Water Risk Management Facility Plan Guideline

Contents

1. Purpose

This guideline provides direction in developing an appropriate and compliant site microbial Water Risk Management Facility Plan (WRM Facility Plan).

For the initial development phase of a comprehensive WRM Facility Plan, it is prudent to involve subject matter experts and or consultants to conduct site-specific risk analysis and develop management strategies aligned with the relative WACHS Water Risk Management and Control Policy and Water Risk Management Procedure.

Figure 1: WACHS Water Risk Management Framework

2. Guideline

The region's nominated Water Risk Management Committee (WRM Committee) is responsible for initiating, reviewing, and endorsing all WRM Facility Plans. When developing a site specific WRM Facility Plan, it's crucial to consider and engage the necessary expertise.

For an indicative list of Facility types refer to Regional Network Model Facility List.

- For **low complexity sites** (lower risks and simpler conditions), a WRM Facility Plan aligned with WRM Small Site Template is required at minimum, (including site & floor plans).
- For **high complexity facilities and health campuses** (sites that have identified higher risks associated with complexity, age, design, use of cooling towers and potential immune compromised cohorts) is required to have a WRM Facility Plan in line with Scope. It is recommended that region engage with subject matter experts/consultants for initial development at a minimum.

2.1 Water Risk Management System

A site specific WRM Facility Plan should consider the volume flow rates and design of the water systems across the water infrastructure of the property and how these can have an adverse impact on the quality of the water such that it may no longer meet the health-related guideline values in the Australian Drinking Water Guidelines (ADWG) when measured at the outlet or tap, i.e., point of use.

The design of the site drinking water supply system can be extensive and complex with sections of low flow and outlets that are used infrequently. Such design features may include various water components, i.e., storage tanks, tap outlets, aerators, cold and hot water systems, reuse systems, and additional water quality treatment. It is essential to understand how water quality can be affected at various locations and/or water components within the system of the facility.

2.2 Water System Risk Analysis

The scope of the water system analysis should cover the entire process, from where the water enters the facility to distribution throughout the facility to its final uses. A WRM Facility Plan should consider:

- source and quality of water supply to the facility, such as town mains, private supply, and storage tanks on site
- water distribution system based on available detailed drawings and physical inspections of existing systems
- components of the system that are related to temperature and disinfection, such as hot or warm water systems, cold water pipes, looped and recirculating systems, thermostatic mixing valves (TMVs), tempering valves, backflow prevention devises, thermal insulation of pipes, dosing systems for disinfectant or other chemicals, and filters
- connecting systems, for instance, fire, irrigation systems, landscaping features, birthing pools, spa baths, hydrotherapy pools
- all outlets and locations, for instance, plumbing fixtures and chilled water dispensers
- materials used within the system
- temperature of water throughout the system to identify where water is regularly or seasonally present in the range of >20°C to <60°C for extended periods of time
- details of any previous microbial hazard testing results
- details of any previous cases of microbial hazard infection suspected or found to be associated with the system.

2.3 At Risk Patients Assessment

To evaluate at risk patients the assessment should consider high risk patients noting this is not an extensive list:

- newborn babies
- males
- elderly people >50 years of age
- smokers
- people with chronic obstructive pulmonary disease
- diabetes
- therapeutic immunosuppression
- transplant immunosuppression
- diseases that result in immunodeficiency (HIV, AIDS) and
- people undergoing chemotherapy.

2.4 Hazards and Risks Assessment

To evaluate hazards and risks the assessment should consider:

- A hazard is an agent that has the potential to cause harm
- A hazard source is a location or condition that can give rise to, or increase, a hazard, such as the mains water supply, a reduced pressure zone device, cold water pipe work and the like
- A hazardous event is a situation that can lead to the presence of a hazard caused by a hazard source, such as: A mains water supply (source) may create an external biological contamination within the water supply or produce cold water above 25°C
- A risk is the likelihood that a hazard is to cause harm to people in a specified timeframe, combined with the magnitude of that harm and its consequences.

2.5 Key Risk for WRM Facility Plan Consideration

To evaluate key risks the facility plan should consider:

- Water supply risks can include:
  - Water is provided to the WACHS property via a town water service provider system. This water is used by the WACHS facility to supply the makeup for the on-site drinking water system
  - Private water supply, where the WACHS facility directly obtains its own water through bore supplies, rainfall capture, or other methods
  - WACHS has no control over the supply components (catchment, treatment, bulk water storage, and distribution). These components are the responsibility of the local water service provider. Nonetheless, WACHS is committed to effective communication with the local water service provider to ensure that WACHS is aware of all relevant aspects of the incoming water supply that could affect those sections of the drinking water scheme over which WACHS has direct control.
- Health / Clinical risks can include:
  - Health / Clinical risk is the risk of a person contracting a disease or negative health impact from a water distribution system at the facility
  - To assist in managing exposure risks, it is important to understand the likely susceptibility of patients in any given area of a WACHS facility. The WRMP is to provide a clinical risk ranking for each area of the hospital, classified as:
  - Patient Demographics: The type of procedure or treatment a patient is undergoing can have a direct effect on their immune system and hence their susceptibility to Legionella (e.g., surgery, radiotherapy, chemotherapy, etc.)
  - Patient Risk Factors: The type of condition the patient suffers from can also have a direct impact on their immune status (e.g., cancers, immune system diseases, chronic conditions, age, etc.)
  - Uses of Water - The uses of water in the area are directly linked to the risk of patient exposure via aerosol (e.g., toilets, showers, humidifiers, etc.)
- Plumbing Systems risks can include:
  - Pipework that allows heat transfer
  - Pipework that supports water stagnation, i.e., dead legs/capped pipes to allow for future facility expansion, bypass valves on filters, and patient bathroom unused for 7 days, and decommissioned plumbing fixtures awaiting removal
  - Age or conditions of pipes can provide environmental conditions for the proliferation of microbial growth
- Incorrect selection of pipework material such as:
  - rubber, acrylonitrile butadiene styrene (ABS), styrene butadiene rubber (SBR), and polyvinyl chloride (PVC), as well as corrosion products of iron and steel. These materials increase the risk of microbial growth and may require additional risk management. System materials should also be compatible with disinfection chemicals at the concentrations they are likely to be used
  - Deficiencies in commissioning new pipework. All WACHS facilities commissioning new pipework must undertake a full microbiological test, testing to identify leaks and confirm that the system performs to requirements before normal operation begins. Prior to handover, pre-commissioning disinfection must be undertaken
  - Potential for aerosol exposure
- Heated Water Systems: Water that has been intentionally heated, such as hot water (>60°C) or warm water (~45°C) systems.
- Cold Water Systems
- Equipment and Installations:
  - birthing and spa pools

  - decorative fountains, water features, landscaping. and irrigation systems
  - hydrotherapy pools
  - ice machines and water coolers
  - respiratory therapy equipment
  - showers.
- Water tank storage deficient in stratification, adequately insulated or insufficient turnover.
- HVAC Systems – Cooling Towers etc.

2.6 Implementing Controls

WRM Facility Plan Control measures to be considered:

- Incoming water quality (e.g., high turbidity, high temperature, inadequate residual disinfectant). All WACHS facilities are responsible for the water quality distribution and are managed correctly from the point of entry into the site.
- Plumbing controls, including design, commissioning, and operational controls. Such as maintaining temperature ranges on heated systems, maintaining enough flow, and minimising and managing dead or idle legs.
- Disinfection systems utilise systemic and/or localised treatment, monitoring, and dosing to maintain free chlorine levels and ensure effective operation.
  - Systemic treatments include heat disinfection and chemical measures,
  - Localised treatments include UV light, ozonation, and point-of-use microfiltration.
- Regular maintenance in conjunction with a system of water quality monitoring is performed to ensure all controls are effective, performed as intended and is scheduled with records archived in the WACHS Agility system.
- Exposure controls aim to protect patients, staff, and visitors to facilities from the risk of exposure to water aerosols that may contain microbials. These can include removing aerators from taps, avoiding mist-generating devices, and selecting of shower heads and spray nozzles that reduce aerosol generation.

For each control measure 1-5, it is necessary to determine:

- the objective of the control measure
- the location in the system where the measure is to be implemented and controlled.
- the type and frequency of monitoring for the control measure
- the acceptable limits for the parameter being monitored
- the corrective action to be taken if the parameter fails to meet the acceptable limits
- the documentation procedure for the control measure.

Routine flushing ensures a regular flow of water through the water distribution system allowing any chemical disinfectants to enter the outlets within a water distribution system while reducing water stagnation, biofilm development and bacterial growth. Routine flushing should be undertaken by competent staff and can be performed as part of routine cleaning e.g., during the cleaning of a patient's/resident's room. When conducting routine flushing, the staff member must use a chlorine indicator strip to detect the presence of chlorine and record the indicated value in accordance with the WRM Facility Plan. The main steps for routine flushing should meet the following criteria:

- Turn each cold-water outlet on and run for a minimum of 120 seconds. Turn tap off.
- Turn each warm or hot water outlet on and run water until a steady temperature is achieved or for 120 seconds, whichever is the greater
- If flushing is carried out at low volume, then it needs to go for longer to ensure all the water in the branch line to and from the thermostatic mixing valve is replaced.

- If the room is occupied, flush at a low volume to avoid creating aerosols, but increase the time to 4 minutes.
- For mixer taps, run the water at both the maximum and minimum temperature for 120 seconds.
- Take extra care with showers that have flexible hoses. Although the flexible hose is to not completely drain, where possible, leave the shower head in a position that enables it to drain (note – the shower head should not be closer than 10 cm from the floor)
- If discolouration or odour is noticed while flushing, then continue flushing until the water is clear and/or the odour is gone. If either persists the outlet should be isolated, and the plumbing investigated
- Flush the toilet with the toilet lid down.
- When testing for Free Chlorine Residual (FCR)
    - Compliant
        - FCR reading is ≥0.20 mg/L for warm/hot (post TMV) or ≥0.50 mg/L for cold
    - Non-Compliant
        - FCR reading is <0.20 mg/L for warm/hot (post TMV) or <0.50 mg/L for cold

2.7 Monitoring Tasks

It is crucial to maintain adequate record keeping in accordance with the WRM Facility Plan to include:

- details of where and when
- what was flushed (e.g., Tap/shower) and by whom?
- additional comments.

Task	Controls	Staff Member(s)	Health Risk Considerations	Notes
Incoming Water Quality	IM	Facility managers (FMs) Maintenance Managers (MMs) Maintenance Officers (MOs)		(Temperature, Turbidity, Residual Disinfectant)
Plumbing Controls	IM, OP	FMs, MMs, MOs, Contractors		(Maintaining Water Temperature, Managing Dead Legs)
Regular Maintenance of Water System	IM, OP	MOs, Consultant Engineers, Contractors	• People >45 years of age • Smokers and heavy drinkers • People suffering from chronic respiratory or kidney disease • Anyone with an impaired immune system for example: Autoimmune disorders,	

			HIV/AIDS, Cancer, Organ transplants, Splenectomy, Chronic illnesses, susceptibility to viruses and bacteria	
Exposure Controls	IM	FMs, MMs, Contractors		
Disinfection Systems	IM	MOs, Contractors		
Routine Flush	IM, OP	Cleaners	• People >45 years of age • Smokers and heavy drinkers • People suffering from chronic respiratory or kidney disease • Anyone with an impaired immune system for example: Autoimmune disorders, HIV/AIDS, Cancer, Organ transplants, Splenectomy, Chronic illnesses, susceptibility to viruses and bacteria	
Flushing Low Use Water Outlets (5 minutes x1/week)	OP	MOs,Cleaning Staff, Nurses	• People >45 years of age • Smokers and heavy drinkers • People suffering from chronic respiratory or kidney disease • Anyone with an impaired immune system for example: Autoimmune disorders, HIV/AIDS, Cancer, Organ transplants, Splenectomy, Chronic illnesses, susceptibility to viruses and bacteria	
Inspections	OP	FMs, MMs,	• People >45 years of age • Smokers and heavy drinkers • People suffering from chronic respiratory or kidney disease • Anyone with an impaired immune	

			system for example: Autoimmune disorders, HIV/AIDS, Cancer, Organ transplants, Splenectomy, Chronic illnesses, susceptibility to viruses and bacteria	
Water Monitoring Temperature	OP	FMs, MMs,		
Adequate Disinfectant Residual	OP	FMs, Contractors		
Sampling Procedure	VR	MMs, MOs, Cleaning Staff Contractors	• People >45 years of age • Smokers and heavy drinkers • People suffering from chronic respiratory or kidney disease • Anyone with an impaired immune system for example: Autoimmune disorders, HIV/AIDS, Cancer, Organ transplants, Splenectomy, Chronic illnesses, susceptibility to viruses and bacteria	Appropriately skilled and trained staff must read and follow the DoH Standard Drinking Water Sampling Procedure - Microbiological
Sample Logistics & Time Allocation	VR	FMs, MMs, MOs, Administrative Staff Contractors		Samples must be received at the laboratory no more than 24 hours after sampling in accordance with DoH Standard Drinking Water Sampling Procedure - Microbiological. Remote sites must coordinate with known regional logistic networks to transport from site to Perth laboratory

Table 1: Monitoring tasks - Appropriately skilled and trained staff. Implementing Controls (IM) Operational Monitoring (OP) Verification Monitoring (VR)

2.8 Operational Monitoring

Water system risk	Operational monitoring point(s)	Critical limit/ verification	Frequency of monitoring	Example control measures
Elevated turbidity in incoming water	At point of entry to facility	Turbidity >1 NTU (nephelometric turbidity unit)	Online, weekly or event based	• Request water provider to reduce turbidity of incoming water (e.g., through proactive pipe cleaning) • Once water provider controls source of elevated turbidity, flush facility plumbing to waste, via scour if possible • Filter and/or disinfect at point of entry
Low disinfectant residual in incoming water (does not prevent Legionella growth)	At point of entry to facility	Free chlorine residual or total chlorine in chlorinated water supplies <0.5 mg/L	Online or weekly	• Enquire if water provider can increase disinfectant residual of incoming water • Filter and/or disinfect at point of entry
Stagnation of water in plumbing system	Monitor and record use of water in rooms/facilities	Outlet unused for 7 days	Same day every week	• Flush unused outlets • Remove dead legs
Water temperature (supports Legionella growth)	At selected representative hot and cold-water outlets and storage vessels	Water temperature >20°C or <60°C	Monthly or more frequently if heater is undersized or during extended periods of hot weather. Online continuous monitoring of hot storage and return water temperatures	• Increase temperature of calorifiers/storage • Ensure that hot water pipes do not raise temperature of cold-water pipes (e.g., via appropriate lagging)

Low disinfectant residual within plumbing (does not prevent Legionella growth)	At cold outlets furthest from water supply point-of-entry to facility. At warm water outlets furthest from water heater	Free chlorine residual <0.5 mg/L Free chlorine residual <0.2 mg/L	Weekly	• Boost disinfectant residual at point of entry to facility • Increase flushing to prevent loss of residual within facility • Test again to verify effectiveness of controls

Table 2: Examples of water system risks, operational monitoring and controls for Legionella management in a health or aged care facility. enHealth – Guidelines for Legionella Control

System	Task	Frequency of inspection
Cooling towers and evaporative condensers	• Monitor water quality, water use and chemical component of water treatment program • Microbiological monitoring – total count • Microbiological monitoring – Legionella • System inspection including observation of internal condition of sump, packing and water • System component inspection including dosing equipment, bleed control and drift eliminators • Clean and disinfection of system	At least monthly At least monthly At least quarterly At least monthly At least quarterly At least monthly
Air-handling systems	• System inspection, including valves, pipes, spray nozzles, air-intakes and exhaust outlets • Inspection of humidifiers • Inspection of tanks, trays and discharge pipes • Clean and disinfection of system	At least monthly At least monthly At least monthly At least annually
Heated and cold water systems	• Assess effectiveness of water management system • Inspection of water treatment units • With warm water systems, raise water temperature to 60°C • Clean and disinfection of system	At least monthly At least monthly At least one hour per month At least annually
Spas	• Replace at least 10 per cent of water • Filter water through system • Filter water after use	At least once per week Two hours per day One hour after use

Table 3: Minimum maintenance for systems – Government of WA – Code of Practice. Prevention and Control of Legionnaires' Disease 2010

2.9 Verification Monitoring

Periodic Legionella sampling is an effective means of checking the efficacy of the water treatment regime and a vital component of the overall Legionella risk management program. Legionella testing is also useful as part of an:

- investigation of an outbreak

- validation of effectiveness of control measures
- verification of the effectiveness of decontamination.

Cooling towers and associated water systems should be subject to routine microbiological monitoring as part of the water treatment program designed to control scaling, corrosion, and fouling. Monitoring of pH, total dissolved solids and/or conductivity, bacterial counts and disinfectant or biocide concentration is to indicate when the water treatment program requires modification, and the point at which thorough cleaning and disinfection are necessary.

The WRM Facility Plan sampling programme should cover each individual plumbing system (e.g., at a building, department, or ward level), because plumbing systems may vary in age, performance, and condition throughout a facility. Areas of high clinical risk and the outlet furthest from the point of entry of water into the system should be emphasised. Details of verification monitoring for the facility are to be documented in the WRMP and include:

- the parameters being tested
- testing locations
- the frequency of monitoring is to be proportional to the risk associated with the failure of the process
- operational limit(s)
- the corrective action to be taken and the communication requirements and responsibilities if the parameter is not within the specified operational limit
- the records to be kept for each monitoring activity and corrective action in line with WACHS reporting requirements.

To ensure drinking water quality sampling is executed accurately, WACHS has committed to:

- using qualified contractors and/or standardised techniques for collecting samples for testing
- developing procedures and training for internal staff where internal staff are required to undertake sampling (currently limited to chlorine residual sampling)
- ensuring samples are tested by NATA accredited analytical laboratories for the tests in question
- samples must be undertaken in accordance with DoH Standard Drinking Water Sampling Procedure - Microbiological.

Refer to Appendix B for example tables of recommended testing programs.

Test result (cfu*/mL) (Legionella)	Required control strategy
Not detected (<10)	• System under control • Maintain monitoring and treatment program
Detected as <1,000	• Immediate online disinfection (alternative or higher dose biocide than usual) • Review control strategy • Re-test water within three to seven days of plant operation and assess if further remedial action** is necessary

Detected as ≥1,000	• Immediate online decontamination (halogen-based biocide) • Review control strategy • Re-test water within three to seven days of plant operation and assess if further remedial action** is necessary

*cfu = colony forming units
** Adapted from Australian/New Zealand Standard, AS/NZS 3666.3. Refer to this standard for further information.

Table 4: Control Strategies for the Presence of Legionella – Government of WA – Code of Practice. Prevention and Control of Legionnaires' Disease 2010

Test result (cfu*/mL) (Heterotrophic)	Required control strategy
<100,000	• System under control • Maintain monitoring and treatment program
≥100,000 to <5,000,000	• Immediate online disinfection (alternative or higher dose biocide than usual) • Review control strategy • Re-test water within three to seven days of plant operation and assess if further remedial action** is necessary
≥5,000,000	• Immediate online decontamination (halogen-based biocide) • Review control strategy • Re-test water within three to seven days of plant operation and assess if further remedial action** is necessary

*cfu = colony forming units
** Adapted from Australian/New Zealand Standard, AS/NZS 3666.3. Refer to this standard for further information

Table 5: Control Strategies for the Presence of Other Heterotrophic Microorganisms – Government of WA – Code of Practice. Prevention and Control of Legionnaires' Disease 2010

2.10 Immediate Investigation for Detection

A WRM Facility Plan should direct, where Legionella is in a water sample from the water distribution system and the exposure of vulnerable people should be immediately controlled. Once the exposure is controlled, it is critical to determine possible risk locations and the potential extent of colonisation of the system through increased water monitoring. Where Legionella colonisation has been found, appropriate control measures (e.g., disinfection) to the affected sections or components of the water distribution system or the entire water distribution system depending on the extent of identified or potential colonisation.

If one outlet in a facility produces a positive Legionella test result, compare it with other results across the water distribution system to determine whether the system is locally

contaminated or if there is wider contamination throughout the system. Where Legionella colonisation has been found, apply appropriate control measures (e.g., disinfection) to the affected sections or components of the water distribution system, or the entire water distribution system, depending on the extent of identified or potential colonisation.

In response to a confirmed microbial detection, the elevated water test results are to be highlighted and distributed via email to key identified individuals as per WRM Facility Plan and WRM Committee protocols terms of reference (ToR) (Appendix C). The nominated delegate is to contact local Department of Health (DoH) and IPC representatives as relevant to discuss results and proposed corrective actions.

The WRM Committee to review clinical risk and process for executive to be informed. Points to consider include, but are not limited to:

- potential risk to patients, staff and public
- impact on service/department/location
- previous water sample result history
- lab details for the microbiologists to discuss positive results
- maintenance of confidentiality.

Ensure the above process occurs in timely manner. For example, call to the microbiologist within one hour of receiving a positive sample.

2.11 Legionella Control Measures

The WRM Facility Plan should detail clear actions if Legionella is detected in a facility's water distribution system or a case of Legionnaires' disease is shown or suspected to be linked to colonisation of a facility water distribution system i.e., that one or more of the following control measures or an alternative suitable decontamination procedure should be undertaken as a matter of priority:

- Heat disinfection: This involves flushing all outlets systematically with water ≥70°C for a minimum of 5 minutes, or ≥60°C for a minimum of 10 minutes if 70°C cannot be achieved or maintained, with stringent controls employed to prevent scalding (e.g., actively informing all residents and staff, and preventing use of taps other than by suitably trained and experienced staff). This method is only effective for a short time (i.e., weeks); it should only be considered to provide a temporary remedy while the source of the contamination and possible measures to address it are investigated. Many facilities do not have sufficient hot water storage capacity or the logistical or human resource capability to undertake efficient heat disinfection, and therefore the option to employ this method is limited. Additionally, this method can only be used to disinfect heated water systems.
- Chlorination and hyperchlorination: Maintenance of a free chlorine residual concentration of ≥0.5 mg/L at all cold-water outlets and ≥0.2 mg/L at all heated water outlets can help suppress the proliferation of Legionella in a water distribution system but when colonisation has become established, a higher concentration dose is required. Chlorine dosing in water distribution systems is complicated, and the method used to achieve the desired free chlorine residual throughout the system without causing system damage is dependent on the design of the system and the available infrastructure and expertise.
- Cleaning of fittings or replacement with new or cleaned fittings. This involves the removal and disassembly of the components and inspection and cleaning of individual components in accordance with the manufacturer's recommendations. This is to generally consist of a physical clean followed by an appropriate heat or chemical

disinfection. Thermostatic Mixing Valve (TMVs) are to be maintained in accordance with Australian Standard AS 4032.3.

Implementation of appropriate exposure controls (**Error! Reference source not found.**): This can provide protection to patients and residents while other control measures are being investigated and implemented. Once appropriate control measures have been implemented or undertaken, normal operation of the system and facility can usually recommence immediately. However, exposure controls should be continued and monitored in high-risk areas and for high-risk patients and residents until further sample results indicate that the control measures have been successful.

Samples should be collected for testing not less than 3 days and not more than 7 days following completion of appropriate control measures.

2.12 Response to Suspected/Positive Case of Legionella and/or Other Pathogenic Bacteria

Where a WACHS facility–acquired Legionnaires' disease case is suspected or confirmed, the facility is to follow site WRM Facility Plan actions, including but not limited to:

- Promptly conduct sampling, swabbing, and testing to determine the extent of potential Legionella colonisation within the water distribution system.
- Carry out appropriate precautionary control measures (e.g., chemical or heat disinfection) as a matter of priority.
- Clinical staff and carers are to be advised to consider or raise the possibility of a Legionella infection should residents of the facility present with pneumonia or a respiratory infection.
- The WRM Facility is to include procedures for heightened patient surveillance in response to specified triggers, such as Legionella detection and suspected or confirmed cases,
- Implement exposure controls such as sponge bathing and micro-filtration of water at point of use.
- Contact local public health authority (WA DoH) is required and for further advice.

Any suspected/confirmed Legionella related incidents are to also trigger the need for identified key personnel (to be part of the site WRM Facility Plan) to meet to consider the following:

- event monitoring requirements
- remedial actions, including system disinfection and applicable 'system specific corrective actions'
- communication and engagement of stakeholders
- reporting, internal / external
- appointment of an incident manager
- need for clinical screening
- potential impact on personnel and operations.

In managing and responding to any drinking water quality related incident, WACHS has committed to working cooperatively with the DoH in relation to any public health related aspects of the incident response. This includes providing the DoH with any information it reasonably requires facilitating such an investigation and to protect public health and agreeing to coordinate any public announcement in relation to the incident with the DoH.

3. Roles and Responsibilities

Executive Director – Infrastructure and Environment is responsible for ensuring WACHS has appropriate WRM related policies, procedures, and guidelines in place and provide assurance that Regional WRM Committees are effective in managing microbial hazards.

Director – Infrastructure and Environment is overall person accountable for Water Quality Management across WACHS. Providing assurance that WACHS Water Risk Management Plans and related policies are current and relevant. Responsible for overseeing Regional WRM Committee governance and assurance activities. Escalation pathway for WRM Facility Plans issues and clarification. Accountable for updating WACHS WRM and Control Policy and associated documents.

Regional Executive Directors are accountable for ensuring WRM related policies, procedures, and guidelines are adhered to, that a WRM Committee is established to oversee planning and assurance activities and that all required facilities have WRM Facility Plans that are current, relevant and operationalised locally.

WRM Committee is responsible for initiating, reviewing, and endorsing all WRM Facility Plans. Monitor systems and trends within WRM and ensure effective WRM planning, and assurance activities are developed and implemented. Accountable for the reporting, implementation and delivery of a drinking water quality program as documented within the WRM and Control Policy and WRM Facility Plans. Accountable for the regular review of the water quality management system performance across the group, including but not limited to risk assessment and water system performance by relevant stakeholders with the appropriate knowledge, skills, and expertise. Refer to Appendix C.

Regional Managers of Infrastructure and Support Services are responsible for establishing and maintaining WRM Facility Plans in line with the WRM related policies and Guideline. The WRM Facility Plans require WRM Committee endorsement and oversight.

The **Nominated Responsible Manager** for a facility is responsible for ensuring operational management and response activity aligns to the endorsed WRM Facility Plan with the reporting of activity to WRM Committee.

Maintenance and Facility Managers are to oversee management and control activity and ensure appropriate record keeping as defined WRM Facility Plan.

Infection Prevention and Control Nurses are to support processes in relation to sampling, flushing and other response activities are completed in accordance with the water risk management requirements.

Water Quality Consultant when engaged by the region to provide services such as creation of a WRM Facility Plan in accordance with “Scope” is responsible to undertake actions as specified within the relevant contract. Provides subject matter expertise or consulting, as required.

Other staff identified in the WRM Facility Plan are to undertake sampling, flushing and other response activity as outlined in the WRM Facility Plan.

All staff are required to comply with the directions in WACHS policies and procedures as per their roles and responsibilities. Guidelines are the recommended course of action for WACHS staff are expected to use this information to guide practice. If staff are unsure which policy documents apply to their role or scope of practice, and/or are unsure of the application of directions they should consult their manager in the first instance.

4. Monitoring and Evaluation

4.1 Monitoring

To ensure the guideline is operationalised effectively, the following monitoring activities are to be used for surveillance sampling:

- site WRM Facility Plans are established, reviewed, and endorsed by appointed WRM Committee
- response activity to detection or cases is provided by WRM Committee for quarterly WACHS-wide dashboard reporting
- confirmation that responses to detection or cases are reviewed at the WRM Committee and provided for noting at local Clinical Governance and Work Health and Safety Committee meeting.

4.2 Evaluation

To evaluate the usefulness of this procedure the following are to be considered:

- feedback from WRM Committee meetings to the effectiveness of response activity to detection or cases
- formal reviews of the WRM Facility Plans.

5. References

AS 4775:2007 Emergency eyewash and shower equipment

AS 5369:2023 Reprocessing of reusable medical devices and other in health and non-health related facilities

AS/NZS 3666 SET:2011 Air-handling and water systems of buildings Set

AS 4276.1:2021 - Water microbiology - Water quality - General requirements and guidance for microbiological examinations by culture (ISO 8199:2018, MOD)

AS 4276.2 -1995 - Water microbiology: Culture media, diluents and reagents (Reconfirmed 2013)

AS 4276.3:2021 - Water microbiology: Enumeration of heterotrophic microorganisms – Pour plate, spread plate, membrane filtration and most probable number techniques

AS 4276.4 – 1995 - Water microbiology: Coliforms - Estimation of most probable number (MPN)

AS 4276.5 – 2019 - Water microbiology: Coliforms, Escherichia coli and thermotolerant coliforms –Membrane filtration method

AS 4276.6 – 1995 - Water microbiology: Thermotolerant coliforms and Escherichia coli –Estimation of most probable number (MPN)
AS/NZS 4276.6:2007 - Water microbiology: Coliforms, Escherichia coli and thermotolerant coliforms - Determination of most probable number (MPN)

AS 4276.8 – 1995 - Water microbiology: Faecal streptococci - Estimation of most Probable number (MPN)

AS 4276.9**:**2019 - Water microbiology: Enterococci in water by membrane filtration using membrane – Enterococcus indoxyl-β-D-glucoside agar (mEI)

AS 4276.12 – 1995 - Water microbiology: Pseudomonas aeruginosa - Estimation of most probable number (MPN)

AS 4276.13:2021 - Water Microbiology: Pseudomonas aeruginosa - Membrane filtration method

AS 4276.14:2014 - Water microbiology: Detection of Salmonella spp. (ISO 19250:2010, MOD)

AS 4276.15:2014 - Water microbiology: Examination for Vibrio cholerae

AS 4276.17.1:2016 - Water microbiology: Spores of Clostridium perfringens - Membrane filtration method

AS 4276.17.2:2016 - Water microbiology: Spores of Clostridium perfringens Estimation of most probable number (MPN) using the multiple tube dilution technique

AS 4276.19:2001 - Water microbiology: Examination for thermophilic Campylobacter spp. Membrane filtration

AS/NZS 4276.20:2003 - Water microbiology: Examination for coagulase positive Staphylococci, including Staphylococcus aureus, by membrane **filtration**

AS 4276.21:2019 - Water microbiology: Examination for coliforms and Escherichia coli –Determination of most probable number (MPN) using enzyme hydrolysable substrates (ISO 9308-2:2012, MOD)

AS 4276.22:2019 - Water microbiology: Water quality - Enumeration of Escherichia coli **and** coliform bacteria - Membrane filtration method for waters with low bacterial background flora (ISO 9308-1:2014/Amd 1:2016, MOD)

AS 4276.23:2016 Water microbiology: Soils, sediments, sludges, slurries and bio-solid. Procedures for sample preparation

The National Safety and Quality Health Service (NSQHS) Standards. Sections 3.01; 3.02; 3.08; 3.10; 3.11; 3.12; 3.14; 3.17

Devereaux BM, Jones D, Wardle E, on behalf of the Infection Control in Endoscopy Committee. Infection Prevention and Control in Endoscopy 2021. Melbourne: Gastroenterological Society of Australia (GESA), 2021.

National Health and Medical Research Council – National Water Quality Management Strategy. Australian Drinking Water Guidelines 6 2011

Environmental Health Standing Committee Guidelines for Legionella control in the operation and maintenance of water distribution systems in health and aged care facilities (2016)

Department of Commerce, Department of Mines and Petroleum, Code of Practice Prevention and control of Legionnaires' Disease (2010)

Environmental Protection Act (1986)

Australian Building Codes Board, Handbook Warm Water Systems (2020)

Health (Miscellaneous Provisions) Act 1911, Health (Air-handling and Water Systems) Regulations (1994)

Office of the Auditor General, Regulation of Air-handling and Water Systems Report (2023)

Australian Building Codes Board Plumbing Code Research (Nd)

*Public Health Act 20*16

Department of Health, Licence and Accreditation Regulatory Unit WA Health Facility Guidelines, Engineering Services (Nd)

6. Definitions

Term	Definition
Water Risk Management and Control Policy	The Water Risk Management and Control Policy (WRM and Control Policy) provides standardised direction in relation to water systems in a consistent manner that complies with all Legislative, Australian New Zealand Standards and Policy requirements.
Water Risk Management Committee– region specific	The Water Risk Management Committee (WRM Committee) – region specific, ensures that operational, clinical, and engineering matters are considered in a coordinated, cohesive, cooperative, and holistic way during the process of the development and implementation of WRM Facility Plans and ongoing response to microbial risk.
Water Risk Management Facility Plan	The Water Risk Management Facility Plan (WRM Facility Plan) is required by any facility bound by the WRM and Control Policy that details water risk analysis, management, and response in line with the WACHS WRM Procedure
Water Risk Management Facility Plan Guideline	The Water Risk Management Facility Plan Guideline (WRM Facility Plan Guideline) supports the application of the WRM and Control Policy, and WRM Procedure

	providing direction for the development and management of site-specific WRM Facility Plans.
Water Risk Management Procedure	The Water Risk Management Procedure (WRM Procedure) provides direction on how facilities are to develop and maintain a WRM Facility Plan and what sites require an endorsed WRM Facility Plan

7. Document Summary

Coverage	WACHS Health Care Facilities, Aged Care Facilities, Renal Hostels or any facility that requires a LARU licence
Audience	Any positions identified that have accountability to water management and/or control in above mentioned facilities.
Records Management	Non Clinical: Corporate Recordkeeping Compliance Policy
Related Legislation	*Health (Miscellaneous Provisions) Act 1911* (WA) Health (Air-handling and Water Systems) Regulations 1994 (WA) *Public Health Act 2016* (WA) *Work Health and Safety Act 2020* (WA) Work Health and Safety (General) Regulations 2022 (WA)
Related Mandatory Policies / Frameworks	• Infrastructure (Asset Management) Policy Framework • Public Health Policy Framework • Risk, Compliance and Audit Policy Framework
Related WACHS Policy Documents	• Aseptic Technique Policy • Hand Hygiene Policy • Infection Prevention and Control Policy • Specimen Collection Procedure • Waste Management Policy • Water Risk Management and Control Policy • Water Risk Management Procedure • Work Health and Safety Policy
Other Related Documents	• ABCB Plumbing Code Development Research Report Warm Water Systems (2015) • ABCB Handbook Warm Water Systems (2020) • CDOC, DMP Code of Practice – Prevention and Control of Legionnaires' Disease (2010) • DoH Western Australian Standard Drinking Water Sampling Procedure - Microbiological • DoH Western Australian Health Facility Guidelines for Engineering Services (2021) • enHealth Guidelines for Legionella control in the operation and maintenance of water distribution systems in health and aged care facilities (2015)

	• NHMRC, NRMMC National Water Quality Management Strategy, Australian Drinking Water Guidelines 6 (2011) • Office of Auditor General Regulation of Air-handling and Water Systems Performance Audit (2023) • Regional Network Model Facility List • Water Risk Management - Scope • Water Risk Management - Small Site Template
Related Forms	Nil
Related Training	Nil
Aboriginal Health Impact Statement Declaration (ISD)	ISD Record ID: 3515
National Safety and Quality Health Service (NSQHS) Standards	3.6, 3.12
Aged Care Quality Standards	Nil
Chief Psychiatrist's Standards for Clinical Care	Nil
Other Standards	Below standards available via the WACHS Library: • AS 2031: 2012 Water Quality – Sampling for Microbiological Analysis (ISO 19458:2006, MOD) • AS 4032.3 Water Quality –Valves for the Control of Heated Water Supply Temperatures – Requirements for Field Testing, Maintenance or Replacement of Thermostatic Mixing Valves, Tempering Valves and End of Line Temperature Control Devices • AS/NZS 3500 Set (Parts 0-4):2021 Plumbing and drainage set • AS/NZS 3896:2017 Waters – Examination for Legionella spp. Including Legionella pneumophila • AS/NZS 5667.5:2022 Water quality – Sampling

8. Document Control

Version	Published date	Current from	Summary of changes
2.00	7 August 2024	7 August 2024	• Change of title, previously Legionella Management Guideline • Contemporary guideline required to provide stronger compliance and guidance to water risk management and control, in response to Office of the Auditor General 2022 report findings. • Provides guidance in developing an appropriate and compliant microbial Facility Plans • Provides direction in risk analysis and management strategies • Provides Facility Plan templates
2.01	20 August 2024	20 August 2024	• Updated references and links

9. Approval

Policy Owner	Executive Director Infrastructure and Environment
Co-approver	Nil
Contact	Asset Manager Infrastructure and Environment
Business Unit	Infrastructure and Environment
EDRMS #	ED-CO-21-129508

This document can be made available in alternative formats on request.

Appendix A: Water Risk Management Activity Examples

Task	Responsibility		AS NEEDED	DAILY	WEEKLY	MONTHLY	QUARTERLY (3-MONTHLY)	BI-ANNUALLY (6-MONTHLY)	ANNUALLY
	Site / Contractor	Position / Team							
INCOMING WATER									
Measurement of Free Chlorine Residual (FCR) at incoming mains feed	Site	FM		x					
Manual dosing of hypochlorite at Water WST's	Site	FM	x						
Incoming water filters to be inspected / cleaned / replaced	Site	FM	x						
Calibration and maintenance of incoming mains chlorine meter probe (and any other probes e.g. pH, EC, turbidity etc)	Site / Contractor	FM	x						x
Measurement of temperature	Site	FM	x		x				
Microbiological sampling as per SITE XXX Water Quality Monitoring Program	Site / Contractor	FM	x			x			
Flushing of dead & idle legs (e.g. 'backup' lines, etc.) & documenting	Site	FM			x				
Daily inspection of Water Treatment Plant (WTP) – operation, leaks, alarms, chemical reservoirs etc.	Site	FM	x	x					
Engage with the Water Supplier	Site	FM	x						
Review of Implementation Program	Site	Committee	x						x
DRINKING WATER SYSTEMS									
Daily & Weekly Inspections	Site	FM	x	x	x				
Flush little used outlets / dead legs	Site	FM, Cleaning	x		x				
Flushing of bypass lines	Site	FM, Cleaning	x		x				
Monthly HPC, Legionella, Pseudomonas aeruginosa, Amoeba and E. coli sampling on rotational basis as per the verification monitoring program	Site	FM, Cleaning	x			x			
Weekly E. coli sampling of feed water supplied to hospital	Site	FM, Cleaning	x		x				
Metals suite sampling on rotational basis as per the verification monitoring program	Site	FM	x			x			
Record selected sentinel outlet temperatures	Site	FM	x			x			
FCR monitoring (from all sampled outlets)	Site	FM	x			x			
Clean and disinfect drinking water systems	Site	FM, Cleaning	x						
FCR monitoring of incoming mains and designated FCR monitoring points (distal outlets) across system	Site	FM	x	x					
HOT WATER SYSTEMS									
Hot water recirculation pump checks (if not linked to BMS)	Site	FM			x				
Rotation of 'standby' and 'duty' pumps (if not automated)	Site	FM			x				
Hot / warm water flow and return temperature checks (if not linked to BMS)	Site	FM				x			
Representative routine temperature monitoring hot water outlets (distal outlets)	Site	FM				x			
Recalibration of temperature gauges	Site	FM	x					x	

Drain / clean / flush of tanks / heat exchangers / calorifiers / generators etc.	Site	FM	x						x
Heat exchanger maintenance	Site	FM	x						x
Testing of high temperature alarms	Site	FM	x					x	
Testing of auto shutdown of high temperature	Site	FM	x						x
Clean and disinfect hot water systems	Site	FM	x						
Pasteurisation of hot water systems	Site	FM	x			x			
Testing, servicing & maintenance of TMV's	Site	FM	x						x
Clean / disinfection / replacement of showerheads	Site	FM	x						
WATER STORAGE TANKS (WSTS)									
FCR monitoring at WSTs (or closest outlet)	Site	FM			x				
Manual dosing of chlorine at WSTs	Site	FM	x						
WST inspections (screening, internal condition, float valves, lid locked etc.)	Site	FM	x			x		x	
WST cleaning and disinfections	Site	FM	x						x
POTABLE OUTLETS									
Water cooler cleaning & disinfection	Site	FM	x						
Hydrotap servicing and maintenance	Site	FM	x						
Replacement of filters	Site	FM	x						
Drinking Water Program Review	Site	FM	x						x
HUMIDIFIERS									
Inspect and clean cylinders	Site	FM				x			
Drain down tank until empty	Site	FM				x			
Check condition of flexible hoses, gaskets for fouling or leaks	Site	FM				x			
Check operation of humidifier by altering set point in IELVs/on Loytec	Site	FM				x			
Ensure that all drains are clear	Site	FM				x			
Fill tank and ensure water level sensor for correct operation	Site	FM				x			
De-scale and clean the steam cylinder or record/report if replacement is required (Replace 12 monthly)	Site	FM				x			
Check and verify IELVS alarm operation with plant operator	Site	FM					x		
Check and verify local alarm operation	Site	FM					x		
Check water level, adjust if necessary	Site	FM					x		
Check operation of automatic blow down devices	Site	FM					x		
Check operation of humidifier and humidifier valves	Site	FM					x		
Check steam generator and steam traps	Site	FM						x	
Check and electrical connections	Site	FM						x	
Check humidifier strainers and drains for obstructions / deposits – clean where necessary	Site	FM						x	
ZIP CHILLED & BOILED WATER									
Check for correct operation	Site	FM	x						x
Check and Record hot and cold temperatures (>98°C and < 10°C)	Site	FM							x
Check Silicon Hoses and replace as needed	Site	FM							x
Check Main solenoid shuts off water supply	Site	FM							x

Check and test isolation, non-return and pressure reduction valves	Site	FM							x
Check control panel for faults	Site	FM	x						x
Check Water Filter change indicator. Replace Filter if required (must replace after 6 months or 5,000L)	Site	FM	x					x	x
Check and clean air filter, remove all lint and dust from intakes, vents and fans	Site	FM	x						x
Clean unit and work area	Site	FM	x						x
Disinfect the chilled water tank with chlorine (> 5 mg/L) for 1 hour, then drain and flush until the free chlorine level is below 1 mg/L	Site	FM	x						x
END POINT FIXTURES									
Water cooler and shower head cleaning & disinfection	Site	FM, Cleaning	x						
Servicing and maintenance of end point fixtures	Site	FM	x						
Replacement of water cooler / drinking fountain filters	Site	FM	x						x
Replacement / cleaning of Aerators	Site	FM	x					x	
Replacement / cleaning of Showerheads and Hoses	Site	FM	x					x	
MANAGEMENT ACTIONS									
Trend analysis of water quality results (using Compliance Tool software)	Site	FM, Committee	x			x			
Review of drinking water program performance for Regional WRM Committee meeting	Site / Contractor	Committee	x					x	
Onsite *Legionella* / Water Quality Awareness Training	Site / Contractor	Committee	x						x 2yrs
Review of Implementation Program (Compliance Tool software checks)	Site	Committee	x						x
EMERGENCY SHOWERS									
Flushing (shower and eyewash) & Inspection	Site	FM	x		x				
Microbiological sampling (Legionella, HPC and E.Coli) and trending as per *SITE XXX* Water Quality Monitoring Program (quarterly on rotational basis)	Site	FM	x				x		
Eyewash nozzle and shower head cleaning / replacement	Site	FM	x		x				x
Flow testing and verification of valve operations (audit as per AS 4775)	Site	FM	x						x
Trending of microbiological results	Site	FM, Committee	x						
Review of Implementation Program	Site	Committee	x						x
ICE MACHINES									
Inspections	Site	FM	x		x				
Flush little used outlets / dead legs	Site	FM	x		x				
Flushing of 'bypass' / 'backup' lines / system	Site	FM	x		x				
Microbiological sampling as per SITE XXX Water Quality Monitoring Program (Legionella, HPC and E.Coli)	Site	FM	x				x		
Ice machine servicing, cleaning &	Site	FM	x				x		
disinfection									
Trend analysis of water quality results	Site	FM, Committee	x				x		
Review of Logbook & Implementation Program	Site / Contractor	Committee	x						

Onsite Legionella Training	Site / Contractor	Committee	x						x
FIRE WATER									
Legionella and HPC sampling (only if outlets being utilised for purposes other than firefighting)	Site	FM	x						
Flushing of fire systems based on micro results	Site	FM	x						
Inspection of fire tanks	Site	FM	x						X 5yr
Scouring / cleaning and disinfection of fire tank	Site	FM	x						
Trending of microbiological results	Site	FM, Committee	x			x			
Review of Implementation Program	Site / Contractor	Committee	x						x
GARDEN IRRIGATION SYSTEMS									
Legionella & HPC Sampling (irrigation systems) if required or uses change	Site	FM	x					x	
Legionella, HPC and E. coli sampling (Lake Water)	Site	FM	x					x	
Flushing of dead legs / 'little used' outlets	Site	FM	x						
Trending of microbiological results	Site	FM, Committee	x					x	
Review of Implementation Program	Site / Contractor	Committee	x						x
HYDROTHERAPY POOL									
Daily / weekly / monthly inspections	Site	FM	x	x	x	x			
Four hourly sanitizer concentration and pH checks	Site	FM	x	x					
Clarity, ambient temperature and relative humidity checks	Site	FM	x	x					
Total alkalinity, calcium hardness and water balance checks	Site	FM	x		x				
Microbiological sampling	Site	FM	x			x			
UV unit inspections (to include checks for leaks, lamp operation, UVT, hours run, etc.)	Site	FM	x		x				
Flushing of 'bypass' lines (UV unit & media filter)	Site	FM	x		x				
Servicing & maintenance of 'Y' strainers	Site	FM	x						
Inspection of balance tank	Site	FM	x				x		
Scouring / cleaning and disinfection of balance tank	Site	FM	x						
Review of Implementation Program (the Water Quality Compliance Tool checks)	Site / Contractor	Committee	x						x
UV SYSTEMS									
UV Unit inspections	Site	FM	x	x					
UV Lamp replacement	Site	FM	x						
UV Quartz cleaning	Site	FM	x					x	
Temperature monitoring at WSTs	Site	FM				x			
Recommended Program	?	?							
RO WATER SYSTEMS									
Daily & Weekly Inspections	Site	FM	x	x	x				
Physical & Chemical Monitoring	Site	FM	x			x			
Inspection of WST's	Site	FM	x			x			

Scouring / cleaning and disinfection of permeate WST's	Site	FM	x						x
Inspection and recharging of brine salt tanks	Site	FM	x	x					
Testing of 'backup' CSSD RO system	Site	FM	x		x				
Flushing of CSSD 'backup'	Site	FM	x		x				
WATER SUPPLY									
Replacement of filters	Site	FM	x				x		
Microbiological sampling (Legionella & HPC Sampling)	Site	FM	x						
AS5369:2023 investigative sampling	Site	FM	x						
ALL MISCELLANEOUS SYSTEMS									
Trending of microbiological results	Site	FM, Committee				x			
Technical Review	Site / Contractor	Committee	x						x
Review of Logbook	Site / Contractor	Committee	x						x
Recommended Program									
RMD REPROCESSING SYSTEMS (WASHER DISINFECTORS, MANUAL REPROCESSING, AERS, STEAM STERILISERS)									
Daily & Weekly Inspections	Site	FM	x	x	x				
Servicing and Maintenance of RMD Reprocessing equipment	Site	FM	x						
Replacement of filters	Site	FM	x						
Physical & Chemical Representative Sampling as per AS5369:2023 – Metals and Inorganics	Site	FM	x			x			x
Microbiological Representative Sampling as per AS5369:2023	Site	FM	x			x	x		x
Investigative Water Quality Monitoring as per AS5369:2023	Site	FM	x						
Review of Implementation Program (the Water Quality Compliance Tool checks)	Site / Contractor	Committee	x						x
ENDOSCOPY SYSTEMS									
Microbiological Surveillance of endoscopes as per the GENCA/GESA Infection Control in Endoscopy Guidelines (2021)	Site	FM	x			x	x		
MISTING SYSTEM									
Flushing of dead legs / 'little used' outlets / bypass line	Site	FM	x						
FCR monitoring	Site	FM	x			x			
Temperature monitoring	Site	FM	x			x			
Microbiological sampling as per the Verification Monitoring Program	Site	FM	x						
Trending of microbiological results	Site	FM, Committee	x						
Technical Review	Site / Contractor	Committee	x						x
Review of Logbook	Site / Contractor	Committee	x						x
WASHDOWN SYSTEM									
Flushing of dead legs / 'little used' outlets / bypass line	Site	FM			x				
FCR monitoring	Site	FM	x					x	

Temperature monitoring	Site	FM				x			
Microbiological (Legionella, HPC and E.Coli) sampling as per the Verification Monitoring Program	Site	FM						x	
Trend analysis of water quality results	Site	FM, Committee	x						
Review of Logbook & Implementation Program	Site / Contractor	Committee	x						
Onsite Legionella Training	Site / Contractor	Committee	x						
HVAC SYSTEMS									
Inspections on cooling coils, air intakes, exhausts, drip trays and sumps, drains, traps & tundishes	Site	FM	x		x	x			
Inspections on HVAC fans	Site	FM	x				x		
Inspections on ductwork drainage, supply air outlets, return air outlets and relief grills	Site	FM	x			x			
Cleaning and disinfection of HVAC units and associated components	Site	FM	x				x		
Legionella and HPC sampling	Site	FM	x			x			
Technical Review	Site / Contractor	Committee	x						x
Trending of microbiological results	Site	FM, Committee				x			
COOLING TOWERS									
Physical checks including controller, dosing units, pumps, contamination, float valves, etc	Site	FM			x	x			x
Adjust cooling water operating parameters (dose rate, bleed rates, etc.)	Site	FM	x						
Operation of cooling tower water treatment recirculation pumps	Site	FM	x	x					
Flushing of dead legs	Site	FM				x	x		
Water treatment service reporting & results review	Site	FM	x						
Bio-dispersant dosing	Site	FM	x						
Biocide and scale inhibitor level checks	Site	FM	x						
Corrosion inhibitor dosing	Site	FM	x						
Calibration of controllers	Site	FM	x						
Cleaning of probes	Site	FM				x			
Functional checks on solenoid valves	Site	FM				x			
Cleaning of inlet strainers	Site	FM	x						
Physical checks on side-stream filtration system	Site	FM			x				x
Filter backwash & servicing	Site	FM							x
Circulation of cooling tower and condenser basin	Site	FM		x					
Trend analysis of water treatment results including HPC, Legionella & dip slides	Site	FM				x			
Legionella & HPC sampling	Site	FM				x			
Corrosion Monitoring	Site	FM					x		
Makeup water quality test HPC & Leg	Site	FM				x			
Monitoring of makeup water quality	Site	FM				x			

Clean and disinfection of cooling systems (including drift eliminators, louvers & packing)	Site	FM					x		
Inspection of bund integrity	Site	FM				x			
Review of Logbook	Site	FM, Committee	x						
Onsite Legionella Training	Site	FM, Committee	x						
Program technical review	Site	FM, Committee	x						
CSSD WATER SYSTEMS									
Daily & Weekly Inspections	Site	FM	x	x	x				
Replacement of filters	Site	FM	x						
Physical & Chemical Sampling of EPS and WD – (full chemistry annually)	Site	FM	x			x			
Physical & Chemical Sampling of Manual Cleaning Sinks – (full chemistry annually)	Site	FM				x			x
Physical & Chemical Sampling of Steam Sterilisers as per AS5369:2023	Site	FM							x
Microbiological Sampling of Washer Disinfectors – as per AS5369:2023	Site	FM	x			x			
Microbiological Sampling of Endoscope Washers – as per AS5369:2023. Link to water quality testing document in TRIM perhaps - ED-CO-21-454638	Site	FM				x			
Microbiological Sampling of Manual Cleaning –TVC (only if filter bank present) only if utilised as final rinse water for reprocessed RMDs	Site	FM					x		
Microbiological Sampling of EPS and WD – Endotoxins	Site	FM							x
HARVESTED STORMWATER SYSTEMS									
Daily & Weekly Inspections	Site	FM	x	x	x				
Inspection of tanks	Site	FM	x			x			
Cleaning and disinfection of tanks	Site	FM	x						
Formalised biocide dosing (proposed automation, currently manual reactive disinfections)	Site	FM	x						
Legionella, E. coli and HPC sampling	Site	FM	x				x		

Appendix B: Example of Water Samples Collected

Type of Water Sample	Amount	Frequency	Parameters Tested
Potable Water (DWS) Hot and Cold	73 avg.	Monthly	HPC, Legionella, pH, Temperature, Free Chlorine
Recycled Water (RCW)	9	3 Monthly	HPC, Legionella, pH, Temperature, Free Chlorine
RCW (proposed)	9	Annually	E. coli, Somatic Coliphages, Clostridium
Evaporative Cooling Towers (CWT)	9	Monthly	HPC, Legionella, pH, Temperature, Free Chlorine
Evaporative Fluid Coolers (EFC)	8	Monthly	HPC, Legionella, pH, Temperature, Free Chlorine
CSSD - Endoscope Washer - Final Rinse (current)	7	Monthly	link to ED-CO-21-454638
CSSD - Washer Disinfectors	9	Monthly	link to ED-CO-21-454638
Ice Machines	7	Monthly	HPC, Legionella, TC, E. coli
Irrigation Water (IRR)	6	6 Monthly	HPC, Legionella, TC, E. coli, Ps. A.
Non-Potable Water (NPW)	6	6 Monthly	HPC, Legionella, pH, Temperature, Free Chlorine
Renal Dialysis - Microbiological	4	3 Monthly	HPC, Endotoxins
Renal Dialysis - Metal Trace	4	6 Monthly	ChemCentre Renal Dialysis Suite
Australian Drinking Water Guidelines (ADWG)	3	Annually	ChemCentre Domestic Water Suite
Reverse Osmosis flow and return (CEP)	2	3 Monthly	TVC, Endotoxins
Reverse Osmosis tanks (CEP)	2	6 Monthly	Chemistry to AS 5369-2023. 7.2.3.1. Water quality
Supply Water E. coli (Feed)	2	Weekly	TC, E. coli
Softened Water return (MNH L2)	1	3 Monthly	TVC, Endotoxins
Hydrotherapy Pool	1	Monthly	HPC, Legionella, TC, E. coli, Ps. A., Amoebae, Naegleria

Appendix C: WRM Committee Terms of Reference Example

Role / Position		Responsibility
Regional WRM Committee	**Executive Director (ED)**	**Program Management** Overall person accountable for Water Quality Management across the Region. **Incident Response** Accountable for the reporting and implementation of a drinking water quality program as documented within the WRMCP and WRMP. **Documentation and reporting** Accountable for ensuring adequate documentation relating to drinking water quality management is kept and maintained across the group. **Review and Improvement** Accountable for the regular review of the water quality management system performance across the group, including but not limited to risk assessment and water system performance by relevant stakeholders with the appropriate knowledge, skills, and expertise.
	Director of Nursing (DON) / Health Service Manager (HSM)	**Program Management** Overall person accountable for providing executive level clinical management regarding water quality. **Incident Response** Accountable for delivery of incident response procedures from a Health Facility and an Infection Prevention and Control perspective. **Documentation and Reporting** Accountable for ensuring adequate documentation relating to Legionella detections and any Legionellosis cases are kept and maintained. Responsible for the reporting and implementation of a drinking water quality program as documented within the WRMP. **Training and Awareness** Responsible for ensuring that relevant employees and clinical employees are familiar with and trained to implement the WRMP.
	Regional Manager Infrastructure and Support Services (RMISS)	**Program Management** Overall person responsible for Water Quality Management and Site(s) WRMP. **Incident Response** Accountable for the action and closeout of incidents by the WRM Committee as determined by the WRMP. Responsible for the reporting and implementation of a WRMP program as documented within the WRMCP and associated documents. Is one of four primary contacts in the event of a Legionella or water related incident. Ensure that all personnel associated with the management, operation and maintenance of the water systems are aware of the corrective actions. **Performance and Monitoring**

		Is a recipient of Legionella and related water quality results. Reviews performance of relevant employee's actions follow the completion of response to an incident. **Training and Awareness** Responsible for ensuring that relevant employees and contractors are familiar with and trained to implement the WRMP. Responsible for communicating any updates / changes to the LRMP to the relevant stakeholders. Responsible for the implementation of a formalised water management awareness training program. **Documentation and Reporting** Responsible for ensuring adequate documentation relating to drinking water quality management is kept and maintained **Review and Improvement** Responsible for the regular review of the water quality management system performance, including but not limited to the Site(s) WRMP and water system performance by relevant stakeholders with the appropriate knowledge, skills and expertise. Reviews local regulatory requirements and implements as required (including licensing or registration requirements where applicable). Ensures that any information relating to the management and operation of the water systems is made available to internal and external auditors and stakeholders upon request. Engages independent external auditors to audit the WRMP every 5 years. Ensures that a baseline Legionella / water hygiene risk assessment has been undertaken on all the on-site water systems and that a review is undertaken (at least every 4 years, or 2 years for residential patient areas) or if any organisational, design and/or operational changes have been made affecting the water systems.
	Facilities Maintenance (FM)	**Program Management** Implements a Water Quality Management Program as documented within the WRMCP and associated documents. Identifies and documents water systems and equipment that are a potential source of Legionella. Assesses water systems and equipment for the risk of Legionella in line with the risk assessment and legislative requirements: Evaluates risk factors, including, as a minimum, water aerosol formation, stagnant water, dead zones, water temperature, mineral deposits, and visible biofilm. Reassesses the risk for each water system affected by an organisational, design and/or operational change. Is responsible for the day-to-day operations relating to water quality management. Delegation of day-to-day responsibilities relating to Legionella management. **Incident Response** Is one of four primary contacts in the event of a Legionella or water related incident. Ensures the effectiveness of incident or emergency responses are reviewed.

		Delegation of day-to-day responsibilities relating to water quality management. Is the primary respondent to reports of a suspected / confirmed case/s of Legionnaires disease. Responsible for notifying relevant personnel of elevated Legionella results and initiating incident response procedures from an FM perspective. Responsible for incident responses (which include co-ordination and reporting) to suspected / confirmed case/s of Legionnaires' disease. Communicates corrective actions to all personnel associated with the management, operation and maintenance of the water systems. Establishes alerts to inform employees about the presence of Legionella contamination and the measures to be taken. Restricts access and applies corrective actions to clean and disinfect Legionella contaminated facilities when Legionella water test results exceed the requirements outlined within the WRMCP. Provides training and personal protective equipment (PPE) for work activities on Legionella contaminated facilities. Ensures the effectiveness of incident or emergency responses are reviewed. **Performance and Monitoring** Is a recipient of Legionella and related water quality results. Is accountable for the effective implementation of the WRMP. **Training and Awareness** Assists with the implementation of a formalised drinking water management awareness training program. Ensures that any changes to the WRMP are communicated to the relevant stakeholders. Ensures relevant employees and contractors are familiar with and trained to implement the WRMP. Provides training and personal protective equipment (PPE) for work activities on Legionella contaminated facilities. **Remediation** Advises the Regional WRM Committee when corrective action to drinking water quality is required. Co-ordinates maintenance of end-point fixtures. Co-ordinates the operation, repair, maintenance, decontamination preservation and decommissioning of the water infrastructure. Responsible for ensuring that the water systems can be operated in such a manner that provides a safe environment for personnel. **Documentation and Reporting** Accountable for the maintenance of records related to Legionella operational, verification and 'event based' Legionella monitoring samples. Quarterly reporting prepared and submitted to the Hospital Infection Prevention and Control Committee. **Review and Improvement** Ensures regular review of the water quality management system performance, including but not limited to risk assessment, and water system performance by relevant stakeholders with the appropriate knowledge, skills, and expertise.

		Determines and implements a control program that includes a maintenance and inspection program (where required) and monitoring program for Legionella in water systems at the facility and in equipment at risk and documents results: Applies controls to minimise water misting, stagnant water and dead zones, and manage water temperature. Implements a preventive maintenance and inspection program to monitor equipment and manage water treatment. Ensures testing of water systems and equipment at the facility using sampling and analysis protocols in accordance with established local requirements or internationally recognized standards. Restricts access and applies corrective actions to clean and disinfect Legionella contaminated facilities when Legionella water test results exceed the requirements outlined within the WRMP. Provides training and personal protective equipment (PPE) for work activities on Legionella contaminated facilities. Establishes alerts to inform employees about the presence of Legionella contamination and the measures to be taken.
	Regional Infection Prevention and Control (IPC)	**Program Management** Acts as a subject matter expert and advise, as necessary. **Incident Response** Is notified of Legionella and related 'out of specification' water quality results. Communicates (as required) water quality infection related risks on site to WACHS employees / contractors. **Performance and Monitoring** Is a recipient of Legionella and related water quality results. **Training and Awareness** Responsible for supporting IPC related training for relevant employees to assist with implementation of the Water Risk Management Policy and related documents. **Review and Improvement** Participates in providing subject matter expertise during reviews of water quality management system performance, including risk assessments, the WRMP and water system performance. Participates in the review of the effectiveness of incident or emergency responses. Participates in the review of the effectiveness of the WRMP.
	Maintenance Supervisors	**Incident Response** Follows directions of the RMISS and Facilities Manager and undertakes required responsibilities under the WRMP. **Performance and Monitoring** Reports any suspected concern(s) surrounding water quality. **Training and Awareness** Is aware of the risk of Legionella within the facility. Undertakes Legionella awareness training as required. **Remediation** Implements corrective actions and maintenance. **Documentation and Reporting** Responsible for ensuring adequate documentation is kept and maintained.