Make living walls waterwise

What can almost two decades of managing living walls teach us about creating resilient, water-conscious vertical landscapes? **Anja Spice** investigates

Water has always been fundamental to successful planting but increasingly it is becoming a design constraint in its own right, forcing changes in how we design, plant and irrigate living walls.

England's water resources face mounting pressure, with the Environment Agency warning of less water reliably available as climate change brings hotter, drier summers alongside warmer, wetter winters.

For landscape professionals, that raises an obvious question: can we continue greening buildings without creating landscapes that demand ever more irrigation?

Living walls are sometimes criticised for their water requirements. But the answer is more nuanced than simply comparing vertical planting with a conventional garden.

Research into 16 outdoor living walls found average consumption ranging from 2.5 to 9 l/m2/d, comparable with other forms of green infrastructure. Crucially, water demand varied considerably according to the system, orientation, solar exposure, planting density and species selection.

It isn't simply whether plants grow vertically that determines water consumption but how the wall is designed.

Designing for a changing climate

Armando Raish, founder of Life on Walls, has worked with living walls for almost 20 years and has seen irrigation move from a technical consideration to a central question in their design.

"Reliable irrigation is the primary driver for success or failure of every living wall, regardless of the system or its age," he says. "But climate resilience needs to play a much bigger role. The future has to be about moving away from high water-consumption systems towards larger root zones retaining more moisture."



The growing space available to each plant has a major impact on water demand. Systems with restricted root space tend to dry out faster and may need frequent watering. Giving plants a larger root zone allows the growing medium to hold more moisture, helping plants cope for longer between irrigation cycles.

Research supports the wider principle. Different living wall systems demonstrate markedly different evapotranspiration behaviour, while substrate characteristics, irrigation management and plant choice all influence water requirements, challenging the assumption more plants make a better living wall, Armando argues.

High planting densities can create impressive instant coverage but squeezing too many plants into inadequate root space can increase competition for water and maintenance requirements. The objective should instead be a balanced planting matrix, with species selected for the conditions and grouped according to compatible water requirements.

Middlesex University hybrid system

A project installed by Life on Walls at the Ritterman Building at Middlesex University reveals another approach.

Installed in 2017, around 110 m² of living wall was spread across four corners of the university's science building with 3,500 plants aiming to save, store and recycle rainwater. Rather than depending entirely on mains irrigation, the installation was conceived as a vertical rain garden.

Excess roof water is captured in concealed reservoirs behind the living wall panels. Moisture then wicks naturally from the reservoirs into the planting cells without pumping or power. A supplementary automated irrigation system provides backup, currently running for several minutes weekly to replenish areas receiving insufficient rainwater.

The result is a hybrid system: rainfall is the primary resource, with mechanical irrigation providing resilience when nature cannot.

That principle is becoming increasingly relevant. Longer periods between rainfall and hotter days mean a wall designed around historical weather patterns may no longer perform the same way today.

If designing the Middlesex wall now, Armando says he would take this further by specifying more drought-tolerant plants with lower water dependency.



Research into stormwater-fed living walls is similarly examining plants capable of coping with both wet periods and prolonged drought, with some species in trials surviving several weeks without water.

Efficiency overrides simple irrigation

Modern living walls still need reliable irrigation. Life on Walls typically uses automated drip irrigation to deliver controlled quantities of water directly to the planting zones at predetermined intervals to allow watering schedules to be adjusted for exposure, season, and planting.

The important distinction is between watering plants and wasting water. Overwatering can be as damaging as under-supplying, contributing to root rot, fungal problems and unnecessary drainage. Frequency and duration therefore need to be monitored and adjusted rather than left permanently on one setting.

Excessive irrigation can also wash nutrients from the rootzone. The more water permeating a living wall or garden, the greater chance of nutrients leaching from the growing medium, raising need for supplementary feeding. Using only the water the plants need can therefore reduce both water consumption and nutrient loss.

Asking whether living walls save water over traditional gardening brings no universal yes-or-no answer. Published research shows living wall water consumption can be comparable with other landscaped areas but performance depends heavily on the system and its management.

A poorly designed wall with small rootzones, unsuitable plants and excessive irrigation can consume considerable water. A well-designed system using appropriate planting, larger moisture reserves, targeted irrigation and captured or recirculated water can prove markedly different.

For Armando, that distinction will become ever more important as the landscape industry adapts to climate change.



Tips for a waterwise living wall

1. **Automated irrigation.** Deliver water consistently and directly to the rootzone
2. **Reliability.** Secure a dependable water supply and an alert/monitoring system to spot failures quickly
3. **Plant selection.** Match species to orientation, sunlight, temperature and expected water availability.
4. **Free-draining substrate.** Good drainage helps prevent waterlogging, root rot and fungal problems.
5. **Companion plant intelligently.** Avoid mixing drought- and wet-loving species on the same irrigation regime.

References: GOV.UK, ScienceDirect