LAIST Consultation — Meeting Minutes

Water Quality, Monitoring Parameters and Treatment

PIC Project • Emergency Water Supply System

1. Water Quality Parameters

1.1 Essential Parameters to Monitor

Based on the meeting, the critical parameters to include in the sensor system were defined as:

- **pH** — fundamental quality parameter.
- **Turbidity** — use a turbidimeter (more reliable than other methods).
- **Temperature** — relevant for microbiology (especially at extreme temperatures due to precipitation).
- **ATP (Adenosine Triphosphate)** — used solely to monitor microbial activity. To be included if viable.
- **Residual chlorine** — supplied by the public network; relevant only in a network supply context.

Note: Conductivity is not required in terms of water ageing — LAIST confirmed this parameter can be omitted.

[!] ATP open question: would be very valuable to include, but technical and cost feasibility is yet to be confirmed.

1.2 Turbidity

The turbidimeter was indicated as the most reliable method for measuring turbidity. This is the chemical parameter that best characterises the visual quality and filtration of water.

2. Treatment System

2.1 UV vs. Chlorine

Decision: If the system includes UV, there is no need to add chlorine. The justification for chlorine is its disinfectant action, which is replaced by UV. The correct solution for our system is UV.

2.2 Water with High Chlorine Levels

The proposal to use water with high chlorine levels was rejected: it generates undesirable chemical by-products and is therefore not recommended.

2.3 Activated Carbon Filter

If the system has permanent access to public network water, the carbon filter is useful to mitigate smell and taste — organoleptic aspects that only humans can perceive and that are not captured by sensors.

3. UV Light Parameters

- To define the UV light exposure time parameters (dose, cycle, duration), a visit to a **WTP (Water Treatment Plant)** is recommended.
- Technical reference of interest: **SODIS technology** (Solar Disinfection), used in Africa to disinfect water using sunlight as a UV source — may be relevant for off-grid scenarios.

4. Tank Maintenance and Operation

4.1 Water Movement

- Water must be in **continuous movement** to prevent microbiome sedimentation.
- Options: mechanical agitation or forced circulation — already considered in the architecture with the circulation pump.

4.2 Tank Cleaning

Recommended procedure for periodic cleaning of containers:

- Use detergent followed by bleach, leaving it to act for some time.
- Rinse thoroughly before reuse.

4.3 Physical Protection

- Maintain a safety distance between the water container and the outer protective grating.
- Objective: prevent contamination by direct contact and protect the integrity of the system.

5. Summary — Decisions and Next Steps

Confirmed

✓ Parameters to implement: pH, turbidity (turbidimeter), temperature, ATP (if viable).
✓ Conductivity is not required for this system.
✓ UV system replaces chlorine — do not use both.
✓ Carbon filter useful if there is network supply (smell/taste).

To Do

- Verify feasibility of including ATP sensor.
- Contact / visit a WTP for UV dose parameters.
- Research SODIS technology as a technical reference.
- Define tank cleaning and maintenance protocol.

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