

## W03.2.1 Implement Legionella Management Plan

### Technical Document

WELL Building Standard™ version 2 (WELL v2™), Q1 2021 addenda



#### HOW TO USE THIS DOCUMENT:

This document is intended to serve as a guide on how to create a project **technical document to implement protocols to reduce risk of water quality loss and Legionella colonization**.

This document is meant to demonstrate an acceptable degree of detail for a documentation submission. The Feature cannot be demonstrated solely through a confirmation that the requirements have been or will be implemented. The level of detail is up to the discretion of the project team, but the documents must include specific details demonstrating that the actual policies/protocols have been enacted in the project boundary.

This document and similar tools are intended to assist projects in their pursuit of WELL v2 but use of this document and/or similar tools are in no way a guarantee of achievement of any rating or designation, and no representation or warranty is made regarding the likelihood of achieving any rating or designation.

Note: The below document is based on the Q1 2021 addenda of the WELL Building Standard™ version 2 (WELL v2™). Project teams are required to implement the feature requirements from the addenda version assigned to their project or any more recent addenda version.

#### FEATURE PART REQUIREMENTS:

##### 1: Legionella plan development

*The project provides a Legionella management plan that meets the following requirements:*

- a. *Addresses hot water systems, cooling towers, decorative fountains and any other devices or spaces under control of the project where water is recirculated and aerosolized.*
- b. *Includes the items listed below:*
  1. *Determination of roles for Legionella management in the building, distinguishing those under project control from those that may be the responsibility of building management or other parties.*
  2. *Water system inventory and process flow diagrams of systems within the project boundary.*
  3. *Hazard analysis of water assets within the project boundary. If the project does not operate the building hot water supply system (e.g., boilers, heaters, pumps or hot water risers), then an explanation of the building-wide Legionella management policies (if any) and how they influence risk is included.*
  4. *A list of monitoring actions for relevant variables (e.g., temperature or residual chlorine), performance limits associated with these variables, and corrective actions when variables exceed such limits.*
  5. *A list of critical control points (locations where actions to maintain relevant variables listed in (4) within performance limits are applied) within the project boundary.*
  6. *Verification and validation procedures for evaluating the suitability and proper implementation of the management plan. A Legionella sampling schedule is included if projects have operational control over cooling towers and spas.*
  7. *Protocols for documenting results of monitoring activities and corrective actions. If sampling for Legionella is planned, results are included.*

#### WELL Core Guidance:

Meet these requirements in the whole building.



The below sample documentation is intended to provide guidance in creating a Legionella management plan. It is not a template. You may note included components that are not required to demonstrate compliance with this Feature.

Example document for Feature Part 2.1: Legionella plan development

1. Water Management Team Roles and Responsibilities

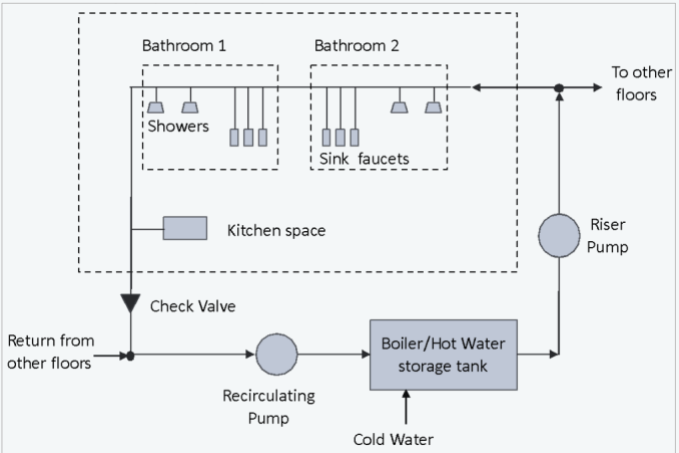
Name	Title	Role	Phone	Email
Ex: [name]	Ex: Building manager	Ex: Leads water management team, procures services (including water and plumbing consultants).	Ex: [number]	Ex: [email]
	Ex: Building engineer	Ex: On-site responsible for HVAC and hot water delivery, maintains shared facilities, common areas. Implements building's water management plan.		
	Ex: Office space manager	Ex: Maintains plumbing within the tenant space.		
	Ex: Building water consultant	Ex: Contractor to implement/evaluate water management plan.		
	Ex: Building maintenance associate/evening shift	Ex: Backup Emergency point of contact.		
	Ex: Building security / night shift	Ex: Emergency point of contact - midnight.		
	Ex: Plan preparer	Ex: Person who wrote the plan and is knowledgeable of the building.		

2. Water system inventory and process flow diagrams:

The space occupies the totality of the [X] floor of the whole building, which has [X] floors above ground. The internal layout is open plan, with its north-west portion having a small kitchen and having two bathrooms placed near the elevator bank. Each bathroom has [#] showers, [#] toilets and [#] sinks with automatic sensor operated faucets.

The sink faucets provide warm water (hot/cold mix). The showers have a single faucet with controllable temperature and flow. A centralized recirculating hot water system delivers water to the office. The building has a cooling tower that provides heat rejection for the AC system. No bathtubs/spas or spraying misting fountains are part of the project, nor are present in the building's common entryways.

Based on the recommendations set in the [Legionella Toolkit](#) developed by the US Centers for Disease Control and Prevention, the tenant's water safety plan should address risk related with the cooling tower and the hot water distribution system. The process flow diagram shows the main components of the hot water supply and delivery to the tenant space.



### 3a. Hazard analysis of water assets (tenant space with responsive landlord)

The project is an office space with a regular weekly occupancy of [X] people of approximate ages ranging [X - X]. Facilities are to be used primarily during weekdays [timeframes]. Each showerhead is expected to be used [X] times a week on average, mainly during mornings by bike commuters.

Approximately [X%] of the population is in an age group with higher incidence of Legionnaires disease (for further reference basic clinical information can be found [here](#); also see the [ESGLI guidance](#) and Hong Kong [Code of Practice](#) for risk analysis).

The building is fed by municipal tap water that uses chloramines as the primary disinfectant. A core building Legionella management plan is available to tenants upon request. It describes sentinel and control measures towards managing the building's cooling tower (including sampling), periodic maintenance of the cold-water tank, and features in the lobby/first floor. A copy of the plan dated [X], is appended to this document.

The building performs weekly monitoring of the hot water temperature at an unmixed basement tap to confirm the hot water delivery temperature. Records as of [date] show hot water delivered of [X]°F / [X]°C. Since there is no thermostatic mixing before this temperature is unlikely to foster Legionella amplification as it is well above its development range. A walk through the basement showed good pipe insulation. The plumbing for the project has all fixtures (showerheads and faucets) installed with thermostatic mixing valves set at a maximum temperature of [X]°F / [X]°C to prevent scalding.

Records of quarterly Legionella sampling of the cooling tower system are available as well as all maintenance activities; the latest report, dated [X], showed [X] CFU/mL of Legionella pneumophila serogroup 1, while prior tests were non-detect. No maintenance activities have been recorded at the cooling tower since. The rooftop air intakes are located away and protected from drift from the cooling towers.

Overall, the main risks for contamination include:

- ✓ Stagnation of water in showerheads and handwashing facilities after the weekend recesses.
- ✓ A slim risk for intrusion of Legionella from the cooling tower drift into the air conditioning system.

Since the hot water is delivered at [X] °F ([X] °C) and mixed at the point of use, there is little risk of Legionella amplification from the core building plumbing. However, periodic testing of the time that the warm water takes to reach its maximum temperature (theoretically [X] °F / [X] °C) is recommended to monitor the quality of the hot water delivery. In addition, tracking shower usage patterns is recommended and should inform potential risks of bacterial growth due to water stagnation.

### 3b. Hazard analysis of water assets (tenant space with non-responsive landlord)

The project is an office space with a regular weekly occupancy of [X] people of approximate ages ranging [X - X]. Facilities are to be used primarily during weekdays [timeframe]. Each showerhead is expected to be used [X] times a week on average, mainly during mornings by bike commuters.

There are some occupants of age groups with higher incidence of Legionnaires disease (see US CDC Legionella toolkit for further reference, basic clinical information can be found [here](#)).

The building is fed by municipal tap water that uses chloramines as the primary disinfectant. Details of the base building operations. The hot water enters the project through a base building connection. No maintenance or operational records were provided by the building management upon request. Records as of [date] show hot water delivered of [X]°F / [X]°C.

Since there is no thermostatic mixing before This temperature is unlikely to foster Legionella amplification as it is well above its development range. A walk through the basement showed good pipe insulation. The plumbing for the project has all fixtures (showerheads and faucets) installed with thermostatic mixing valves set at a maximum temperature of [X]°F ([X]°C) to prevent scalding.

#### 4. Monitoring actions for relevant variables, performance limits associated with these variables and corrective actions when variables exceed limits:

The following monitoring actions are conducted / tested for on a quarterly basis.

Relevant Control Variable	Location	Performance Limits	Frequency	Corrective Action(s)
Ex: Time that water takes to reach maximum temperature*	Ex: All fixtures	Ex: $\leq 20$ seconds	Ex: Bimonthly	Ex: <ul style="list-style-type: none"> <li>Inform building manager</li> <li>Check pipe insulation and building records</li> </ul>
Ex: Maximum temperature delivered by fixture*	Ex: All fixtures	Ex: $110 \pm 5$ °F	Ex: Bimonthly	Ex: <ul style="list-style-type: none"> <li>Check thermostatic valve</li> <li>Inform building manager</li> <li>Check building records for hot water temperature delivery</li> </ul>
Ex: Total and combined chlorine (after 30 second flush)	Ex: Kitchen, one sink faucet and one shower per bathroom	Ex: Total Chlorine $\leq 4$ mg/L Residual Chlorine $\geq 0.2$ mg/L	Ex: Monthly	Ex: <ul style="list-style-type: none"> <li>Review flushing frequency and fixture usage rates</li> <li>Inform building manager</li> </ul>

\*Measured 'first draw' (before the first occupant uses the fixture)

#### 5. Identification of critical control points:

Points where actions are taken to keep the control variables within desired ranges:

- Bathroom and kitchen faucets
- Showerheads

#### 6. Verification and validation procedures

Action	Frequency
Ex: Flush all fixtures (showers, bathroom and kitchen faucets): <ul style="list-style-type: none"> <li>Open the valve to full flow and set it to its maximum temperature</li> <li>Wait until reaches its maximum temperature. Check temperature with hand contact (no thermometer needed)</li> <li>Flush for [X] minutes.</li> </ul>	Ex: Weekly, before the beginning of the first workweek day (e.g., Monday morning before the first occupant arrives)
Ex: Clean aerators of bathrooms and kitchen faucets: <ul style="list-style-type: none"> <li>Unscrew aerators and immerse them in a [X]% bleach solution for [X] minutes. Rinse in cold water when done.</li> <li>Examine fixtures with the aerator removed for presence of slime and residue. Corrective action: If slime is found, use a scouring pad or a pipe scrub brush dipped in a [X]% bleach solution to clean the pipe. When done, open the valve to full flow, set at cold water, for [X] minutes.</li> <li>Replace aerator and run the tap for [X] seconds in cold water</li> </ul>	Ex: Monthly
Ex: Clean showerheads: <ul style="list-style-type: none"> <li>Unscrew aerators and immerse them in a [X]% bleach solution for [X] minutes. Clean any visible trace of slime or residue and rinse in cold water.</li> <li>Examine pipes with the aerator removed for presence of slime and residue. Corrective Action: if slime is found, use a scouring pad or a pipe scrub brush dipped in a [X]% bleach solution to clean the pipe. When done, open the valve to full flow, set at cold water, for [X] minutes.</li> <li>Screw back aerators and run the shower with cold water for [X] seconds.</li> </ul>	Ex: Monthly

Ex: In addition to these control measures, monthly review of the building's cooling tower operational records is scheduled to ensure its appropriate management.

## 7. Protocols for Documenting Results

Monitoring, control and corrective actions must be documented in the log below, along with all monitoring results, relevant plumbing repairs, and other service disruptions.

Documentation of all work orders are copied and attached to this plan.

### Monitoring, control, and corrective actions log

Date	Time	Location	Parameter	Value	Taken by (Initials)	Notes
		<i>Ex: Kitchen faucet</i>	<i>Ex: Maximum temperature</i>	<i>Ex: [X]°C</i>		<i>Ex: Within range</i>
		<i>Ex: Kitchen faucet</i>	<i>Ex: Time to reach temperature</i>	<i>Ex: [X] minutes</i>		<i>Ex: Called office space manager to contact plumber</i>

### TIPS FOR MULTIPLE LOCATIONS

- Organizations participating in WELL Portfolio or the multiple projects pathway can submit a Guideline for this feature part, as well as a technical document for each audited project. This Guideline must outline the feature requirements, at minimum, and it can be shared across multiple projects as a means to provide guidance for compliance. A subset of audited projects must also each submit their own technical document that demonstrates compliance with the feature requirements.