Planning for Water

26th March 2019

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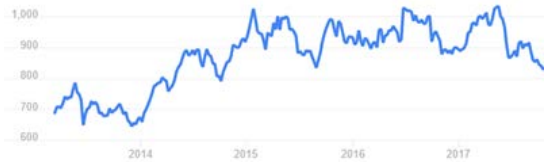
United Utilities
helping life flow smoothly

Planning for Water

- Current Mechanisms
- Water Resources Management Plan
- Future Mechanisms
- Drainage and Wastewater Management Plan
- Water Resources West
- Other factors to consider
- Systems thinking



Images sources: Google finance, Daily Mail

Who are we?

This is what it takes to serve **seven million customers** every day...

We are the only FTSE100 company in the North West and the UK's largest listed water company

56,000 hectares of catchment land

184 reservoirs

1,400 km of aqueducts

88 water treatment works

42,000 km of water mains

77,500 km of sewers

568 wastewater treatment works

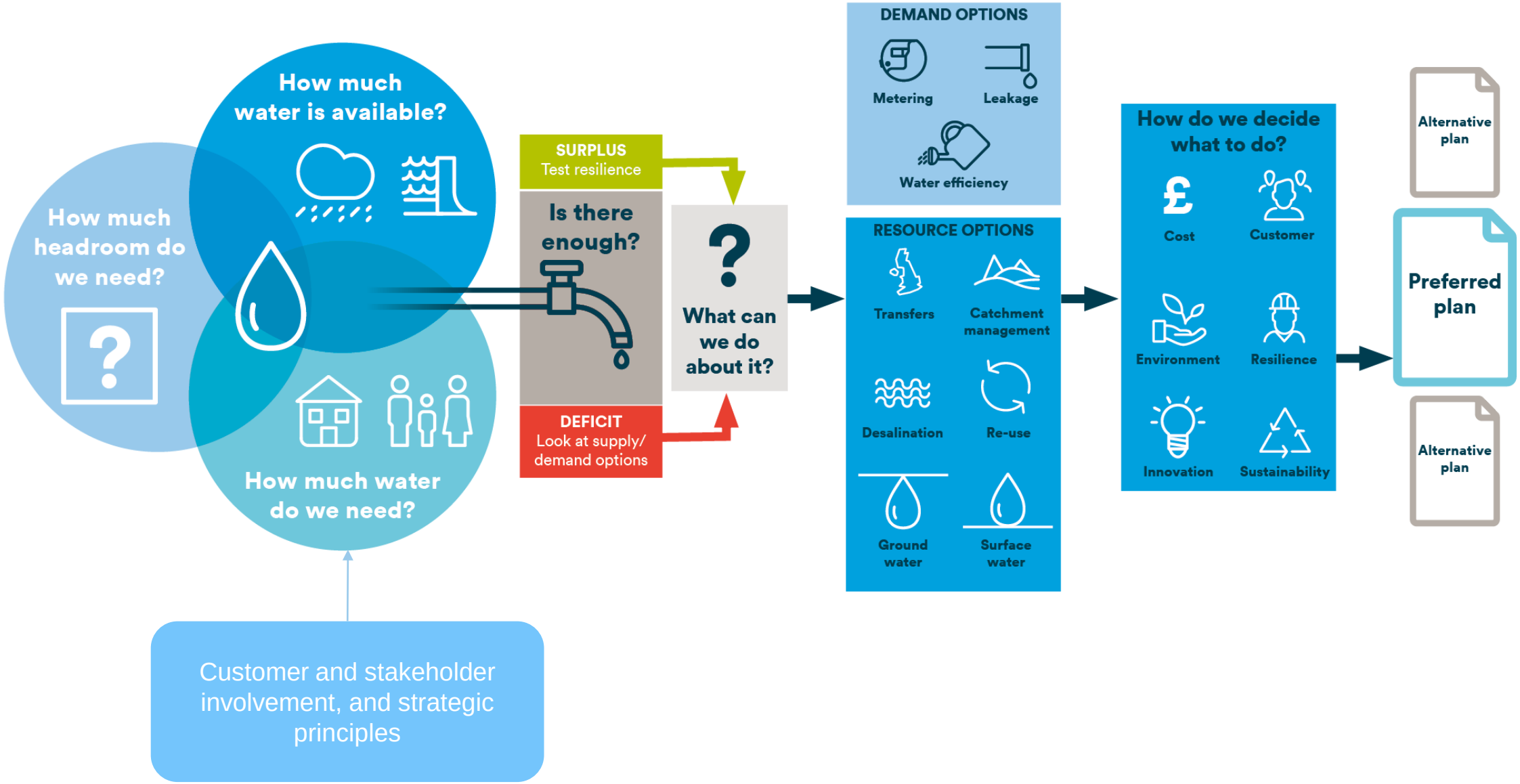
...and around **5,000** skilled employees

Current Mechanisms

Current mechanisms

- There are many different mechanisms currently in place, driven by our requirements and those of our regulators.
- All interlinked which results in a very complex process, creating multiple layers and interdependencies and leads to an unstructured and chaotic approach

Water Resources Management Planning Process



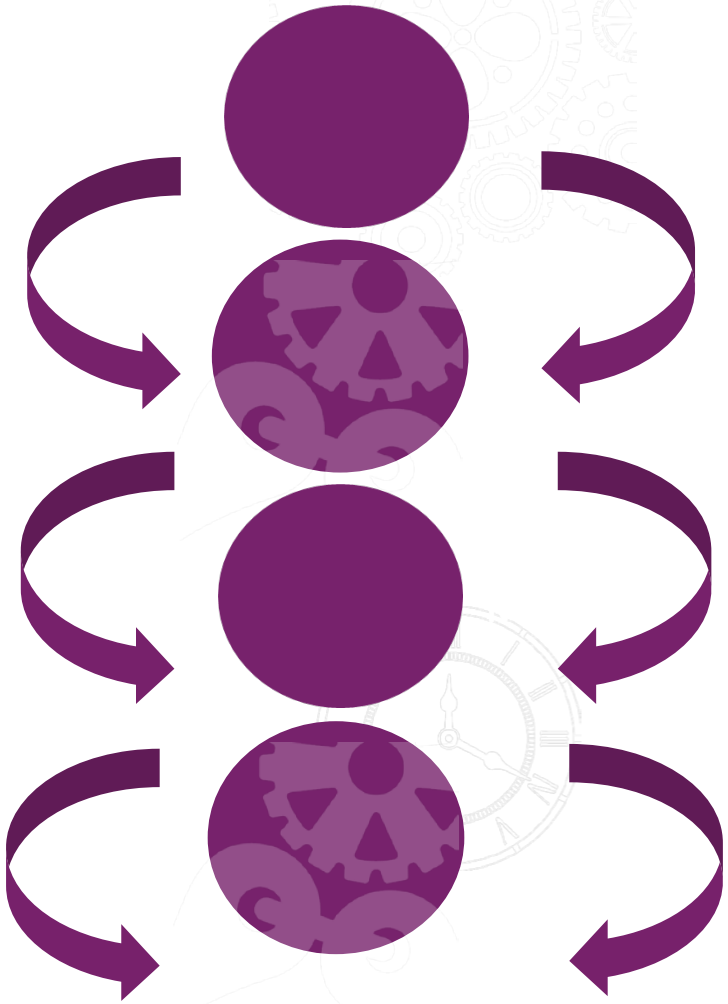
Future Mechanisms

Future Regulatory Mechanisms

This is about to get even more complicated by the emergence of new plans, processes and organisations.

Drainage and Wastewater Management Plans

a 25 year plan setting out how we will manage our entire wastewater system, considering all hydraulic and water quality matters.

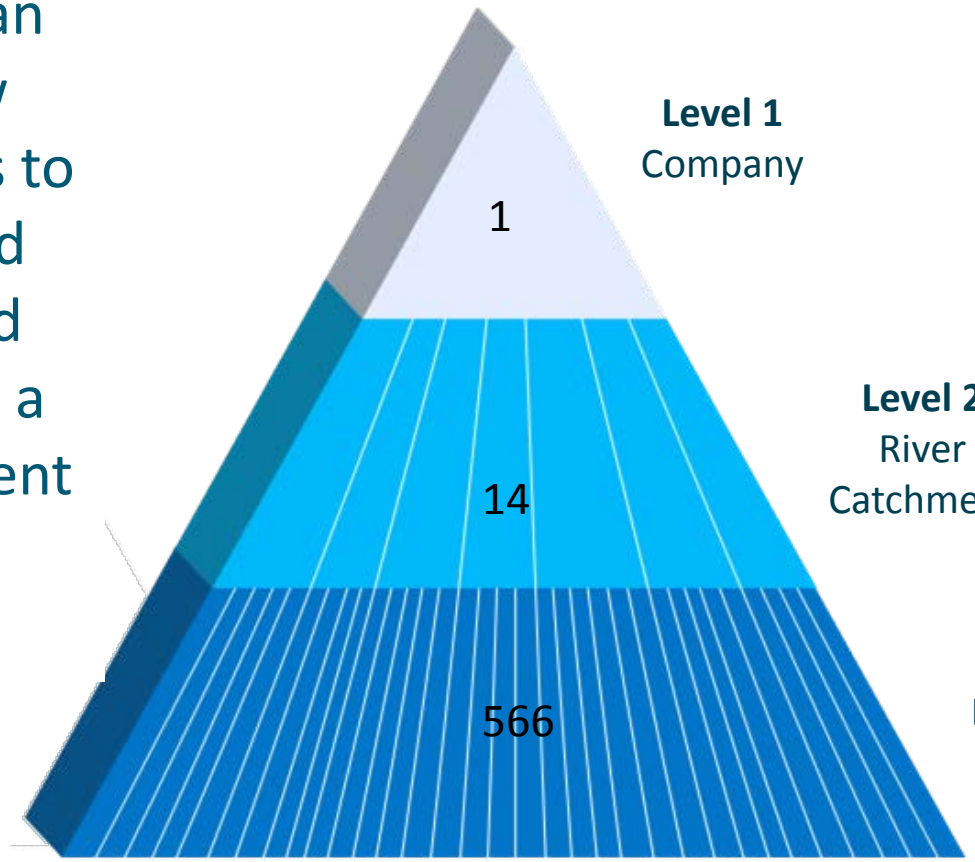


Regional Water Resources Management Plans (Water Resources West)

to ensure strategic oversight and co-ordination of water resources matters across the river catchments of the west of England and the cross border river systems with Wales.

What is a Drainage and Wastewater Management Plan?

A 25 year strategic plan that will set out how United Utilities intends to maintain a robust and resilient drainage and wastewater system at a drainage area, catchment and company level



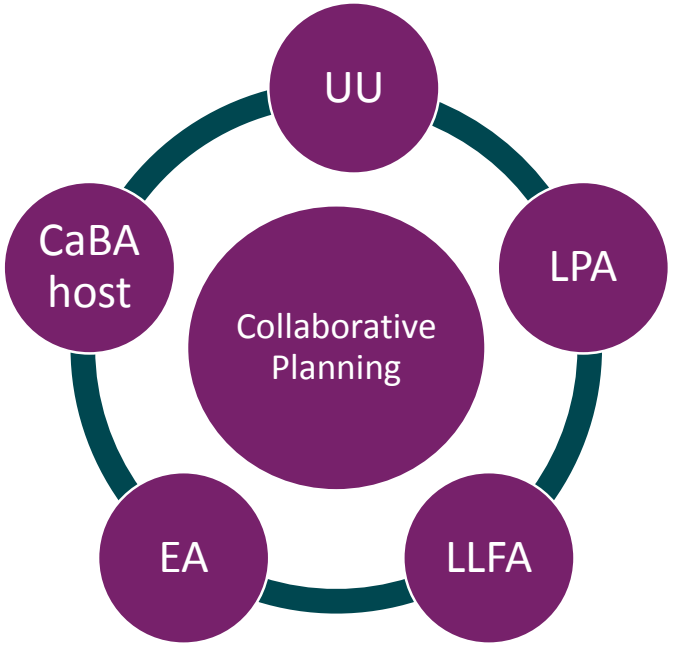
Level 1
Company

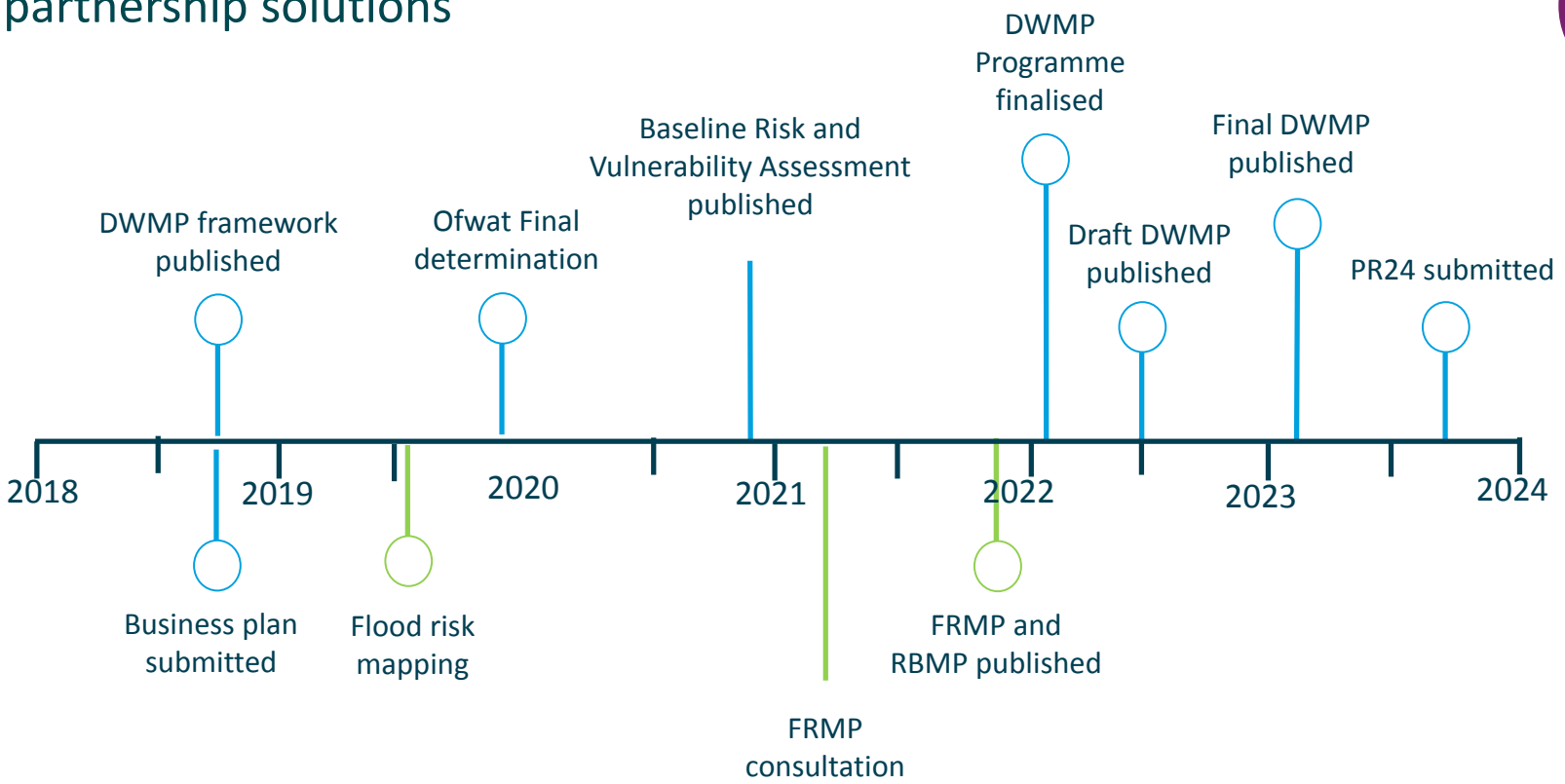
Level 2
River Catchment

Level 3
Drainage area

How will we produce the plan?

- Plan will be developed using published framework that was developed by the industry, regulators and stakeholders
- We will work closely with other Risk Management Authorities to develop best value long term plan for customers with a strong focus on partnership solutions

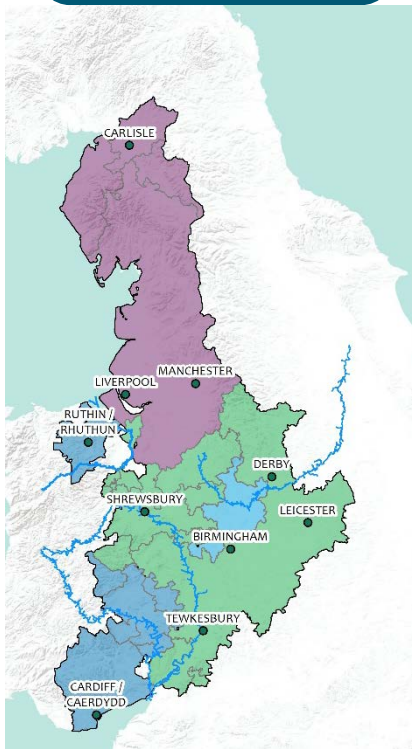




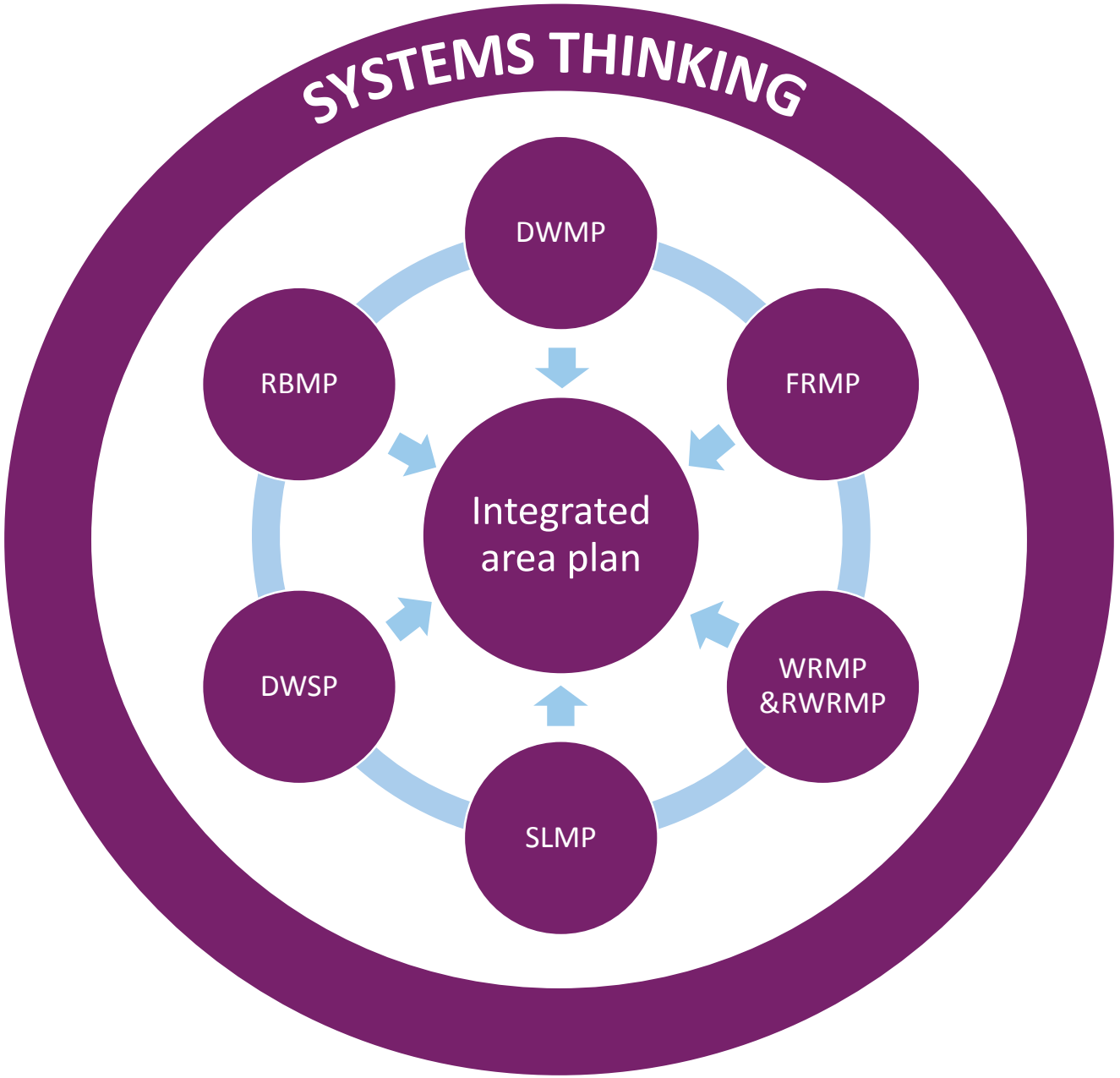
Regional plans

National Framework

- West Country Water Resources
- Water Resources South East
- Water Resources West
- Water Resources North
- Water Resources East



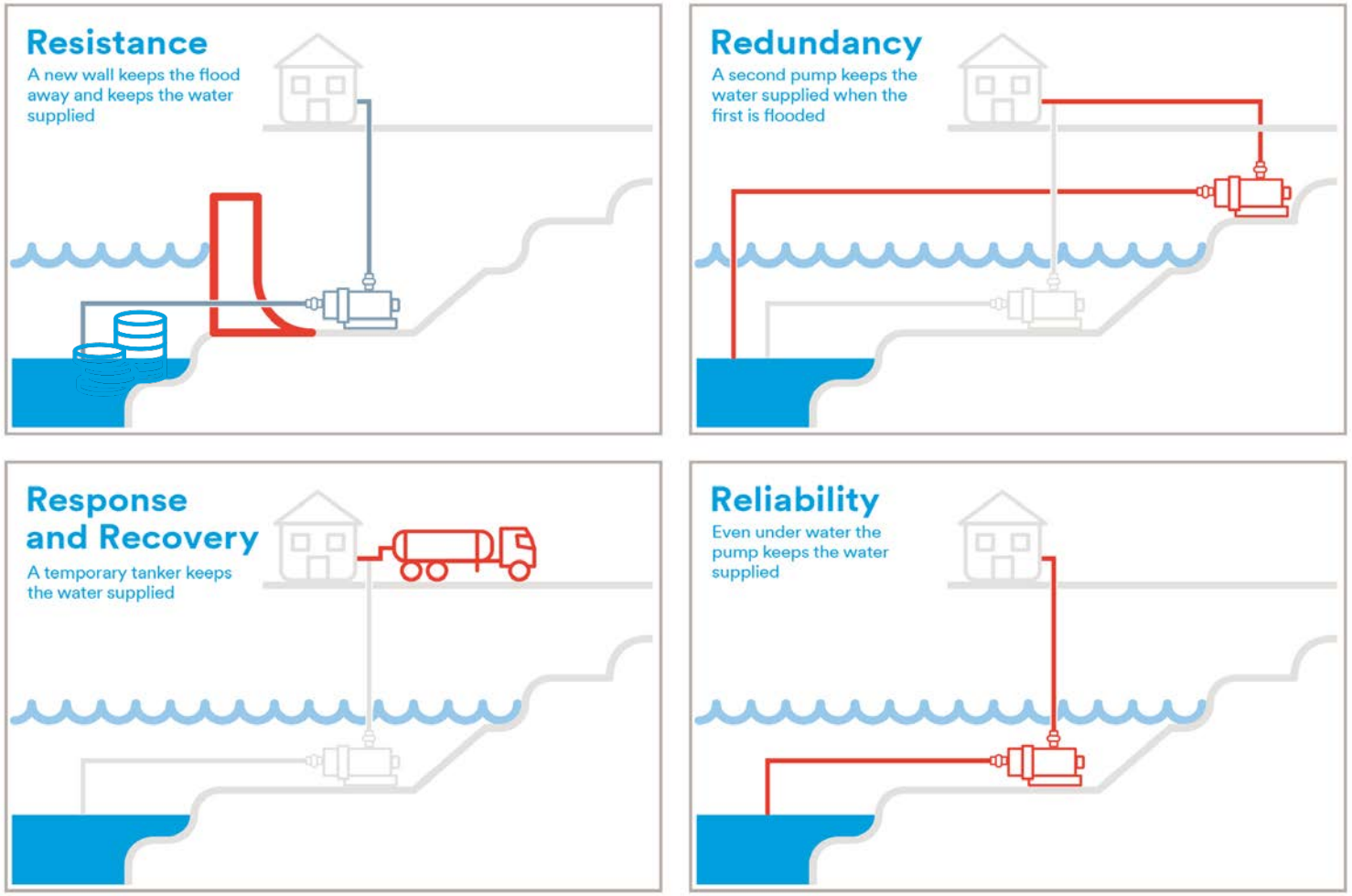
How will these work with other plans?



Other factors to consider

Water Industry Resilience

"The ability to cope with, and recover from, disruption and anticipate trends and variability in order to maintain services for people and protect the natural environment now and in the future"



Risk assessment

Controls

Resistance
Covering water process units

Redundancy
Dualing trunk mains

Response and Recovery
Additional Water Tankers

Reliability
Raising electrical panels

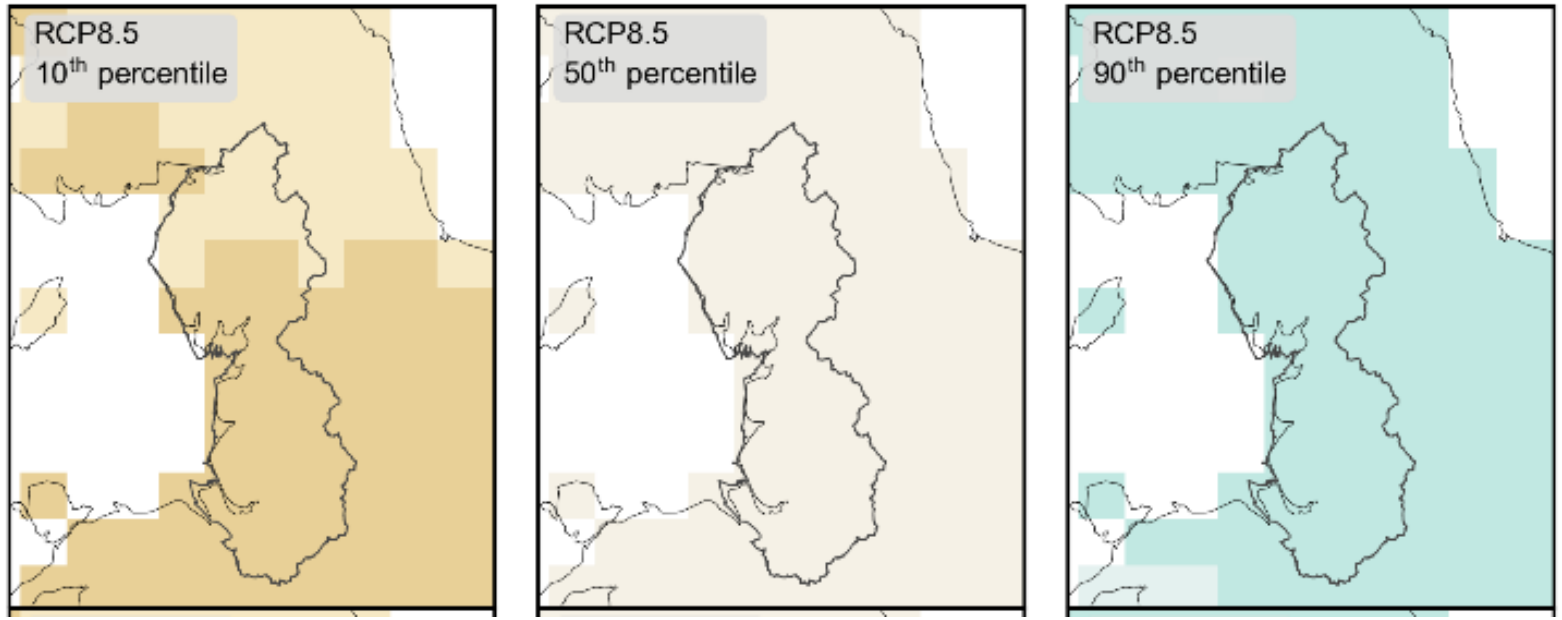
Climate Change Adaptation

Our Adaptation Reports in 2011 and 2015 identified the key climate risks to water and wastewater services:

- more frequent and/or higher magnitude drought events in summer, leading to an increased risk of water supply deficits
- more rainfall in the winter, and more occurrences of heavy rainfall, leading to an increased risk of sewer flooding and pollution events

There are many other climate risks identified across our business that we will need to adapt to including impacts on our workforce and supply chain.

UKCP18 - Summer precipitation anomaly for North West England for 2020-2039 minus 1981-2000 (high emissions scenario)
Source: Met Office Hadley Centre



Climate Change Adaptation

We manage climate change risk like any other risk, it is embedded into our planning processes as one of a number of trends that we need to plan for.

Our current plans are based on the output of the UK Climate Projections 2009. We will update our planning to incorporate the new UK Climate Projections published in 2018 although this will require some work to transform the outputs into a format we can use.

Water Quality
Continue to support moorland rehabilitation to increase resilience to a changing climate

Power Outage
Better understand how increasing storm frequency might impact dependencies

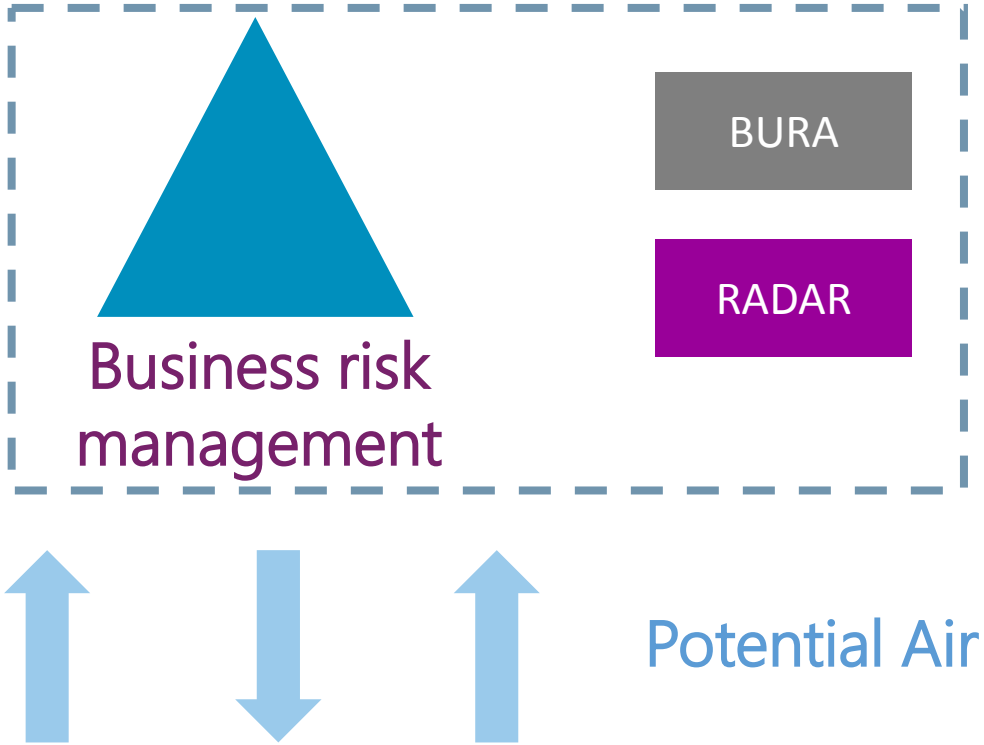
Flooding of Assets
Assessing which of our assets will become more vulnerable to flooding and protecting

Drought
Embed new projections into our Water Resources Management Plan 2024

Peak Demand
Use 2018 drought data to project how demand could increase on local pinch points

Sewer Flooding
Better spatial data in UKCP18 will greatly enhance the accuracy of sewer flood models

Risk Management in UU



Bridging the air gap will enable…

- Targeted investment based on risk reduction/management
- Risk allocation of maintenance budgets
- Stronger line of sight using a structured approach to risk aggregation

Operational risk management

Business Planning
WRAP: Wholesale Risk Asset Planning

Risk Register: MyRisk	Prioritisation tools: Optimus	Deterioration Models: PIONEER	Reporting tools: Airline	Statutory Inspections: DWSP

So how do we build a plan?

Systems Thinking

Systems thinking

What….is systems thinking?

Systems thinking is the understanding of a whole **end to end system**. It requires the examination of the **interactions and impacts** that individual parts have on one another. It also involves the recognition that changing one part affects other parts with **predictable patterns** of behaviour

Components of a system

Why….systems thinking?

- To provide **long term customer benefits** and **improved customer service**
- It will support increased **resilience** of our assets
- We believe it will enable us to deliver **frontier value**
- It will allow us to demonstrate our intent in terms of **strategic innovation**
- We need to understand the **holistic** impact of our decisions and actions
- **Investment can be targeted** within the system to produce the greatest value for money intervention
- Evidence demonstrates that there are **significant efficiencies and performance improvements** within organisations who have leveraged a systems thinking approach
- Customers can see the value in systems thinking and describe it as ‘forward looking and holistic’
- Enables the forecasting of scenarios to take appropriate **proactive** actions

UU Integrated Catchment Strategy

SYSTEM THINKING APPROACH TO PLANNING AND SERVICE DELIVERY

To enable delivery of **effective and efficient water management outcomes** within a catchment we are **bringing together our analysis** of water quality, water resources and flood management and taking a **holistic systems approach to planning and service delivery**.

- To drive efficiency and ensure **long term affordability** for our customers
- To consider what is best for the environment, demonstrated through a **natural capital assessment**
- To enable holistic and **integrated working**
  - Synergies between water quality, quantity and resources
  - Identify efficiencies and multiple benefits
- To align with DEFRA's **25 year strategy**
- To develop **innovative and sustainable** catchment based solutions
  - Asset and non-asset interventions
  - Partnership working
- To **identify uncertainties** within;
  - Technical needs / feasibility
  - Cost benefit assessment
- To improve **collective understanding** of what is achievable


TOTEX

WFD

Flood resilience

Water resource resilience

Climate change

Priority substances

Systems thinking- catchment scale

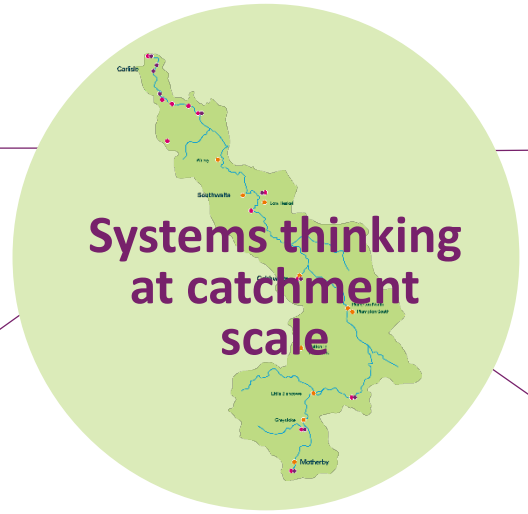
Innovation

Innovative permitting approach

New low tech asset for Phosphorous removal

Natural capital pilot

Nutrient trading



Multiple benefits

Targeted asset + catchment interventions

Match funding opportunities

More for less

Flooding and water quality improvements

Added natural capital value

Long-term benefits to the catchment

Partnership

Co-delivery of catchment interventions

Match funding opportunities

Petteril steering group

Community engagement

United Utilities – helping life flow smoothly

Environment Agency

British Geological Survey

Lancaster University

NATURAL COURSE – Our Water, Our Future

Eden Rivers Trust

Cumbria County Council

NATURAL ENGLAND

CARLISLE CITY COUNCIL – www.carlisle.gov.uk

A clear solution for farmers – Catchment Sensitive Farming

Holistic risk assessment

Enhanced modelling

Intensive monitoring

Benchmarking

Stakeholder engagement

SYSTEM THINKING APPROACH TO PLANNING AND SERVICE DELIVERY

INTEGRATED CATCHMENT PROGRAMME & TIMELINE

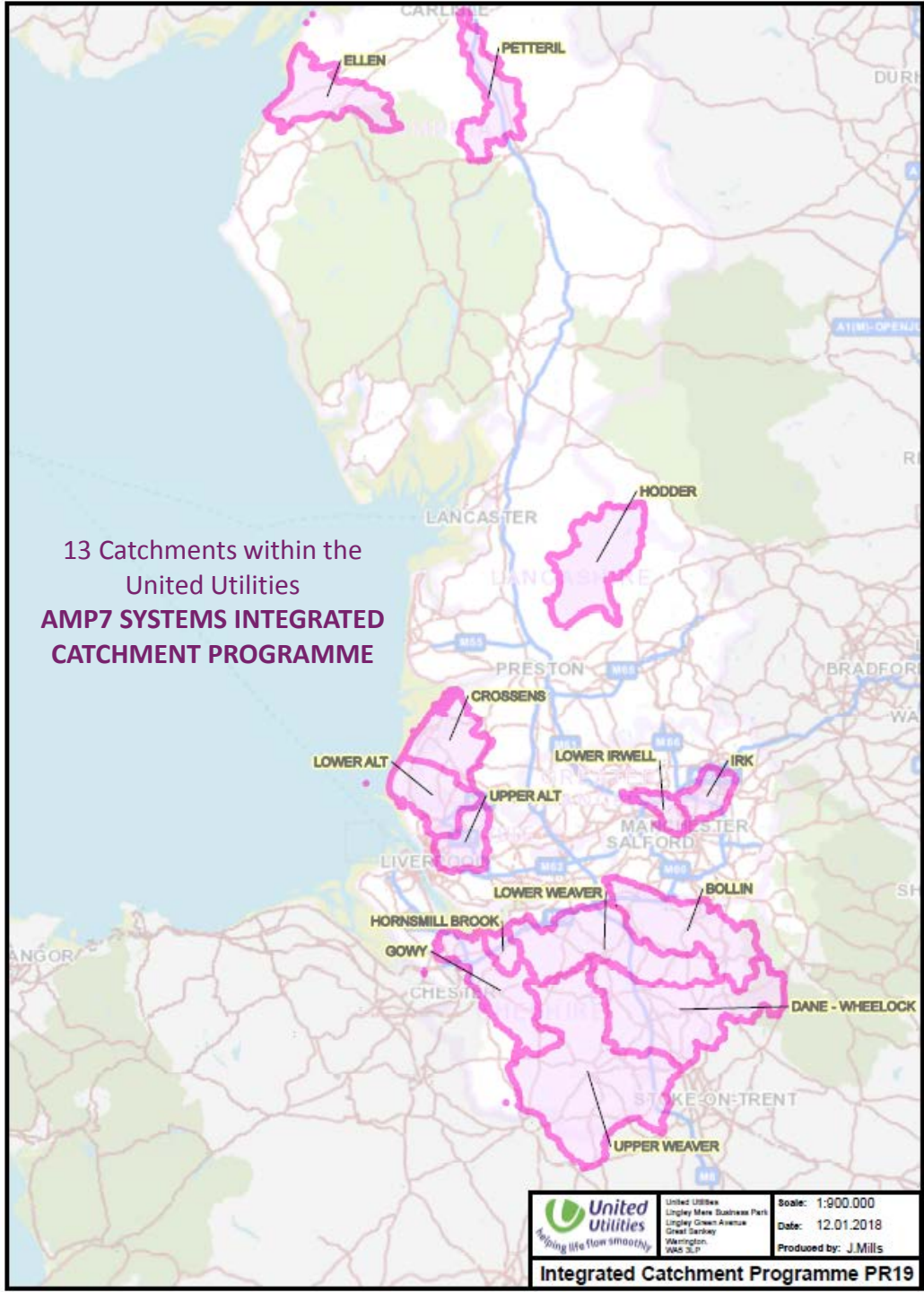
AMP6 (2015-2020)*

- Development of IC strategy
  - Petteril Phase 1
    - **Development of PR19 IC programme**
      - Development of Natural Capital ODI and measuring tool
        - **Innovation trials (Wrenbury, sustainable P removal, catchment solutions)**
          - **New flexible operating agreement**
            - Influencing WINEP 3
              - Development of strategic partnerships
                - Challenging regulatory uncertainty around WFD requirements (CBA, technical needs)

Delivery of AMP7 Programme (2020-2025)*

- **Application of natural capital tool**
  - **Natural Capital Plan for Manchester**
    - Burscough/Martin Mere scheme
      - **Nutrient management platform**
        - Scope of work for Rhodes Farm nature reserve project (AMP7-AMP8)
          - Integrated drainage area study output projects
            - **Catchment system operations hub**
              - **Cheshire sustainable P removal**
                - Petteril Phase 2
                  - **Chipping green infrastructure solution**
                    - Identifying In-AMP7 solutions

*parallel programme therefore chronologically not to scale



Systems thinking- Integrated Drainage Strategies

Creating capacity within networks and treatment plants to accommodate future development

Integration

Flooding and water quality issues

Resilience of assets

Natural capital approach

Collaboration

Assessment of risk

Solution innovations

Funding and leverage

Partnerships

Multi organisation & regulatory partnerships

Opportunity and priority alignment through an evidence based approach

Urban catchments

Managing surface water discharges to our combined network through promotion of SuDS

Rural catchments

Identification of misconnections

Slow the Flow interventions

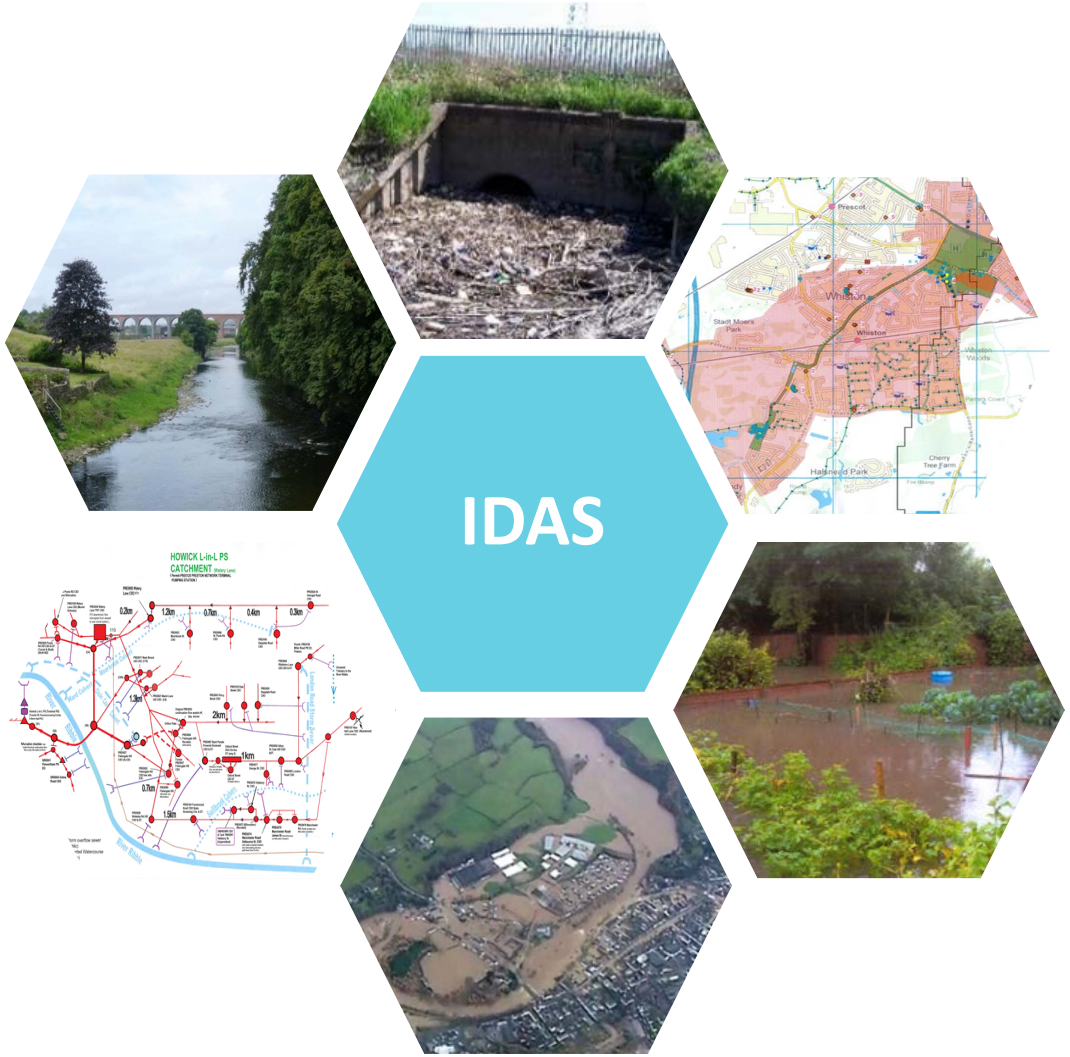
Natural Flood Management

Coastal areas

Natural Flood Management

Spill Reduction

Holistic delivery of asset and catchment interventions



Thank you- any questions?