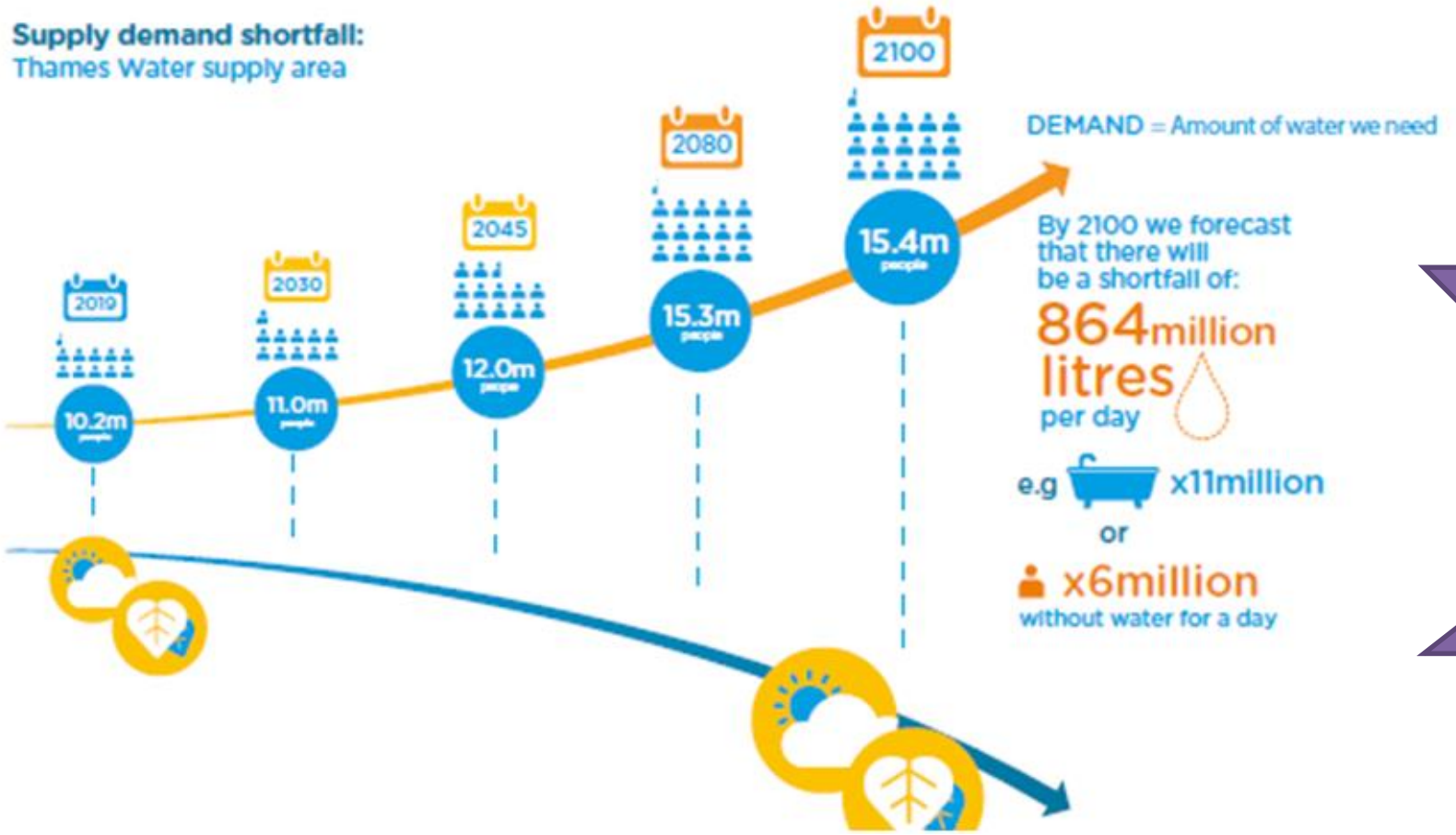
Water Resource Challenges and Water Neutrality

Andrew Tucker
Water Demand Reduction Manager
Thames Water

Why save water?

Population growth, new homes & businesses

Environmental need, climate change



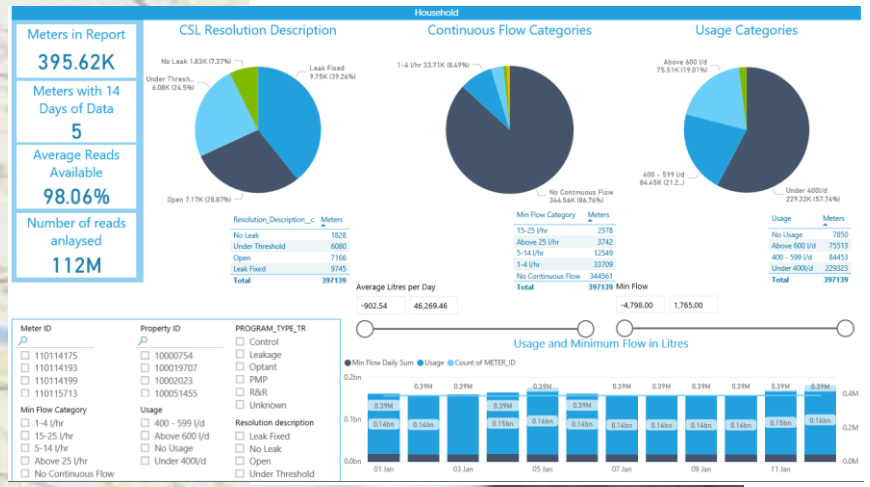
Metering, reduce leakage, water efficiency, customer engagement

New water resources

Water resources & water efficiency are tough topics

What are we doing on managing water demand?

Smart Meter Rollout - London



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Smart Metering – headline findings

Industry leading insight must be used to maximise our smart meter investment

Water Savings:

Smart metering reduces household water use by

12-17%

Continuous Flow:

8% of homes have Leaks / Wastage.

Avg continuous flow is **280 l/day**

Non-Household:

26% of water delivered is continuous flow (Leaks/wastage)

Bulk Meters:

30-35% of water delivered to blocks of flats is continuous flow (**Leaks/Wastage**)

Water Efficiency Visits:

Visits on high-usage homes reduces water use by approx. **10%**

Per Capita Consumption:

High-usage homes skew PCC

Avg = **169** l/p/d.

Mode = **115 l/p/d**

High-Usage:

c.**25%** of households use **more than 500 l/day**

New Homes:

Actual usage (**119-179 l/p/d**) exceeds Building Regs levels (110-125 l/p/d)

Covid:

Increased household usage by

5-19%

Affordability:

Water Efficiency can reduce bills and benefit '**water poverty**' and **bad debt**

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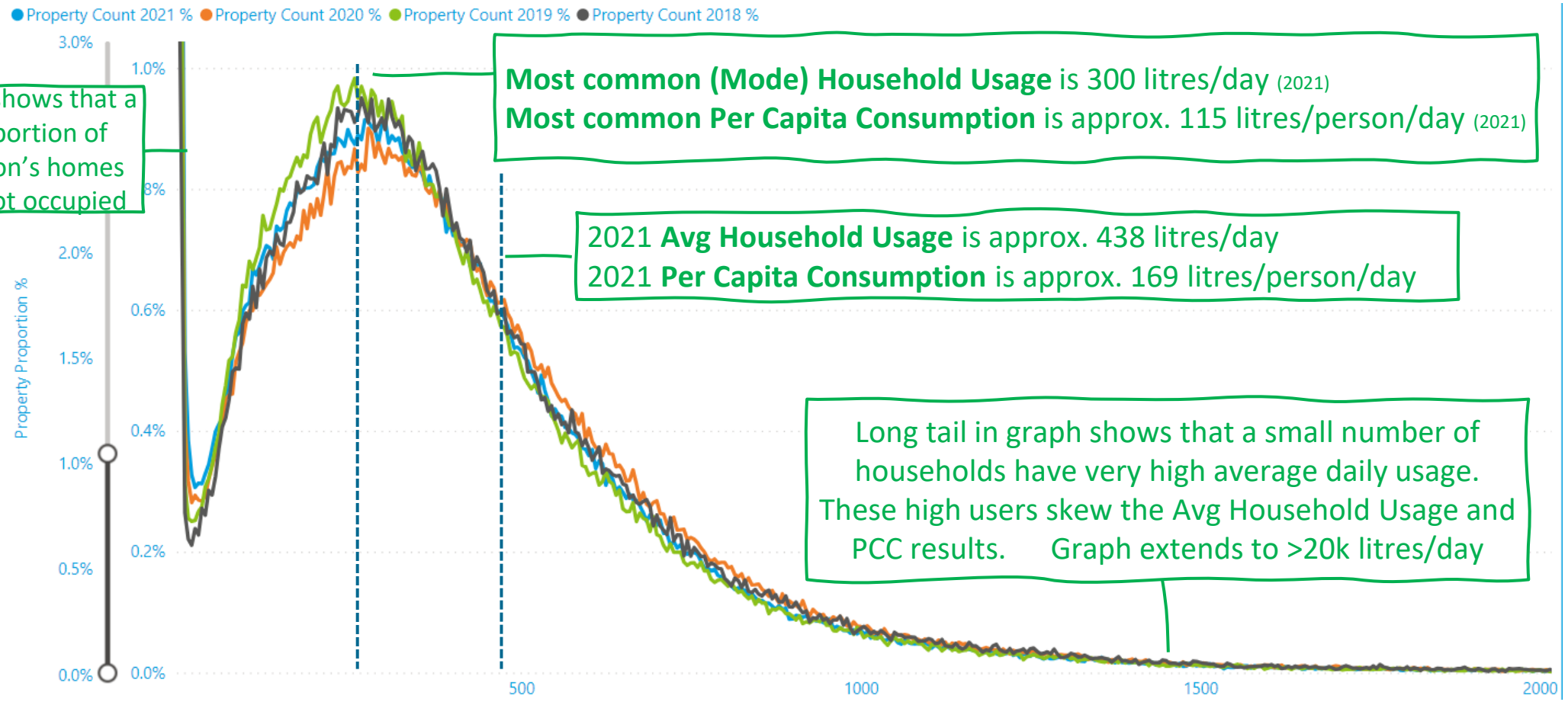
Household Water Use



Spike shows that a proportion of London's homes are not occupied

Most common (Mode) Household Usage is 300 litres/day (2021)
Most common Per Capita Consumption is approx. 115 litres/person/day (2021)

2021 **Avg Household Usage** is approx. 438 litres/day
2021 **Per Capita Consumption** is approx. 169 litres/person/day

Long tail in graph shows that a small number of households have very high average daily usage. These high users skew the Avg Household Usage and PCC results. Graph extends to >20k litres/day

- The average person DOES NOT use the average Per Capita Consumption value
- A smaller proportion of high usage homes skew the avg household use and Per Capita Consumption values

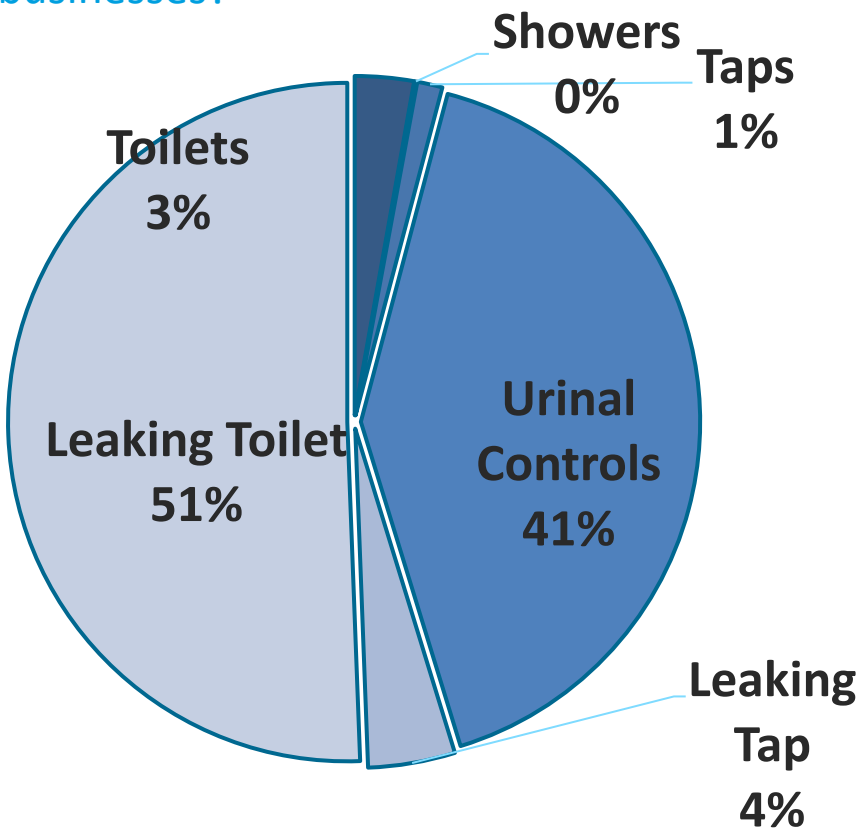
Water Efficiency in Homes

- Retrofitting water saving devices and fixing ‘wastage’ leaks

Water Efficiency in Businesses

Smarter Business Visits

What saves the most water in businesses?



Discretionary Water Use

Retailer-Wholesaler Group – Water Efficiency Steering Group

RWG
Water Efficiency Sub Group

Group	Representing
Wholesale account mgrs	Wholesalers
Retail account managers	Retailers
UKWRC	Retailers
WaterUK	Wholesalers
Defra	Government
Ofwat	Regulators
EA	Regulators
CCW	Customers
MOSL	Market Operator
MEUC	Customers
RWG Main Group	Wholesalers/ Retailers
NRW	Regulators
Welsh Government	Government

SES Water	Conservaqua
CCW	Wave Utilities
Thames Water	Wessex Water
Waterscan	Three Sixty
Southern Water	Business Stream
MOSL	Yorkshire Water
Switchsupplier.com	Northumbrian Water
Bristol Water	Castle Water
Anglian Water	Everflow Water
South West Water	Severn Trent Water
United Utilities	Dwr Cymru
De-Meter Ltd	Affinity Water
Pennon Water Services	Waterwise

Leaky-Loos: Guess how many litres per day?

Leaky-Loos

Homes

- About **5%** of homes in the UK have a leaky-loo
- Avg loss = **~400 litres per day**. 8,000 l/day is common
- Leaky-loos are **+95%** dual-flush toilets
- Approx. **50/50** split drop-valve & inlet filling-valve failures
- Failure on **most WC brands.** Some failing more than others

Business

- >9,200 'Smarter Business Visits'. ~1,700 so far 2020/21
- **29%** of businesses had a leaky loo. Avg 2.2 leaky-loos / site
- Inspected >60k toilets, **~5k were leaking** (8.3%)
- Avg loss = >**2,000 litres/day**. **8,000 litre fixes** are our most common (943 in total).

Leaky-Loos: Guess how many litres per day?

Joint Statement on Toilet Leakage

1. The issue of leaking dual-flush toilets is recognised by the UK Water Efficiency Strategy Steering Group (UKWESSG) and the Bathroom Manufacturers Association (BMA), as is the need to work together to address the problem.
2. Reducing the number of leaky loos will save householders and businesses money on water loss and on repairs. It will reduce carbon emissions, improve the security of future water supplies and leave more water in the environment.
3. The BMA, toilet manufacturers and Thames Water (representing the UKWESSG) have been working together to understand leaky-loo causes and identify the most viable solutions.
4. As a result of this collaborative working, we can confirm that just over half of the toilet designs or materials identified as prone to potential leaky-loo issues, are no longer on the UK market. The WC manufacturers are working to improve the performance of more WC devices available for the new installations and retrofitting markets, by the end of 2021.
5. The UKWESSG and BMA are working together to:
    a. Encourage changes in design and materials by manufacturers that avoid or minimise the leaky-loo issue in newly installed or repaired toilets.
    b. Raise awareness amongst households and businesses so that they quickly spot leaks in their existing toilets and get them fixed.
    c. Raise awareness amongst plumbers, installers, developers and policy makers
6. To help buyers and installers of dual-flush toilets, Waterwise have developed a simple 1-page guidance note to reduce the risk of leaky-loos.

waterwise

Seven water-saving tips when buying dual-flush toilets

Dual-flush toilets enable people to choose either a large or small flush. When working well and used correctly, they deliver significant water savings and play an important role in ensuring we have enough water to meet our needs and those of the environment.

However, the water-saving benefits from dual-flush toilets can be lost if they are leaking into the pan or if it is not clear which button delivers which flush.

Research has shown that between 5% and 8% of UK households have a leaky loo[1,2]. Over 95% of the leaky loo issues have been found on push-button dual-flush toilets, with water leaking into the pan[3]. A leaking dual-flush toilet can waste between hundreds and thousands of litres of water a day.

We also know that with some dual-flush toilets we just can't tell which button delivers which flush, so we press them all or press them repeatedly.

We are working with the water industry and bathroom manufacturers to address these issues, but to help make sure the water-saving benefits of dual-flush toilets aren't lost we also suggest the following water saving-tips for those specifying, buying, installing or maintaining a dual flush toilet.

Seven water-saving tips for buying dual-flush toilets

Materials and design

1. Drop-valves: silicone and neoprene washers/seals were found to fail less than rubber washers/seals[3]. If it is not clear what's present in the product you can ask the manufacturer.
2. Filling-Valves: ball or float valves were found to fail less than diaphragm or equilibrium valves[3,4].
3. Syphon valves were found to be far less likely to cause leaky loos as they have an air gap between the body of water in the cistern and the outlet into the bowl[3]. Typically, these valves use a lever handle[4].

Easy-to-understand flush buttons

4. Choose dual-flush toilets where it is easy to identify which button delivers the big flush and which one delivers the small flush. For example:
    a. Where there is clear separation between the two buttons;
    b. Where the big flush button is noticeably bigger than the small flush button;
    c. Where there are permanent markings on or near the buttons that make the difference clear - such as two dots on the big flush button, one dot on the small flush button.
5. If you do choose a dual-flush toilet type where you think the buttons aren't clear then there may be a sticker in the product packaging which you should display near the toilet buttons. You can find out which button controls which flush by doing a test, timing the period it takes to refill.

Once installed - ongoing maintenance

6. Maintain your dual-flush toilet in line with the manufacturer's guidance.
7. Once the toilet is in use regularly, check it for leaks. Your local water supplier may be able to provide you with toilet leak detection strips free of charge. Alternatively:
    a. Half an hour after a flush, wipe the back of the pan dry with toilet tissue;
    b. Place a new, dry sheet of toilet tissue across the back of the pan;
    c. If the paper is wet or washes away you may have a leaky loo you need to get fixed.

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waterwise Water Efficiency Strategy for the UK

bma Bathroom Manufacturers Association

The Society of Public Health Engineers

New Homes: Usage, PCC & Continuous Flow

How does actual water use compare to Building Regulation levels?

Building Regulations Part G

- Minimum Standard of **125** litres per person per day, or Optional Standard of **110** l/p/day
- Calculation or Fittings Approach

Avg Household Usage (litres/day)	Occupancy	PCC
300	1.8	167
	2.0	150
	2.2	136
	2.4	125
	2.6	115
	2.8	107

A single robust and accurate measured water use value

Divide it by an 'estimated' occupancy value (very little data available)

e.g. The problems with using a 'Per Capita Consumption' approach. Accurate occupancy or population data is difficult to access. Small changes in occupancy values will generate significantly different PCC outputs from a single accurate measured water use volume.

Produces an 'estimated' PCC value - turning good quality data into poor quality data. **Regulators and Policy Makers should STOP USING PCC !!**

Actual Measured Usage and Continuous Flow

- Sample set of 4.7k smart metered new build homes in London
- Average **daily household usage** is approx. **287 litres per day**
- Depending on occupancy, **actual Per Capita Consumption** ranges from **119 to 179 litres per person per day** (using occupancies 2.4 and 1.6). **This PCC range exceeds Building Regulation targets**
- **Continuous Flow** is being measured in **6%** of occupied new homes
- **Continuous Flow** is being measured in **9%** of new build homes pre and post occupation.
- **Continuous Flow** is happening in new homes even before occupied.

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Environmental Incentives for Developers

- Whilst many other environmental / water efficiency incentives may continue using the Building Regulations PCC methodology, seeking litres/person/day levels lower than 110 l/p/d levels, our smart meter data analysis shows that when developers use the PCC 'calculation' approach, **real-life actual water use levels DO NOT replicate Buildings Regulations levels**.

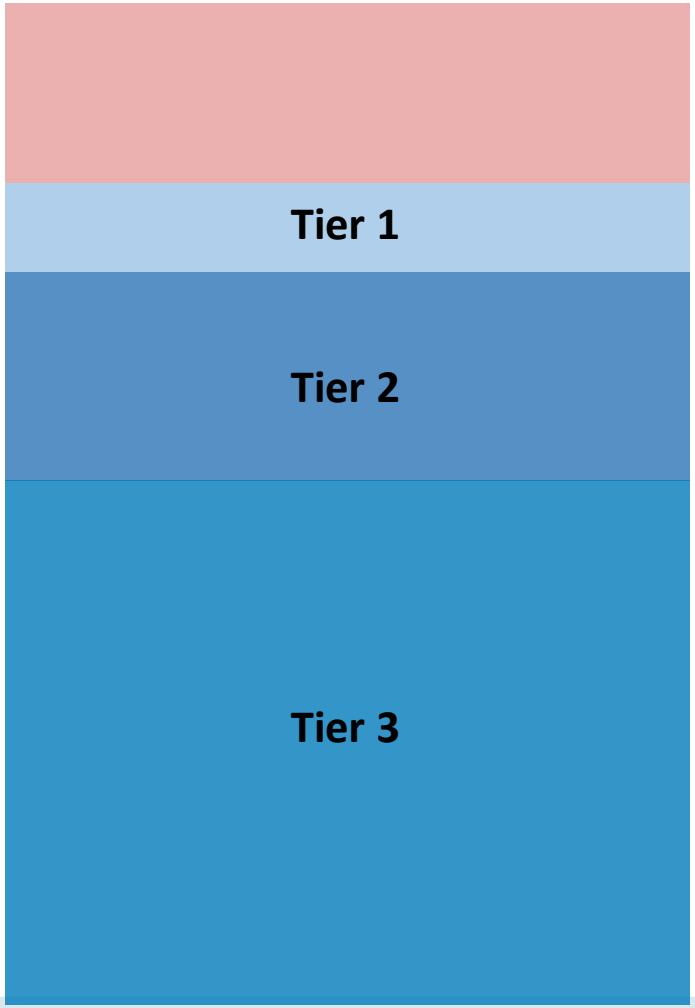
- Our Environmental Incentive takes a different approach.
- Will introduce a 3-Tier incentive offer, aiming to;
    1. better guarantee **water efficiency device installation** (Reducing Water Use)
    2. drive the integration of **alternative technologies** (Water Reuse)
    3. achieve **water neutrality** (Offsetting)
- Used principles from Waterwise's ***A Review of Water Neutrality in the UK*** (2021), to develop 3-tier incentive

Leaky-Loos: Guess how many litres per day?

<u>Tier 1</u>: Build to Building Regs '**Optional Requirement**' of 110 litres/person/day is achieved through the '**fittings approach**'

<u>Tier 2</u>: **Rainwater harvesting and/or greywater recycling / reuse**, delivering at least 50 litres/property/day

<u>Tier 3</u>: **Water Neutrality** offsetting through our Smarter Homes / Business Visits or Developer led initiatives



Actual measured usage 119 to 179 litres/person/day

125 litres/person/day

110 litres/person/day

min 50 litres/property/day

Remaining water use to offset to achieve water neutrality

Changing landscape for water use and demand reduction .....?

Future changes on the water efficiency radar

- Defra Environment Act
  - Introduction of Nation Water Target. Drive water efficiency across all sectors. Possibly based on percentage reduction of water into public supply (?)
  - Introduction of Mandatory Independent Water Label. Only action that will improve water performance of every device, every appliance in every home and every business.
  - Strengthen Building Regulations. Future Homes Standard. Phase improvement process. Eventually aims to embed mandatory independent water label and incentivise water reuse options.
  - Strengthen Fittings Standards. Possibly linked to water label. Prevent leaky-loos and make good water efficient performance core business.
- Better Collaborative Energy & Water Delivery
- Retailer-Wholesaler Water Efficiency Action Plan. Recommend changes to regulation, targets, incentives (e.g. remove PCC target metric, clarify roles under competition law, create customer demand for water efficiency, better incentivise retailers etc etc
- UK Water Efficiency Strategy 2.0 (Waterwise)

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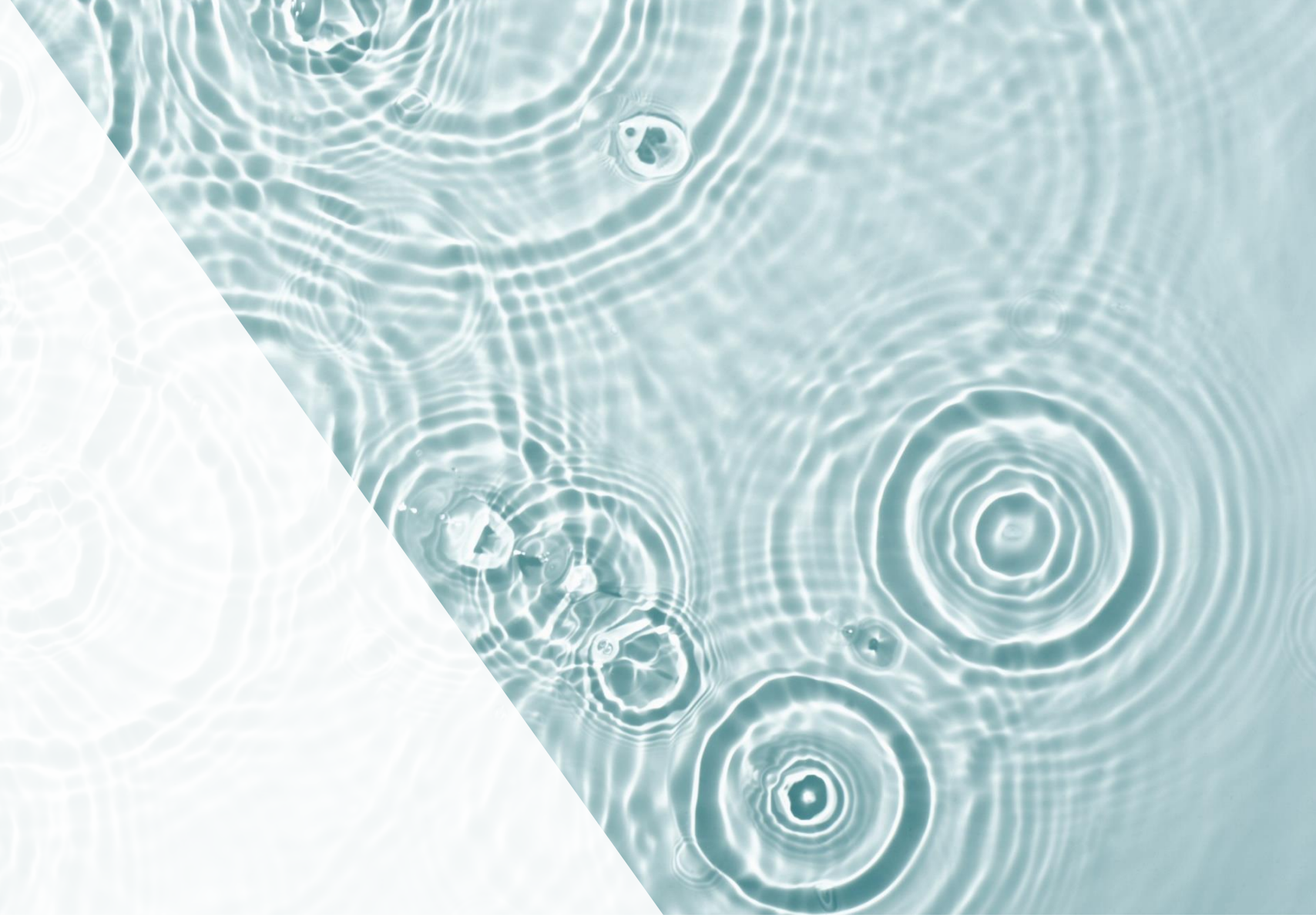
Thank You



Unified Water Label

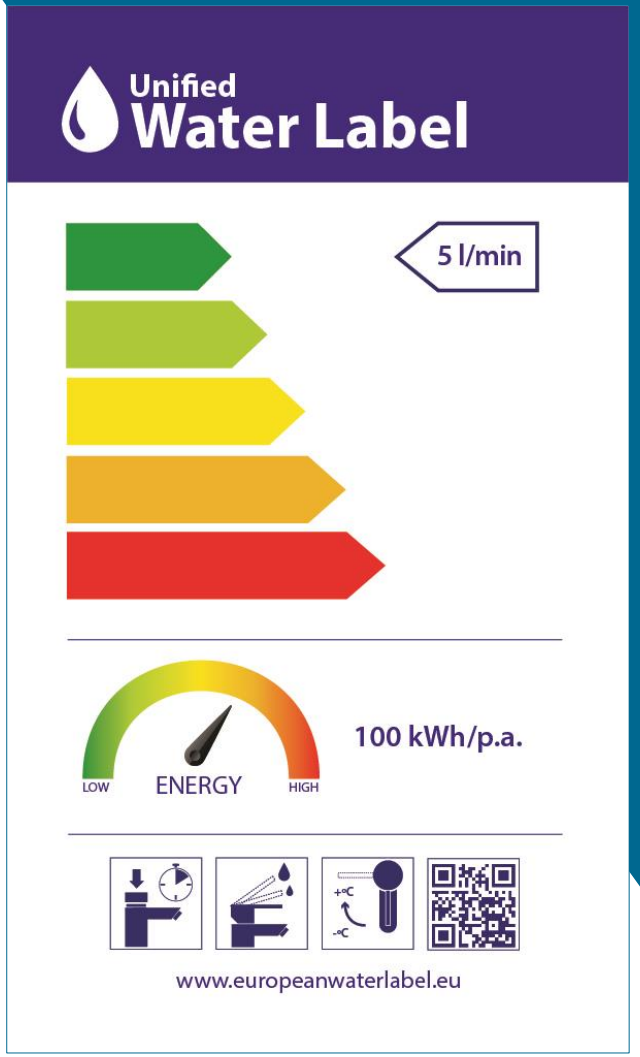
Christian Taylor-Hamlin

Christian Taylor-Hamlin

Employed by Neoperl

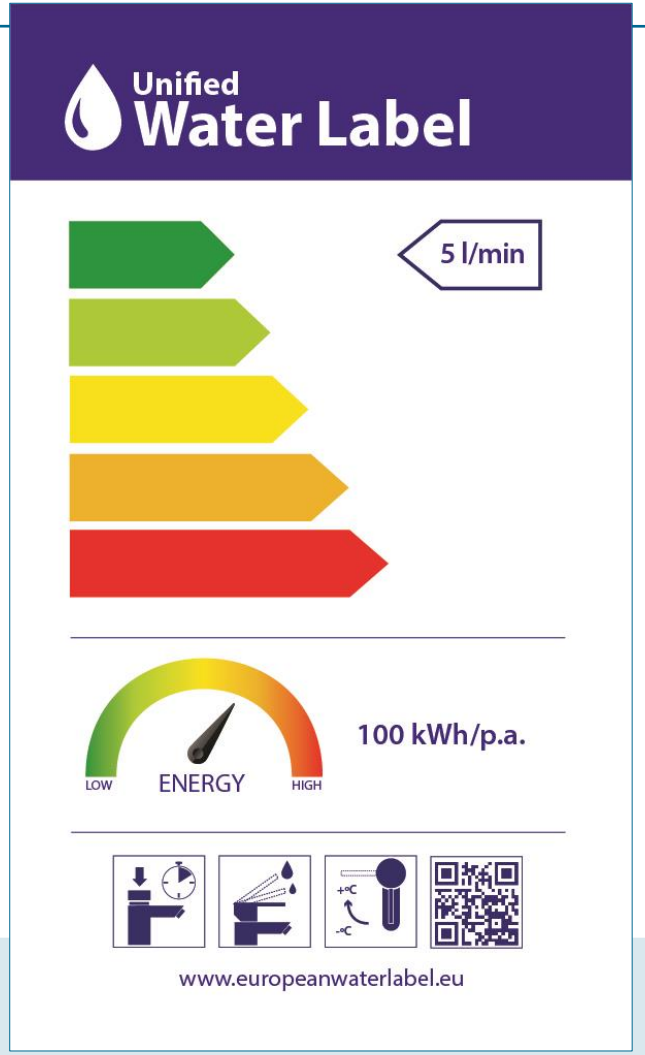
Previously Employed by: -
Several Other Product Manufacturers
Bathroom Manufacturers Association

Currently Elected Technical Chair of the Unified Water Label Association (UWLA)



Unified Water Label

- What is it?
- How can I use it?
- Future developments



What is the Unified Water Label?

Industry reaction to the growing water use issues

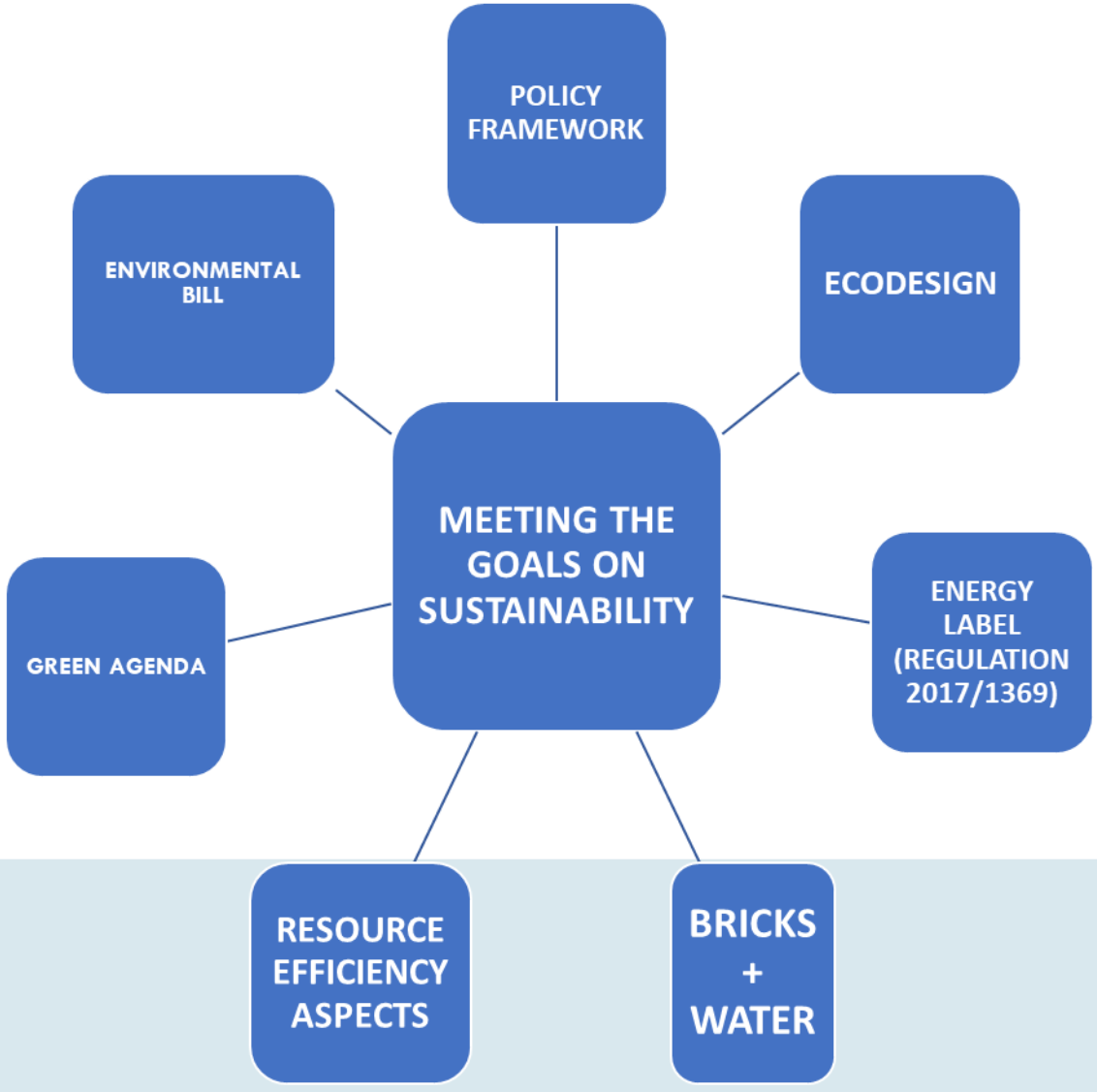
Quote from United Nations

"Water is at the core of sustainability and is critical for socio-economic development, healthy ecosystems and for human survival itself.

It is vital for reducing the global burden of disease and improving the health, welfare and productivity of populations"

What is the Unified Water Label?

Many Political Drivers & Other Influencers



What is the Unified Water Label?

UN SDG – United Nations Sustainable Development Goals

- Goal 6 – Clean Water and Sanitation
- Goal 9 – Industry, Innovation and Infrastructure

What is the Unified Water Label?

- A simple, honest label to aid choice at point of selection
- Simple easy to understand label developed by experts
- Primary metric water with associated energy use
- Covers several product categories:
- Cohesive message across the UK & Europe
- Flexible tool that can easily adjust to the market
- Already has traction in the marketplace and continually growing

What is the Unified Water Label?

Product		Primary Metric
Baths		(Max) Fill Volume
WCs	Suites Flush Cisterns WC Pans	(Average) Flush Volume
	Replacement flushing devices	Dual Flush
Taps	Basin	(Max) Flow Rate
	Kitchen	
Showers	Electric	(Max) Flow Rate
	Controls (valve, hose, head)	
	Heads/hand showers	
Urinal	Controllers	(Max) Fill Rate
Supply Line flow regulators		(Max) Flow Rate
Spout end aerator/regulators	(Replacement market only)	(Max) Flow Rate

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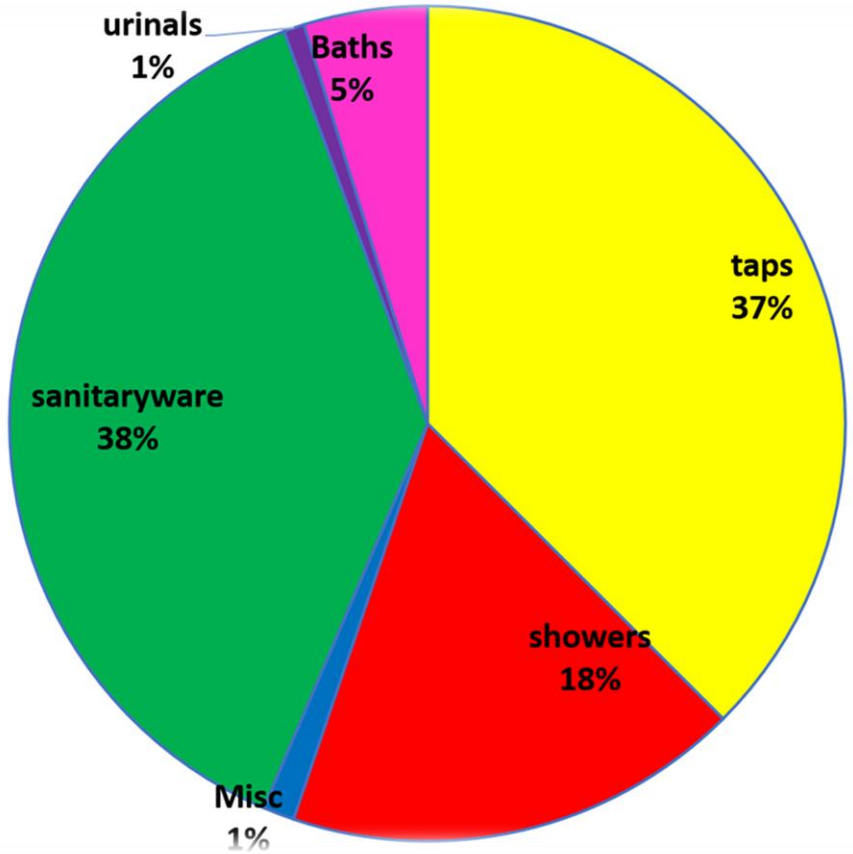
What is the Unified Water Label?

13 000+ individual products listed

- 38 % Sanitaryware
- 37 % Taps
- 18 % Showers

- 150+ Brands

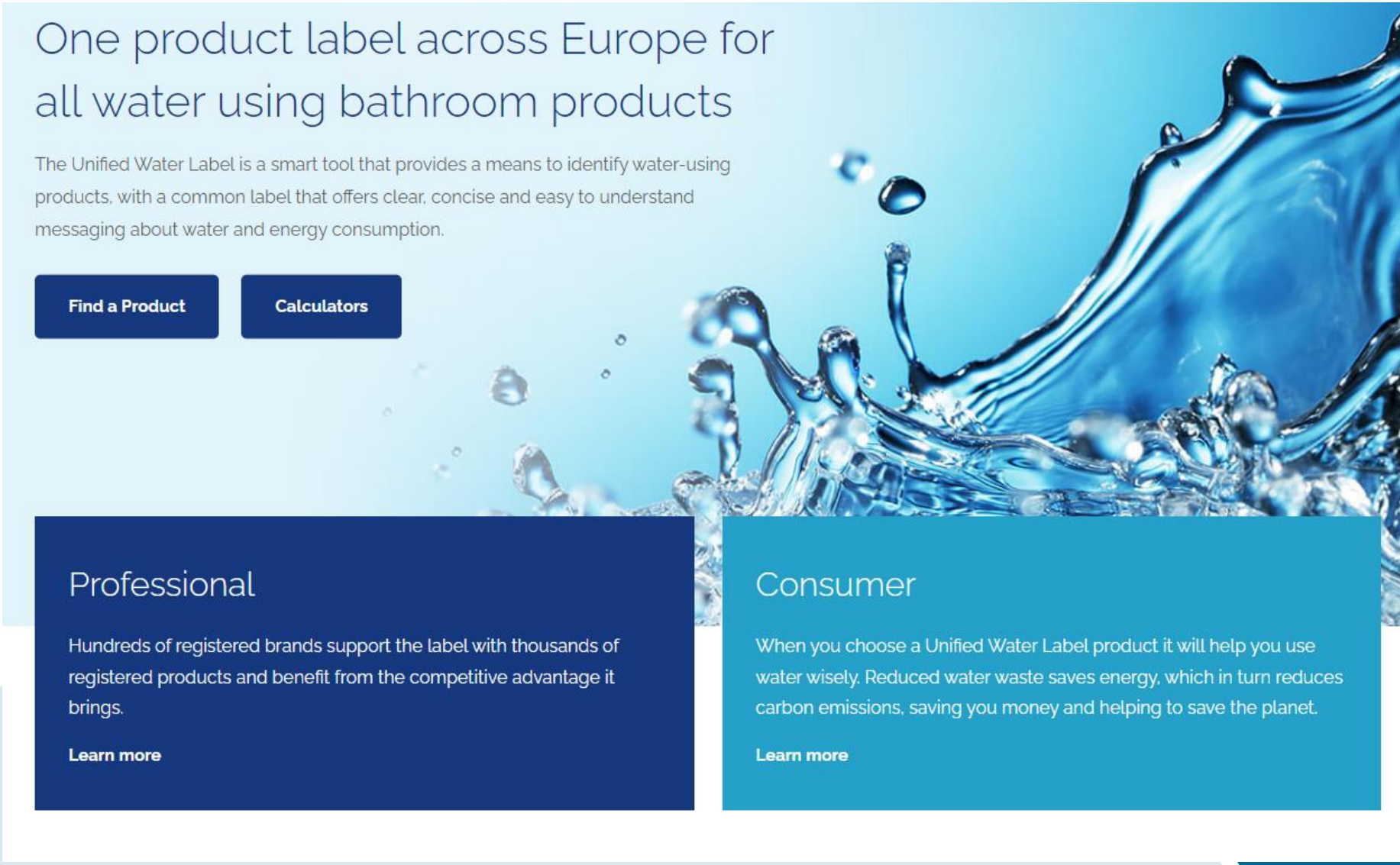


What is the Unified Water Label?

Website – www.uwla.eu
Searchable Database

Filters for

- Product Category
- Water Delivery Performance
- Registered Company
- Product Name



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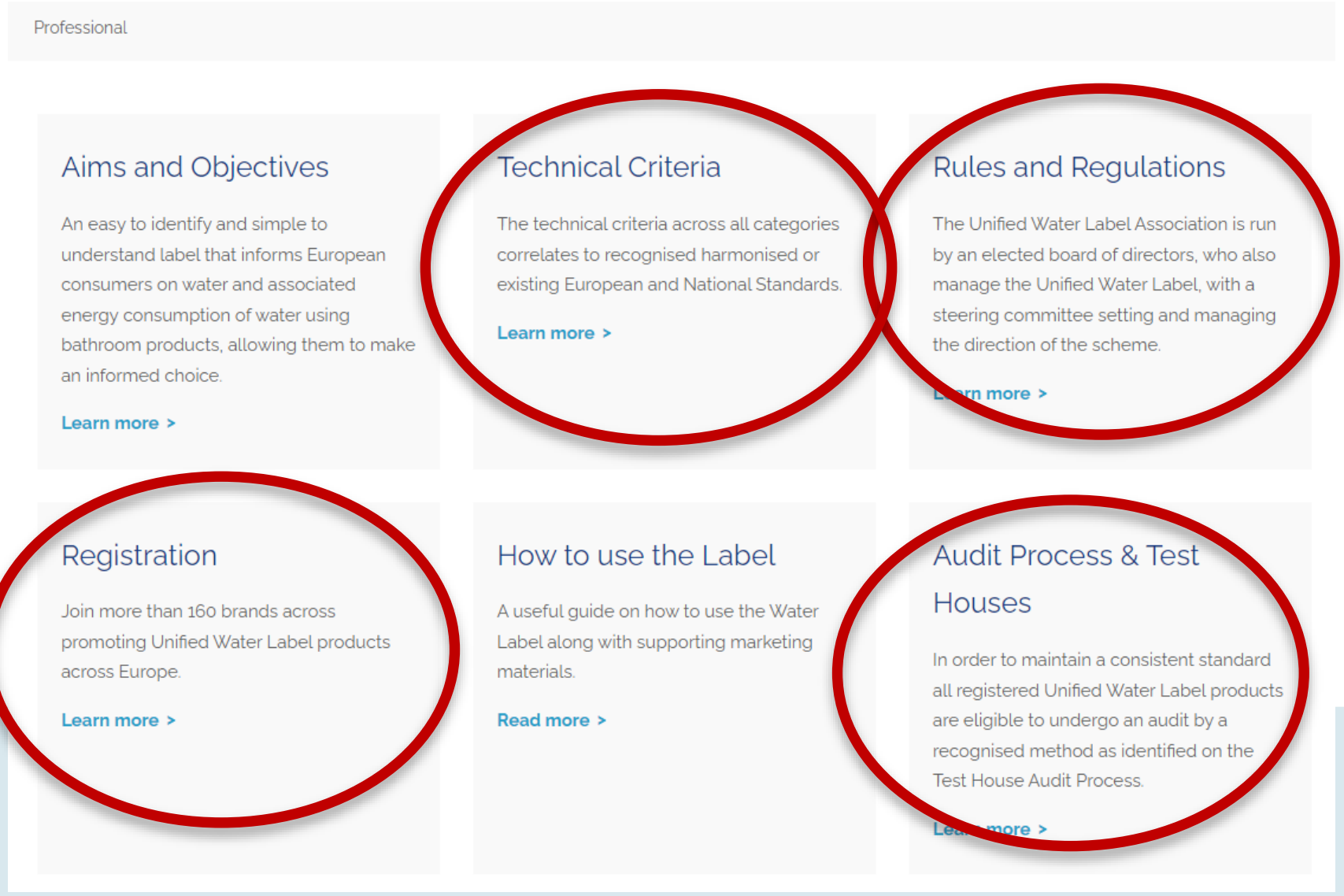

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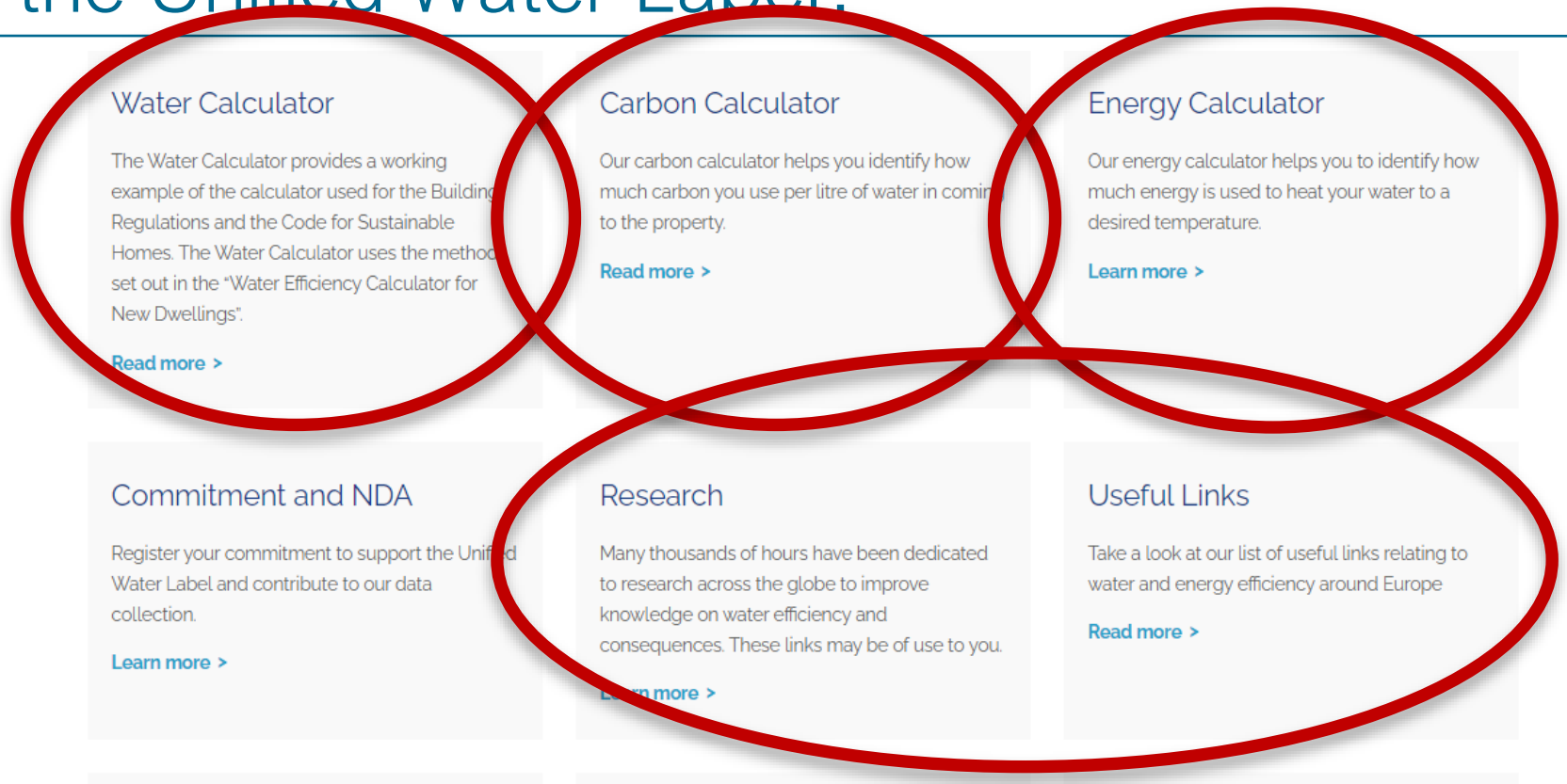


What is the Unified Water Label?

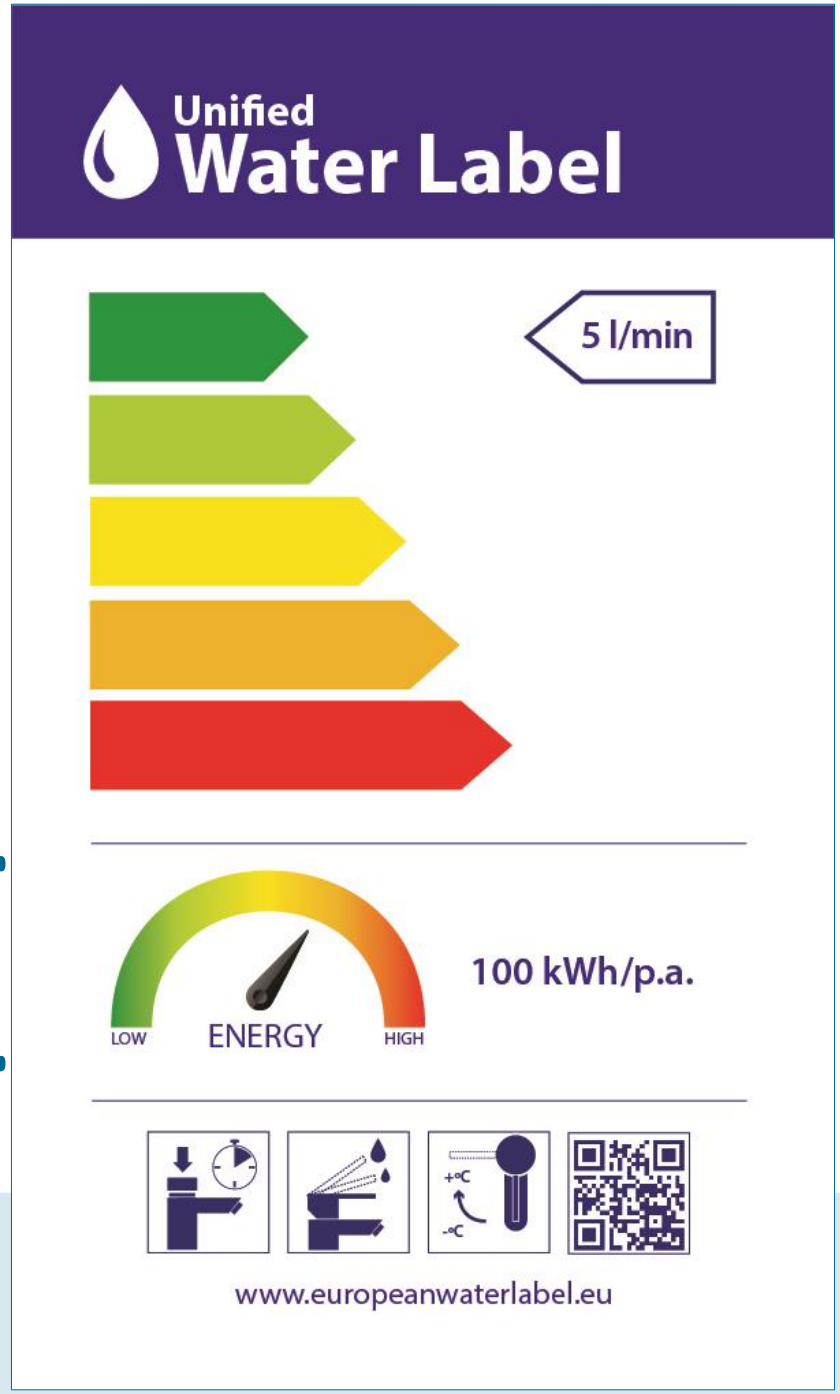
Independent Audit

- 5 % Each category
- 3 years ‘sign off’ reduces repeat audit of same product
- Third party Approvals – recognised e.g. Kiwa, NSF, WRAS

What is the Unified Water Label?

General Performance bands

Energy Rating



Maximum water delivery

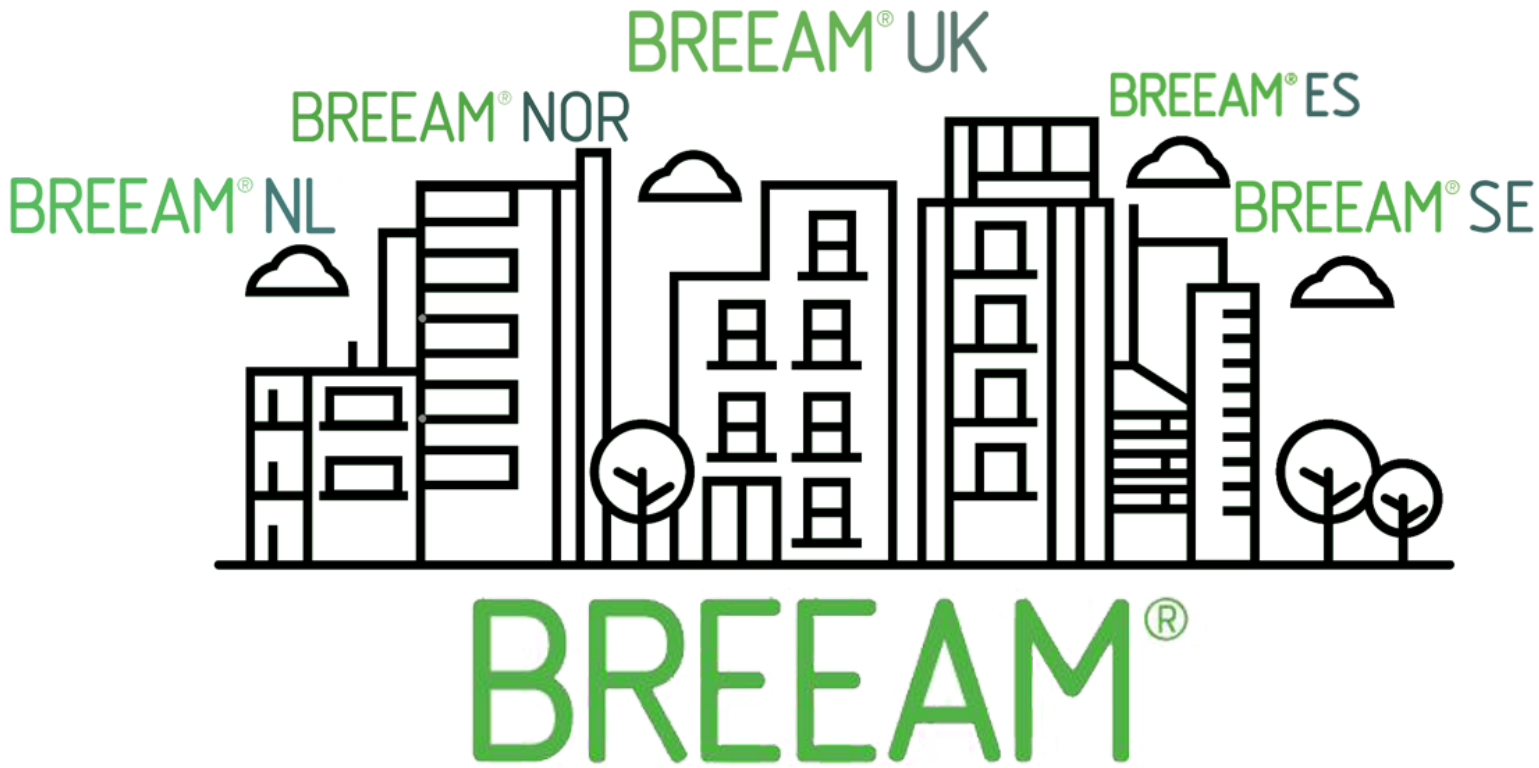
Product feature Icons

How can I use it?

Opportunities

How can I use it? - Specification

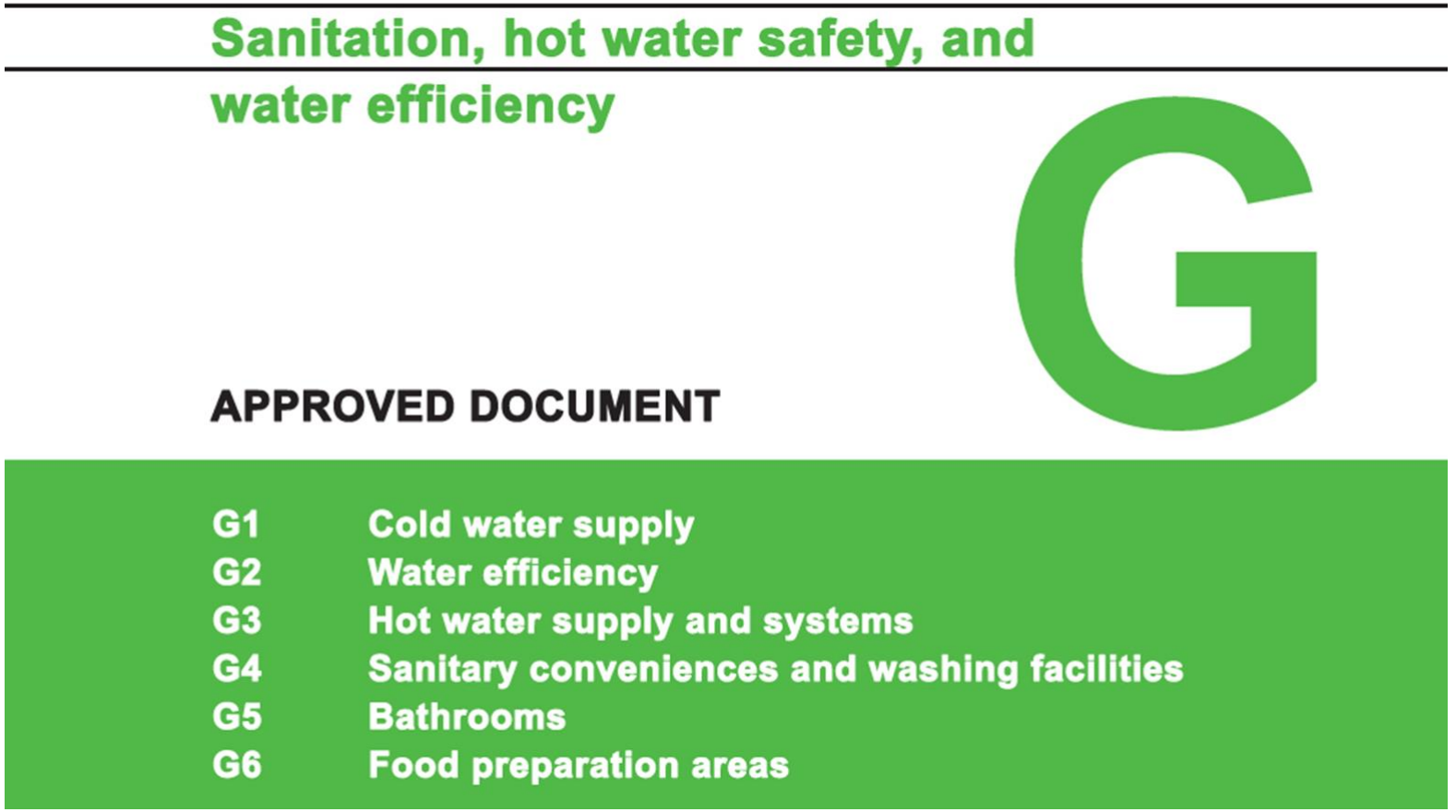
How can I use it? - Specification



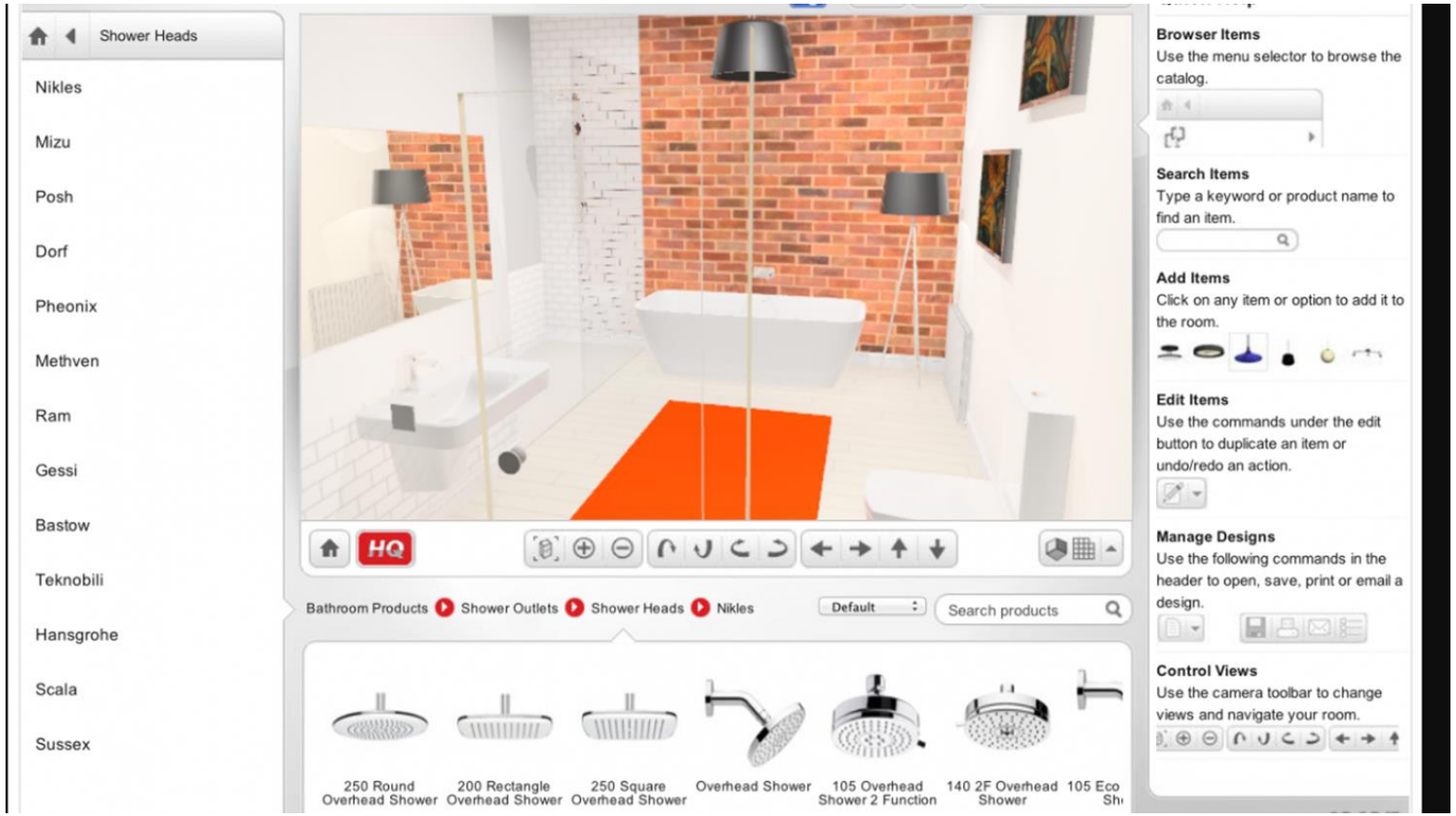
How can I use it? - Specification

How can I use it? - Specification

How can I use it? – House Build



How can I use it? – Refurbishment



How can I use it? – Supply Chain

How can I use it? – Supply Chain

Did you know

using water more efficiently can reduce your energy bills and help tackle climate change?

Heating hot water accounts for 25% of home energy usage. Using water efficiently reduces energy bills and ultimately reduces carbon emissions.

Look for the Unified Water Label and start making a difference

A clear colour coded system shows how much energy and water the product uses. Green products use less than Red.

Unified Water Label

visit www.uwla.eu to find out more

SUPPORT THE UNIFIED WATER LABEL AND BE PART OF THE SOLUTION

#dontforgettheplug

P **PREVENT** water scarcity
L **LINK** water, energy and carbon issues
U **UNDERSTAND** how much water is used
G **GAIN** from saving money on bills

UWLA Unified Water Label Association

www.uwla.eu

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Information Packs

Developed to help retailers and partners to promote the benefits of water efficiency and the UWL

A series of GIFs is available

https://www.youtube.com/watch?v=zDe7hfCDyn4&t=6s

The series can be easily used via social media

Irish Green Building Council is using the material in their retailer campaign and reported good uptake

Merchant, Installer packs – ready early March

Can be translated!

How can I use it?

Future Developments

- Currently the pre-eminent product based water label in the UK and Europe
- This may not be the case in the future

Future Developments

- Standards Development (CEN)
- UK Gov - BEIS
  - Energy Technology List for Commercial Showers
  - Energy labelling for Taps and Showers
- UK Gov - Defra
  - Water labelling for water delivery products

Future Developments

Spray Force

Future Developments

Spray Dispersion

Future Developments

Temperature Drop

Future Developments

Rinsing & Hand Washing

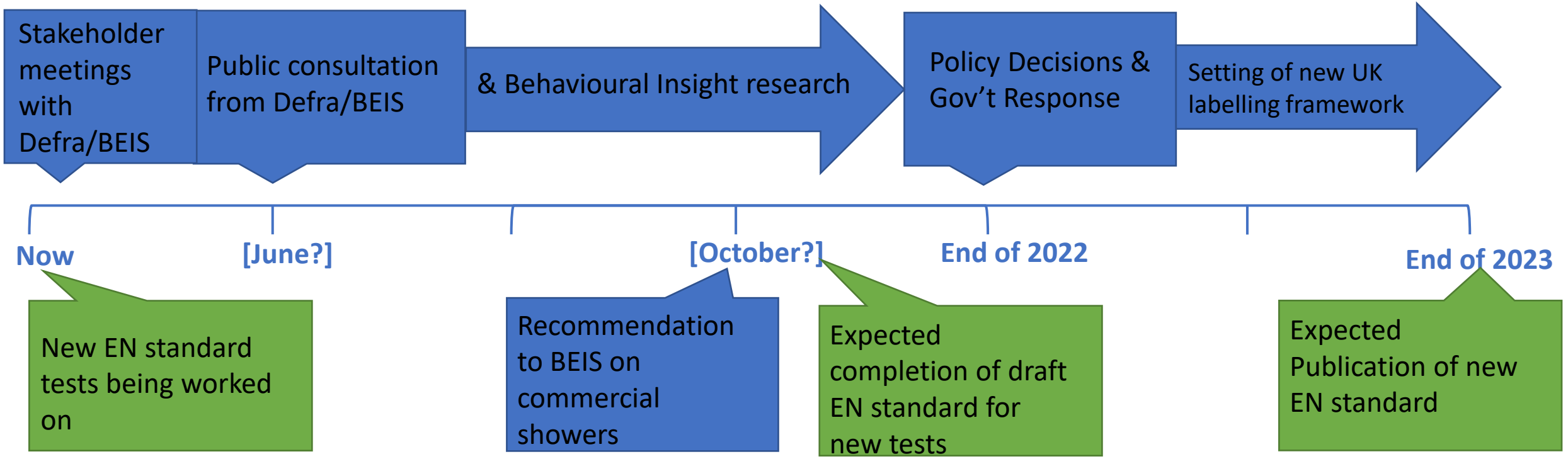
Future Developments

Vessel Filling

Future Developments

WC Flushing

Workstream Overview

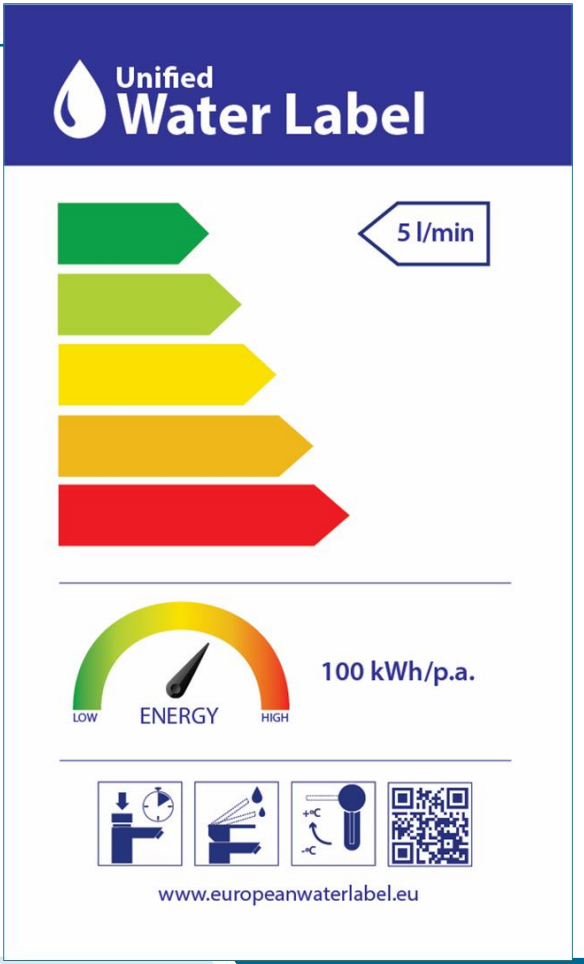


Summary

Environmental change is here and happening

Embrace and make commercial advantage

TOGETHER WE HAVE THE SOLUTION



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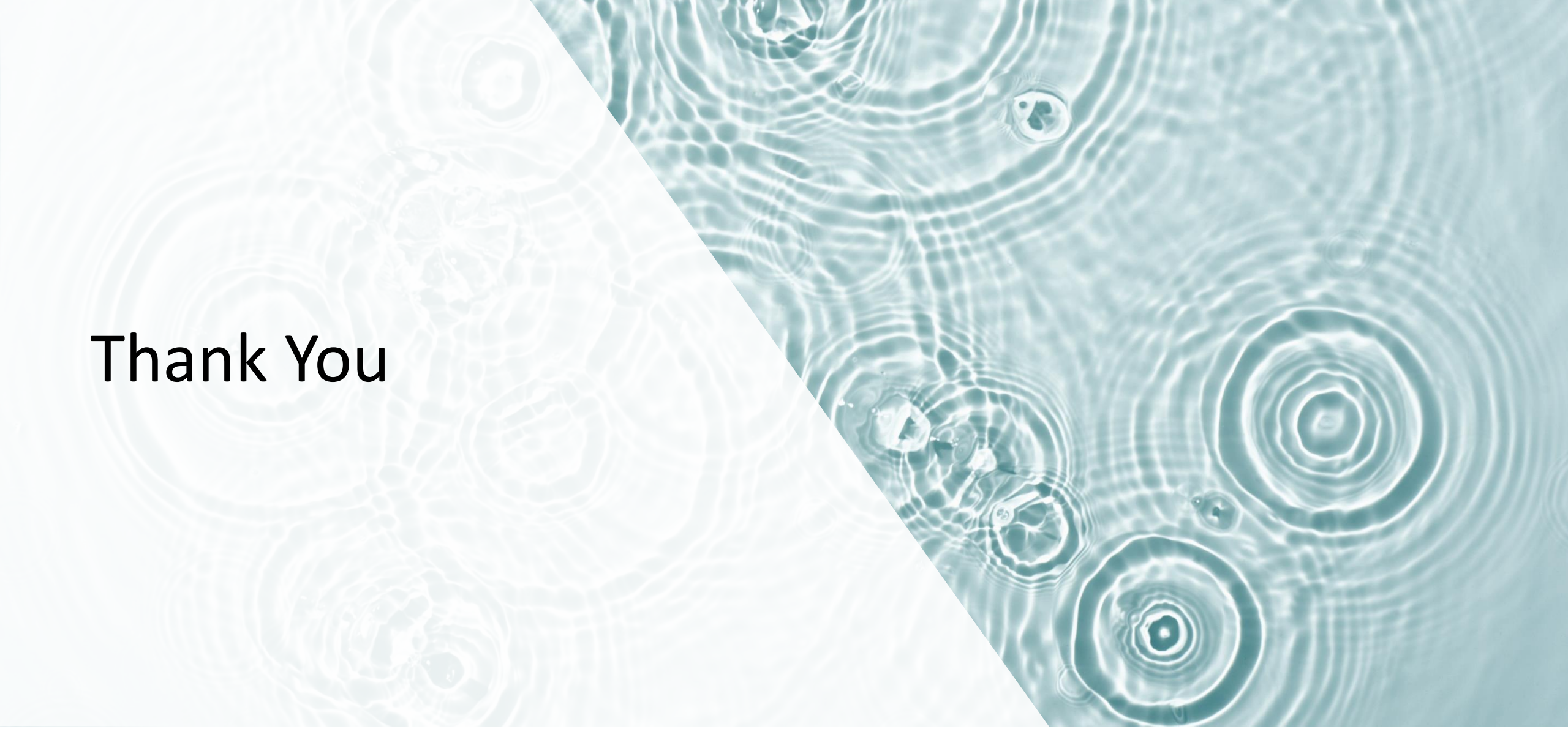


Escape of Water Prevention & Mitigation

Paul Redington - Zurich Claims
Deevi Williams - Zurich Resilience Solutions

Background

EOW losses are continuing to rise in terms of frequency and cost

Impacting significantly on our customers and their loss ratios

The human, environmental & reputational impact

Cost – Insurance **Industry**

£c900m/year

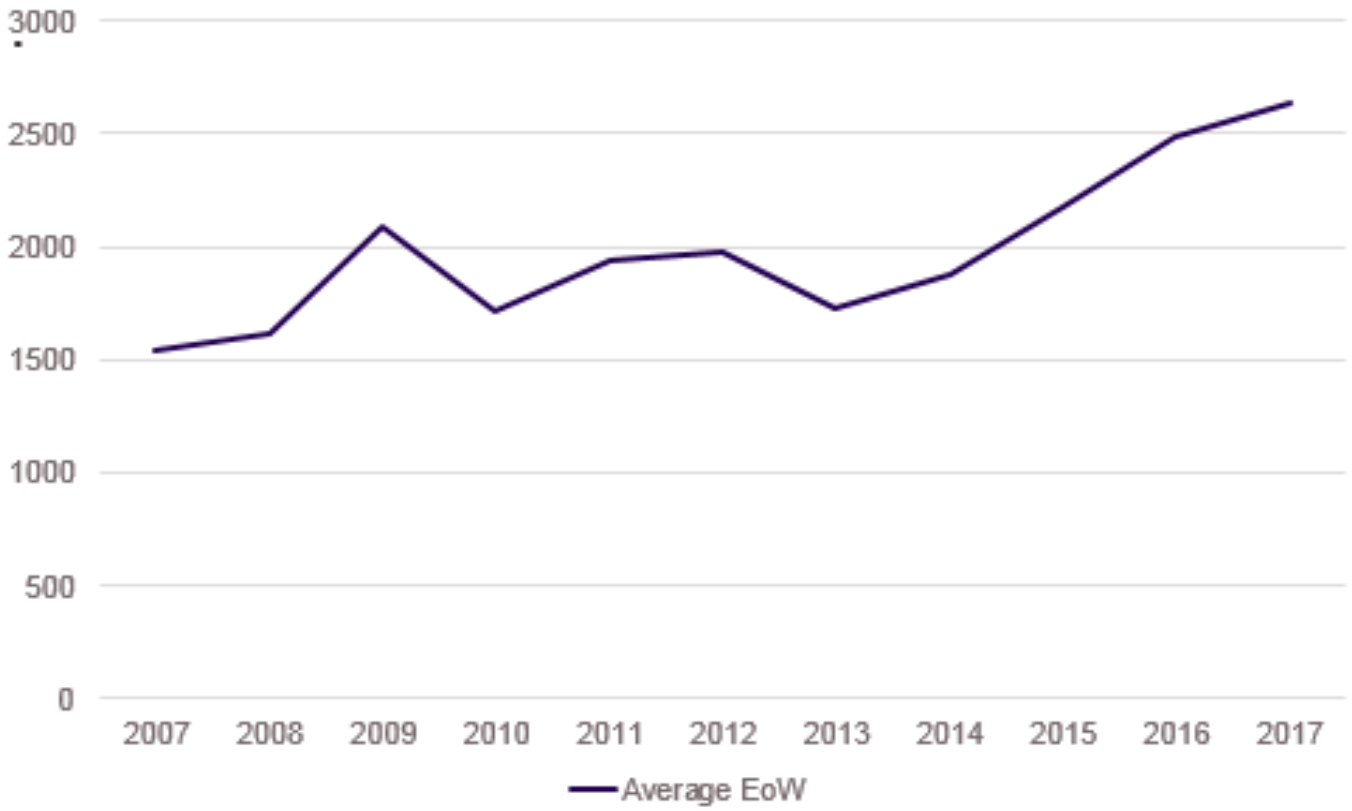
20% of all property claims

£3,120 (2020)

£50% increase in cost from 2014

Association of British Insurers

Escape of water average claim cost



Causes & Influencing Factors

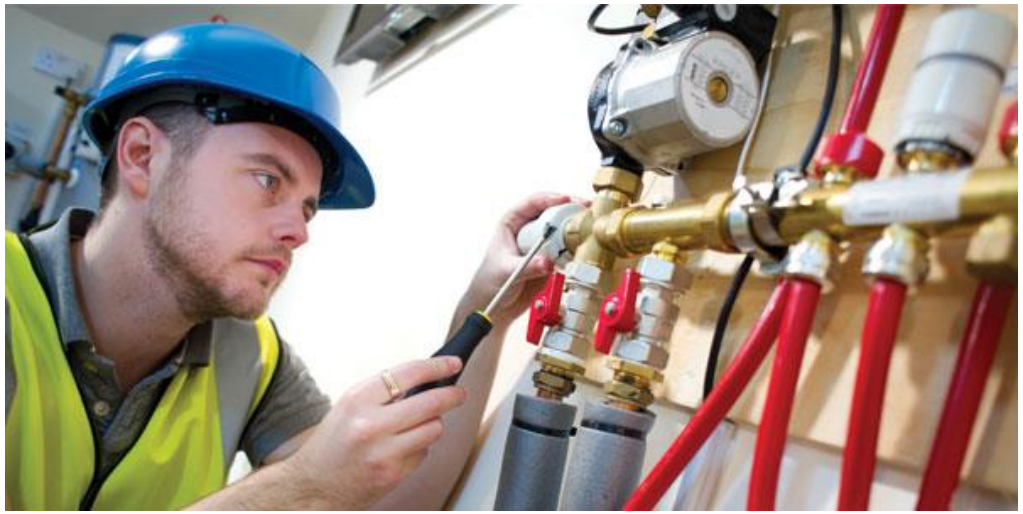
1. Contemporary Lifestyles

2. Current Climate – Economic & Natural

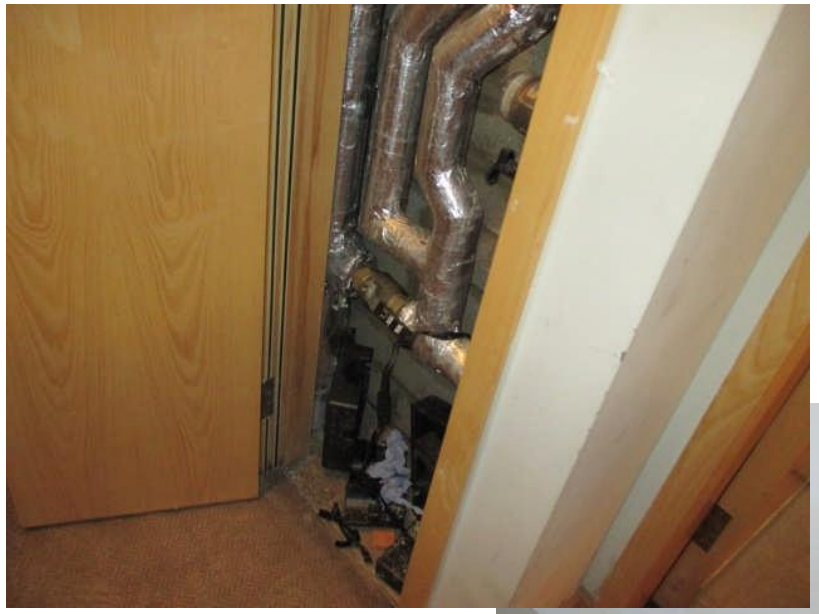
3. Construction & Workmanship

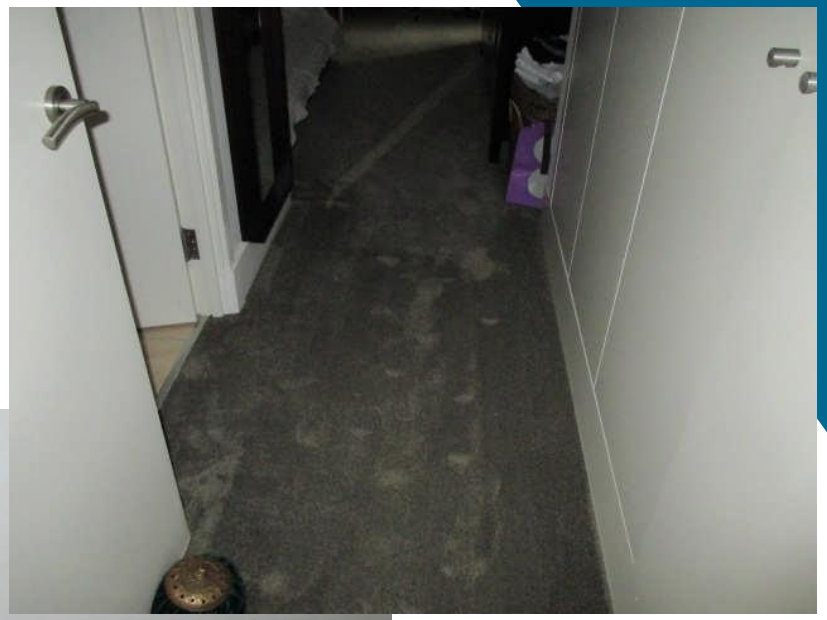
Case Study

- Residential development in central London
- Purpose built circa 12 years ago
- 6 floors with over 20 flats across multiple blocks
- Mixture of 1,2 & 3 bed units



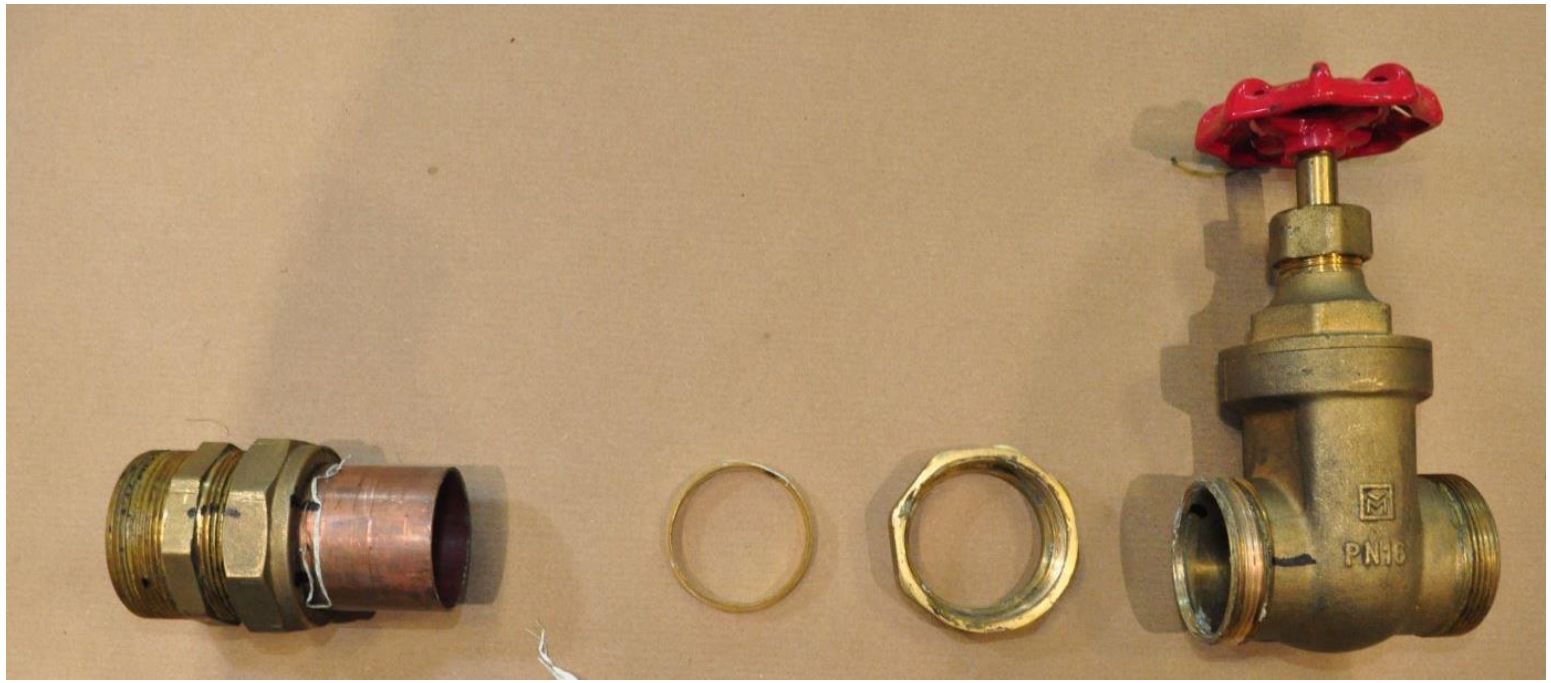
The point of origin & the damage





Déjà vu?

The offending joint/pipework



Prevention is better than cure

Leak Detection Technology

Detection device solutions	Typical areas of use
Leak sensors	• Basement and plantrooms • Near waste pipes in bathrooms, en-suits, kitchens and utility rooms • Service risers containing soil pipes where isolation is not applicable.
Flow Monitor and automatic shut off valves	• Suitable for all types of properties ranging from private dwelling, schools, hospitals, offices, retail spaces, hotels
Leak sensor and automatic shut off valve	• Offers most comprehensive coverage of areas within entire buildings. • Typically found in high end residential or high-risk premises and tend to be more expensive.
Smart Platforms	• Can be used in any premises and typically works by collecting flow and leak data and generate insights for the user • Smart apps monitor alarm activation and water consumption • Can be used remotely to open and close valves when necessary

The right technology can prevent major losses

Case Study

Newly refurbished commercial building:

- Failed copper pipe causing water pressure to drop leaking out into the building
- Drop in water pressure caused one of the low-pressure sensors to activate notifying the on-site facilities manager to investigate
- Maintenance crew were able to find the failed joint and damage was limited to the first floor and office area
- Overall minimal disruption and damage

Escape of water facts:

- Largest 50 losses in 2021 averaged £150,000
- Largest losses typically between £1m and £3.5m
- Largest construction escape of water loss £14m: residential loss involving corrosion of pipework

What can we do about it?

[Resource | RISCAuthority]

Designing out the risks:

- Use Approved Document G – Insurer Requirements (RISC Authority)
- Insist on contractor approvals & training
- Design in leak detection and/or flow monitoring
- BIM can help understand the risks at the design phase
- Need to have greater focus on the impact of water damage in high rise and modern methods of construction

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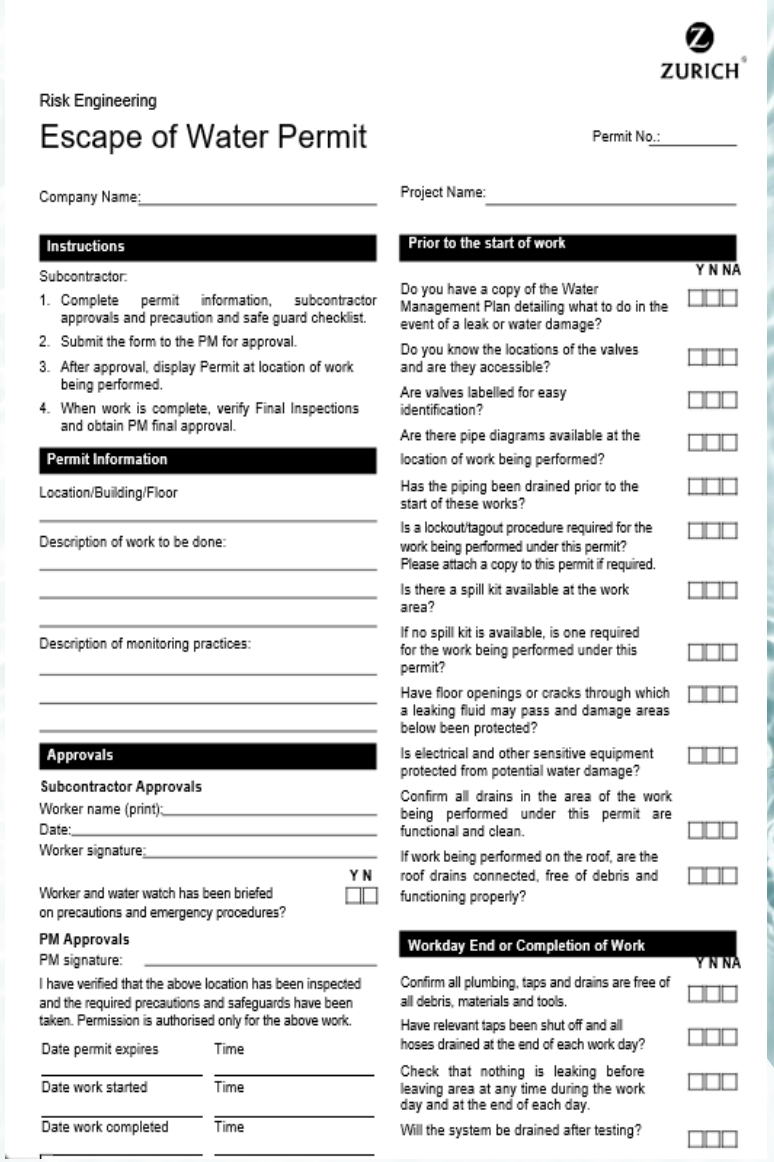
Escape of Water Permit

The permit is divided into several parts as follows:

- Instructions - contractor vetting and approvals/safeguard checklist
- Description of location/what's being done
- Pre-work activities check
- Approvals
- Workday end or completion of work verification



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Risk Engineering

Escape of Water Permit

Permit No.:

Company Name:

Project Name:

Instructions

Subcontractor:

1. Complete permit information, subcontractor approvals and precaution and safe guard checklist.
2. Submit the form to the PM for approval.
3. After approval, display Permit at location of work being performed.
4. When work is complete, verify Final Inspections and obtain PM final approval.

Permit Information

Location/Building/Floor

Description of work to be done:

Description of monitoring practices:

Approvals

Subcontractor Approvals

Worker name (print):

Date:

Worker signature:

	Y	N
Worker and water watch has been briefed on precautions and emergency procedures?	☐	☐

PM Approvals

PM signature:

I have verified that the above location has been inspected and the required precautions and safeguards have been taken. Permission is authorised only for the above work.

Date permit expires	Time
Date work started	Time
Date work completed	Time

Prior to the start of work

	Y	N	NA
Do you have a copy of the Water Management Plan detailing what to do in the event of a leak or water damage?	☐	☐	☐
Do you know the locations of the valves and are they accessible?	☐	☐	☐
Are valves labelled for easy identification?	☐	☐	☐
Are there pipe diagrams available at the location of work being performed?	☐	☐	☐
Has the piping been drained prior to the start of these works?	☐	☐	☐
Is a lockout/tagout procedure required for the work being performed under this permit? Please attach a copy to this permit if required.	☐	☐	☐
Is there a spill kit available at the work area?	☐	☐	☐
If no spill kit is available, is one required for the work being performed under this permit?	☐	☐	☐
Have floor openings or cracks through which a leaking fluid may pass and damage areas below been protected?	☐	☐	☐
Is electrical and other sensitive equipment protected from potential water damage?	☐	☐	☐
Confirm all drains in the area of the work being performed under this permit are functional and clean.	☐	☐	☐
If work being performed on the roof, are the roof drains connected, free of debris and functioning properly?	☐	☐	☐

Workday End or Completion of Work

	Y	N	NA
Confirm all plumbing, taps and drains are free of all debris, materials and tools.	☐	☐	☐
Have relevant taps been shut off and all hoses drained at the end of each work day?	☐	☐	☐
Check that nothing is leaking before leaving area at any time during the work day and at the end of each day.	☐	☐	☐
Will the system be drained after testing?	☐	☐	☐

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THANK YOU!

Further Resources:

Zurich escape of water risk insight:
https://www.zurich.co.uk/news-and-insight/escape-of-water

Zurich escape of water permit (available to download on page 24):
http://hosting.fluidbook.com/Hemsley_Fraser/6ed26e38b1d7e15b776721730e8a122e_Zurich-Escape-of-Water-SCORM/#/page/24

RISC Authority Approved Document G:
https://www.riscauthority.co.uk/news-and-features/insurer-augmented-approved-document-g-water-supply-2021-edition

CIREG Managing Escape of Water on Construction Sites:
https://cireg.org/index.html

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