓	✓		✓	

Please refer to the relevant part for guidance or where insufficient information is found within this plan reference should and will be made to best practice within HTM 04 and statutory guidance within ACOP L8, however interpretation of guidance and clarifications required reference the management of water within the Trust must be directly from the Water Safety Group.

Special notes are highlighted in blue across all parts of the WSP to give emphasis to pertinent information relevant to the section being considered where appropriate

This plan must also be read in conjunction with the Trust's Health and Safety policy HS01 and supplementary information in relation to COSHH.

For information reference medical equipment please refer to HS11 & HS12 that provide detailed arrangements for the management of medical devices.

Reference should also be made to part A section 5.9 of the WSP which details further Trust policy and procedure which should be considered with this plan.

The scope of this WSP will extend but not be limited to:

- Domestic Cold Water Services - Storage and Distribution
- Domestic Hot Water Services - Generation Storage and distribution
- Faucets, showers, bib taps, etc.
- Thermostatic Mixing Valves (TMV)/Thermostatic Mixing Taps (TMT)/Thermal Stop Taps
- Drinking Fountains
- Vending Machines
- Emergency Showers/ Eye Washers
- Dental Chairs
- Nebulisers
- Humidified incubators
- Wet Air Conditioning
- Adiabatic coolers
- Portable humidifiers
- Ground/Floor wash vehicles
- Other systems considered to pose a risk
- Mobile Screening Vehicles
- Hydrotherapy pools
- Birthing pools

The WSP does not provide specific guidance for management of water quality for specialist water systems used for cleaning of surgical instruments or medical devices e.g. Endoscopy Water or CSSD supplies which have their own stringent procedures and standards in place.

This Water Safety Plan (WSP) has a controlled circulation and the validity statement on page two must be noted.

2.0 INTRODUCTION

2.1 Capital Development & System Modifications:

Management of water systems and associated end-of-line fittings to reduce the risk of microbial growth including opportunistic pathogens such as Legionella and Pseudomonas aeruginosa is vital to patient safety. Maintenance (Planned Preventative Maintenance - PPM) and surveillance control measures employed by the WSG for the Trust are of upmost importance and must be diligently followed to protect and safeguard patients, staff, visitors and systems within the Trust.

The design of systems and selection of plant is of upmost importance and directly effects long term and ongoing maintenance and the health of any system as a whole. The role of the WSG is to ensure systems are in place and to provide advice reference water safety which includes:

- Design
- Validation
- Installation or the build
- Accessibility for maintenance
- Commissioning
- Hand over & occupation
- Microbiological analysis etc

The WSG has to approve all designs or system modifications prior to installation as detailed within this plan to ensure changes are recorded on the Compass system and risk assessments are updated as required. The WSG also ensure that changes do not have detrimental effects elsewhere on the system which may not be considered as part of an individual project.

Any deviation from the guidance within this WSP is to be agreed by the WSG and by the Trust responsible person water or Authorised Engineer Water. This guidance is based upon best practice and processes and procedures adopted and approved by the WSG within the Trust.

For general information reference pathogens / legionellosis please refer to part A before reading this document.

3.0 PATIENT RISK CATEGORISATION

Patient risk must be considered when managing and accommodating patients to ensure their safety and any additional arrangements that may need to be put in place to safeguard vulnerable patients against Legionella or pseudomonas Aeruginosa.

The Trust has already designated areas of high risk or augmented care as listed below, these areas have particular requirements from both operational and development standards. Further information can be found in part A of the WSP and as summarised below.

The WSG must always be consulted prior any development in relation to water safety and specific patient risks inclusive of any requirements for additional risk management strategies for new or developing clinical areas

3.1 Legionella

The following areas are considered to have high risk patients by the WSG that may be susceptible to Legionella bacteria:

Department	Risk Categorisation
CHU	High
Renal	
Deanesly Ward	
Durnall	
Critical Care Unit	
Cystic Fibrosis Unit	
Davey Unit	

Additional monitoring is completed within these areas as part of the Trusts precautions as well as general clinical surveillance across the Trust.

3.2 Pseudomonas aeruginosa

The following areas are considered to have high risk / augmented patients by the WSG that may be susceptible to Pseudomonas Aeruginosa:

Department	Risk Categorisation
CHU	Augmented
ICCU	
NNU	
SCBU	
Renal Dialysis Unit	
Renal, Pond Lane, Cannock, New Cross Hospital	
Deanesly	
Durnal	
Delivery	
Cystic Fibrosis	
Davey Unit	

Additional monitoring is completed within these areas as part of the Trusts precautions as well as general clinical surveillance across the Trust.

3.3 General

Patient risk should always be considered as part of the design process to both protect the planned patient group for the area being constructed and adjoining areas from possible contamination, the WSG must always be consulted particularly in areas listed above or for these patient groups.

If Legionella or Pseudomonas A is found as part of any sampling associated with any project or development the Trust responsible person and or WSG must be immediately informed

4.0 DESIGN INSTALLATION AND COMMISSIONING OF REFURBISHED

The design, installation and commissioning of all new-builds and refurbished areas must be carried out in accordance with the Trust's current Policy/Procedure for Capital Schemes in line with recommendations with this Water Safety Plan, Trusts engineering standards and documents listed in part A section 5.9.

4.1 Design Validation:

In order to ensure that all designs are developed in accordance with Trust engineering standards and industry guidance, all designs must be offered to the WSG for comment / approval. The Authorising Engineer (Water) can also approve designs in line with the WSG prior to installation or mediate any queries in accordance with the summarised points below:

- Systems must be carefully designed so as to minimise aerosols and the material used in construction must not harbour or provide nutrients for bacteria. They must be designed to be readily drained and cleaned.

- The systems must able to be maintained in a clean and sound condition and must be easily and safely accessible.

- All plant and distribution pipe-work (where accessible) must be clearly labelled.

- Cold water systems designs must ensure that the inlet, outlet and surface water temperatures of cold water storage tanks are not greater than 20ºC (or 2ºC from the supply).

- At cold water draw-off points, temperature must not exceed 2ºC above the temperature measured in at the source of the cold water storage tanks within two minutes.

- Domestic hot water temperatures should be maintained in line with below:

    - ‘Stored’ and ‘Flow’ at 60.0ºC
    - ‘Return’ at >55.0 ºC
    - ‘Distribution’ and at point of supply at >55+ºC direct-supplied outlets or to thermostatically controlled valves and / or taps (measured at sentinel outlets).
    - ‘Drain’ at >55 ºC. In order to ensure that the temperatures required for achieving thermal disinfection (>60ºC for the ‘Flow’ and >55ºC for ‘Distribution’) are maintained.

- No flexible hoses will be fitted to any new buildings or refurbishments as some flexible hoses are unsuitable for use in domestic water.

- No materials used in construction will include those that are known to harbour or provide nutrient for bacteria. Plastic pipe-work must not be used **only copper** for potable supplies. Any materials that come into contact with the water must comply with the requirements of the Water Supply (Water Fittings) Regulations 1999.

- Scalding control in patient areas will be achieved by the installation of Type 3 D 08 specification TMVs or TMTs as listed in appendix 1 sanitaryware specification. The temperature from all such outlets must be validated at to WSP 17:

- The pipe-work length from the TMV to the outlet will be restricted to a maximum of **two metres,** however it is preferable that TMTs are used wherever practicable to reduce lengths of pipe-work carrying blended water to a minimum.

  In intensive care and other critical care areas, where patients are unlikely to be able to use the wash-hand basins, the installation of standard mixing taps may be preferred to reduce bacterial risks associated with thermostatic valves following assessment and consultation with the WSG.

- Devices such as aerators and flow straighteners fitted to taps have been shown to exacerbate the problem of localised bacterial contamination by providing the nutrients which support microbial growth, providing surface area for oxygenation of water and leaching nutrients. Subject to local assessments, it is important to consider the removal of these devices wherever practicable but ensuring splashing is minimal or managed within the basin.

- All new and replacement expansion / pressurisation vessels fitted must be of the "flow-through" type.

- Pipework must be:

  - Arranged such that the cold water pipework is below hot water pipework in order to minimise any potential heat transfer.
  - All thermally insulated in accordance with BS 5970, BS 5422, BS476 and current Building Regulations Part L.

    This is to ensure that there is no heat-gain or loss occurring. It must be ensured that all pipework installed is distanced to allow the installation of the correct insulation.

Works should not be undertaken until the design is finalised / approved by the WSG, works completed without approval may need to be changed at a later date at the contractors costs if deemed necessary by the WSG.

4.2 Pre-start Works:

Prior to the start of any works, the contractor must:

- Provide 7 days' notice to the Estates Helpline via the project manager for all isolations, disconnections or connections of services as well as any PTW requests. These requests would have also been made to the WSG at design stage.

- Carry out base-line microbiological analysis as agreed by the WSG for:

  - Legionella
  - Pseudomonas Aeruginosa
  - TVCC
  - E. coli
  - Coliforms

    No work should be carried out on the water system until the WSG have reviewed and advised on sample results ensuring any precautions or arrangements needed are put in place before works start.

Where samples are being taken from facilities that are to remain in use, these facilities must be sampled on completion of each phase. The contractor MUST NOT amend, cut, drain, isolate any existing pipework until all the results have been confirmed; this is to ensure the contractor is aware of the condition of the water and takes the relevant precautions to modify and amend the existing pipework. Therefore the contractor will not isolate, drain or amend the existing hot and cold water for the first 10-14 days of the project, unless these samples are taken prior to the start on site date.

- Advise and mitigate the impact of works on adjoining / neighbouring system which will remain 'live' during the project.

  Actions must be agreed by the WSG prior to commencement of works.

- Carrying out flow and temperature checks on the existing systems (particularly flow and return HWS pipework) affected by the proposed works validating existing performance and following changes or installation of new systems.

  This must include adjacent areas, including plant rooms that could potentially be impacted upon by the proposed works. Any issues associated to existing systems must be reported to the WSG and or RP / DR P water.

- Ensure the existing infrastructure / plant being reused is capable of meeting any new demand requirements or is not sufficiently oversized to cause operational issues with all proposed changes to the system i.e. pumps, calorifiers etc.

  Any issues associated to existing systems must be reported to the WSG and or RP / DR P water.

4.3 During Installation:

The system must be regularly checked ensuring that it is being carried out in accordance with the requirements detailed within the Trust engineering standards, the WSP and as specified in the relevant scheme design specifications and contractual agreements.

The contractor if connecting to the Trusts water supply must allow for temporary connection via a double check or RPZ valves during construction and water quality testing until all water quality results are approved by the Responsible Person, Deputy Responsible Person or WSG. On approval the double check or RPZ valves can be removed and connections made permanent to the area. It is important to minimise any risk of contamination following back into the connection point which could then be distributed to other parts of the system.

Once connected to any Trust system flushing must be carried out in accordance with section 4 of Part B of this WSP which calls for 2 minute twice weekly flushing in all areas, or if deemed necessary by the WSG daily flushing. Records of flushing must be provided to the Trust upon project completion or as requested. It is important that until hot flow and return services are connected to the main system there will be no circulation. It is therefore essential that procedures are put in place to ensure that the hot return services are flushed.

Cleanness during installation and protecting mechanical components from dust and dirt ingress is of vital importance during the construction phase to ensure systems are not seeded, to do this the contractor must:

- Store all domestic water pipework and fittings in a clean orderly manner, pipework must have ends covered at all times either by caps or tape.
- Ensure all components are maintained clean from point of delivery or storage to installation.

- Support pipework off the ground when on site with a pipe support or similar to protect from damage.
  Any pipework, components etc. seen laying on the floor shall be scrapped at the contractor's cost.
- Keep component parts including taps in their own individual packaging until either time to install or disinfection prior to fitting.
  Should components be delivered in dirty packaging, there will be a requirement to clean the packaging prior to storage in order to prevent the contamination of individual components.
- During installation pipework must also have ends covered at all times either by caps or tape, this also applies to component parts which could become contaminated from third parties also working on site during construction, typically, electricians, plasterers, joiners etc. These trades could unknowingly contaminate the installation.
  Should this be found the installation will be written off and replaced at the contractors cost and without compromise to the program.
- Provide a clean tray to lay any components in prior to installation for low level installation works i.e. connecting up a kitchen sink, WC etc to stop clean and chlorinated components being placed on the floor.
- Ensure pipework is free of flux grit, scale and jointing materials before closing up of joints minimise any construction products to be flushed from the system at a later stage.

Under no circumstances
will pipework be allowed to become wet until commissioning

Pressure testing with water is not a preferred method of leak detection on any pipework system. Systems must be pressure tested dry with Medical Quality dry air or nitrogen as the process of testing with water has been found to significantly contribute to the level of bacterial contamination of a system prior to hand-over as sections could dry out or left in stagnation or cause premature fowling or corrosion of pipework or fittings.

Where there is a requirement to install drain cocks, these drain off points must be installed where possible to the top of the new pipework to minimise the potential for contamination settling into these points and increasing the risk of bacterial proliferation. These drain points must be drained on a daily basis once the new pipework is charged from the domestic water system to ensure any potential contamination is flushed from the system.

Where isolation valves are installed at high level, these must be installed as close to the 'Tee' as possible. Although this does not usually affect the day to running of the services it must be noted that should there ever be a requirement to isolate services from these valves, this would inadvertently create dead-legs. It is therefore recommended that where isolation valves and / or stopcocks are installed i.e. at each branch off, that these are located as close to mains run / 'Tee' as possible. It must be highlighted however, that the position of the valves must not compromise any future maintenance requirements.

Branch connections must be kept to less than 'three-times the diameter of the pipe' or <300mm (whichever is the smallest). It must also be ensured that the isolation valves on the hot flow and return are positioned so that circulation is not affected should the outlet need to be isolated.

In the absence of a scheme clerk of works, the Responsible Person (Estates) or their deputy will verify and ratify each installation (or stage thereof) and confirm that it is found to be compliant. On completion of works relevant procedural paperwork as attached must be completed and submitted to the WSG.

4.4 Commissioning of Potable and DHW Services:

Correct commissioning is vitally important for the satisfactory operation of the hot and cold water systems. The contractor must prepare a commissioning brief for use by the commissioning engineer

and clerk of works or project engineer. This brief must specify fully the extent of the tests and measurements that are to be taken / commissioning and the objectives which must be achieved, and must include:

- full design data on temperatures, chemical levels, water flow rates and pressures
- plant and equipment data
- number commissioning procedures for thermostatic mixing valves in accordance with
- HTM 04-01 inclusive of D08 thermostatic mixing valves
- drawings and schematics
- microbiological activity levels
- a list of test certificates to be provided

The commissioning manual or O&M must be prepared by the contractor and submitted to Trust for review before being issued in final form. Typical schedules of checks and performance tests must be included in this manual together with record sheets and as fitted drawings. These must be amended and supplemented as the designer considers necessary. Once the Trust is satisfied that the system meets the design intent, the final accordance record sheets should be completed. If performance is not acceptable, the matter should be dealt with in accordance with the contract requirements. These commissioning and testing records will be required so that subsequent maintenance and periodic checks can be made to ensure that the installation continues to operate as intended.

The Trust project engineer or clerk of works, must countersign any relevant test record documents, must witness commissioning and testing. As installed drawings, schematic diagrams, operating and maintenance manuals etc must be supplied at the time of handover. Certified records of pressure testing and disinfection must also be made available. The whole commissioning procedure must be carried out under the guidance of a single authority, although the involvement of specialists or manufacturers may be required for specific items of plant. Valid calibration certificates must also be included within the O&M manuals for all measuring equipment used by commissioning engineers.

The installation, on completion, must be operated by the contractor as a whole, and subjected to specified functional or performance tests. Once the system meets the design intent, the final completion record sheet(s) shall be completed. In the event of performance not being acceptable, the matter should be dealt with in accordance with the contract requirements.

In the absence of a scheme clerk of works, the Responsible Person (Estates) or their deputy will verify and ratify each installation (or stage thereof) and confirm that it is found to be compliant. On completion of works relevant procedural paperwork as attached must be completed and submitted to the WSG.

A water quality (Legionella and Pseudomonas aeruginosa) risk assessment must be completed at the end of commissioning either arranged via the main contractor or Trust. The assessment must be completed by Hydrop who will update the Compass system and provide the relevant information to the WSG to enable the Trust handover paperwork to be completed satisfactory.

4.5 Project Hand-Over and Occupation:

Hand-over of all new-builds and refurbishments should not be carried out until all of the requirements detailed in WSP 51 are satisfied and duly signed.

Where there are water safety risks at handover these must be acknowledged and mitigation put in place prior to occupation. The details must be recorded within WSP 51 paperwork and confirmed in place by the RP / D RP.

4.6 System Flushing

Once filled, systems must not be drained unless full disinfection is to be carried out prior to building occupancy and use. Draining a system and leaving it wet has **disastrous consequences**. Allowing water to stagnate will also result in water borne bacteria (biofilm) growing and proliferating in the storage vessels and peripheral parts of the system. To reduce the risk of this, it is recommended that flushing should take place in accordance with the table below:

TO BE CARRIED OUT BY ESTATES DEPARTMENT STAFF (OR OTHERS ON THEIR BEHALF)			
TASK	**FREQUENCIES** Note: Task frequencies are based on a yearly basis determined by historical findings and industry best practice as approved by the WSG.		
	AUGMENTED CARE	**GENERAL HOSPITAL BUILDINGS**	**NON-PATIENT BUILDING / DOMESTIC BUILDINGS**
Clinical Risk Evaluation Of Patients	As required led by infection prevention and liaised to responsible / deputy responsible person / WSG		
Usage Of Evaluation And Flushing	2x Weekly Additional flushing may be requested by the WSG to increase turnover of connected systems or due other concerns the WSG may have		

To prevent the accumulation of biofilm during construction dosing of water systems with appropriate biocides should be considered. New Cross and Cannock Chase Hospitals already have centralised Chlorine Dioxide systems which treat all water on site however projects on other site may warrant dosing with such systems during construction. The WSG must be consulted reference the requirement for this dosing and when in use through flushing must be undertaken ensuring the biocide reaches all parts of the systems, and particularly outlets. The Trust would also have to be satisfied of all controls in place for dosing ensuring Health and Safety arrangements are robust and checks are in place to adequately maintain level of biocide in line with recommended levels of 0.2 – 0.5 ppm CL02.

Dosing with an appropriate level of biocide as soon as water hits a pipe or storage vessel, along with regular flushing, can control the accumulation of biofilm more effectively. Once started, this procedure has to be sustained and logged, as lapses can result in a critical increase in water borne bacteria at the outlet.

4.7 Disinfection (Hyper Chlorination):

Disinfection is achieved by the shot-dosing of a sodium hypochlorite disinfectant solution at a minimum of 50 ppm of free chlorine in line with WSP 34.

Disinfection must be carried out as close to hand-over (and occupation) as practicable ensuring systems are put into normal usage as soon as possible. The table below provides a guide to what need to be disinfected and best practice to achieve this which must be finalised and agreed with the WSG:

Incoming Mains (MCWS)	The incoming mains supply must be disinfected prior to connection to system or, where this is not practicable the incoming mains water quality must be checked prior to connection to the system as part of the pre-construction works.
Water Storage Tanks / Hot water Generation	All storage tanks and hot water generation vessels / equipment must be suitably disinfected or where this is not practicable the incoming storage and hot water generation vessels / equipment water quality must be checked prior to connection to the system.

Outlet Fittings	All taps, shower heads, TMVs, associated strainers and aerators must be dip-disinfected prior to final connection.
Distribution System and all outlets	Disinfection must be carried out in accordance with the relevant specifications listed above inclusive of all parts and outlets of the system including locations which may be temporarily capped-off or deemed deadlegs whilst awaiting future connection to equipment and / or other facilities i.e. connections to bed pan machines. In these situations the disinfectant solution must be drawn through and made available to these areas. If equipment is connected that me get damaged by the disinfection process it should be disconnected and re connected following disinfection.
	The RP or D RP will normally witness all chlorination's at the project managers request, if they are not satisfied the chlorination was successful they will request for the process to be repeated to their satisfaction / approval.

The only acceptable method to the Trust for the measurement of Chlorine in a system is via 'drop test' or 'electronic measurement' of total and free chlorine

WSP 34 is based on best practice from L8 and British Standards which is used by the WSG to ensure disinfections are safe and successful. Further guidance can be as found within current versions of documents listed below but the WSG must always be consulted before any disinfection:

- BS8558 : 2015 Flushing and Disinfection
- BS PD 855468 : 2015 - Guide to the flushing and disinfection of services supplying water for domestic use within buildings and their curtilages

Within the Trust the normal concentration of chlorine for effective chlorination is 50ppm for one hour with a residual of >30ppm after this period at all outlets.

If chlorine is found to be depleted it indicates bacterial activity and additional disinfections will be needed until a reserve is easily maintained.

When a potentially less corrosive concentration of disinfectant solution is deemed necessary by the WSG the table below should be used to determine the appropriate disinfectant concentration and contact time this is particularly useful when sensitive pipe-works and / or equipment are associated with the system is being disinfected:

1 **Initial free chlorine concentration** mg/L	2 **Contact period** h:min	3 **Minimum residual free chlorine measured at the end of the contact period** mg/L
3.1	16:00 [B]	1.9
5	10:00	3
10	05:00	6
15	03:20	9
20	02:30	12
25	02:00	15
30	01:40	18
40	01:15	24
50 [C]	01:00	30

Proprietary solutions of disinfectant should always be used in accordance with manufacturers' instructions. COSHH Regulations require that risks from using disinfectants are assessed to ensure that control procedures are in place being suitable and sufficient for that particular application.

Sodium hypochlorite is normally used for hyper-chlorination / disinfection

This process must only be carried out by suitably equipped and trained personnel from either:
- Approved contractors who are members of the Legionella Control Association or
- Suitably equipped and trained Trust personnel

Where alternative disinfection agents are proposed full written proposal must be provided to the Responsible Person or Deputy Responsible Person / WSG for approval. The rational for an alternative disinfection agent is needed, the proposed agent, COSHH sheets, risk assessment and methodology must be approved by the WSG

Alternative disinfection agents must not be used without prior consent from the Responsible Person / Deputy Responsible Person / WSG

Although chlorine dioxide is known to be more effective for the removal of biofilm in domestic water systems, sodium hypochlorite is easier and safer to handle at high concentrations

Disinfection must not be undertaken before materials, for example linings in cisterns, have fully cured. Advice must be sought from equipment manufacturers to ensure that proposed disinfection chemicals will not adversely affect performance. No heat source should be applied during the disinfection procedure, including final flushing.

Once disinfection has taken place, it is essential to put in place measures to ensure that hot and cold water temperatures are maintained and regular usage evaluation or flushing is completed in accordance with part A of this WSP, at least 2 x weekly, and possibly more frequently during periods of hot weather if temperatures of cold water are above normal limits and as requested by the WSG.

4.8 Temperature / ClO2 Profiles

Temperature and CLO2 profiles must be taken as part of the commissioning process prior to contractual handover and bringing the system into use.

Water temperatures and ClO2 levels (where applicable) must be recorded three times equally spaced over 24 hour period under simulated maximum usage loads to demonstrate that the recommended temperatures and CLO2 reserves are being achieved under real life usage.

Equipment used for measurement must be suitably calibrated via recognised body and calibration certificates made available, the use of BMS monitoring is not sufficient for commissioning processes. The table below provides the minimum requirements for temperature monitoring:

Incoming Mains (MCWS)	After 2 minutes of running cold water the temperature to be reached will be maximum 20ºC or no greater that 2^0C of incoming mains temperature.
Cold Water Storage	Measure and record the incoming MCWS. Temperature not to exceed 20ºC or no greater that 2^0C of incoming mains temperature.
	Measure and record the stored water. Temperature not to exceed 20ºC or no greater that 2^0C of incoming mains temperature.
Hot Water Generation and Storage	Measure and record the set temperature setting of the thermostat (if fitted and calibrated). Temperature to exceed 60ºC.
	Measure and record the "Flow" temperature using a contact thermometer or fitted gauge. Temperature to be taken from flow pipework as close to

	the Calorifier as possible. Temperature to exceed 60ºC
	Measure and record the return temperature using a contact thermometer or fitted gauge. Temperature to be taken from return pipework as close to the Calorifier as possible. Temperature to exceed 55ºC
	Isolate cold feed and open drain point and measure and record temperature. Temperature to exceed 60ºC within 1 minute.
	Measure and record the cold feed temperature using a contact thermometer or fitted gauge. Temperature to be taken from cold feed pipework within one metre from the Calorifier. Temperature NOT to exceed 20ºC or no greater that 2^0C of incoming mains temperature.
	Where the unit is monitored using BMS, collect the readings of all the fields listed above, for at least a 24hr period and consider the results. Adjust control parameters as necessary.
HWS	After 1 minute of running hot water the temperature to be reached will be minimum 55ºC.
MCWS/CWS	After 2 minutes of running cold water the temperature to be reached shall be maximum 20ºC or no greater that 2^0C of incoming mains temperature.
Blended	HWS to the TMV minimum 55ºC
	CWS to TMV maximum 20ºC or no greater that 2^0C of incoming mains temperature.
	41ºC (+ 1ºC) for showers
	41ºC (+ 1ºC) for basins
	44ºC (+ 1ºC) for baths
	38ºC (+ 1ºC) for bidets
ClO2	Point of injection – between 0.20 and 0.8ppm (Note: 0.8ppm must be consider as the maximum allowed level at point of injection and it is only allowed at this level at this point in order to allow for the minimum levels to be achieved at the point of delivery). Any level fluctuations must only be tolerated within this range and care must be exercised to ensure that the level of ClO2 at the nearest outlet does not exceed 0.5ppm.
	Point of delivery (measured at sentinel outlets) – between 0.2 and 0.5ppm but aim to achieve a minimum level of 0.20ppm where possible
	Point of delivery at renal dialysis equipment ClO2 levels of 0ppm

Where designated sentinel outlets are fitted with TMV/TMT, the temperature of the hot and cold supply must be measured by surface (contact) temperature measurement

If contact probe is to be used for temperature monitoring through copper pipework, temperatures must be collected as described in BSRIA application guide AG 4/94 – guide to Legionellosis – temperature measurements for hot and cold water services

4.9 Microbiological Analysis

Microbiological sampling must be carried out in order to consider water quality management & control pre and post works. For new builds and major refurbishment projects, microbiological samples must be collected from:

- **12% of outlets by type or 50% overall (pre & post)** inclusive of all designated 'sentinel' outlets
  Sampling:
  - Legionella spp
  - Pseudomonas Aeruginosa
  - TVCC
  - E. coli
  - Coliforms

If the system being modified or Capital works is being completed in an **augmented care** area as detailed in section 3 then the following consideration must be made for Pseudomonas Aeruginosa and samples taken:

- **12% of outlets by type or 50% overall (pre & post)** inclusive of all designated 'sentinel' outlets
  Sampling:
  - Legionella spp
  - TVCC
  - E. coli
  - Coliforms

- **+ 100% of outlets for :**
  - **Pseudomonas Aeruginosa**

All sampling must be completed in accordance with WSP 27 which is in accordance with:

- PHE Microbiological Guidelines
- BS 7592:2008 - Sampling for Legionella
- PHE Hospital waters - microbiological testing

Persons taking water samples must have completed a recognised sample collection methodology City & Guilds level training course providing the Trust assurance samples are taken aseptically in accordance with current guidance and WSP 27. Only on evidence of having completed a course can samples be taken or samples must be witnessed by appointment with the Trust Responsible or Deputy responsible person (Estates).

During major refurbishments, it is important to ensure that microbiological samples are collected from representative sample locations agreed by the WSG, ensuring that:

- Any prevailing risks of exposure to bacterial contamination are addressed, by the contractor or Trust
- To compare levels of bacterial contamination of the domestic water system worked on after the works

Samples to be collected **no earlier than 48 hours following disinfection**

Post works microbiological sample collection must incorporate adjoining areas fed by the same domestic water system, as far as reasonably practicable:

- Incoming mains bacterial contamination pre and post-works and pre and post - disinfection
- Localised bacterial contamination pre and post-works pre and post-disinfection
- Systemic bacterial contamination pre and post-works pre and post-disinfection

All results are Results to be discussed with the Microbiologist, (if on receipt they are outside agreed parameters agree remedial action with the WSG). Legionella results will normally take 14 days following sampling, which may be after the area has been opened on IP approval.

5.0 ESTATES MANAGEMENT WATER SAFETY PROCEDURES

In order to ensure water safety within the Trust and the existing Planned Preventative Maintenance Programme is consistent and effective, the Trust (or others on its behalf) must follow the procedures below approved by the Trust WSG in line with current best practice and guidance.

Part B of the WSP details maintenance arrangements in place for water safety and comprehensive processes / procedures for maintaining water safety within the Trust. The following section provides extracts from Part B of the WSP relevant to capital development elements only, some reference may be needed to part B for works that may include elements of maintenance etc.

It is vitally important that standards of workmanship and works are carried out to high standard and the following procedures must be used to ensure consistency of standards across direct and indirect contract works:

PROCEDURE	DESCRIPTION
WSP 01	Distribution & Outlet Temperature Monitoring
WSP 02	Chemical Sampling CLO2 Level Monitoring
WSP 03	Water Storage Tank Temperature Monitoring
WSP 06	Storage Calorifiers – Manual Temperature Monitoring
WSP 11	Cistern Type Water Heater Temperature Monitoring
WSP 13	Cistern Type Water Heater – Clean & Disinfection
WSP 14	Low Volume Water Heater @ >15 litres – Temperature Monitoring
WSP 15	Combination Boiler – Temperature Monitoring
WSP 16	Instant Water Heater @ 15< litres – Temperature Monitoring
WSP 17	Thermostatic Mixing Valves / Taps – Temperature Monitoring
WSP 19	Thermostatic Mixing Valves / Taps – Clean, Descale & Disinfection
WSP 20	Showers Temperature Monitoring
WSP 27	Microbiological Sample Collection Protocol
WSP 28	Small Size Pipe work Installation Projects & Associated Components Pre & Post Installation Cleaning and Disinfection (Not tap changes)
WSP 30	Water Storage Tank Cleaning & Disinfection
WSP 31	Certificate of Conformity – Cold Water Storage Tank Cleaning & Disinfection Spray Method
WSP 32	Certificate of Conformity – Cold Water Storage Tank Cleaning & Disinfection Soak Method
WSP 34	Domestic Water Services Disinfection
WSP 35	Certificate of Conformity – Distribution Services Disinfection

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 01 Distribution & Outlet Temperature Monitoring	
Frequency	As Specified In Section 4
Limits:	MAINS Temperature: <20ºC within 2 minute Temperature: <20ºC within 2 minute Temperature: ≥55ºC within 1 minute Blended Temperature: ≤41ºC (+/- 1ºC) for basins/showers ≤44ºC (+/- 1ºC) for baths ≤38ºC (+/- 1ºC) for bidets
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

General

Water temperatures at all outlets, both CWS and HWS, must be measured at least once annually and a representative number direct-fed Sentinel outlet (outlets not fitted with TMV or TMT) must be measured at regular intervals.

Temperatures must be measured after two and one minute at full flow respectively.

Note: Where designated sentinel outlets are fitted with TMV/TMT, the temperature of the hot and cold supply must be measured from binder points or by surface (contact) temperature measurement. If contact probe is to be used for temperature monitoring through copper pipe work, a 2°C temperature adjustment must be added to the recorded temperature before recording the temperature.

The temperature measurements must be carried out at different times during the day in order to allow indicative temperature monitoring of the vessel during a typical daily usage profile.

CWS

The outlet temperature measured after allowing the water to run for 2 minutes must not exceed 20°C. Where the temperature exceeds 20°C, the cold water temperature at the point of supply must be measured. When the supply temperature is between 18°C and 25°C, the measured outlet temperature, after running the tap for 2 minutes, must be less than 2ºC higher than that at the point of supply.
Any tap which fails this test must be reported to the Responsible Person or Deputy Responsible Person and the whole cold water system must be investigated. If the point of supply temperature exceeds 25°C, the water company must be alerted.
On each monitoring visit, the temperature of the mains water source must be measured, including any cold water storage water tank when the CWS temperature at the selected outlets tested is measured and found to exceed 20°C.

HWS

The outlet temperature measured after allowing the water to run for 1 minute must be 55°C inclusive of any allowance for temperature adjustment. Where the temperature fails to reach the required temperature, the source must be measured and adjusted as necessary, and the Responsible Person or Deputy Responsible Person (Estates) informed as soon as possible.
On each monitoring visit, the temperature of the source supply (Calorifier etc.) must be measured. This must include the "flow" and "return" temperatures of each unit in the system.

Blended Outlets

The INITIAL and MAXIMUM outlet temperature measured must NOT exceed:

41°C (+1°C) for showers.
41°C (+1°C) for washbasins.
44°C (+1°C) for bath.
38°C (+1°C) for bidets.

Where the temperature exceeds the required temperature, the source must be measured and adjusted as necessary, and the Responsible Person or Deputy Responsible Person (Estates) informed as soon as possible.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 02 Chemical Sampling CLO2 Level Monitoring	
Frequency	As Specified In Section 4
Limits:	Between 0.2 & 0.5 mg/l CLO2
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

General

Chlorine dioxide is an oxidising biocide capable of reacting with a wide range of organic substances. Levels of 0.5 mg/l can, if properly managed, be effective against planktonic and sessile legionella (biofilm) in domestic water systems. The Drinking Water Inspectorate prescribes a maximum value for total oxidants in drinking water supplies which is the combined chlorine dioxide, chlorite and chlorate concentration. This should not exceed 0.5 mg/l as chlorine dioxide.

Frequency

Using a suitably calibrated electronic chlorine dioxide comparator, the following areas are checked / monitored at regular intervals which could be remote via BMS System:

DAILY – plant alarms
DAILY - the rate of addition of chlorine dioxide to the water supply;
DAILY - the concentration of chlorine dioxide at dosing points - between 0.25 and 0.8ppm

(Note: 0.8ppm must be considered as the maximum allowed level at point of injection and it is only allowed at this level at this point in order to allow for the minimum levels to be achieved at the point of delivery).

Any level fluctuations must only be tolerated within this range and care must be exercised to ensure that the level of ClO2 at the nearest outlet does not exceed 0.5ppm.

MONTHLY - the concentration of chlorine dioxide at the sentinel taps - the concentration should be between 0.2 and 0.5 mg/l;

While chlorine dioxide is not affected by the pH or hardness of water, it is sometimes difficult to monitor chlorine dioxide samples in domestic HWS due to its increased volatility causing the chlorine dioxide reserve to be lost when taking a water sample

The results from these analyses must be forwarded to the Responsible Person or Deputy Responsible Person (Estates) with any comments or recommendations for review by the WSG.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 03 Water Storage Tank Temperature Monitoring	
Frequency	As deemed necessary by the WSG
Limits:	Incoming Mains Temperature: <20ºC Stored Water Temperature: <20ºC
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

Using a calibrated thermometer, measure and report the following:

i. Ambient (external temperature)
ii. Tank room temperature
iii. Stored water temperature (Temperature of the tanked water should be monitored via the drain point if practicable)
iv. Supply temperature

Temperature readings should be recorded from as far away from the ball cock as possible.

Care must be taken as not to contaminate the stored water by the use of unclean temperature probes.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 06 Storage Calorifiers – Manual Temperature Monitoring	
Frequency	As deemed necessary by the WSG
Limits:	Flow Temperature: ≥60°C Return Temperature: ≥55°C Drain Temperature: ≥55°C Cold Feed Temperature: <20°C
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

- Measure and record the “Set” temperature setting of the thermostat (if fitted and calibrated). Temperature to exceed 60°C.

- Measure and record the “Flow” temperature using a contact thermometer or fitted gauge. Temperature to be taken from “Flow” pipe work as close to the Calorifier as possible. Temperature to exceed 60°C.

- Measure and record the “Return” temperature using a contact thermometer or fitted gauge. Temperature to be taken from “Return” pipe work as close to the Calorifier as possible. Temperature to exceed 55°C.

- Isolate cold feed and open drain point and measure and record temperature. Temperature to exceed 55°C.

- Measure and record the “Cold Feed” temperature using a contact thermometer or fitted gauge. Temperature to be taken from “Cold Feed” pipe work one metre from the Calorifier as possible. Temperature NOT to exceed 20°C.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 11 Cistern Type Water Heaters – Temperature Monitoring	
Frequency	As Specified In Section 4
Limits:	Unit Temperature: ≥60°C Outlet Temperature: ≥55°C within 1 min
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

- Measure and record the “Set” temperature setting of the thermostat (if fitted and calibrated). Temperature to be at least 60°C.

- Measure and record the temperature of the furthest outlet supplied by the unit. Temperature to be at least 55°C within 1 min.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 13 Cistern Type Water Heaters – Clean & Disinfection	
Frequency	As Specified In Section 4
Limits:	Minimum level of free cl initially: 50ppm Minimum level of free cl after 1hr: 30ppm Maximum level of free cl at end <1ppm
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

- Clean Tank and remove all deposits of scale, corrosion and sludge deposition using a combination of hand scraping and brushing together with application of chemicals to dissolve or soften the scale (where necessary). Vacuum out all loose debris and deposits.

- The tank section of the unit must be filled with fresh water and free chlorine solution to give a minimum free chlorine concentration of 50ppm (50mg/l).

- Draw chlorinating agent from all outlets supplied by the unit (there may only be a few outlets) and ensure the presence of at least 50ppm free chlorine at each outlet.

  After 1 hour, check and if level of free chlorine is below 30ppm (30mg/l), repeat.

  If level is >30ppm/(mg/l), after one hour flush system with fresh water to drain.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 14 Low Volume Water Heater @ >15 Litres – Temperature Monitoring	
Frequency	As Specified In Section 4
Limits:	Unit Temperature: ≥60°C Outlet Temperature: ≥55°C within 1 min
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

- Measure and record the “Set” temperature setting of the thermostat (if fitted and calibrated). Temperature to be at least 60°C.

- Measure and record the temperature of the furthest outlet supplied by the unit. Temperature to be at least 55°C within 1 min.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 15 Combination Boiler – Temperature Monitoring	
Frequency	As Specified In Section 4
Limits:	Unit Temperature: ≥60°C Outlet Temperature: ≥55°C within 1 min
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

- Measure and record the “Set” temperature setting of the thermostat (if fitted and calibrated). Temperature to be at least 60°C.

- Measure and record the temperature of the furthest outlet supplied by the unit. Temperature to be at least 55°C within 1 min.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 16 Instant Water Heater @ < 15 Litres – Temperature Monitoring	
Frequency	As Specified In Section 4
Limits:	UNIT/OUTLET TEMPERATURE: Comfort Temperature and ≤41°C if patient area and outlet is not fitted with a TMV
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

- Measure and record the “Set” temperature setting of the thermostat (if fitted and calibrated).

- Measure and record the temperature of the nearest outlet supplied by the unit.

- Measure and record the “Set” temperature setting of the thermostat (if fitted and calibrated).

- Measure and record the temperature of the furthest outlet supplied by the unit.

Units of this type, because of the limited stored water volume, do not usually need to be operated within the temperature profile and limits prescribed for larger systems (≥60oC for the ‘flow’ and (55oC for the ‘return’ and ‘outlet’) which are necessary for thermal disinfection.

It may be possible to operate these units at “safe” temperatures of ≤41.0oC although they should be switched-on at all times to ensure and encourage adequate use.

Infrequent use of these units (less than 2 x Weekly) would increase the potential of bacterial growth and proliferation (as would be the case in all infrequently used areas throughout the system – both hot and cold), although particularly in this case because of the low temperatures operated.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 17 Thermostatic Mixing Valves / Taps – Temperature Monitoring	
Frequency	As Specified In Section 4
Limits:	FROM THE TMV/TMT 41°C (+1°C) for whb 41°C (+1°C) for showers 44°C (+1°C) for baths 38°C (+1°C) for bidets TO THE TMV/TMT >55°C HWS to the TMV/TMT <20°C CWS to the TMV/TMT
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

SHOWERS, BATHS AND BIDETS

i. Measure and record the "Initial" and "Final" outlet temperature, of each shower and bath fitted with a Thermostatic Mixing Valve / Tap (TMV/TMT or otherwise). The measurements must be carried out immediately and after flushing the water for 1 minute at full-flow avoiding any splashing. The "Initial" and "Final" outlet temperature measured must not exceed:

- 41°C (+1°C) for showers
- 44°C (+1°C) for baths
- 38°C (+1°C) for bidets

ii. Where these temperatures are exceeded, the TMV/TMT must be adjusted in order to allow the unit to operate within the recommended temperature limits described above.

iii. Using an electronic calibrated thermometer with a suitable contact probe, measure and record the temperature of the HWS and CWS supply pipes of each TMV/TMT. The temperature of the CWS should not exceed 20°C or 2°C greater than incoming tank and the temperature & the HWS must not be less than 55°C.

SINKS AND BASINS AND OTHER NON FULL BODY IMMERSION OUTLETS

i. Measure and record the "Initial" and "Final" outlet temperature, of the HOT water outlet of each sink, basin and other non-full body immersion outlets fitted with a Thermostatic Mixing Valve / Tap (TMV/TMT or otherwise). The measurements must be carried out immediately and after allowing the water to flush for 1 minute at full flow minimizing any splashing. The "Initial" and "Final" outlet temperature measured must not exceed 41°C (+1°C).

- Where these temperatures are exceeded, the TMV/TMT must be adjusted in order to allow the unit to operate within the recommended temperature limits described above.

ii. Using an electronic and calibrated thermometer with a suitable contact probe, measure and record the temperature of the HWS supply pipe ONLY of each TMV/TMT. The temperature of the HWS must not be less than 55°C.

iii. Measure and record the cold water outlets of each sink, basin and other non-full body immersion outlets fitted with a Thermostatic Mixing Valve / Tap (TMV/TMT or otherwise). The measurements must be carried out immediately and after allowing the water to flush for 2 minutes at full-flow minimizing any splashing. The outlet temperature measured must not exceed 20°C or 2°C greater than incoming tank and the temperature.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 19 Thermostatic Mixing Valves / Taps – Clean, Descale & Disinfection	
Frequency	As Specified In Section 4
Limits:	100ppm free chlorine for 30 minutes minimum
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

- When site conditions are found to result in scale build-up within a valve, the valve should be descaled and disinfected as per this specification at a frequency set by the WSG determined by site tests and inspections.

- Each TMV / TMT must be removed and replaced or serviced. Servicing can take place on or off site as agreed by the Responsible Person or Deputy Responsible Person.

- At the work-shop or in a suitable location, each TMV / TMT must be dismantled and physically cleaned from all scale deposits and scale deposition (using a suitable descaling solution where necessary).

- All components must be disinfected (this applies to all cleaned and new components). All components must be flushed with clean water and immersed in a Sodium Hypochlorite (100 mg/l free chlorine) for 30 minutes minimum.

- Remove components from disinfectant solution and rinse with clean water to remove presence of disinfectant.

- Reassemble, refit and test operation of valve, including fail-safe test.

- Rinse in clean water, allow to drip-dry and store in a cool and dry place.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 20 Distribution and Outlet Temperature Monitoring	
Frequency	As Specified In Section 4
Limits:	From the TMV 41°C (+1°C) for showers To the TMV >55°C HWS to the TMV <20°C CWS to the TMV
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

- Measure and record the “Initial” and “Final” outlet temperature, of each shower fitted with a Thermostatic Mixing Valve (TMV or otherwise). The measurements must be carried out immediately and after allowing the water to flush for 1 minute at full-flow respectively. The “Initial” and “Final” outlet temperature measured must not to exceed 41°C.

- Where this temperature is exceeded, the TMV must be adjusted in order to allow the unit to operate within the recommended temperature limits described above.

- Using an electronic and calibrated thermometer with a suitable contact probe, measure and record the temperature of the HWS and CWS supply pipes of each TMV. The temperature of the CWS must not exceed 20°C or 2°C greater tank incoming tank temperature and the temperature of the HWS must not be less than 55°C.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 27 Microbiological Sample Collection Protocol	
Frequency	As Required
Limits:	Microbiological Sampling must be carried out in accordance with the HPE "Examining food, water and environmental samples from healthcare environments - Microbiological Guidelines: April 2013" and BS 7592:2008 - Sampling for Legionella bacteria in water systems – Code of practice.
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

Sampling & Frequency

Microbiological sampling is either carried out routinely to ensure processes and procedures in place are effective or as needed to assure the Trust changes to systems or new builds are safe completed in line with guidance within the Trusts WSP prior to occupation or handover. How the sample is taken considers the potential source of contamination in two distinct ways to assist the WSG to determine its location:

Localised contamination:

- Is detected by collecting and analysing a 'pre-flush' sample consisting of the unadulterated collection of a sample of the water present at the outlet or within a pool.

  This is normally achieved by running the tap without flushing or cleaning the tap and collecting the water dispensed or via direct sampling from the body of water within birthing pools etc.

Systemic contamination:

- Is detected by collecting and analysing a 'post-flush' sample consisting of the water collected following spraying the outlet with a disinfectant.

  This is normally achieved by using a solution equivalent to 1% sodium hypochlorite, leaving disinfectant in contact with the tap for at least 2 minutes then flushing the outlet for another 2 minutes before collecting the sample.

Pre and Post sampling is essential for determining the location of any contamination detected and for determining the appropriate remedial corrective action required to remove the identified bacterial contamination. Where routine sampling is being completed it is normal for only pre samples to be taken and in the event of any contamination further sampling would be undertaken. When as needed sampling is undertaken for Capital works etc full pre and post samples are always required to provide assurance against systemic and localised contamination.

For all new build capital works of major adaptions to existing systems to allow for a correct level of investigative biological analysis monitoring, a statistically significant number of samples must be collected:

- **12% of outlets by type or 50% overall (pre & post)** inclusive of all designated 'sentinel' outlets
  Sampling:
  - Legionella spp
  - Pseudomonas Aeruginosa
  - TVCC
  - E. coli
  - Coliforms

If the system being modified or Capital works is being completed in an augmented care areas as detailed in section 3 then the following consideration must be made for Pseudomonas Aeruginosa and samples taken:

- **12% of outlets by type or 50% overall (pre & post)** inclusive of all designated 'sentinel' outlets
  Sampling:
  - Legionella spp
  - TVCC
  - E. coli
  - Coliforms

- **+ 100% of outlets for :**
  - **Pseudomonas Aeruginosa**

To allow for adequate 'trending' of results, at least 30% of outlets (selected by WSG), from the number of outlets discussed above, must be selected and 'fixed' so that they are sampled at each sample collect run. The remainder of samples can be made-up of randomly selected outlets.

The choice, frequency and location of sample and sampling will be made by the WSG unless dictated by IP / IPCG or by an investigating officer or for monitoring purposes by estates. All sampling is reported through the WSG who escalate any issues back through IPCG.

The following table provides a schedule of routine sampling arranged by the WSG and clarifies under what circumstances samples are taken. Clarifications are made above for capital and modifications to existing systems:

Type	Sampling & Contamination	Annual Frequency & Flush	Location	Supporting Information
Food Quality	Outlet **Systemic**	2 Post	Central Processing Unit Outlet within food preparation area New Cross Hospital	To food hygiene regulations Monitoring: Aluminum, Copper, Calcium, Iron, Magnesium, Manganese, Lead, Zinc, Alkalinity, Chloride, Fluoride, Total Organic Carbon, Ammonia, Carbon, Nitrite, Nitrate, Total Hardness, Turbidity, Conductivity, pH, Taste & Odour.
Legionella	Sentinel points **Systemic**	2 Post	High risk areas	Sampling will be phased over 12 months providing a broad indication of any systemic legionella activity
	Birthing Pools **Localised**	4 Filled pool	Maternity	Pool water when filled In accordance with Pool Water Treatments Advisory Group
	Hydrotherapy Pools **Localised**	4 Filled pool	Cannock Chase Hospital	
	Adiabatic Cooler drain **Localised**	6 From internal tank / drain	IT Hubs – IT Main Server & Deanesly Data Centre	Samples taken from May - October
Pseudomonas Aeruginosa	All clinically used outlets **Localised**	2 Pre	Augmented care areas	Sampling will be phased over 12 months providing a broad indication of local and systemic contamination *No routine Pseudomonas spp samples will be collected unless specifically requested by the WSG / DIPC*
	Birthing Pools **Localised**	12 Filled Pool	Maternity	Pool water to be sampled when filled in accordance with Pool Water Treatments Advisory Group No routine Pseudomonas spp samples will be collected unless specifically requested by the WSG / DIPC
	Hydrotherapy Pools **Localised**	52 Filled pool	Cannock Chase Hospital	
TVCC	Hydrotherapy Pools **Localised**		Cannock Chase Hospital	
Escherichia coli	Hydrotherapy Pools **Localised**		Cannock Chase Hospital	
	Birthing Pools **Localised**	12 Filled Pool	Maternity	
Coliforms	Hydrotherapy Pools **Localised**	52 Filled pool	Cannock Chase Hospital	
	Birthing Pools **Localised**	12 Filled Pool	Maternity	

Sampling will also be carried out:

- As part of the WSP processes detailed in part B-C of the WSP
- Following specific request by the WSG, IP or IPCG
- Following notification of failure of microbiological control measures if deemed necessary by the WSG (temperature, CLO2, Usage evaluation etc)
- Changes to the system
- Resampling following positive biological results
- During an outbreak or suspected outbreak of Legionnaires disease instructed by the investigating officer or WSG or IPCG

The sample locations, type and frequency of sample is determined and monitored by the WSG / IPCG

Samples are collected as described in Process No. 27 Microbiological sample collection protocol 27 Microbiological sample collection protocol

Arrangements for decontamination processes / washer disinfector areas detailed within separate decontamination guidance.

Sampling Preparation

Appropriate precautions must be taken to minimise aerosol production, as described in BS 7592:2008 (British Standards Institution, 2008). For example, running taps gently to reduce splashing; using a sterile plastic bag with one corner cut off to enclose the shower head and to funnel the water into a sampling container, not sampling on full flow etc.

In addition, some specific safety notes have been included in the sections below:

The following is a list of equipment that may be needed for sampling. The list is not intended to be exhaustive and not all items may be required for all types of sampling.

- Sterile food-grade plastic bags
- Laboratory supplied sterile sample bottles
- Labels
- Permanent waterproof marker pens and biros
- Laboratory request forms for water samples
- Nitrile (plastic) gloves
- Alcohol medical wipes
- Plastic shoe coverings
- Cool boxes with separators, temperature data-loggers and 10% by volume of frozen ice-packs (ice packs shall not be used for Legionella samples)
- Digital camera
- Digital voice recorder
- Calibrated thermometer
- Stop-watch
- Calibrated disinfectant residual measuring device

Sampling Bottles

The sample bottle required will depend upon the water sample being taken the table below shows the container / bottle required for the type of test required:

Test Required	Sample Bottles
Pseudomonas Aeruginosa **TVC / Aerobic Colony Counts** **Coliforms** **Escherichia Coli** **Environmental Mycobacteria**	**1 x sterile 100 ml plastic bottle** Containing an appropriate neutraliser to neutralise any residual disinfectant in the water i.e. Sodium Thiosulphate
Legionella **Other pathogenic bacteria such as** **Salmonella** **Campylobacter** **E. coli O157, where required**	**1 x sterile 1 litre bottle** *Or 2 x sterile 500 ml plastic bottles (as above)*

The most commonly used neutraliser, which is appropriate for chlorinated or brominated water systems and those using ozone or hydrogen peroxide, is sodium thiosulphate. For mains water, 18 mg/L sodium thiosulphate must be added. Sterile bottles should be provided by the laboratory performing the examination and should be used exclusively for bacteriological purposes.

Microbiological Sampling Collection & Submission for Analysis

Microbiological Sample collection must be carried out in accordance with UKAS 17020:2012, the HPE "Examining food, water and environmental samples from healthcare environments - Microbiological Guidelines: April 2013" and BS 7592:2008 - Sampling for Legionella bacteria in water systems – Code of practice.

The prime objective is to obtain a sample which is representative as far as possible of the water to be examined. To achieve this, certain precautions are necessary which are common to all sampling procedures for the bacteriological examination of water:

1. A suitable UKAS ISO 11731:2009 Water quality - Detection and enumeration of Legionella (or equal) accredited laboratory must be used for all samples collected for bacteriological analysis.

   The laboratory should take part in the Health Protection Agency's water external quality assessment (EQA) scheme for the isolation of Legionella from water.

   The laboratory should also apply a minimum theoretical mathematical detection limit of <*100 Legionella* bacteria/litre sample.

2. All staff undertaking bacteriological sampling must be suitably and adequately trained in the process of sample collection and be aware of the risks of *Legionellosis*.

   Staff who are likely to be more susceptible to *Legionellosis* should not undertake sampling.

   It is the responsibility of the operative's manager (this shall apply equally to Trust employees as well as to Contractor staff), to assess their risk of Legionellosis before being assigned the task of sample collection.

3. Good personal hygiene procedures, including thorough washing of hands using soap, must be adopted by the operative prior to the commencement of the exercise. A fresh pair of disposable gloves must be worn for each sample.

4. Scrupulous care must be taken to avoid accidental contamination of the sample during collection and subsequent handling. If it is thought a sample or samples may have been contaminated by touching the outlet with sample bottle or splashing or dropping cap etc the sample or samples must be disposed of and a new sample or samples taken.

When routinely sampling for Pseudomonas Aeruginosa, only pre-flush samples will be collected from outlets which have not been used in continuous use prior to sample collection

Non routine sampling will require pre and post samples

During sample collection the tap shall not be cleaned or sprayed with disinfectant solution nor flamed for any pre sample

If results of routine pre samples are positive additional post sampling will be arranged by the WSG

5. Samples must be transported by means of reducing any possible change that could occur in the bacteriological content of water between the time of sampling and examination.

   This is achieved by ensuring that the sample is not exposed to light, is kept cool insulated where possible (cool-box) and is transported to the laboratory as quickly as possible.

6. The sample must be examined as soon as possible after collection, preferably within six hours but no more than eighteen hours.

   Samples must not be taken if the laboratory cannot plate them within the above period.

Labelling Sample Bottles

Protocols for labeling, documenting, and packaging samples established by the receiving laboratory must be followed. Obtain authorisation from the laboratory before shipping samples for analysis. Each sample bottle must be correctly labeled with or referenced to paperwork or system with:

- Company or Person requesting the examination
- Samplers name
- Site
- Building
- Outlet Type (whb, sink, tank, Calorifier, etc.)
- Outlet asset number
- Exact location of sample collection in room
- Date & time
- Type of water (domestic, process, other)
- Pre or Post Flush sample
- Hot or Cold or Mixed
- Temperature
- Sample Type (Legionella, PS A, E Coli, TVCC etc)
- Comments
- Reference number if applicable

Order of collection of Samples

When a number of samples for different purposes are to be taken from the same sampling point, certain precautions are necessary:

- Samples for bacteriological examination of Pseudomonas Aeruginosa should be collected on a separate day from all other samples.
- TVCC samples to be collected after the Legionella samples for both pre and post flush samples.
- Where a single spout is present (with either a single blended supply, hot and cold, blended and cold) a single samples should be collected as applicable.

To avoid contamination, samples for bacteriological examination should be kept separate from all others. Boxes for the transport of samples should be made of materials that can be disinfected regularly. They should not be used for carrying anything other than samples of water for bacteriological examination.

Opening and filling of Sample Bottles

1. Keep the sample bottle unopened until the moment it is required for filling.
2. Never rinse out a bottle before taking a sample.
3. Loosen the cap, hold the bottle by the base in one hand and remove the cap with the other hand.
4. Retain the cap in the hand whilst the bottle is filled, and replace them immediately.
5. Finally secure the cover.

Sampling from Taps

- Good personal hygiene procedures, including thorough washing of hands using soap, must be adopted by the operative prior to the commencement of this exercise. A fresh pair of disposable gloves must be worn for each sample.
- Taps chosen for sampling should be clean, free of all attachments and in good repair. Remove all external fitting such as anti-splash devices or hoses where fitted before collecting samples.
- Any alteration of the tap setting during sampling should be avoided as it may have an adverse effect.
- When collecting a “post-flush” sample; the outlet must be disinfected inside (up the spout) and outside with a 1% solution of chlorine, and left for 2 minutes then flushed for 2 minutes, before the sample is collected. This is to ensure that there is no contamination of the water introduced from the outlet.
- Flaming of the tap is not necessary. If, however, there is an explicit instruction from WSG to do so, then flaming or alternative disinfection of the taps should be carried out with the supervision of the RP or D RP.
- Fill the bottle from a gentle stream. Avoid splashing. Ensure the sample bottle does not touch the tap. Do not touch the water as it flows into the bottle or the inside of the cap or bottle. Replace the cap.

Occasionally, when a tap is turned on, water may leak slightly between the spindle and the gland

This is liable to run down the outside of the tap and, by gaining access to the sample, cause contamination

Under such conditions, no sample for bacteriological examination should be taken until the leak has been remedied

Sampling from Taps fitted with POU filters (With the POU filter removed)

1. A “pre-flush” sample (first draw-off) is collected once the POU filter is removed.
2. A "post-flush sample (after flushing for at least 2 minutes) is collected with the POU still filter removed. When collecting a “post-flush” sample; the outlet must be disinfected inside (up the spout) and outside with a 1% solution of chlorine, and left for 2 minutes then flushed for 2 minutes, before the sample is collected. This is to ensure that there is no contamination of the water introduced from the outlet.
3. Fill the bottle from a gentle stream. Avoid splashing. Ensure the sample bottle does not touch the tap. Do not touch the water as it flows into the bottle or the inside of the cap or bottle. Replace the lid.
4. Re-install new POU filter as per manufacturer's instructions.

Sampling from Taps fitted with POU filters (With the POU filter attached) – On the instruction of the WSG / DIPC Only

1. A sample (first draw-off) is collected from the POU filter whilst attached to the tap.
2. Fill the bottle from a gentle stream. Avoid splashing. Ensure the sample bottle does not touch the tap. Do not touch the water as it flows into the bottle or the inside of the cap or bottle. Replace the cap.

Sampling from Showers (See also 'Order of collection of Samples' above)

1. Good personal hygiene procedures, including thorough washing of hands using soap, must be adopted by the operative prior to the commencement of this exercise. A fresh pair of disposable gloves must be worn for each sample.
2. Create a funnel using a clean food grade bag with a corner cut-off using a clean pair of scissors wiped with alcohol based anti-bacterial medical wipes immediately prior to use. Place the showerhead into the bag, seal the open end and put the cut corner into the sample bottle.
3. If the shower is an instant electric heated type turn the shower onto the lowest temperature where the heater is used.
4. Turn the shower on to a gentle flow and fill the bacteriological bottle(s) without rinsing, leaving a small air gap. Avoid splashing. Ensure that the sample bottle does not touch the showerhead. Replace the cap.

Sampling from Showers fitted with POU filters (With the POU filter removed)

1. A “pre-flush” sample (first draw-off) is collected once the POU filter is removed.
2. A "post-flush sample (after flushing for at least 2 minutes) is collected with the POU filter still removed.
3. If the shower is an instant electric heated type turn the shower onto the lowest temperature where the heater is used.
4. Turn the shower on to a gentle flow and fill the bacteriological bottle(s) without rinsing, leaving a small air gap. Avoid splashing. Ensure that the sample bottle does not touch the showerhead. Replace the lid.
5. Re-install new POU filter as per manufacturer's instructions.

Sampling from Showers fitted with POU filters (With the POU filter on) – On the instruction of the WSG / DIPC Only

1. A sample (first draw-off) is collected from the POU filter whilst attached to the shower. Create a funnel using a clean food grade bag with a corner cut-off using a clean pair of scissors wiped with alcohol based anti-bacterial medical wipes immediately prior to use. Place the showerhead into the bag, seal the open end and put the cut corner into the sample bottle.
2. Fill the bottle from a gentle stream. Avoid splashing. Ensure the sample bottle does not touch the tap. Do not touch the water as it flows into the bottle or the inside of the cap or bottle. Replace the cap.

Sampling from Drinking Fountains

1. When a number of samples for different purposes are to be taken from the same drinking fountain:
    - Sample collected from supply source (to be collected as close to 'T' off the supply as possible. When this is not practicable, select a direct-fed outlet as close to the unit as possible which is fed from the same supply).
    - Pre-flush sample from the tap/spout of the drinking fountain (when sampling hot and cold taps/outlets, the samples collected must be separate and not mixed).
    - Post flush sample from tap/spout of the drinking fountain (when sampling hot and cold taps/outlets, the samples collected must be separate and not mixed).
2. Taps/spouts chosen for sampling should be clean, free of all attachments and in good repair. Remove all external fitting such as anti-splash devices or hoses where fitted.
3. Any alteration of the tap/spout setting during sampling should be avoided as it may have an adverse effect.
4. When collecting a “post-flush” sample; the outlet must be disinfected inside (up the spout) and outside with a 1% solution of chlorine, and left for 2 minutes then flushed for 2 minutes, before the sample is collected. This is to ensure that there is no contamination of the water introduced from the outlet.
5. Fill the bottle from a gentle stream. Avoid splashing. Ensure the sample bottle does not touch the tap. Do not touch the water as it flows into the bottle or the inside of the cap or bottle. Replace the lid.

Sampling from Pools & Tanks

1. When sampling tanks carefully remove lid, avoiding tipping any dirt into the tank.
2. Good personal hygiene procedures, including thorough washing of hands using soap, must be adopted by the operative prior to the commencement of the sampling. A fresh pair of disposable gloves must also be worn by the operative after any lid has been removed.
3. Sampling the water must be carried out as far from the inlet as possible.
4. Collect a sample using sterile bottle(s), suitable for collecting samples for bacteriological analysis required by immersing the bottle under the surface of the water, without rinsing, leaving a small air gap. Avoid splashing.
5. Ensure that the sample bottle does not touch the tank, pool wall or other structures prior to sample collection.
6. Do not touch the water as it flows into the bottle or the inside of the cap or bottle.
7. Ensure that the sample bottle does not touch the tank, pool wall or other structures following sample collection.

Sampling from Calorifiers and other Hot Water Generation Units

1. Good personal hygiene procedures, including thorough washing of hands using soap, must be adopted by the operative prior to the commencement of this exercise. A fresh pair of disposable gloves must be worn for each sample.
2. Collect a sample using sterile bottle(s), suitable for collecting samples for bacteriological analysis, without rinsing, leaves a small air gap. Avoid splashing.
3. Ensure that the sample bottle does not touch the Calorifier or other structures.
4. Do not touch the water as it flows into the bottle or the inside of the cap or bottle.

Sampling Collected Ice from Ice Making Machines

1. Good personal hygiene procedures, including thorough washing of hands using soap, must be adopted by the operative prior to the commencement of this exercise. A fresh pair of disposable gloves must be worn for each sample.
2. Collect a sample using a wide-mouth sterile bottle(s), suitable for collecting samples for bacteriological analysis, without rinsing, leaving a small air gap. Avoid splashing.
3. Ensure that the sample bottle does not touch the icemaker or other structures.
4. Do not touch the ice as it is collected into the bottle or the inside of the cap or bottle.

Handling & Shipping of Samples

Samples must be packaged and shipped to the laboratory for analysis as soon as possible - within 6hrs and plated same day within 16 hours.

Samples need to be maintained in a condition not to alter the bacterial content, cool and not exposed to light, generally the shorter the time between sample collection/processing and sample analysis, the more reliable the analytical results will be.

Samples must be delivered to the laboratory on the day of collection. Check laboratory hours of operation—keep in mind that the laboratory might not receive samples on Saturdays, Sundays, or holidays. The integrity of chilled samples sent late on a Thursday or on a Friday could be compromised if not received by the laboratory in time to be plated.

When packaging samples for shipment to the laboratory, remember that all bottles must be protected from damage (especially glass bottles) and (or) leaking. The laboratory usually provides coolers reusable packing materials such as mesh bags, foam sleeves, and bubble wrap. Plastic bags and cardboard boxes will not be returned. Do not use foam peanuts or vermiculite.

Before shipping samples to the laboratory:

- Check that sample bottles are labelled correctly are waterproof and that information is legible.
- Tighten all bottle caps to prevent leakage.
- When shipping multiple sets of samples in the same container, label each set of sample bottles with a different letter of the alphabet (A, B, C) so that bottles of each sample set will have the same letter.
- Place all bottles from a sample set into a separate bag (such as plastic or mesh) or bind with a rubber band to keep them together.
- Pack samples carefully in the shipping container to prevent bottle damage, shipping container leakage, and sample degradation. Use adequate packing material to prevent bottle damage.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 28 Small sized pipe work installation projects & associated components pre and post installation cleaning & disinfection *Note: tap changes would not require completion of this process but would require dip-disinfection*	
Frequency	As Required
Limits:	To be used in conjunction with WSP 29 for release into use of new installations of small sized pipe work installation projects and associated components
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

i. Thoroughly clean all new pipe work to be installed.

ii. Using a suitable vessel, safely prepare a disinfectant solution of Sodium hypochlorite of 100mg/l (ppm) free chlorine.

iii. Safely immerse all cleaned pipe work and associated components (dismantled where practicable) in the disinfectant solution and leave to soak for a minimum of 30 minutes.

iv. Remove pipe work and associated components (reassemble if dismantled) from disinfectant solution and rinse with fresh clean water for a minute and allow them to drip dry in a clean, cool dry place and install within 12 hours of disinfection.

v. Thoroughly flush the new pipe work with clean mains water until tests indicate that the residual level of free chlorine is no greater than that present in the mains water supply.

vi. If deemed necessary by the WSG using a suitable sterile container, collect a water sample and submit for biological analysis. The analysis should measure the presence of contamination by general bacteria (T.V.C.C, Legionella spp and Pseudomonas aeruginosa in high risk patient areas including augmented care units, E. coli & coliforms are not normally tested for unless specifically requested by the WSG).

Sampling will only be needed on small sized pipe work where assurance cannot be provided that fittings / pipe work / materials used have been thoroughly dip chlorinated as above. Where through dip chlorination cannot be achieved in a timely manner the WSG must be consulted who will approve any testing WSG

NOTE: Samples to be collected <u>no earlier than 48 hours</u> following disinfection.

Ensure that for larger installations of pipe work &

new complete installations WSP 51 Must be completed!

All records and certificates must be issued with ‘hand-over documentation’

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 30 Water Storage Tank – Cleaning & Disinfection	
Frequency	As Required
Limits:	**Complete Certificate of Conformity No:** Certificate of Conformity No. 31 Cold Water Storage Tank Cleaning and Disinfection Using Sodium hypochlorite as the disinfecting agent – Spray method **OR** Certificate of Conformity No. 32 Cold Water Storage Tank Cleaning and Disinfection Using Sodium hypochlorite as the disinfecting agent – Soaking Method
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

Sodium hypochlorite will normally be used as the hyper-chlorination disinfectant agent throughout. Where alternative disinfection agents are intended for use, a written proposal outlining the reasons why an alternative disinfection agent is proposed for use, the proposed disinfection agent, COSHH sheets, risk assessment and methodology must be presented to the Estates Department Responsible Person / WSG for written authorisation. Alternative disinfection agents must not be used without prior written consent from the Estates Department Responsible Person.

Tank Disinfection using sodium hypochlorite – Spray Method:

i. Spray all surfaces of the tank using a knapsack or garden pressure sprayer or fogger, with ready prepared 500 mg/L free chlorine solution, ensuring that all surfaces remain wet with disinfectant for at least 10 minutes. Note the requirements for personal protective equipment when spraying of fogging sodium hypochlorite solutions.
ii. When the spray disinfection is complete and the solution has been in contact with all surfaces for at least 10 minutes, thoroughly rinse all sprayed surfaces with clean water and remove any residues with pump/wet vac or flush through to drain.
iii. Refill with fresh water and put back into service. Check residual of free chlorine is below 1mg/L.

As deemed necessary by the WSG normally following any conformed contamination collect water samples as described in WSP 27 Microbiological Sample Collection Protocol and submit for biological analysis. The analysis should measure the presence of contamination by general bacteria Total Viable Colony Count – T.V.C.C., (Legionella spp and Pseudomonas aeruginosa in high risk areas including augmented care units).

Samples to be collected no earlier than 48 hours following installation.

Tank cleaning using sodium hypochlorite – Soaking Method:

i. Fix ball valve in close position.
ii. Isolate Tank from system. Outlets should be sealed from inside tank.
iii. Empty the Tank via drain-point or by using a submersible or barrel type pump, in the absence of a drain-point or should draining from drain-point is impracticable.
iv. The surfaces of the tank(s), including walls, overflow, lid, ball valve etc., should be manually cleaned and then disinfected by spraying with 500 mg/L sodium free chlorine solution using garden type pressure sprayer ensuring surfaces remain wet for 10 minutes.
v. Clean Tank and remove all deposits of scale, corrosion and sludge deposition using a combination of hand scraping and brushing together with application of chemicals to dissolve or soften the scale (where necessary). Vacuum out all loose debris and deposits.
vi. When using high-pressure jet washers to clean the internal surfaces of the Tank, suitable PPE must be used, including a positive pressure respirator. In this circumstance, the escape of aerosols must be restricted or, certainly, minimised.
vii. Where oil and grease contaminants on the tank surface are implicated, they must be removed using suitable degreasants. Where necessary (and practicable) the tank can be steam cleaned to remove grease contaminants.

Tank Disinfection using sodium hypochlorite – Soaking Method:

i. Once the disinfectant solution is adequately mixed, check that a reserve of at least 50mg/L free chlorine is given. Add more activated solution if necessary.
ii. After 1 hour soak period, check free chlorine level; if below 30mg/l, repeat step I. If level is @>30ppm as free chlorine, after one hour, dilute concentration with fresh water and put to drain, without deactivation, provided that the system volume is less than 2m^3 and the residual less than 20mg/L as free chlorine. Where the chemical residual or volume is greater it should be deactivated.
iii. The area of the storage vessel above the water line (overflow, lid, ball valve etc.) should be manually cleaned and then disinfected by spraying with 500mg/l free chlorine solution using garden type pressure sprayer ensuring surfaces remain wet for 10 minutes.
iv. Refill with fresh water and put back into service. Check residual of free chlorine is below 1mg/l.

As deemed necessary by the WSG normally following any conformed contamination collect water samples as described in WSP 27 Microbiological Sample Collection Protocol and submit for biological analysis. The analysis should measure the presence of contamination by general bacteria Total Viable Colony Count – T.V.C.C., (Legionella spp and Pseudomonas aeruginosa in high risk areas including augmented care units).

Samples to be collected no earlier than 48 hours following installation.

Neutralisation:

Normally, Sodium hypochlorite solutions do not require neutralisation prior to disposal to foul sewer. However, if local conditions require it, 50mg/L disinfectant solutions can be neutralised before disposal with sodium bisulphite (SB) or sodium thiosulphate (ST) at the rate of 350 gm SB/m^3 or 525 gm ST/m^3 of disinfectant solution.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 31 Certificate of Conformity - Cold Water Storage Tank Cleaning and Disinfection

Using Sodium hypochlorite as the disinfecting agent – Spray method

Frequency	As Required
Limits:	THIS IS TO BE COMPLETED BY THE COMPETENT PERSON

If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.

No	Tasks	Date	Tank Asset No.	Comments	Signature
1	Tank Volume:				
2	Method of disinfection:				
3	Disinfectant used:				
4	Spray all surfaces of the tank using a knapsack or garden pressure sprayer or fogger, with ready prepared 500 mg/L Cl2 solution, ensuring that all surfaces remain wet with disinfectant for at least 10 minutes. Note the requirements for personal protective equipment when spraying of fogging Cl2 solutions.				
5	When the spray disinfection is complete and the solution has been in contact with all surfaces for at least 10 minutes, thoroughly rinse all sprayed surfaces with clean water and remove any residues with pump/wet vac or flush through to drain				
6	Refill with fresh water and put back into service. Check residual of Cl2 is below 1mg/L.				
7	Water analysis carried out (Y/N):				
8	Analysis results				
9	Date of last disinfection:				
10	Any refurbishment, improvements carried out during this disinfection:				
11	Further upgrading, refurbishment, improvements works required				

This section to be completed by the Trust Supervising Officer

Signature		Date of check	

All reported faults to be transferred to "Monthly Defect Log" for processing

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 32 Certificate of Conformity - Cold Water Storage Tank Cleaning and Disinfection

Using Sodium hypochlorite as the disinfecting agent – Soaking method

Frequency	As Required
Limits:	THIS IS TO BE COMPLETED BY THE COMPETENT PERSON

If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.

No	Tasks	Date	Tank Asset No	Comments	Signature
1	Tank Volume:				
2	Method of disinfection:				
3	Disinfectant used:				
4	Volume of disinfectant used:				
5	pH:				
6	Cl2 level (mg/L):				
7	Initial				
8	After 1 hour:				
9	Post disinfection				
10	Neutralising agent used:				
11	Amount of neutralising agent used:				
12	Water analysis carried out (Y/N):				
13	Analysis results				
14	Date of last disinfection:				
15	Any refurbishment, improvements carried out during this disinfection:				
16	Further upgrading, refurbishment, improvements works required				

This section to be completed by the Trust Supervising Officer

Signature		Date of check	

All reported faults to be transferred to "Monthly Defect Log" for processing

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 34 Domestic Water Services Disinfection	
Frequency	As Required
Limits:	Using Sodium hypochlorite as the disinfecting agent Complete Certificate of Conformity Minimum level of free Cl2 initially: 50ppm Minimum level of free Cl2 after 1hr: 30ppm Maximum level of Cl2 at end <1ppm
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

When disinfecting distribution systems in buildings, it is important to ensure that all persons in the building are notified that the distribution system is being disinfected and that the water should not be used. Outlets should be bagged and signs placed on each outlet advising of this.

Ensure that all hot water is quickly purged from the HWS system and replaced with cold water, prior to the commencement of the disinfection process.

Sodium hypochlorite will normally be used as the hyper-chlorination disinfectant agent throughout. Where alternative disinfection agents are intended for use, a written proposal outlining the reasons why an alternative disinfection agent is proposed for use, the proposed disinfection agent, COSHH sheets, risk assessment and methodology must be presented to the Estates Department Responsible Person / WSG for written authorisation.

Disinfection Using Sodium Hypochlorite

- If CWS storage vessels are associated with the system, they should be cleaned and disinfected by following Process No. 28 above before the distribution system is disinfected.
- Any water treatment equipment must be disconnected from the system. The pH of the water must be measured and must be between 5.5 and 9.0 before chlorinating solution is introduced. If pH is found to be below 5.5 the system must be drained, flushed and refilled with fresh water.
- Treated water must then be used to charge the distribution system. If a storage vessel is associated with the system, the disinfectant solution must be prepared in and supplied by this vessel. If a storage vessel is not associated with the system, a portable vessel must be used to prepare within and supply from the disinfectant solution.
- Sampling point's representative of the system must be tested using a sodium hypochlorite drop test kit to ensure 50 mg/l free chlorine throughout the system to start disinfection. The whole system must be allowed to stand charged for a minimum period of 1 hour, a representative number of samples must be taken from the distribution system and tested using a suitable test kit to ensure levels have been maintained above 30 mg/l free chlorine. All test and sampling points must be identified and the results of each test recorded.
- Where practicable, dismantle TMV/TMTs and clean strainers.
- The system must be thoroughly flushed out with clean mains water until tests indicate that the residual free chlorine concentration is no greater than 1ppm mg/l that present in the mains water supply or within the dosing limits where chlorine dioxide is dosed as an on-line biocide.
- Using a suitable sterile container, collect a water sample and submit for biological analysis. The analysis should measure the presence of contamination by general bacteria Total Viable Colony Count – T.V.C.C., (Legionella spp and Pseudomonas aeruginosa in high risk patient areas including augmented care units). Samples to be collected no earlier than 48 hours following disinfection.

Neutralisation

Normally, sodium hypochlorite solutions do not require neutralisation prior to disposal to foul sewer. However, if local conditions require it, 50 mg/l disinfectant solutions can be neutralised before disposal with sodium bisulphite (SB) or sodium thiosulphate (ST) at the rate of 350 gm SB/m3 or 525 gm ST/m3 of disinfectant solution.

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 35 Certificate of Conformity - Distribution Services Disinfection

Using Sodium hypochlorite as the disinfecting agent

Frequency	As Required
Limits:	THIS IS TO BE COMPLETED BY THE COMPETENT PERSON

If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.

No	Tasks	Date	System	Comments	CP Signature
1	System Volume:				
2	Method of disinfection:				
3	Disinfectant used:				
4	Volume of disinfectant used:				
5	pH:				
6	Initial disinfectant level (Cl2 mg/L):				
7	After 1 hour(Cl2 mg/L):				
8	Post disinfection (Cl2 mg/L):				
9	Neutralising agent used:				
10	Amount of neutralising agent used:				
11	TMV/TMT strainers and all other strainers, aerators and flow straighteners cleaned, disinfected and replaced/renewed				
12	Water analysis carried out (Y/N)				
13	Analysis results				
14	Date of last disinfection:				
15	Any refurbishment, improvements carried out during this disinfection:				
16	Further upgrading, refurbishment, improvements works required				

This section to be completed by the Trust Responsible Person (Estates)

Additional Information

RP / D RP Signature		Date of check	

All reported faults to be transferred to "Monthly Defect Log" for processing

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 50 - Water Safety Design Sign Off	
Frequency	As required
Limits:	See tasks below
If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.	

Project number & or title of works:

Description of works:

No.	Tasks	Yes/No	Comments	Signature	Date
1	Has the project manager conveyed the requirements of Trust engineering standard and water safety policy to the Designer?			Project Manager	
2	Does the design specification comply with the requirements of the Trusts WSP Part C inclusive of patient risk, standards, commissioning etc?			Designer	
3	Have all the relevant departments been adequately consulted during the development of the design specification?			Project Manager	
4	Has the design taken into consideration the impact on the potential risk of Legionellosis and P. aeruginosa infections by reviewing design information in line with best practice and / WSP			WSG	

Additional Notes:

I can confirm my verification that the design proposals, if undertaken as proposed, including and recommended changes would, in my opinion, be compliant with the current Regulations, Guidelines, Codes of Practice and 'Best Practices', requirements for the Management & Control of Water Quality

Signed (Designer) ……	Date ……..
Name ……..	Position ……
Signed (WSG/AE (W)) ……..	Date ……..
Name …….....	Position ……

Water Safety Procedure

The Royal Wolverhampton NHS Trust

WSP 51 – Permit - Handover & Occupation of Refurbished & New Build Facilities

Frequency	As required
Limits:	See tasks below

If Maintenance Staff or contractor cannot, at any stage, comply with any part of this specification, then an alternative specification must be agreed which, both; meets the requirements of current legislation and the needs of the site approved by the WSG.

Project number & or title of works:

Description of works:

Application submitted by:		Date:	
Hand-over date & time:			

1	**Have the requirements for water safety risk assessments & Trust management system been met?**				
1.1	Has a water safety risk assessment been completed?	YES	NO	N/A	PM
1.2	Have flushing groups and assets been added onto Compass?	YES	NO	N/A	PM
1.3	Have any faults/short-falls been identified by the water safety risk assessment?	YES	NO	N/A	PM
1.4	If Yes, have all these faults been rectified?	YES	NO	N/A	PM
2	**Is the installation in compliance with Trust requirements & engineering standards?**				
2.1	Has the installation been completed & signed off in accordance with WSP 50?	YES	NO	N/A	PM
2.2	Has the installation been completed in accordance with Trust's Engineering Standards?	YES	NO	N/A	CoW
2.3	Have O&M manuals been handed over to Estates Management inclusive of as fitted drawings & asset register?	YES	NO	N/A	PM
2.4	Has all commissioning data in accordance with BS 8558:2015, ACoP L8 and HTM 04-01 been included as part of the O&M package?	YES	NO	N/A	PM
2.5	Have all fittings & outlets been dipped-chlorinated?	YES	NO	N/A	CoW
2.6	Has the system been chlorinated in accordance with BS 8558:2015 / WSP 34?	YES	NO	N/A	CoW
2.7	Are bacteriological results within acceptable parameters?	YES	NO	N/A	RP
2.8	Has the system been flushed daily **since disinfection**?	YES	NO	N/A	CoW
3	**Are all bacterial control measures within recommended parameters?**				
3.1	*Incoming cold water mains temperature to area*	YES	NO	N/A	CoW
3.2	*Cold water outlet temperatures at sentinel outlets*	YES	NO	N/A	CoW
3.3	*Incoming / hot water generation flow temperatures*	YES	NO	N/A	CoW
3.4	*Hot water return temperatures primary, secondary and tertiary*	YES	NO	N/A	CoW
3.5	*Blended temperatures 'Safe hot water'*	YES	NO	N/A	CoW
3.6	Average Chlorine Dioxide levels between 0.2-0.5ppm at sentinel outlets (where applicable)	YES	NO	N/A	CoW

	Date of proposed occupation:		To be occupied by:		

Additional Information

This section to be completed by the Responsible Person (Estates) or their deputy/Clerk of Works			
Are all processes and certificates described above been completed/received?	YES/NO	Occupation recommended?	YES/NO
Responsible Person (Estates)/Deputy:	Signed: ……..		
or			
Clerk of Works:	Signed: ……..		

This section to be completed by Trust Consultant Microbiologist			
Hand-over approved?	YES/NO	Occupation approved?	YES/NO
Trust Consultant Microbiologist:	Signed: ……..		

TO ALLOW FOR OCCUPATION OF FACILITY/PHASE THIS FORM MUST BE ACCOMPANIED BY ALL APPROPRIATE RECORDS AND CERTIFICATES

6.0 LEGISLATION, STANDARDS & GUIDANCE

As well as complying with the recommendations outlined in this document and in accordance with the Trust's Policy for Capital Schemes, the design, installation, commissioning and hand-over of the hot and cold water services, new, extended or refurbished, in any NHS premises will also comply with:

- The Construction (Design and Management) Regulations 2015 (CDM)
- the Building Regulations 2010 (and associated amendments)
- The Water Regulations Advisory Scheme's (WRAS) 'Water Regulations Guide', and any other requirements of the local water undertaker
- The Water Supply (Water fittings) Regulations 1999 v. The Water Supply (Water Quality) Regulations 2016
- CIBSE Guide G Public Health and Plumbing Engineering
- BS 1710 – 1984 - Specification for identification of pipeline services
- BS 8558:2011 provides complimentary guidance to BS EN 806. It is a guide to the design, installation, testing, operation and maintenance of services supplying water
- for domestic use within buildings and their curtilages
- BS EN 806-5:2012 Specification for installations inside buildings conveying water for human consumption - Operation and maintenance
- BS EN 806-1:2000 Specifications for installations inside buildings conveying water for human consumption -General
- BS EN 806-2:2005 Specifications for installations inside buildings conveying water for human consumption – Design
- BS EN 806-3:2006 Specifications for installations inside buildings conveying water for human consumption - Pipe sizing. Simplified method
- BS EN 806-4:2010 Specifications for installations inside buildings conveying water for
- human consumption – Installation
- Health Technical Memorandum 04-01: Safe water in healthcare premises - Part A: Design, installation and commissioning 2016
- Health Technical Memorandum 04-01: Supplement - Performance specification D 08:
- thermostatic mixing valves (healthcare premises) 2017
- Health Technical Memorandum 04-01: Safe water in healthcare premises Part B: Operational management 2016
- Health Technical Memorandum 04-01: Safe water in healthcare premises - Part C:
- Pseudomonas aeruginosa – advice for augmented care units 2016
- Heating and ventilation systems Health Technical Memorandum 03-01: Specialised ventilation for healthcare premises
- Decontamination in primary care dental practices HTM01-05
- Department of Health 'Performance requirements for building elements used in healthcare facilities Version:0.6:England'
- HBN 00-10 Part C Sanitary assemblies 2013
- Public Health England (PHE) – Examining food, water and environmental samples from healthcare environments – Microbiological Guidelines:2013
- BS7592:2008 – Sampling for Legionella bacteria in water systems – Code of practice BS ISO 5667-24:2016 Water Quality - Sampling - Part 24:Guidance on the auditing of
- water quality sampling
- World Health Organisation (WHO) – Water Safety in buildings:2011
- BS 8580:2010 – Water Quality – Risk assessments for Legionella Control – Code of
- Practice of rubber/ PVC weatherproof seals
- DH (2006 – 07) Estates and Facilities alert re use of doors - and potentially windows as ligature points. Issued:18th October 2006 Gateway Ref: 7208
- DH (2006 - 05) Shower heads
- NHSE (2004 - 10) Bed cubicle rails, shower curtains

APPENDIX 1 - 2018 TRUST SANITARYWARE SPECIFICATION

2018 Royal Wolverhampton Hospital Trust Sanitaryware Specification

The management and quality of the Trusts sanitaryware has a direct impact on water quality particularly pseudomonas Aeruginosa. The WSG has spent a considerable amount of time developing this detailed brochure containing the outlets / water controlling devices and ceramic / stainless steel devices that can only be used within Trust owned properties and buildings. The products within the sanitaryware specification are approved by the WSG and:

- Minimize stagnation
- Minimize splashing
- Minimize waste water
- Minimize potential for pathogenic growth by having smooth internals or are designed to minimize risk
- Have been approved by IP
- Meet Trust engineering standards
- Utilize approved materials and have necessary WRAS approvals
- Have been thoroughly trialed by the Trust
- Are of a high quality

Any sanitaryware installed not approved by the sanitaryware specification or WSG will have to be removed and replaced with an approved product.

- **Copper tails only to be fitted to majority of outlets connected to Trust systems, exceptions detailed below**
- **All outlets must be dip chlorinated prior to installation**
- **No jointing compounds or plastic pipework is to be used on any potable systems**

Sanitaryware Group	Product - In order of Preference by Type	PDF Information	Comments
NONE TMV MIXER TAP SELECTION			
None TMV Mono block Tap **Lower risk – Immersion scalding risk areas, inclusive of staff and supervised spaces**	**Delabie BIOCLIP Monoblock Mixer for Basins** **Tap Reference: 2821LEP** **Note PEX hoses supplied with these outlets with integral valves to be used and not copper tails unless fitted with separate none return valves** 	Delabie Securtherm BioClip Mixer.pdf	Bioclip / demountable version to be specified Hygiene Control Lever to be specified Maximum temperature limiters / thermal stops to be checked and adjusted on installation to minimise the risk of scalding
None TMV Taps **Lower risk –**	**Delabie Mixers for sinks and Troughs** **Wall mounted mixer with swivel spout: Tap Reference: 2446LEP**	Delabie Securtherm Pressure Balancing Mi	Hygiene Control Lever to be specified Maximum temperature

Immersion scalding risk areas, inclusive of staff and supervised spaces	 **Wall mounted mixer with swivel spout: Tap Reference: 2519L** **Note this tap has a 26lpm flow rate** 	Delabie Mechanical Mixer.pdf	limiters / thermal stops to be checked and adjusted on installation to minimise the risk of scalding
NONE TMV INDIVIDUAL TAP SELECTION			
None TMV Taps **Lower risk – Immersion scalding risk areas, inclusive of staff and supervised spaces**	**HBN 00-10 HTM 64 Markwik High Neck Pillar Taps** **Tap reference: S8265** 	S8265AA DataSheet markwik high neck pill	If being used in areas with high risk of scalding by immersion then a remote TMV must be used, the clinical risk assessment should determine this requirement
None TMV Taps **Lower risk – Immersion scalding risk areas, inclusive of staff and supervised spaces**	**HBN 00-10 HTM 64 Markwik Bib Taps** **Tap reference: S8270** 	S8270AA DataSheet markwik bib tap.pdf	If being used in areas with high risk of scalding by immersion then a remote TMV must be used, the clinical risk assessment should determine this requirement
NONE TMV TIME FLOW TAP SELECTION			
Time Flow Taps **Public Communal Toilets** **Areas that could be at risk of vandalism**	**Reliance Presto Technology 4000** **Tap reference: PUSH200070** 	Reliance 4000S mixer.pdf	Remote TMV must be used as determined by clinical risk assessment Ideally Horne 15 H15-21B

THERMOSTATIC TAP SELECTION			
TMV IPS Mount Taps **Higher risk – Immersion scalding risk areas, inclusive of staff and supervised spaces**	**Reliance Caremix T3 with Extended lever** **Tap Reference: CTAP100006** 	 Caremix-Prime-T3-TMV3-Tap.pdf	Extended clinical handle to be specified
TMV IPS Mount Taps **Higher risk – Immersion scalding risk areas, inclusive of staff and supervised spaces**	**Markwik 21 Demountable Panel Mixer** **Tap Reference: A6243** 	 A6243 markwik 21 Data Sheet.pdf	Demountable version to be specified
TMV Deck Mount Tap **Higher risk – Immersion scalding risk areas, inclusive of staff and supervised spaces**	**Delabie Securitherm BIOCLIP Thermostatic Monoblock** **Tap Reference: H9605610** 	 Delabie Securtherm Thermostatic Bioclip.p	Bioclip / demountable version to be specified Long elbow handle to be specified Clearance from wall to be checked to ensure appropriate handle clearance
TMV Deck Mount Tap **Higher risk – Immersion scalding risk areas, inclusive of staff and supervised spaces**	**Armitage Shanks HBN 00-10 HTM64 (TP6) Contour 21 Washbasin Mixer** **Tap Reference: A4169** 	 A4169AA DataSheet contour 21 wash basi	Copper tails to be specified Clearance from wall to be checked to ensure appropriate handle clearance

AUGMENTED CARE TAP SELECTION			
Augmented Care **TMV IPS Mount Taps** **Higher risk – Immersion scalding risk areas, inclusive of staff and supervised spaces**	**Reliance Caremix T3 with Extended lever** **Tap Reference: CTAP100006** 	Caremix-Prime-T3-TMV3-Tap.pdf	Extended clinical handle to be specified
AUGMENTED SHOWER SELECTION			
TMV Showers **Augmented / Critical Care Areas**	**HORNE TSV1 SHOWER PANEL, LEVER CONTROLS, IDLU AND COVER, SINGLE FUNCTION HEADSET** **Shower Reference: T108T42L** 	Horne T108T42L.pdf	TSV1 Flushing kit to be supplied with each installation. BS 8300 compliant lever controls must be specified with this product Infill panel should be specified to ceiling height
GENERAL CLINICAL AREA SHOWER SELECTION			
TMV Showers	**HORNE TSV1 SHOWER PANEL, LEVER CONTROLS, SINGLE FUNCTION HEADSET** **Shower Reference: T108A2L** 	Horne T108A2L.pdf	TSV1 Flushing kit to be supplied with each installation. BS 8300 compliant lever controls must be specified with this product Infill panel should be specified to ceiling height

TMV Showers	**Reliance Presto 200 Shower Panel** **Shower Reference: PANL500215** 	Reliance 200 Panel.pdf	Infill panel should be specified to ceiling height
REMOTE TMV SELECTION			
Remote TMV	**Horne 15** **TMV Reference: H15-21B** 	Horne_15_LoRes1_18_05_2016_11_51_4	Remote TMV's are to be avoided where possible! Specify with integral isolation valves
Remote TMV	**Meynell 15/3** **TMV Reference: PESM0620J** 	p3231_7_meynell_15_3.pdf	Remote TMV's are to be avoided where possible! Isolation valves must be provided pre installation of each feed to the TMV
AUTOMATIC TAP / SHOWER SELECTION			
AUTOMATIC TAP	**Rada Sense 3** 	rada-sense-washbasin_bidet-t3-dmv.pdf	Installation to be approved by the WSG. Use as outlet for Theatre scrub sinks is preferred

SANITARYWARE SELECTION			
HBN00-10 / HTM64 Basin	**Armitage Shanks HBN 00-10 HTM64 (LB H M 50CM) Contour 21+ Washbasin** **50cm basin = S0430** 	S0430HY Contour 21 50cm back outlet was	Mounting to be checked depending on mounting surface Anti-splash "fin" feature S0386 Waste Pack and S0388 Fixation set also required per basin
HBN00-10 / HTM64 Basin	**Armitage Shanks HBN 00-10 HTM64 (LB G S) / (LB G M) Contour 21+ 40cm / 50cm Back Outlet Washbasin** **40cm basin = S0435** **50cm basin = S0432** 	S0435HY Contour 21 40cm back outlet was S0432 Contour 21 50cm back outlet was	Mounting to be checked depending on mounting surface S0387 Waste Pack and S0388 Fixation set also required per basin
HBN 00-10 / HTM64 Urinal	**Armitage Shanks HBN 00-10 HTM64 UR H Contour HygenIQ Urinal** **Urinal 67CM = S6119** 	S611901 DataSheet Contour hygeniq urin	Dudley Turbo 88 Toilet Cisterns only to be specified Dudley Kinetic Water Controls only Mounting to be checked depending on mounting surface
HBN 00-10 / HTM64 Armitage Shanks Contour 21 + **WC Pans**	**Armitage Shanks Contour 21 + WC Pans** **Back To Wall Rimless WC Pan = S0439**  **HBN 00-10 / HTM64 Armitage Shanks Contour 21 + WC Pans** **Wall mounted Rimless WC Pan = S0443**	S0439 DataSheet contour 21 backtowal	All toilets must be to the rimless specification Dudley Turbo 88 Toilet Cisterns only to be specified Seats must differ in colour to the pan Armitage Shanks S4066 blue

	 **Raised Height Back To Wall Rimless WC Pan = S0440**  **Projection Back To Wall Rimless 70cm Projection WC Pan = S0437 75cm Projection WC Pan = S0438**  **Contour 21 Seat with retaining buffers = S4066 (36) BLUE** 	S0443HY DataSheet contour21wallmounte S0440HY DataSheet contour21 raisedheigl S0437 DataSheet contour2170cmprojec S0438HY DataSheet contour2175cmprojec S406601 DataSheet contour21seatnocove	Projection Pans require Armitage Shanks S6884 cushion for back support
STAINLESS SELECTION			
HBN 00-10 / HTM64 (SU H) Firth **Scrub-up Troughs**	**HBN 00-10 HTM64 (SU H) Firth Scrub-up Troughs** **240CM RH Trough = S2877, 240CM LH Trough = S2876 160CM RH Trough = S2874 160CM LH Trough = S2873 80CM RH Trough = S2872** 	S2877MY DataSheet firth trough 240cm rh S2876MY DataSheet firth trough 240cm lh. S2874MY DataSheet firth trough 160cm rh	Only Rada Sense 3 Automatic tap to be used with scrub sinks on approval by the WSG

	 	S2873MY DataSheet firth trough 160cm lh. S2872MY DataSheet firth trough 80cm rh.p S2870MY DataSheet firth trough 80cm lh.p	
HBN 00-10 / HTM64 Slop Hoppers	**Armitage Shanks HBN 00-10 HTM64 Back Inlet Slop Hoppers** **Dee right hand slop hopper with sink, back inlet = S6551** **Dee left hand slop hopper with sink, back inlet = S6552**  **(DU H) Stirling Back Inlet Slop hopper** **Stirling right hand slop hopper with work surface, back inlet = S6563 MY** **Stirling left hand slop hopper with work surface, back inlet = S6564(MY)**  **(DU) Leven Back Inlet Slophopper** **Leven slop hopper stainless steel, back inlet = S6567 MY** 	S6551MY DataSheet dee bi sink rh slop hop S6552MY DataSheet dee bi sink lh slop hop S6563MY DataSheet stirling bi slophopper r S6564MY DataSheet stirling bi slophopper l S6567MY DataSheet leven bi slophopper.p	Macerator should be installed post sluice to ensure adequate flushing of drains Dudley Turbo 88 Toilet Cisterns only to be specified

HTM64 (JU) Janitorial Sink	**Armitage Shanks HBN 00-10 HTM64 (JU) Janitorial Sink Stainless Steel Unit** **50cm wide x 57cm projection x 90cm high complete with mixer tap with restricted swivel, tamper proof concealing panel for washbasin trap, hinged bucket grating to sink, stainless steel legs with adjustable feet and earthing tag = S6556 MY** 	S6556MY DataSheet janitorial sink.pdf	**Janitorial Sink must not be fitted end of line as classified as low use outlet.** **Flexible connections to outlet to be replaced with solid copper tails.**
HBN 00-10 / HTM64 Drainer Sinks	**Armitage Shanks HBN 00-10 HTM64 (ST A) Doon Single Bowl Single Drainer Sink** **LH drainer 120 x 60cm, no tapholes, no overflow = S5986(At time of print)** **RH drainer 120 x 60cm, no tapholes, no overflow = S5986(At time of print)** 	S5987MY DataSheet doon sink 120x60cm l	Choice of outlets will depend on location Please check product codes with Armitage Shanks
TOILET CISTERN SELECTION			
Toilet Cistern Units	**Dudley Turbo 88 Syphon and Hydroflo fill valve** **Multi pack syphon / outlet, inlet valve lever / push or contact Dudley direct for tailored package = 325829**  	Dudley Cistern Components.pdf	This unit is only to be specified for Cistern applications which should be purchased as a multi pack item for all cistern components or can be supplied as required as a bespoke pack from TC Dudley direct.

URINAL CONTROL SELECTION			
Urinal Control Units	**Dudley Kinetic** 	Dudley Kinetic.pdf	240V mains fed units only
MACERATOR SELECTION			
Bedpan M/C	**Haigh Quattro** 	Quattro.pdf	Macerators to be installed post sluice Haigh's Macifresh deodoriser to be installed with macerator
ICE MACHINE SELECTION			
Ice M/C	**Scotsman TC 180 EVO** 	TC180.pdf	Ice only Configuration The use of Ice machines are to be approved by the WSG and will only be permitted in extreme circumstances
WATER COOLER SELECTION			
Water Coolers bottled M/C	**Angel Springs Glacier Bottle Fed** **Cold and Ambient Feed Only** 	Crystal-Glacier-Bottled-Freestanding.pdf	Mains fed coolers will always be the Trust preference but the Trust will consider bottled coolers where installation does not allow drains or feeds to be installed Service contract to be arranged by local department prior installation
Water Coolers mains M/C	**Water Logic 2500**	WaterLogic 2500.pdf	M/C must be installed within 1 meter of a SSO and mains water isolation valve to allow easy isolation Service contract to be

	 **Water Logic 3 Firewall** 	WaterLogic FireWall.pdf	arranged by local department prior installation

All other outlets must be approved via the water safety group in advance.

The Royal Wolverhampton NHS Trust

Ref: OP79 Water Safety Policy

Attachment 6

Water Safety Plan

PART D

Contingency Measures

Version:	1.1
Ratified by:	Mike Koumi – Authorised Engineer Water
Date ratified:	September 2022
Name of originator/authors:	Joanna Macve, Tom Butler, Steve Brooks
Name of responsible committee/individual:	Water Safety Group
Date issued:	January 2019
Review date:	March 2026
Target audience:	Trust staff
Equality Impact Assessment:	Yes
This process is effective for all employees of the Royal Wolverhampton NHS Trust, Patients, Visitors and Contractors	

Version Control

Water Safety Plan - Part D – Contingency Measures					
Reference/ version.	2022	**Category:**	**n/a**	**Version:**	1.1
Document purpose:	Supporting the RWT NHS Trust Water Safety Policy Document OP79 and wider WSP procedures Defining the general precautions taken for the management of water forming part of the Trust written scheme and water safety plan for The Royal Wolverhampton Hospital NHS Trust				
Intended for use by:	Direct and indirect Staff				
Author(s) responsible for document upkeep	Joanna Macve, Tom Butler, Steve Brooks				
Consultation process	Water Safety Group, Health and Safety Steering Group, Infection and Prevention Group				
Sponsoring Director:	Gwen Nuttall				
Approved by:	TMC				
Dated:	2019 (Schedule as Policy Issue)				
To be reviewed before:	2026 (Schedule as Policy Issue)				
Implementation arrangements:	Estates Managers, Supervisors, Health & Safety Representatives, Health & Safety Officers, Staff and Contractors.				
Monitoring Arrangements:	The implementation and effectiveness of this process will be reviewed on an ongoing basis through the Water Safety Group and Health & Safety Steering Group, by checking whether the process is being used and receiving feedback on current effectiveness and possible future revisions.				

VALIDITY STATEMENT

This document is due for review on the latest date shown above. After this date, the process documents may become invalid. The electronic copy of this document is the only version that is maintained. Printed copies may not be relied upon to contain the latest updates and amendments.

1.0 STRUCTURE & GUIDANCE

The Water Safety Plan is designed to be a series of easy reference specific guides to water safety inclusive of safe hot water within the Trust for our staff and contractors explaining in brief how water is managed, systems maintained and developed within its properties.

This plan is a key attachment to operational policy 79 and must be read in conjunction with this document and its attachments. Water Safety Plans (WSP) are recommended by Health Technical Memorandum 04-01 and a written scheme is required by Approved Code of Practice L8 (ACOP L8). The combined WSP and written scheme provide best practice and a holistic approach to the management of water systems.

The WSP is a living document. It is kept under continual review by the Water Safety Group (WSG) to ensure adequate assessment and control of risks is in place. The content of the WSP is a fixed monthly agenda item of the WSG ensuring the document is maintained reflecting best practice.

The WSP has four parts A-D, this section part D provides contingency measures in relation to the Trust's Management & Control programme for: The control of Legionella, hygiene, 'safe' hot water, cold water and drinking water systems including Pseudomonas aeruginosa – advice for augmented care units. Each part of the WSP can be considered in isolation, however part A should always be read first to provide general background information and precautions in line with OP79. The table below shows the parts of the WSP and targeted departments they are aimed for:

Part No.	Document Title	Targeted Departments						
		Estates	Capital	IPC	Nursing	Medical Physics	Facilities	Med Micro.
A	OP 79 Attachment 3 **General Precautions**	✓	✓	✓	✓	✓	✓	✓
B	OP 79 Attachment 4 **Maintenance Arrangements**	✓		✓				✓
C	OP 79 Attachment 5 **Capital Development & Water System Modifications**		✓	✓				✓
D	OP 79 Attachment 6 **Contingency Measures**	✓	✓	✓	✓		✓	

Please refer to the relevant part for guidance or where insufficient information is found within this plan reference should and will be made to best practice within HTM 04 and statutory guidance within ACOP L8, however interpretation of guidance and clarifications required reference the management of water within the Trust must be directly from the Water Safety Group.

Special notes are highlighted in blue across all parts of the WSP to give emphasis to pertinent information relevant to the section being considered where appropriate

This plan must also be read in conjunction with the Trust's Health and Safety policy HS01 and supplementary information in relation to COSHH.

For information reference medical equipment please refer to HS11 & HS12 that provide detailed arrangements for the management of medical devices.

Reference should also be made to Part A Section 5.9 of the WSP which details further Trust policy and procedure which should be considered with this plan.

The WSP does not provide specific guidance for management of water quality for specialist water systems used for cleaning of surgical instruments or medical devices e.g. Endoscopy Water or CSSD supplies which have their own stringent procedures and standards in place.

This Water Safety Plan (WSP) has a controlled circulation and the validity statement on page two must be noted.

2.0 INTRODUCTION

Management of water systems and associated end-of-line fittings to reduce the risk of microbial growth including opportunistic pathogens such as Legionella sp. and Pseudomonas aeruginosa is vital to patient safety.

Planned Preventative Maintenance / PPM and surveillance control measures employed by the WSG for the Trust are of upmost importance and must be diligently followed to protect and safeguard patients, staff, visitors and systems within the Trust.

In order to ensure that the PPM program is effective in minimising or controlling risk of Legionellosis, the Trust (or others on its behalf) will undertake a number of periodic inspection and monitoring tasks. The actual frequency of the tasks adopted, will depend on a number of criteria such as the type of building, type of occupants and history of the plant/system, further details reference maintenance can be found in part B of this WSP.

Historical data and experience has allowed the WSG to develop needs based maintenance for certain plant or equipment. This is determined by the results of each visit and is dependent on various measured parameters such as:

- physical condition
- biological activity (if applicable)
- temperature
- usage frequency etc

Maintenance performance and actions are normally monitored by the Responsible Person or Deputy Responsible Person for water and the WSG.

Part D of the WSP aims to put in place arrangements for situations which are outside normal parameters to ensure the actions taken by the WSG or RP's are logical, in line with normally industry practice and consistent to resolve any issue in the quickest possible time while reducing and managing any risks.

Any deviation from the guidance within this WSP is to be agreed by the WSG and by the Trust responsible person or deputy responsible person water or Authorised Engineer Water.

This guidance is based upon best practice and processes / procedures adopted and approved by the WSG within the Trust and the Trust Authorised Engineer for water.

For general information reference:

- Pathogens / Legionellosis please refer to part A
- Maintenance part B
- Capital development part C

  before reading this document.

3.0 CONTENTS

4.0 CONTINGENCY MEASURES

The following section summarises normal control measures and remedial actions that must be taken when a combination of normal microbiological control measures or a key control measure fails.

Part A of this WSP details microbiological control measures used to reduce the risk of microbial growth including opportunistic pathogens such as Legionella species and Pseudomonas aeruginosa which are:

- Temperature
- Oxidising biocide (Chlorine Dioxide) (New Cross & Cannock Chase Hospitals only)
- Flushing
- Cleaning
- Bacterial Contamination Monitoring - Water bacterial analysis sampling
- Hyper Chlorination

The Trust employs temperature control as the primary method of Legionella control in line with ACOP L8, this is successful when cold water is maintained below 20ºc and hot water is maintained above 55ºc as detailed in part A of this WSP. In addition to Temperature Control the Trust uses on-line dosing of oxidising biocide, Chlorine dioxide (ClO2) on its large hospital sites New Cross & Cannock Chase Hospitals as a secondary control measure.

ClO2 is an oxidising biocide / disinfectant that, when used correctly, has been shown to be effective at controlling both Legionella and biofilm growth in hot and cold water systems. It is used to aid Legionella control where maintaining a conventional temperature regime is difficult across expansive systems or where the removal of all dead legs and little used outlets is impractical.

The combinations of control measures ensure water quality is maintained particularly when regimes fail or engineering works are completed. i.e. Chlorine Dioxide is utilised in Trust complex systems particularly during summer periods to negate the effects of elevated cold water temperatures, similarly it is also used where hot water temperature control is unreliable or in areas of poor circulation etc.

Water flushing is utilised to ensure the adequate turnover of water!

A robust usage evaluation system is also employed which records any unutilised outlets on a twice weekly basis

Underutilisation is both escalated and reported back to the WSG

Strategic flushing is also used to purge outlets or systems identified as infrequently used ensuring water temperatures and turnover is consistent.

Typical failures in control measures could be:

- Incoming water supply >25ºC
- Tank temperature >2ºC of Mains temperature

- Outlet temperatures >2°C than mains/tank temperature
  etc

Where failures of normal microbiological control measures are observed it is of upmost importance that either the RP or D RP / WSG is consulted to ensure secondary measures are or remedial actions can be put in place to mitigate any risk while any failures can be rectified or mitigated.

The range of remedial actions can include but not limited to:

- Set point adjustments and or calibration
- Additional maintenance or replacement of components
- Strategic flushing
- Pasteurisation
- On-line disinfectant
- Capacity management to reduce water retention
- Reduction of dead legs or design improvements
- Insulation improvements
- Ventilation improvements
- Relocation of pipework if practicable

- Biological sampling

The requirement for biological sampling will be agreed by the WSG and or RP / DR P or DIPC and facilitated by the WSG

Any sampling must be carried out as described in WSP Part B – WSP 1 'Microbiological sample collection protocol'

On receipt of biological analysis results, follow guidance in from section 4

The WSG / RP /D PR must always be consulted if contingency measures are deployed

4.1 Biological Analysis / Water Sampling

Biological analysis or water sampling is used to provide baseload data and to both identify and access risk.

Part A of this WSP provides further details reference analysis and control measures used by the WSG. The table below provides limits for the interpretation of results following any water sampling completed within the Trust:

Analysis Sample	Reported Results		Result Interpretation
Legionella pneumophila sgr 1, 2-14 & species	<100cfu/l		Insignificant
	100cfu/l - 1,000cfu/l		Significant
	>1,000cfu/l		Highly Significant
Pseudomonas aeruginosa	None Detected		Satisfactory
	<10cfu/100ml		High
	≥10cfu/100ml		Not Satisfactory
TVCC Aerobic count	22ºC	< 1,000cfu/ml	Insignificant
	22ºC	1,000cfu/ml - 10,000cfu/ml	Significant
	22ºC	>10,000cfu/ml	Highly significant
	37ºC	< 100cfu/ml	Insignificant
	37ºC	100cfu/ml - 1,000cfu/ml	Significant
	37ºC	>1,000cfu/ml	Highly significant
Escherichia **coli**	None Detected		Insignificant
	>0cfu/100ml		Highly significant
Coliforms	None Detected		Insignificant
	>0cfu/100ml		Highly significant

The DIPC / WSG / RP / D PR must always be:
sent all results and consulted when reviewing sample results

Alternative guidance or limits will be disregarded by the WSG until fully approved by both the Trust DIPC and Authorised Engineer Water

Routine microbiological monitoring for TVC's is not recommended as there is no direct association with TVC's and the presence of waterborne pathogens. TVC analysis is

used for the validation and commissioning of new build and modifications of existing facilities. TVC's provide an indication of how successful chlorination has been and or bacterial load / contamination of any system tested. The use of TVC analysis will be dictated by the WSG.

Sampling for Coliforms & e coli is only carried out routinely in pool areas. Potable systems are not normally tested unless there is reason to believe they may have been contaminated or specifically requested by the WSG.

Sampling requirements for capital development / water systems modifications are detailed within part C of this WSP sections 4.2 & 4.9 and WSP 27

This provides details of all none routine tests required preceding and following any works as part of the building occupation and handover process

WSP 27 provides full details of the required sample collection methodology

WSP 51 provides the necessary permit for handover & occupation of refurbished & new build facilities

4.2 Legionella & Pseudomonas Aeruginosa Risk Assessments

The WSG use water safety risk assessments in all buildings it owns and maintains to assess risk in accordance with ACOP L8 and HTM 04. These are supplemented with a Pseudomonas Aeruginosa risk assessment for its augmented care areas where specific guidance is needed.
The following are additional actions to follow in the event of either

Following indication of significant or not satisfactory sample results or a confirmed or suspected diagnosis of a Legionellosis or Pseudomonas Aeruginosa infection in addition to existing assessments if deemed necessary a local risk assessment will be carried out by IP following specific requests from the DIPC or WSG.

The purpose of the local risk assessment is to carry out a detailed coordinated assessment of the patients, staff, environment and water system in an area where a Significant or Highly Significant Legionella or Pseudomonas aeruginosa biological sample analysis result has indicated that there may be a problem.

The Risk Assessment must consider the maintenance records for the area, flushing records and also investigate the water systems in the area to identify the underlying cause of the problems and set out the remedial action necessary to address the threat. In addition an assessment of the patients will be carried out so that appropriate measures are taken to protect any patients that may be considered to be susceptible to infection.

The assessment must fully utilise the WSG team and experience to ensure measures are put in place to mitigate any risks in relation to water safety.

The outcomes of local risk assessments must be considered by the WSG to identify any 'Lessons Learned' as a meeting agenda item.

4.3 Biological Analysis & Actions - Legionella

Legionella monitoring should be carried out where there is doubt about the efficacy of the control regime or where recommended temperatures, disinfectant concentrations or other precautions are not consistently achieved throughout the system.

The WSG asses when and where to test, which may include:

- When storage and distribution temperatures do not achieve those recommended and systems are treated with a biocide regime as part of emergency contingency arrangements.
- In systems where temperature or biocidal control regimes are not consistently achieved
- When a nosocomial outbreak is suspected or has been identified
- Where there are at-risk patients with increased susceptibility

  The frequency of testing is normally decided by the WSG based on any results obtained or historical information

The following table provides contingency actions that should be considered by the WSG, RP, DR P following positive identification of legionella bacteria:

Legionella bacteria (cfu/L)	Action required
Not detected or up to 100	The primary concern is protecting susceptible patients, so any detection of *Legionella* should be investigated and, if necessary, the system resampled to aid interpretation of the results in line with the monitoring strategy and risk assessment.
>100 and up to 1000	Either: If the minority of samples are positive, the system should be resampled. If similar results are found again, a review of control measures and a risk assessment should be carried out to identify any remedial action 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.
>1000	The system should be resampled and an immediate review of the control measures and a risk assessment should be carried out to identify any remedial actions, including possible disinfection of the system. Retesting should take place three days following systemic chemical or thermal disinfection and at frequent intervals thereafter until a satisfactory level of control is achieved as agreed by the WSG.

Following any positive legionella sample the WSG will provide a sample regime for all areas based on historical and possible causes of any control measures failing which normally includes samples from:

- cold water storage tanks and the furthermost outlet from any tank
- heat source flow, or the closest tap to the heat source, and the furthermost tap on the hot water service system
- where traditional calorifiers are in use and drain valves have been fitted if deemed necessary by the WSG

Analysis of water samples for Legionella must be performed in a UKAS-accredited laboratory with ISO accreditation for the detection and enumeration of Legionella included within the scope of accreditation. Any laboratory must take part in a water microbiology proficiency testing scheme to BS EN ISO 17043 or alternative quantitative testing methods may be used as long as they have been validated using BS EN ISO 17994 and meet the required sensitivity and specificity

Any laboratory must also apply a minimum theoretical mathematical detection limit of ≤100 Legionella bacteria/litre sample

Any actions following Legionella sampling must be discussed and agreed by the WSG with agreement of the DIPC and RP & D RP. The authorised engineer water must also be fully consulted where deemed necessary by the WSG if not in attendance at any WSG.

The following table and flowcharts provide an indicative guide / next steps following positive legionella sampling. Individual conditions will normally dictate which procedure is appropriate and therefore the charts can be adapted by the WSG accordingly based on historical and possible causes of any control measure failure:

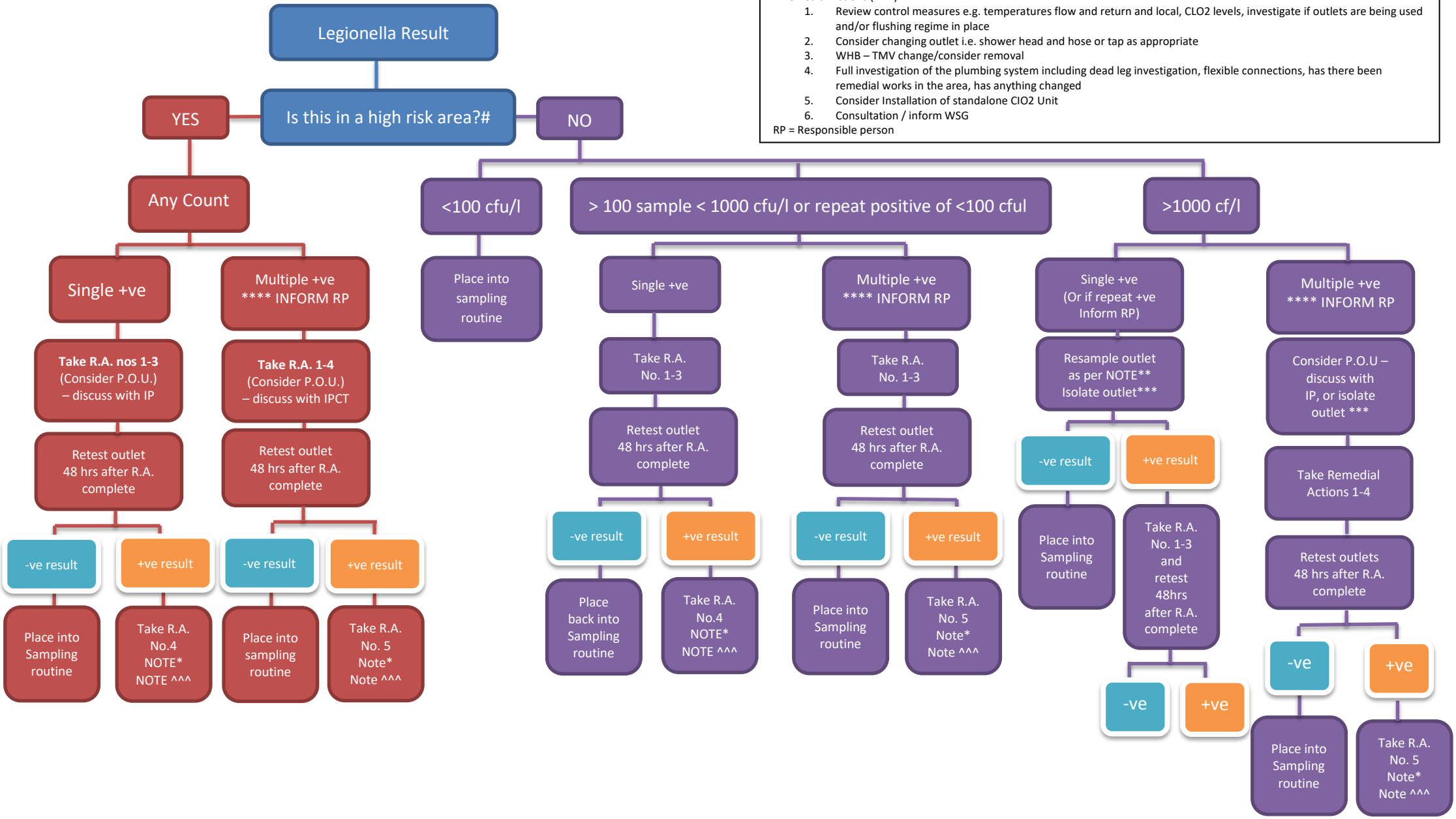
4.31 Legionella Action Table

Legionella bacteria (cfu/l)	Results from Pre-Flush Samples Pre-flush samples tend to be an indicator of local conditions and if detected will often require Post-flus samples in order to determine that the contamination is local not systemic.	Systemic results (Post-flush samples) Post-flush samples (or multiple positive samples) may be an indication that the whole year is contaminated and that controls are not effective.
Legionella not detected	Continue with current control systems	
Legionella from detection to 100	Action required • The detection limit for Legionella by culture methods was historically 100cfu/l, at present laboratories, may be able to report o levels of 10cfu/l or less. This can cause confusion over what level should bring about corrective actions. The primary concern is protecting susceptible patients, so any detection of legionella should be investigated and, if necessary, the system resampled to aid interpretation of the results in line with the monitoring strategy and risk assessment.	
100 – less than 1000	Action required • Identify remedial actions, investigate: o Usage frequency o Outlet for corrosion an scale o Local dead ends o Cross flow between hot and cold and vice versa o Localised failure of HWS return • It may be appropriate to immediate resample to indicate if initial remedial actions have been effective. The location should then be resampled after 3 to 6 months to confirm any actions taken have remained effective. In addition to the above, and if the outlet is served by a TMV: • Review the need for the TMV taking into account the relative risks of scalding. Remove the TMV if considered appropriate. • If the TMV is to remain, clean and disinfect the TMV, the outlet and the strainers on both cold and hot feeds. • Identify any flexible hoses (particularly after the TMV) and consider replacement, avoiding the use of flexible hoses where practicable.	Action required Whilst low number are unlikely to pose any risk to the general population, • Review immediately the system control measures and risk assessment. • Identify remedial actions, investigate: o Check of any hot water backflow via the calorifier cold feed pipes o Calorifier discharge via open vents to the cold tank o Failure of HWS to operate at target temperatures o Over capacity and under usage. • Cleaning and Disinfection of the entire system should be considered. • It may be appropriate to confirm effective disinfection, any required microbiological samples should be taken between two and seven days after the system is treated. (Samples taken immediately after a disinfection process might give false negative results). • The water system should then be resampled regularly to confirm any actions taken have remained effective.
1000 – 10,000	Action required In addition to the above • Review immediately the local control measures and risk assessments to identify any required remedial action (dead ends etc.) • Cleaning and Disinfection of the outlet should be undertaken – (especially showers and spray taps). • If a shower (spray outlet) cannot be taken out of use, consider installing point of use microbiological filters on all affected showers. • It is likely to be appropriate to resample, between 2 and 7 days after, to indicate if initial remedial actions have been effective. • The locations should then be resampled (e.g. 1 to 3 moth) to confirm an actions taken have remained ineffective.	Action required In addition to the above • Cleaning and Disinfection of the entire system is likely to be required. • To confirm effective disinfection microbiological samples should be taken between 2 and 7 days after the system is treated. (Samples taken immediately after a disinfection process might give false negative results).
> 10,000	Action required In addition to the above • Take immediate measures to prevent exposure form this outlet until remedial measure are taken and shown to be effective. • If the outlet cannot be taken out of use, install a point of use microbiological filter on all affected outlets. • Resample, between 2 and 7 days after, to indicate if initial remedial actions have been effective. • The locations should then be regularly resampled to confirm any actions taken have remained effective.	Action required In addition to the above • Take immediate measures to prevent exposure from all outlets fed by the system until remedial measures are taken. • Clean and disinfect the entire system as soon as possible.

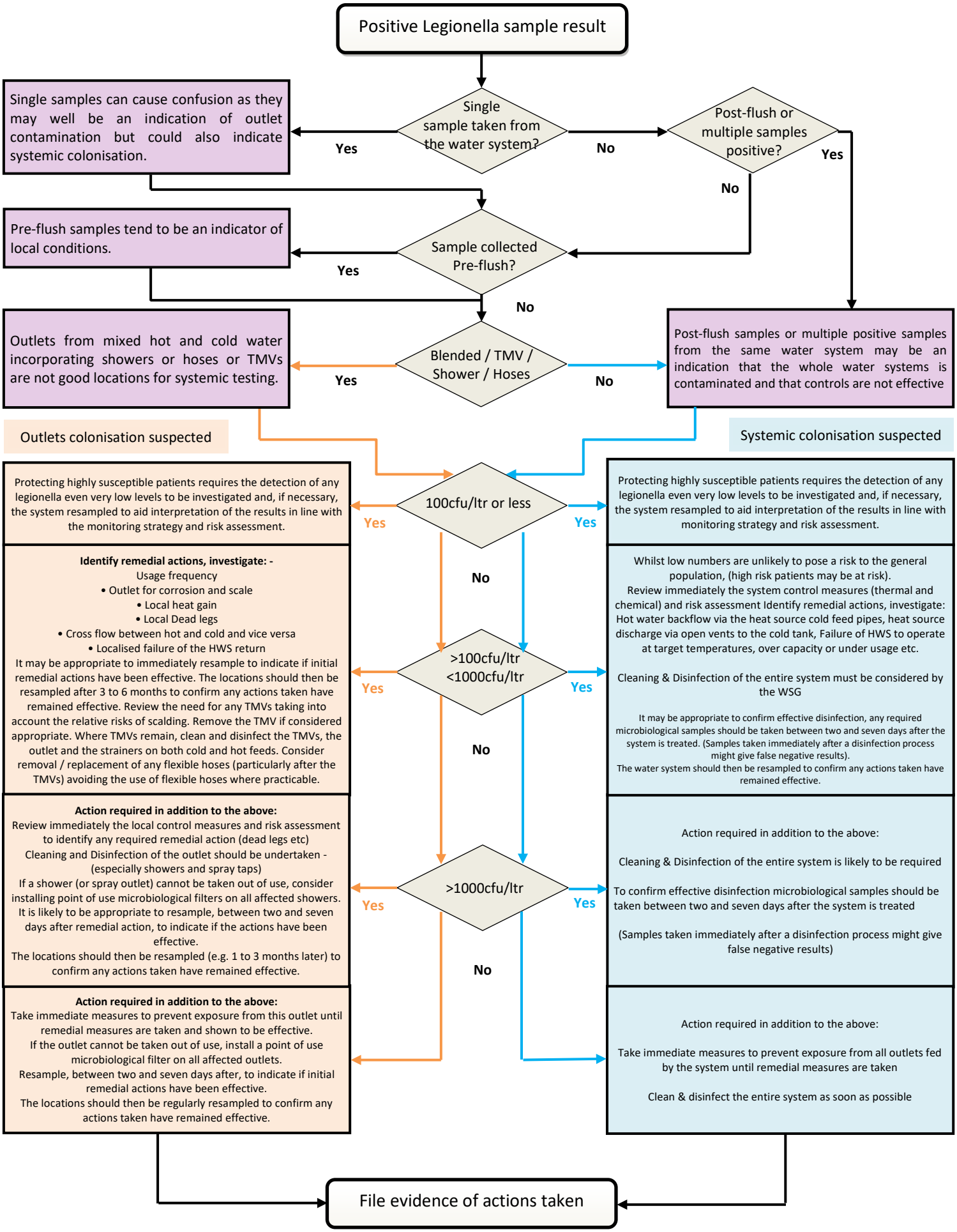
4.32 Legionella Action Flow Chart

NOTE
High risk area: See areas listed Part A section 4 of this WSP for defined areas
* If all remedial actions are exhausted and there is no improvement in results, then take remedial action No. 6.
** Take additional samples pre and post from adjacent areas on same loop based on worst case scenario (Low usage outlets).
*** Remedial Action should occur 48 hours after isolation.
**** More than one positive on same loop in the system.
^^^ More frequent sampling may be required
• Remedial Actions (R.A.)
1. Review control measures e.g. temperatures flow and return and local, CLO2 levels, investigate if outlets are being used and/or flushing regime in place
2. Consider changing outlet i.e. shower head and hose or tap as appropriate
3. WHB – TMV change/consider removal
4. Full investigation of the plumbing system including dead leg investigation, flexible connections, has there been remedial works in the area, has anything changed
5. Consider Installation of standalone CIO2 Unit
6. Consultation / inform WSG

RP = Responsible person



4.33 Legionella Action Decision Tree



4.4 Legionellosis - Patient Management

The following table provides general guidance for management of patients where positive Legionella counts have been identified. This can be used by the WSG when assessing any local risk with advice from the Trust Consultant Microbiologist and / or DIPC when interoperating this information before any actions are taken.

Ensure that any long standing items identified on existing risk assessments are considered and up to date being discussed with the Responsible Person (Estates) and Microbiologist / or DIPC as part of the process when reviewing the below:

HIGH RISK PATIENTS	Intensive monitoring of patients – Atypical signs/symptoms Alert to consultants and staff Ward round Engineering/pipe work review Review/audit flushing procedures and usage patterns Look back at patients discharged previous 10 days Contact GP Contact patients Consider prophylaxis Consider set up of helpline	Install filters Intensive monitoring of patients Alert to consultants and staff Case review daily Engineering/pipe work review Review/audit flushing procedures and usage patterns Consider prophylaxis, consent and medication Inform GP of patients discharged in previous 10 days - Prophylaxis Inform patients Set up help line	Close facility/Transfer to alternate facility Capacity issues Consider direct emergencies (escalation policy Director of Operations) Engineering/pipe work review Review/audit flushing procedures and usage patterns Review/identify all potential sources Alert Consultants and staff Case review daily Consider prophylaxis Inform patients and GP of patients discharged within previous 10 days - prophylaxis Set up helpline
	Intensive monitoring of patients – Atypical signs/symptoms Alert to Consultants and staff Review local engineering work Look back at patients discharged previous 10 days Contact GP – atypical signs and symptoms Contact patients – signs and symptoms	Install filters Intensive monitoring of patients – atypical signs and symptoms Alert to Consultants and staff Case review daily Local engineering review/work Review/audit flushing procedures and usage patterns Inform GP of patients discharged in previous 10 days - Prophylaxis Inform patients Set up help line	Consider: Install filters Intensive monitoring of patients – atypical signs and symptoms Alert to Consultants and staff Case review daily Local engineering review/work Review/audit flushing procedures and usage patterns Inform GP of patients discharged in previous 10 days - Prophylaxis Inform patients Set up help line
LOW RISK PATIENTS	Low risk Regular surveillance Ward Manager/matron informed cascade Routine flushing	Intensive monitoring Alert to Consultants and staff atypical symptoms Local engineering review/work Review/audit flushing procedures and usage patterns	Intensive monitoring Alert to Consultants and staff – atypical symptoms Local engineering review/work Review/audit flushing procedures and usage patterns Consider case reviews Consider prophylaxis Consider filter
	LOW COUNT/NUMBER OF POSITIVES		**HIGH COUNT/NUMBER OF POSITIVES**

4.5 Biological Analysis & Actions – Pseudomonas aeruginosa

The following provides general Pseudomonas Aeruginosa contingency guidance however all actions must be agreed by the WSG / DIPC / RP / DR P before being undertaken for any defined augmented care area.

Pseudomonas Aeruginosa monitoring must be carried out where there is doubt about the efficacy of the control regime or as part of normal six monthly surveillance or as mandated by the WSG or where other precautions are not consistently achieved throughout the system.

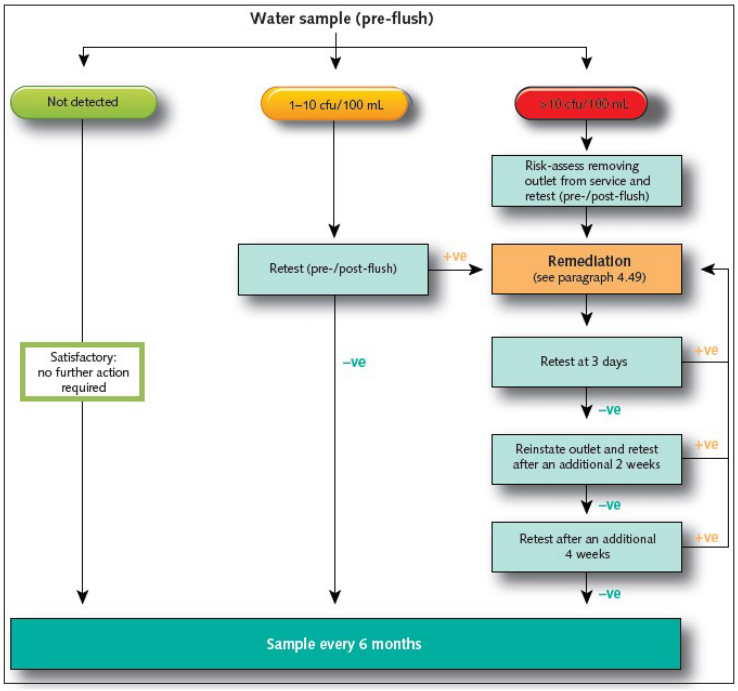
In the event of a high or not satisfactory result for Pseudomonas Aeruginosa sample being received, it is important to consider whether the reported contamination is due to

external sources rather than from the water supplied to the outlet. The following factors must be considered:

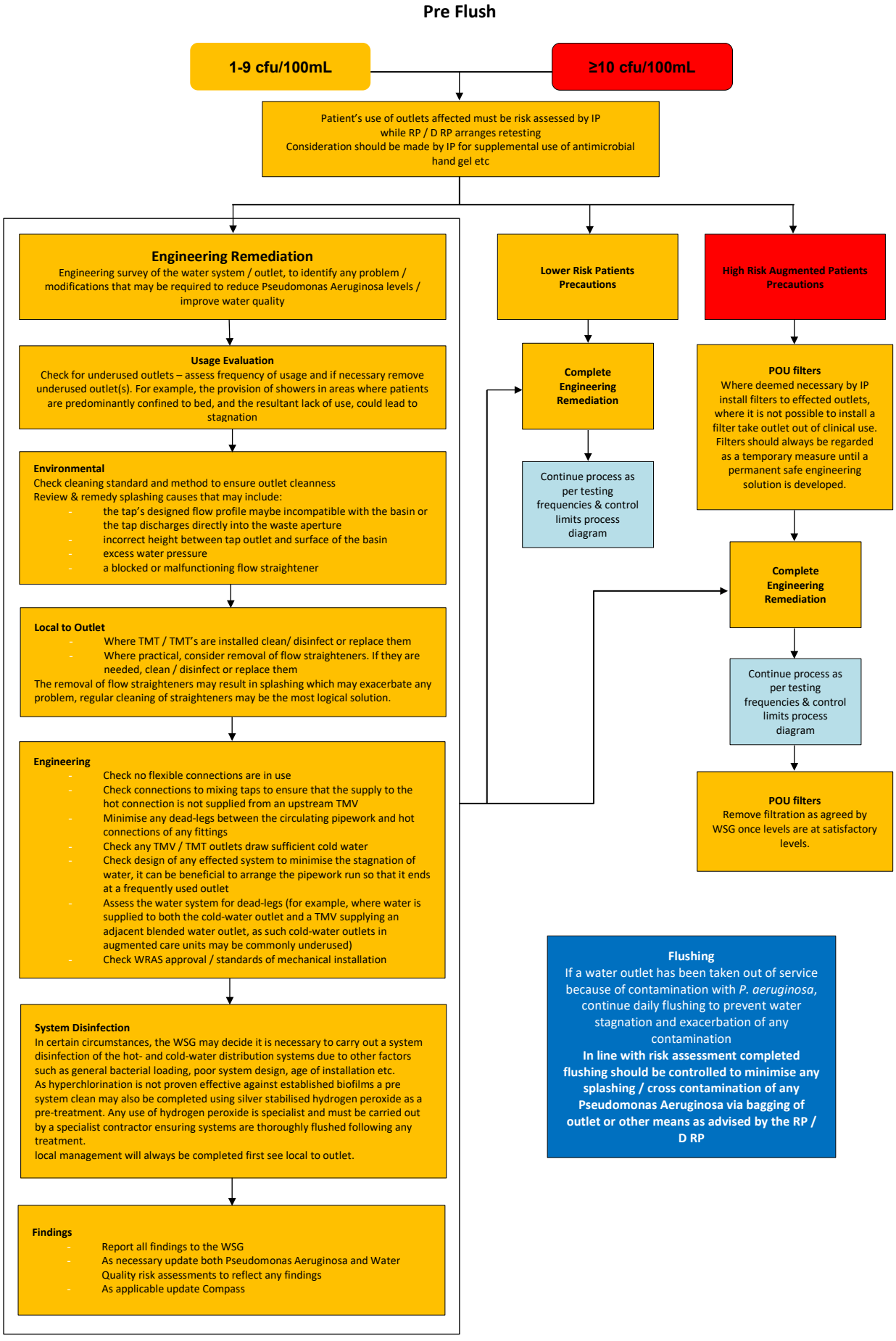
- Condition of tap / outlet
- Condition of associated strainers and aerators
- Design and positioning of plug-hole in relation to the tap
- Correct usage of wash hand basin / sink
- Correct disposal of liquid waste

Considering variation in counts that do occur depending on the type of sample collected for augmented care areas a threshold level of <1 cfu P. aeruginosa per 100ml of water is deemed appropriate and represents the possibility of the presence of biofilm

The following table shows the recommended testing frequencies and control limits for Pseudomonas aeruginosa and must be used with the proceeding table and section on results interpretation ensuring a consistent approach for the management of Pseudomonas Aeruginosa:



4.51 Pseudomonas Aeruginosa Action Flow Chart



4.6 Pseudomonas Aeruginosa Results Interpretation

Experience to date has shown that outlets can harbour contamination normally as a result of miss use of clinical wash hand basins and or outlets or basic design issues.

Complex design TMV or TMT outlets can also exacerbate any problems presented from the environment providing ideal habitats for any bacterial to survive. These factors should be born in mind when reviewing any results which could at times be misleading as rarely is Pseudomonas Aeruginosa a systemic problem when normal water quality control measures are robust.

The following notes are intended to be a guide for use with the Pseudomonas Aeruginosa limits and action diagrams and should only be used with consultation with both IP and the WSG ensuring all factors are understood when considering results:

If water sample results are not satisfactory (≥10cfu/100ml)

Resampling and or further sampling, along with a remediation survey of the water system, should be used to identify problem areas and modifications that may be required as per remediation action flow chart

If water sample results are not acceptable / high (<10cfu/100ml)

Resampling should be completed following action flow chart guidance

It may be possible following strategic flushing for this level of contamination to clear but on going monitoring is required and possible service / mechanical clean and chlorination of outlet

If water sample test results are satisfactory (0 cfu/100ml)

No need to repeat sampling for a period of 6 months
unless there are changes in the water distribution and delivery systems components or system configuration
(e.g. refurbishments that could lead to the creation of dead legs)

Where there are clinical suspicions that water may be linked with patient colonisation or infection water sampling should be undertaken. The frequency of testing can be adjusted by the WSG as required based on clinical need / data.

The following table provides interpretation of P .aeruginosa following sampling:

Interpretation of pre and post flush counts	
High P.aeruginosa count pre-flush (≥10cfu/100ml) and low post-flush count (<10cfu/100ml)	**Suggestive of local outlet problem** See Pseudomonas Action Flow Chart
High P.aeruginosa count pre-flush (≥10cfu/100ml) and low post-flush count (<10cfu/100ml)	**Suggestive of local systemic problem** See Pseudomonas Action Flow Chart

High counts in pre-flush samples but with low or zero counts post-flush would indicate that areas at or near the outlets are the source of contamination. In addition a few positive outlets where the majority of outlets are negative would also indicate that the individual outlets are contaminated.

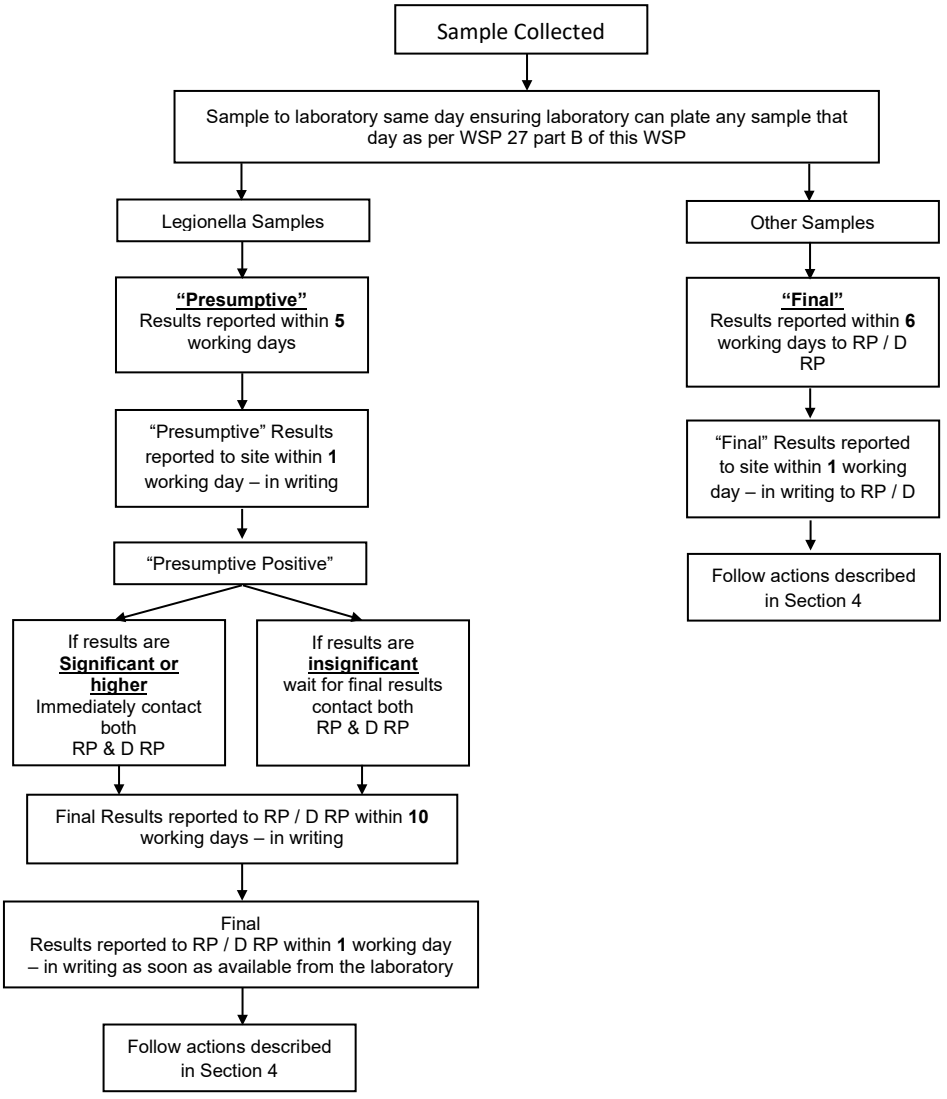
If the samples indicate that the circulating water is the problem, then most outlets would possibly be positive and other points in the water system could then be sampled to assess the extent of the problem.

In the event of an outbreak or incident, further advice on the management of Pseudomonas Aeruginosa contamination in water systems can be sought from PHE which would be led by the IP team and DIPC.

Experience to date has shown no meaningful correlation between the presence and level of P. aeruginosa and the level of total viable count of bacteria

4.7 Sample Results Process Notification / Reporting

The table below shows the expected process following a water sample being taken and how results are to be interpreted / referenced within this WSP:



4.8 Case definitions used by the National Surveillance Scheme for Legionellosis

Confirmed Case:

A clinical diagnosis of pneumonia with laboratory evidence of one or more of the following:

- Isolation (culture) of Legionella species from clinical specimens
- Seroconversion (a fourfold or greater increase in titre) determined using a validated indirect immunofluorescent antibody test (IFAT) incorporating a monovalent L.pneumophilia serogroup I antigen
- The presence of L.pneumophilia urinary antigen determined using validated reagents/kits

Presumptive Case

A clinical diagnosis of pneumonia with laboratory evidence of one or more of the following:

- A single high titre of 128 using IFAT as above (or a single titre of 64 in an outbreak)
- A positive direct fluorescence (DFA) on a clinical specimen using validated monoclonal antibodies (also referred to as a positive result by Direct Immunofluroescence [DIF])

4.9 Classification of Nosocomial Legionellosis

Definite nosocomial:	Legionnaires' disease in a patient who was in hospital for all 10 days before the onset of symptoms.
Probable nosocomial:	Legionnaires' disease in a person who was in hospital for between 1 and 9 days of the 10 days before the onset of symptoms and either became ill in a hospital associated with one or more previous cases of Legionnaires' disease, or yielded an isolate that was indistinguishable from isolates obtained from the hospital water system at about the same time.
Possible nosocomial:	Legionnaires' disease in a person who was in hospital for between 1 and 9 of the 10 days before the onset of symptoms, in a hospital not previously known to be associated with any case of Legionnaires' disease and where no microbiological link has been established between the infection and the hospital.

5.0 COURSE OF ACTION IF AN OUTBREAK OF LEGIONNAIRES' DISEASE IS SUSPECTED

The Trust will usually be informed of a suspected outbreak of Legionnaires Disease by a member of the Trust Infection Prevention team or Health and Safety Executive.

If an outbreak is suspected, then the WSG & above will normally work in association with the Public Health Laboratory and the local Medical Officer for Environmental Health to search for the source of the causative organism. This search is a specialist task which involves epidemiological studies and taking water samples for analysis.

The Health and Safety Executive may be involved in the investigation of outbreaks under the Health and Safety at Work Act 1974. Local authority environmental health officers may also be involved.

It is essential that NO ONE drains or disinfects the systems before samples have been taken.

The Engineers role is an important one - guiding specialists to the various water systems within the building, and, in particular, to the points from which samples can be taken. Easy access to these sampling points is essential.

An investigation would concentrate upon all potential sources of Legionella infection including:

- domestic hot and cold water system distribution
- showers or spray washing equipment
- drainage systems and taps
- therapy pools
- humidifiers
- cooling coils in air conditioning systems
- fountains and sprinklers

To assist in such investigations the Trust Estates team of engineers will need to be able to provide details of all associated equipment, its location, technical data, the operating, and maintenance and spares information on all the above installations. They must assist by advising the investigating team as to the extent of servicing on the site and locating taps and sample points.

Off-site information will also be required such as whether there has been any local excavation or earth moving works; alterations to water supply systems or drainage systems or any other factors which may have a bearing on the site.

The WSG working with the Infection Prevention and Control Group is responsible for identifying the cause of infection and will advice on cleaning, disinfection, any engineering modifications and long- term control measures.

6.0 MAJOR OUTBREAK PLAN

Please refer to the 'Guidance on the Control and Prevention of Legionnaires' Disease in England Technical Paper 1 - Disease Surveillance Date of Issue: August 2010 Document code: LegDisTP1 Version: 01.00

6.1 Introduction:

This plan is largely based on the Trust Outbreak Control Plan, with a few minor alterations to emphasise issues particularly pertinent to the control of legionella.

Legionella species occur naturally in the environment and are particularly associated with water sources. Outbreaks of human disease can be associated with a particular water source, which on occasions has proved to be a health care establishment.

Acute hospitals may be affected by any outbreak, whatever the source, as if large numbers of cases needing admission are involved, the normal running of the hospital may be affected. The Trust microbiology laboratory may also be required to process large numbers of diagnostic or environmental samples.

However, this plan is limited to the actions that should be taken if the source of the outbreak is thought to be one of the hospitals within the Trust.

6.2 Definition of an outbreak:

"A legionella outbreak is defined by the Health Protection England (formerly the Public Health Laboratory Service) as two or more confirmed cases of legionellosis occurring in the same locality within a six month period. Location is defined in terms of the geographical proximity of the cases and requires a degree of judgement. It is the responsibility of the proper officer for the declaration of an outbreak. The proper officer is appointed by the local authority under public health legislation and is usually a Consultant in Communicable Disease Control (CCDC)."

6.3 Detection of an Outbreak:

An outbreak may be detected by a variety of routes and personnel. Clinical, Infection Prevention, Microbiology and Public Health staff shall always consider the possibility of an outbreak when dealing with any case of definite or suspected legionella infection.

Any person, whatever their profession, must contact either the head of estates or engineering manager or member of the Infection Prevention Team immediately, if they suspect that an outbreak of legionella infection may be occurring within the Trust. A member of the Infection Prevention Team or Estates is available 24 hours a day and can be contacted via the hospital switchboard.

The Infection Prevention Team / DIPC will investigate the situation and will decide whether to instigate the 'Outbreak Control Plan – Legionella'. Discussions with the relevant members of the WSG will form part of this early fact finding activity.

It will be noted that when determining whether an outbreak of legionella infection is occurring, cases may not be confined to patients but may also occur in visitors and staff.

6.4 Outbreak Control Plan:

The main objectives of the Outbreak Control Plan are as follows:

- To identify and define at the earliest stage if a legionella outbreak has occurred and if this is associated with the Trust premises.
- To organise satisfactory communication with appropriate internal and external agencies, patients and relatives.
- To identify the source of the infection.
- To stop further spread and prevent its recurrence.

The responsibility for co-ordinating the above objectives, lies with the WSG.

6.5 Outbreak Control Team / WSG - Legionella

The Trust is a large organisation. A legionella outbreak may affect one or more sites. The relevant personnel for each site affected will be included in the Outbreak Control Team / WSG. Some of the roles detailed below will be filled by the same person e.g. the DIPC may also be the microbiologist on the WSG.

The Outbreak Control Team / WSG must be called together rapidly and will comprise:

- DIPC - Director of Infection Prevention and Control or nominated Deputy
- Infection Prevention Nurse(s) - responsible for the site(s) affected
- WSG
- Medical Director
- Nursing Director
- Medical, Nursing and Managerial staff from the site(s) affected
- Estates Management RP / D RP - responsible for water at the site(s) affected
- Clinical Risk manager
- Health and Safety Advisor
- Infectious Disease physician
- Environmental Health Officer

Additional members may be invited to attend the outbreak meeting and may include:

- Trust Authorising Engineer Water
- Senior Bed Manager
- Medical records manager
- Nominations from the Communicable Disease Surveillance Centre or the Division of Hospital Infection, Central Health Protection Agency Laboratory
- Consultant from the local Health Protection Agency Laboratory
- Regional Epidemiologist
- Communications Manager

Secretarial and clerical support must be made available to the Team and regular reports distributed to all Team members.

6.6 Procedure for Outbreak Control Team Meeting / WSG

The first Outbreak Control Team meeting will be co-ordinated by the DIPC.

The terms of reference of the Team are:

- To investigate the source and cause of the outbreak
- To implement measures necessary to control the outbreak
- To monitor the effectiveness of the control measures
- To provide clear guidelines for communication with patients, patients' relatives, media, staff, other health authority services within and outside the Hospital.

Particular topics that must be considered by the Team are:

- Detection of the source and implementation of any remedial measures required
- Case definition and detection of cases
- Diagnostic procedures and the effect on the microbiology laboratory
- Treatment of cases and any change in local empirical prescribing policy
- Effect on the normal running of the hospital
- Managing communication with patients, staff, public and media
- Funding of the above activities
- Defining the end of the outbreak
- Future monitoring and control measures

The DIPC initially act as chairperson and outbreak co-ordinator. The team will decide at the first meeting the roles to be undertaken by each team member. The chairperson and co-ordinator roles may be reassigned if the team so wish.

Each member will keep a daily record of his or her actions in respect of the outbreak and retain them in case the handling of the outbreak is reviewed/challenged at a later date.

It will be noted that the Estates team plays a pivotal role in the detection of the source of the outbreak and implementing any remedial measures.

Subsequent meetings will systematically review the outbreak. The need to obtain further assistance will be formally considered at each meeting. It will be recognised that regional and national expert support is available for legionella outbreaks and the Team will make best use of this via the existing Authorised Engineer for Water.

6.7 End of the outbreak

After the outbreak is officially considered over, a final meeting of the Outbreak Team / WSG will be held to:

- Review the action taken by all participants and to identify any areas for further improvements.
- Recommend if necessary changes which will reduce the chance of recurrence of the outbreak.

6.8 Interim & Final Reports

The Outbreak Control Team / WSG is responsible for providing any interim reports required by the hospital, and the final report at the conclusion of the outbreak, which must be signed by:

- Director of Infection Prevention and Control or nominated Deputy
- Estates Managers RP / DR P - responsible for Water control at the site(s) affected