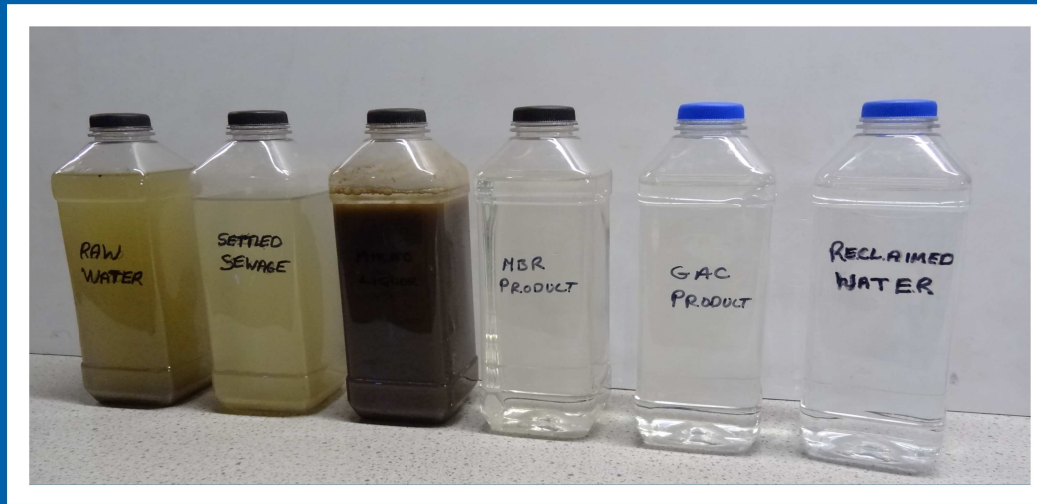


# Water Reuse for London



Martyn Tupper

Senior Research Scientist

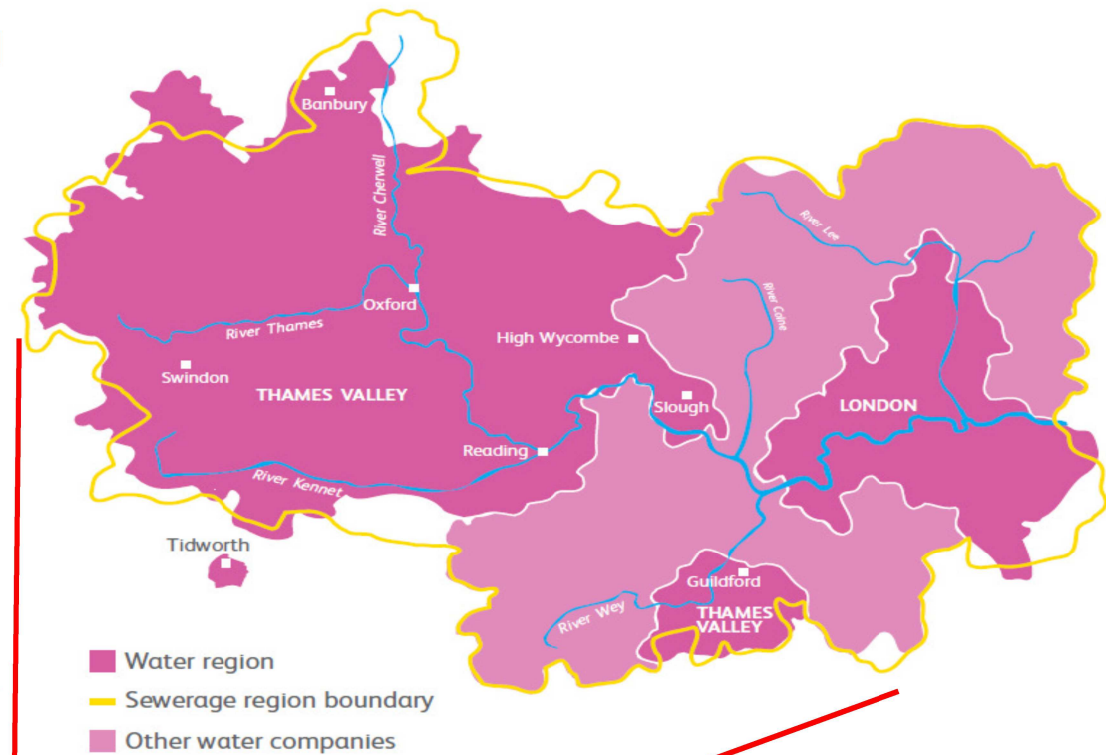
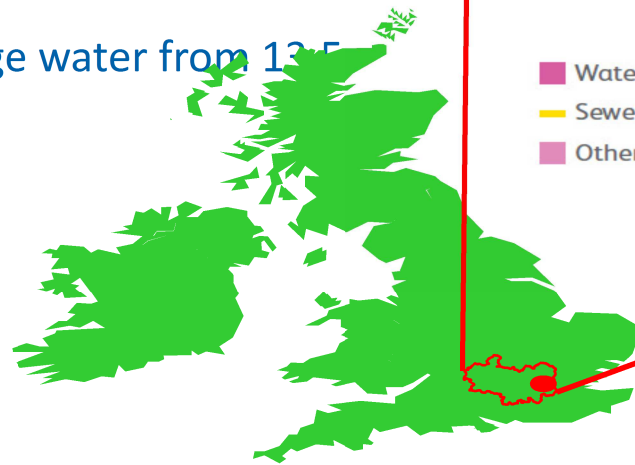
[Martyn.Tupper@thameswater.co.uk](mailto:Martyn.Tupper@thameswater.co.uk)



# Background

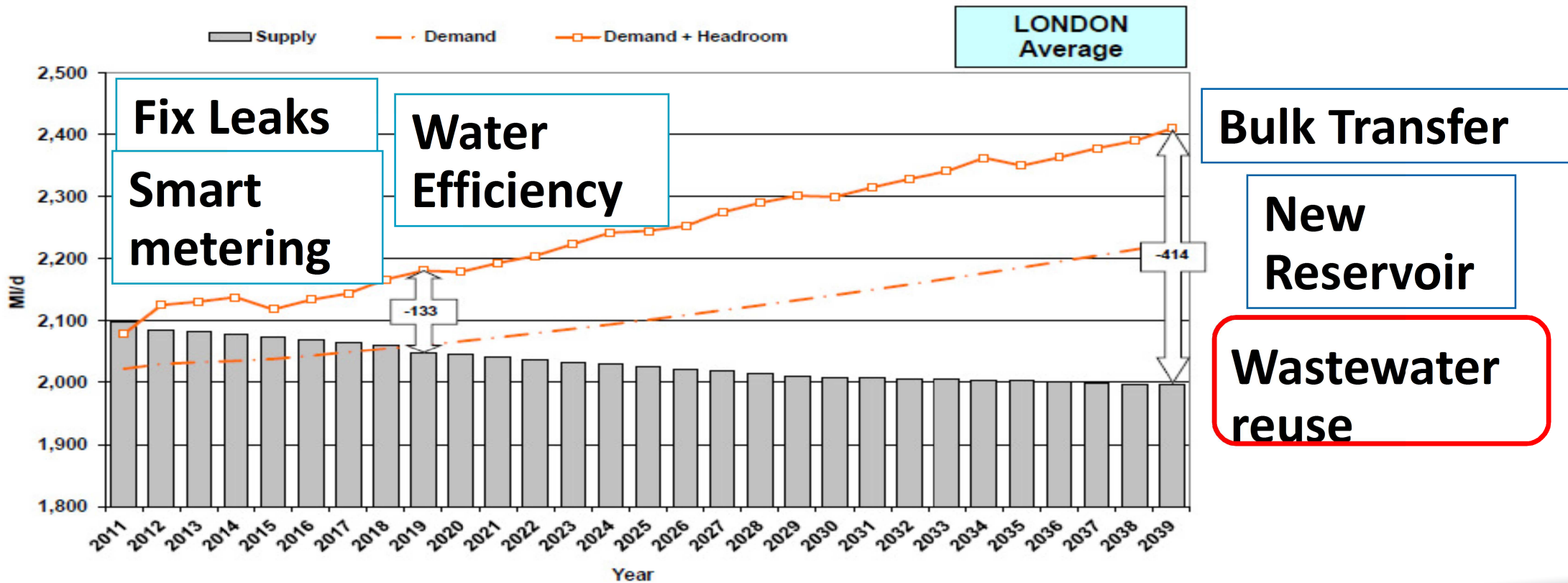
## Thames Water Utilities Ltd

- Supplying 2,600 MLD of drinking water to 9.2 million customers in London and Thames Valley
  - 87 WTWs
  - 31,186 km of water mains
  - London: 80% surface water and 20% groundwater
  - Thames Valley: 30% surface water and 70% groundwater
- Treating 2,800 MLD of sewage water from 13.5 million customers
  - 350 STWs
  - 65,585 km of sewer



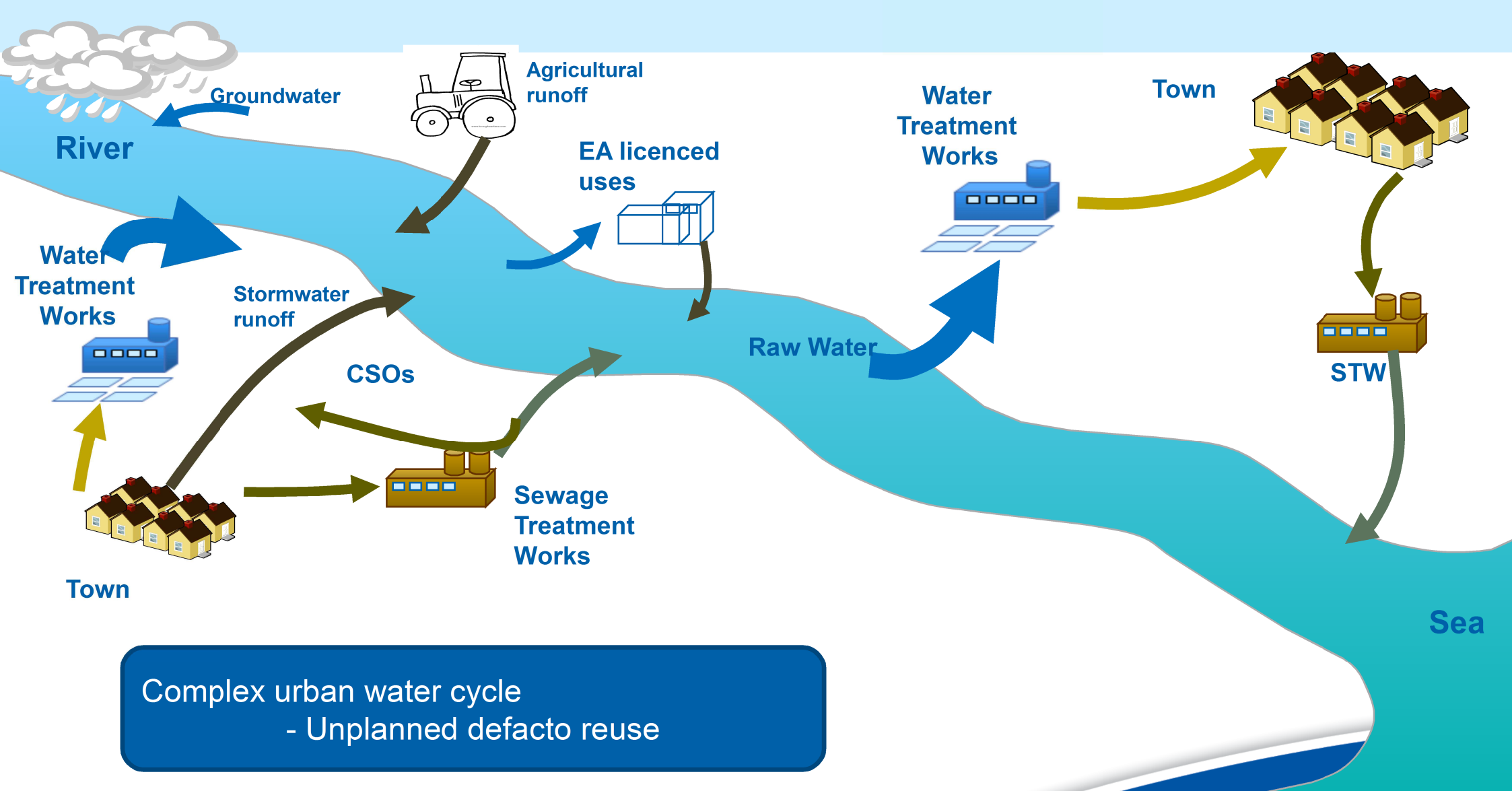
# Background

## Long-term supply demand balance

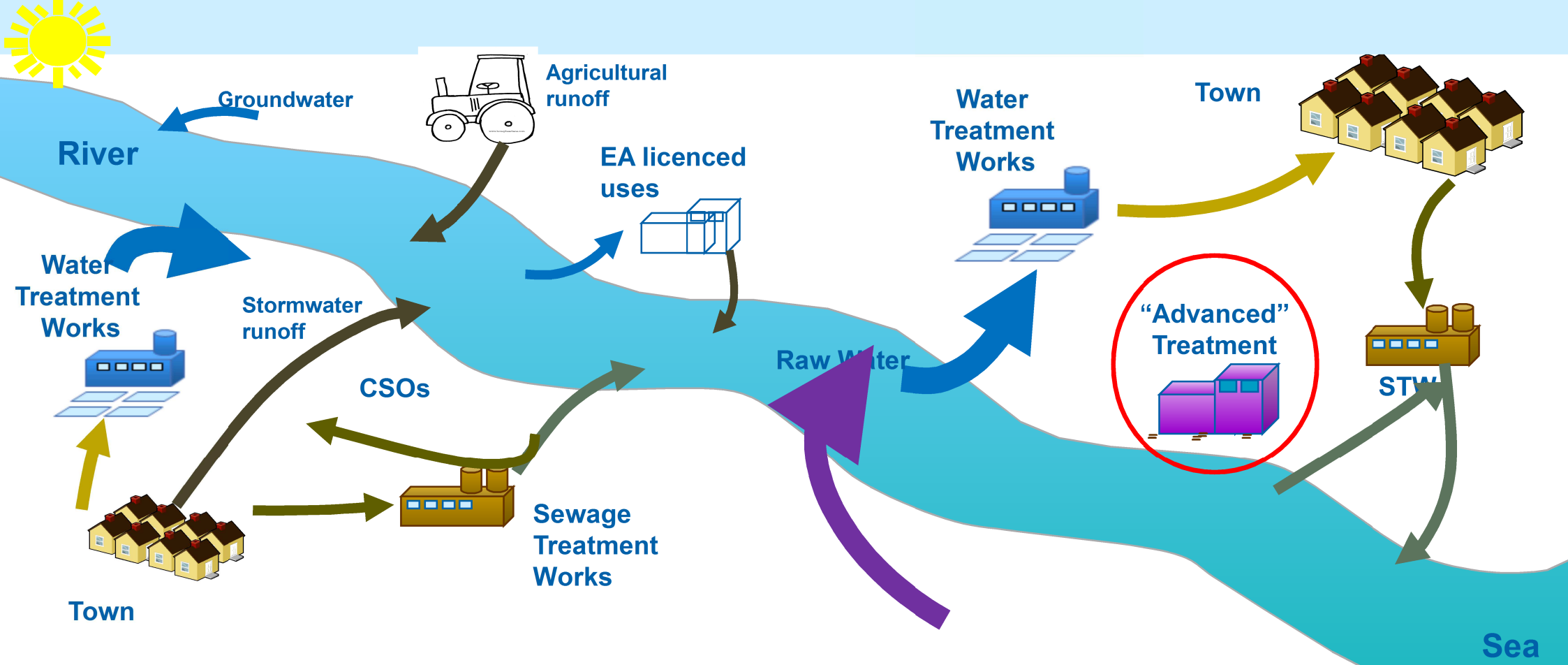


Demand Management

New Strategic Resource







Planned wastewater reuse

- What new risks may be introduced?
- What treatment technology will be required?

# Water Quality Monitoring

## Risks to Human Health

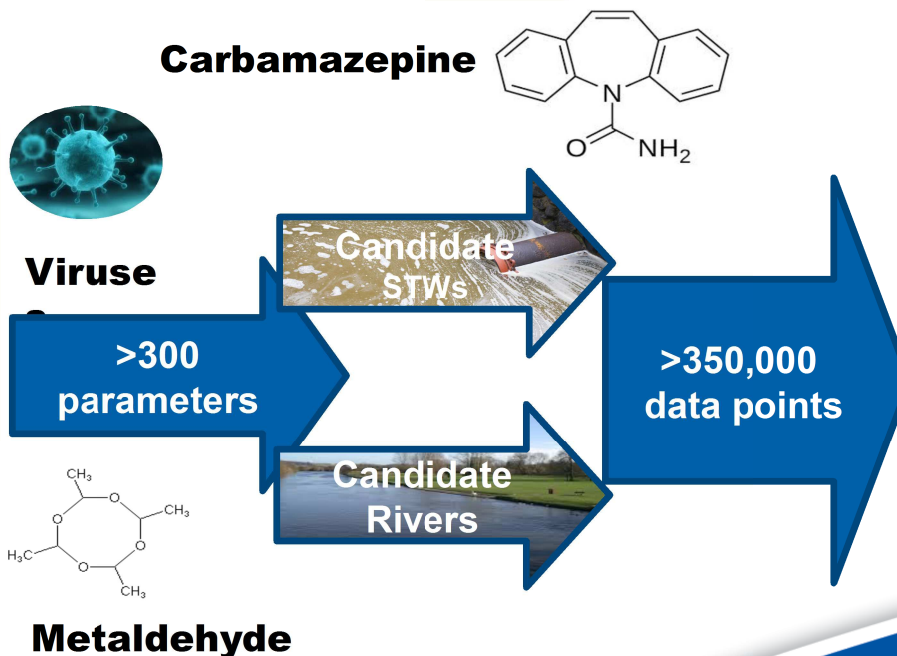
E.Coli  
Virus  
Cryptosporidium

## Aesthetic & Potable Risks

Taste & odour  
(e.g. Salt, 2-EDD)  
Nitrate  
Metaldehyde

## Risks to Environment

Nutrients  
EDC's  
Pharmaceuticals  
Pesticides  
Heavy Metals  
Other emerging compounds



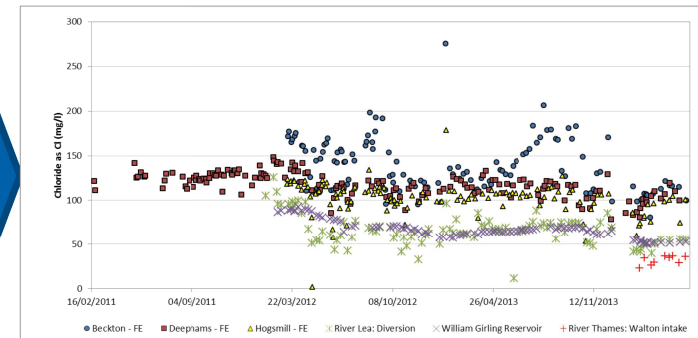
## Water Quality Guidelines

### Discharge to environment

- Environment Agency
- Water Framework directive
  - No Deterioration

### Abstraction for Drinking water treatment

- Drinking Water Inspectorate
- Utility assessed



# What we have found so far

**ST  
W +  
MF**

Chloride 141 mg/l  
 Diclofenac 1327 ng/l  
 Estrone 8.47 ng/l  
 Metaldehyde 0.1 ug/l  
 Nitrate as N 23.6 mg/l

**AO  
P**

Chloride 129 mg/l  
 Diclofenac <2ng/l  
 Estrone 2.7 ng/l  
 Metaldehyde 0.14 ug/l  
 Nitrate as N 22.6 mg/l

**RO +  
AOP**

Chloride <2 mg/l  
 Diclofenac <2 ng/l  
 Estrone <0.4 ng/l  
 Metaldehyde <0.004 ug/l  
 Nitrate as N 1.66 mg/l

**NF**

Chloride 102 mg/l  
 Diclofenac 5.8 ng/l  
 Estrone 0.2 ng/l  
 Metaldehyde <0.004 ug/l  
 Nitrate as N 21.8 mg/l

Removal of target organic chemicals  
 Metals and salts  
 High energy +  
 Chemical demand  
 By-products

High Quality effluent  
 High energy  
 Re-mineralisation  
 Waste Stream

Removal of target organic chemicals  
 Lower energy  
 Nitrate



Deephams IPR Pilot Plant  
 2008-2012

Note: 95th percentiles shown



Waste Stream

# What we have found so far

**MBR**

Chloride 120 mg/l  
Diclofenac 569 ng/l  
Estrone 0.88 ng/l  
Metoldehyde 0.27 ug/l  
Nitrate as N 23.2 mg/l

**GAC**

Chloride 117 mg/l  
Diclofenac 14.3 ng/l  
Estrone 0.17 ng/l  
Metoldehyde 0.23 ug/l  
Nitrate as N 22 mg/l

Meets USA EPA reuse standards  
Removal of some target organic chemicals within MBR  
Pathogen removal  
Low COD for biomass  
>1000 days SRT  
Nitrification/denitrification

>100 Million Litres saved across park  
Avoided 2012 drought impacts  
Managing risk on a busy site



## Old Ford Water Recycling Plant 2011-ongoing

Note: 95th percentiles shown





# Engagement and Future Opportunities



<http://demoware.eu/>



info@demoware.eu  
@DemowareFP7

Process monitoring & control  
Managing Risk & Benefits  
Public & stakeholder engagement  
Governance & Policy

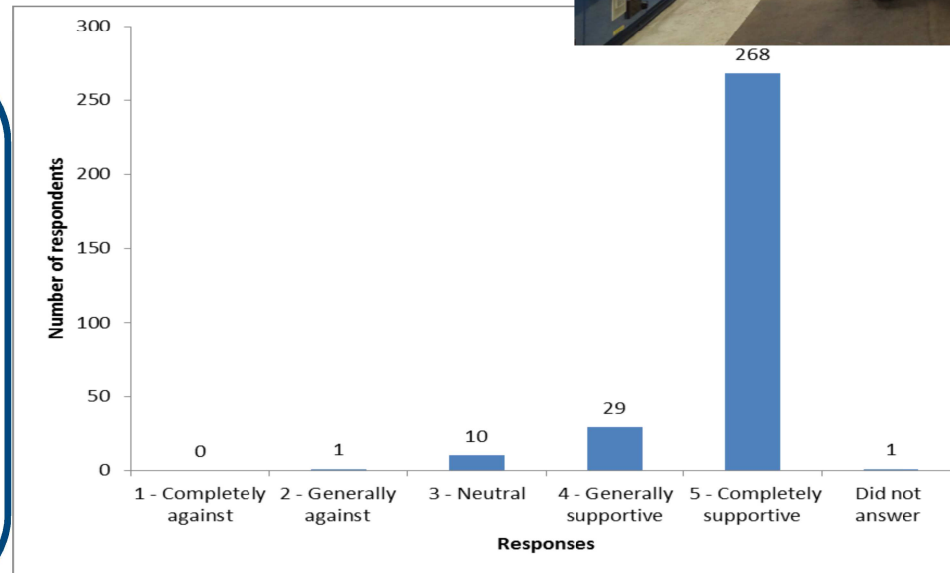


Site tours & surveys

## Horizon 2020 Funding

Making Non-Potable Water Sustainable through Risk Management  
How to produce a more sustainable lower quality water for toilet flushing and not put drinking water at risk.

Engaging new housing developers



Public Perceptions of Recycled Water: A Survey of Visitors to London 2012 Olympic Park.



**Thank you,  
Questions?**

