



Delivering Environmental Improvements to the North West Lakes Network through a Catchment Systems Thinking Approach (CasT)

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Ullswater

About United Utilities



56,000 hectares of catchment land



165 reservoirs



1,400 km of aqueducts



88 water treatment works



42,000 km of water mains



78,000 km of sewers



567 wastewater treatment works



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



What we do impacts each and every person in the North West as they simply get on with life, from making a cup of tea, using the loo, having a shower, the list goes on...

We deliver **1.7 million litres of fresh, clean drinking water** to over **7 million customers** every day across the North West. We also collect and treat **1,300 million litres of wastewater every day**, so it's safe to go back into the environment

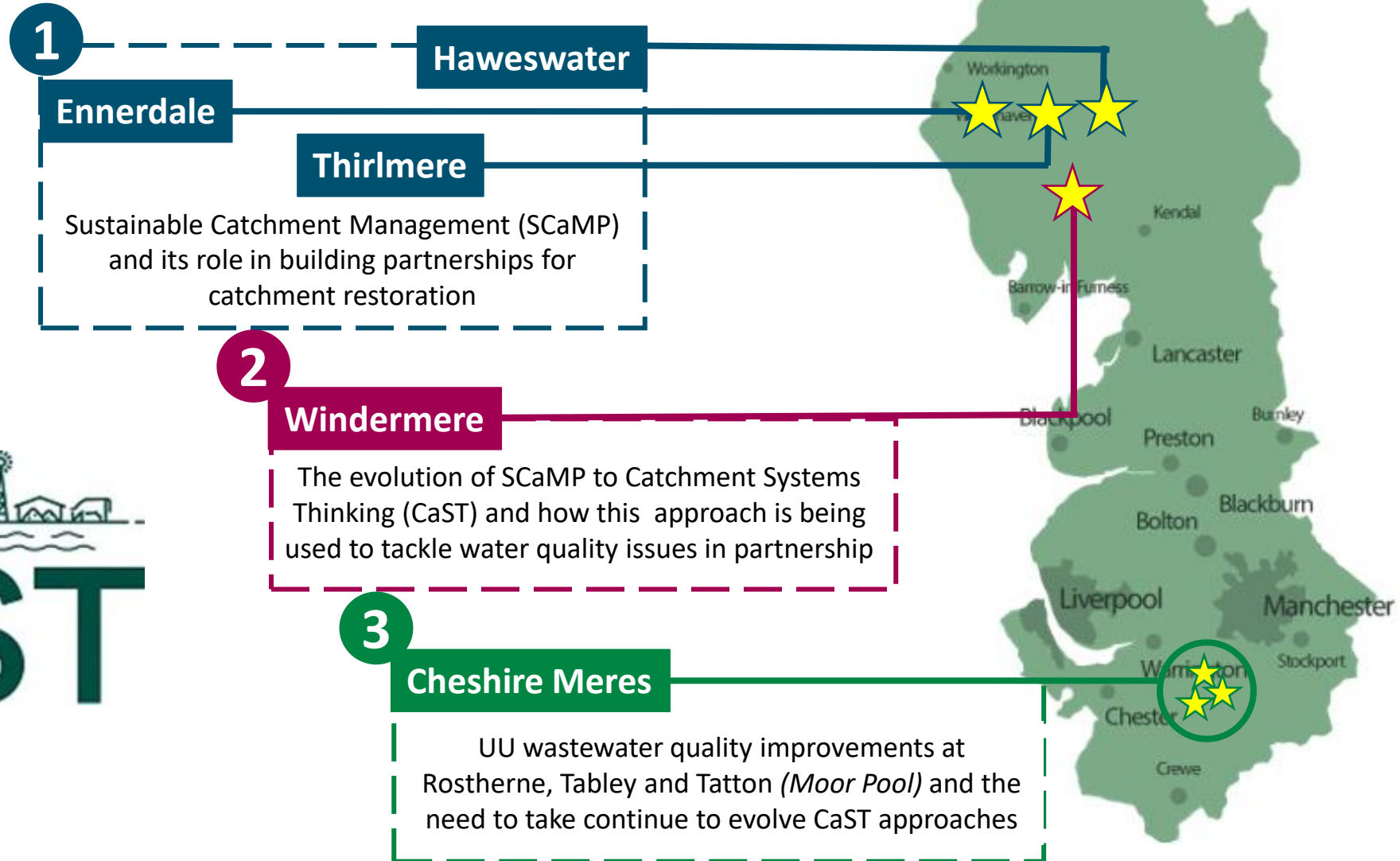
In the current AMP7 period (2020-25) we'll **invest £5.9bn** running, upgrading and future-proofing the region's water infrastructure and services to a blueprint shaped by our customers.

We'll help lift a **quarter of a million people out of water poverty, cut leakage and knock a tenth off water bills** so that by 2025 average bills will be less, in real terms, than 2010. And we'll adapt as we go.

As COVID-19 shows, customer priorities change, which is why we constantly **seek their views through Water Talk**, our 7,700-strong customer panel.

UU North West Lakes Focus

Case Studies for Discussion



SCaMP

Sustainable Catchment Management

- Launched in 2005 by UU 'clean water' business areas as an innovative and large scale project designed to:
 - Improve catchment quality
 - Meet nature conservation objectives
 - Improve raw water quality
 - Ensure a sustainable future for agricultural tenants
- Working with partners including RSPB, over 10 years
- Leveraged stewardship funding to deliver improvements at tenant farms and drinking water catchment
- Reduced the risk of cryptosporidium through improved muck handling facilities, planted trees and restored peatlands
- Set the foundation and principles for Catchment Systems Thinking (CaST)



Sustainable Catchment Management: Drinking Water Catchment Restoration Case Studies



Restoration: 2003 rewilding project across the **4,500 hectare** catchment. Working in partnership to deliver a shared vision.

Delivery model: Partnership. UU is not the main land owner. Our main interest is water resources.

Funding: UU contribution to co-fund a project officer. No income to UU.

Activities: management of the ancient semi-natural woodlands, rewilding through natural regeneration and 50,000 native species planted to replace diseased larch. Proposed beaver reintroduction. New National Nature Reserve.



Restoration: 2020 resilience project working in partnership to restore natural processes across **4,500 hectares** of drinking water catchment.

Delivery model: UU owned land. Common grazing rights, long term tenancies. Delivery via NGOs with shared interests.

Funding: UU is the main funder through WINEP enhancement. NGOs also fund via direct access to grants. Subsidies for the farming activity are received by UU.

Activities: management of the commercial forestry activities, native species planted to replace diseased larch, deer management, river restoration, shallow peat restoration, livestock management.



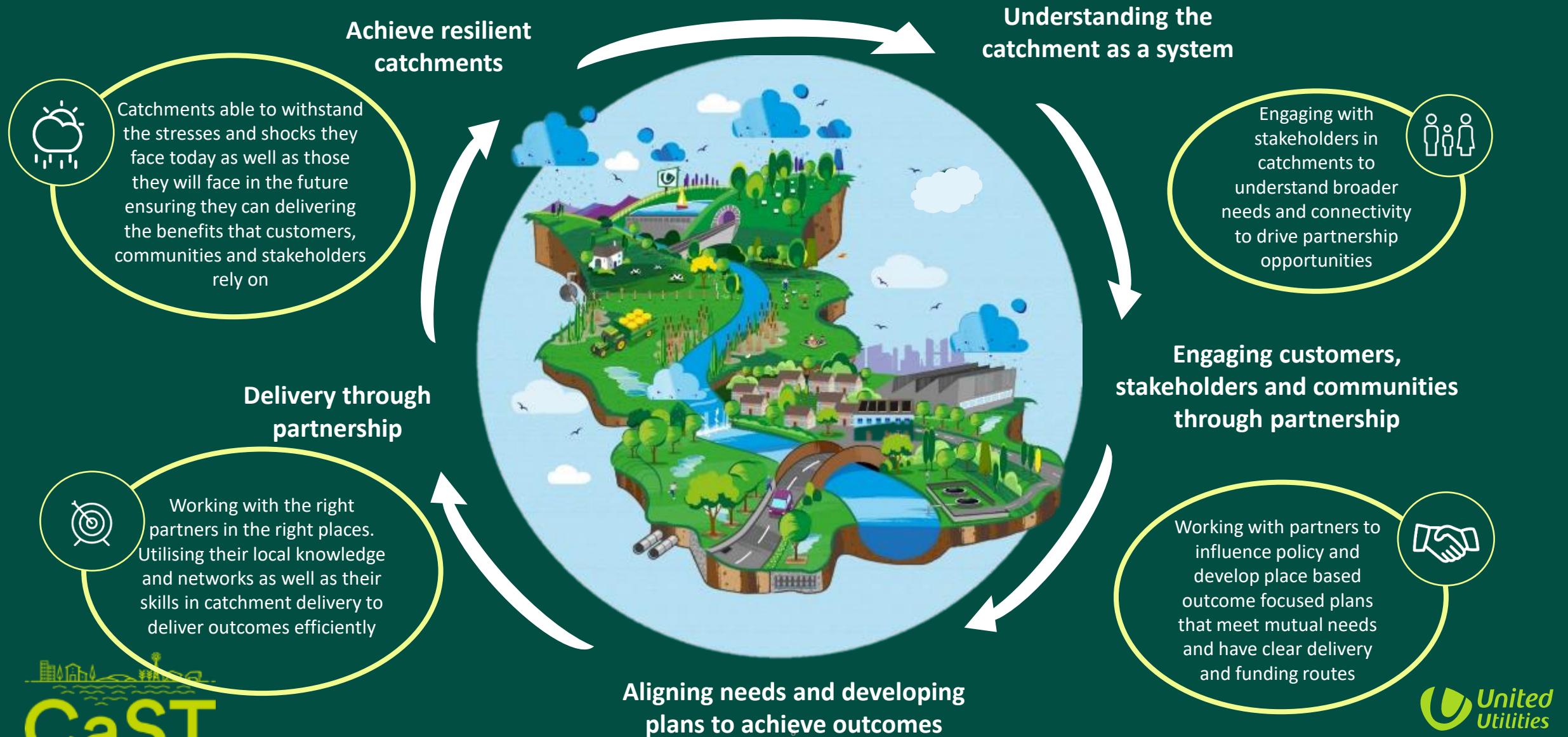
Restoration: Nature friendly farming since 2012 in partnership with RSPB across **3,000 hectares**. Published reports on the economics and sustainability of upland farming.

Delivery model: UU owned land. RSPB are tenants and delivery partner.

Funding: UU receives market rate rental income from RSPB. Rewilding is funded via RSPB in receipt of subsidies and grants, and UU WINEP enhancement.

Activities: Peatland restoration, grazing management, river restoration, upland tree nursery, tree planting, natural regeneration, farm business diversification, eco-tourism.

Catchment Systems Thinking – An Evolution of SCaMP

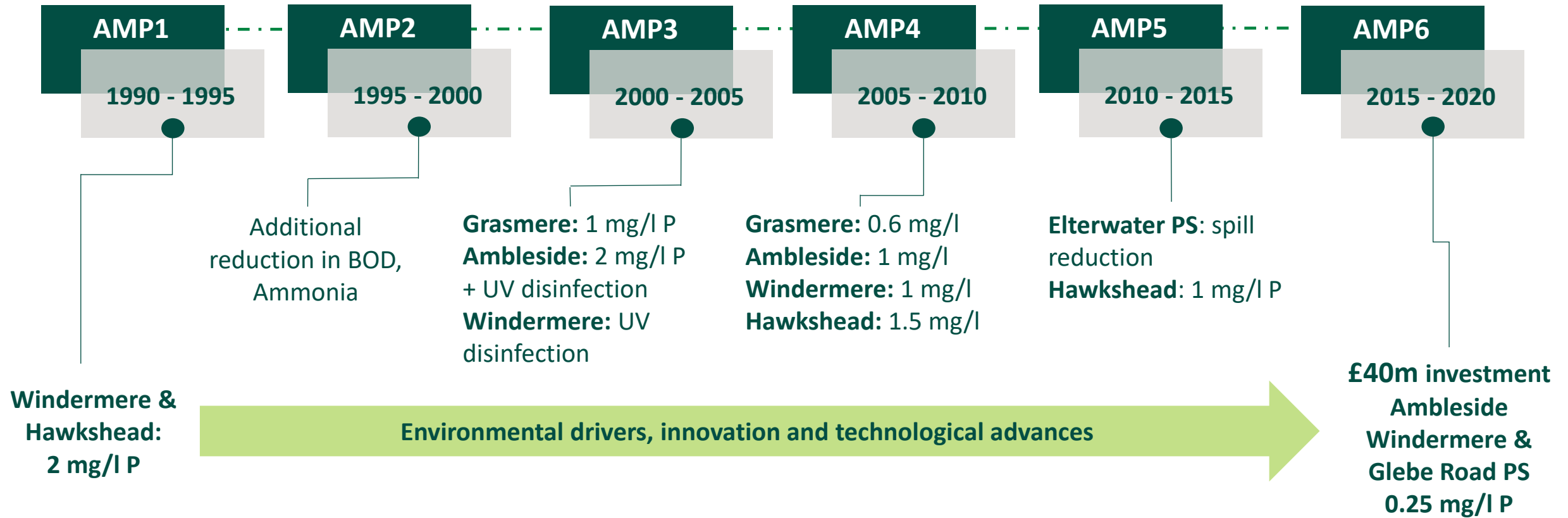


CaST in Action - Windermere

- UU has a long history of investigation and investment in Windermere and surrounding catchment
- 1990 UU phosphate input into Windermere accounted for circa 2mg/l compared to 0.25mg/l in 2020
- Previous environmental drivers required reductions of total Phosphorus discharge and reduce number of spills from pumping stations
- Historically undertaken significant modelling of the catchment to take holistic view of inputs
- Dec 2010 United Utilities and Environment Agency agree long term holistic approach to Windermere catchment
- Significant investment over >30 years has led to substantial P reduction from UU assets
- Partnership and collaboration key to continuing to improving water quality in Windermere no one organisation can do it alone



Water Industry Enhancements



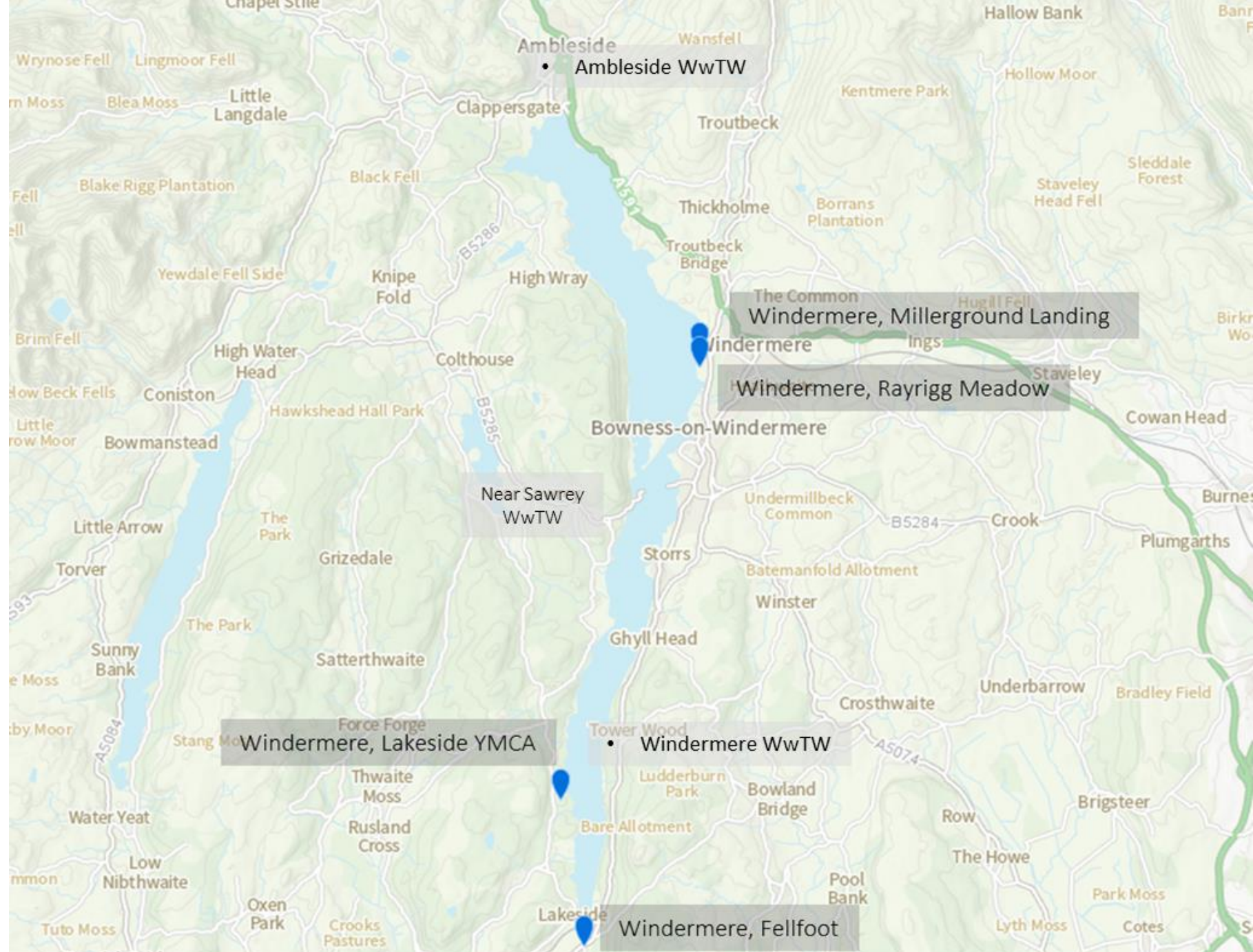


Current Situation – Treating Wastewater

- Wastewater treatment processes around Windermere are cutting edge
- Operating the treatment process in real time to optimise the process automatically based on the quality of the wastewater coming in
- Filters on treatment works allow us to treat to the lowest ever phosphorous levels entering Windermere
- Added UV to all final effluent from wastewater sites around Windermere (neutralises bacteria entering water)
- Increased pumping station capacity to increase flows to the treatment works and reduce spills from storm overflow at Glebe Road
- UU is contributing to 4 excellent bathing water sites with UV treatment on final effluent to neutralise bacteria

Taking a collaborative Approach

- **60% +** of phosphate entering Windermere comes from other sources
- Catchment Systems Thinking (CaST approach) required to look at the catchment holistically
- Partnership and collaboration key improving water quality in Windermere
no one organisation can do it alone



Looking Ahead



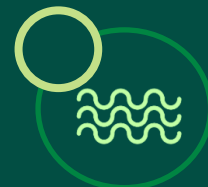
UU sitting on a collaborative Board dedicated to the improvement of water quality in Windermere



Continuing to support nature based solutions through the CaST Account



UU has signed a partnership with The Rivers Trust which will help improve the collaboration



Recently launched our Better Rivers: Better North West pledges – setting out our targets to improve the health of water environments in the North West

AMP6 (2015-2020) Water Quality Improvements for Rostherne Mere



Rostherne Mere

- Largest and deepest of Cheshire Meres
- This site is a designated National Nature Reserve, Site of Special Scientific Interest (SSSI) and Ramsar site

The Need

- Move Rostherne Mere from *Unfavourable* to *Favourable* condition
- Under the CRow Act (2002) UU required to deliver improvements to UU wastewater discharges impacting Rostherne Mere
- AMP6 NEP requirement – identified by NE and endorsed by EA
- 2 UU combined sewer overflows at Mere Platts Pumping Station and Rostherne Pumping Station – discharging to Rostherne Brook required improvement.
- UU intermittent discharges were estimated to be contributing 20% of the annual phosphorus load to the mere, contributing to eutrophication issues with regulatory requirement to cease intermittent storm discharges from UU assets.

AMP6 (2015-2020) Water Quality Improvements for Rostherne Mere



The Solution

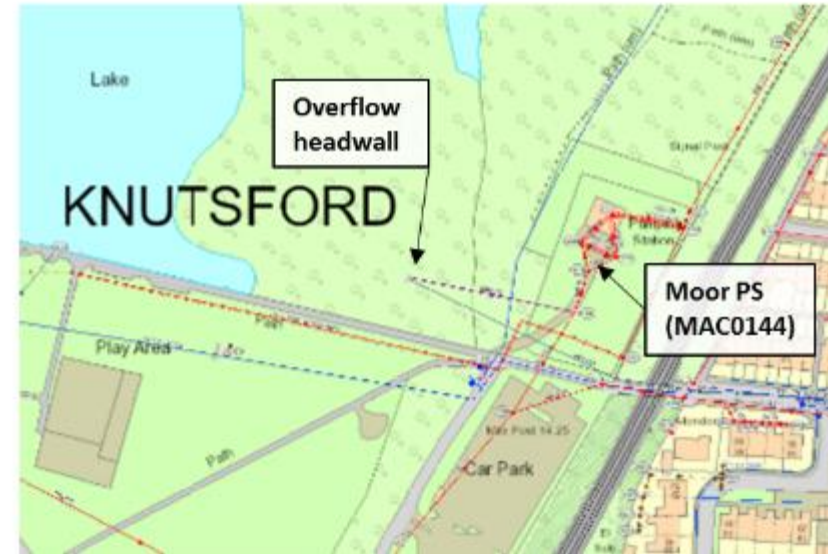
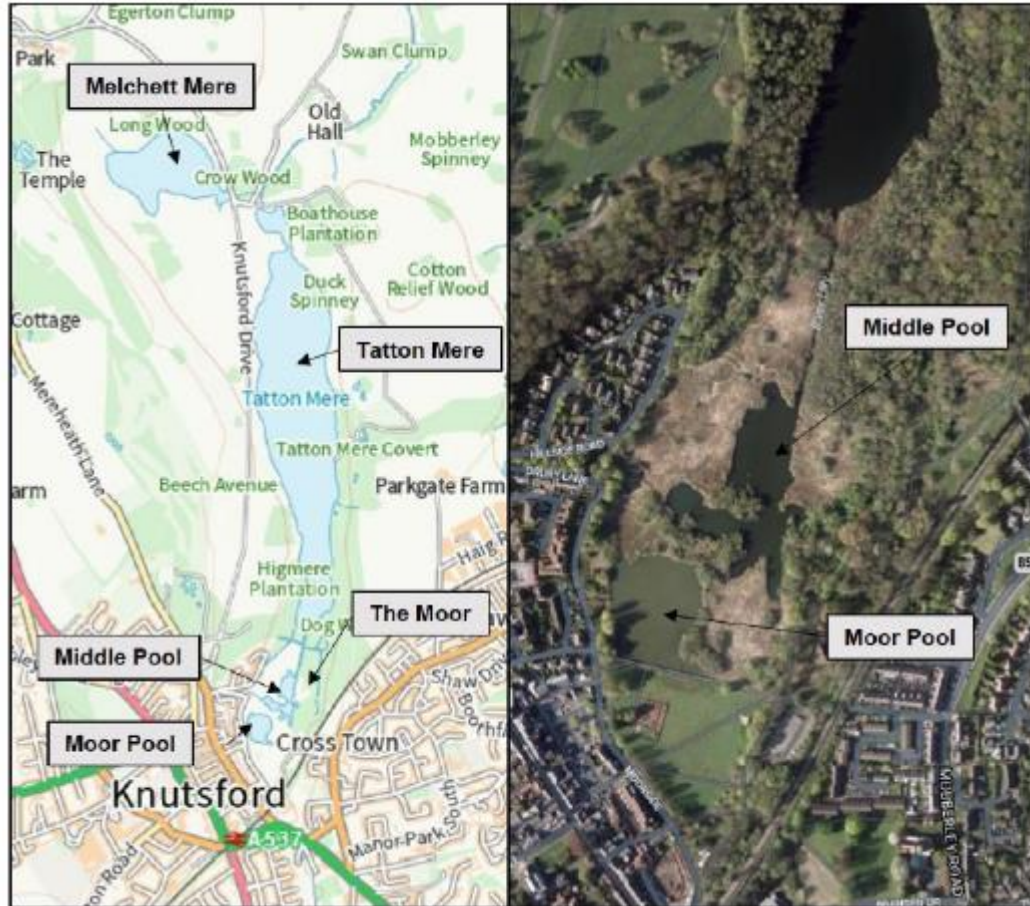
£6.5m scheme delivered by December 2017 included:

- 375m³ storage tank at Mere Platt's PS
- New pumping station at Rostherne with a storage volume of 690m³
- New 5km rising main from Mere Platts PS to Bowden WwTW
- Upgrade at Bowden WwTW to include increased primary and humus tank capacity to reduce compliance risk and accommodate increased pass forward flows from upstream Mere Platts/Rostherne Network

CaST Opportunities

- Developing through Natural Course collaborative project led by Natural England and links to Cheshire Hub.

AMP7 (2020-2025) Water Quality Improvements for Moor Pond (Tatton Mere catchment)



Moor Pool

- Hydraulically linked to Tatton Mere
- UU Moor Pumping Station CSO discharge to Moor Pool

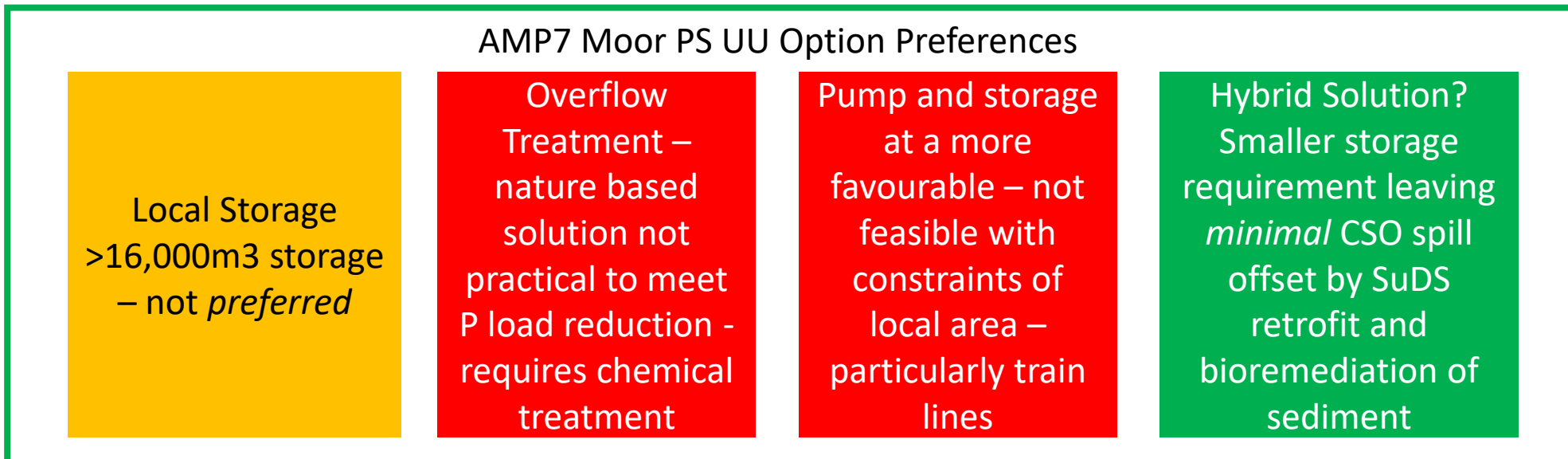
The Need

- AMP7 WINEP Habitats Directive Driver to reduce Phosphorus to meet conservation objectives and move towards WFD Good Status
- AMP7 WINEP requirement to cease intermittent discharges from Moor PS (upstream of Knutsford WwTW)

AMP7 (2020-2025) Water Quality Improvements for Moor Pond (Tatton Mere catchment)

Optioneering Process (ongoing)

- Local storage – 16,000+m3 storage to meet cessation of spills requirement
 - Likely cost >£20m
 - Local disruption, significant carbon impact
 - Focus on one intermittent source discharge doesn't deliver WFD Good Status – previously produced '*Tatton Mere Management Plan*' recommends a number of options across wider catchment to improve water quality in the Tatton Mere system – opportunity to use this previous work to drive a CaST approach



AMP7 (2020-2025) Water Quality Improvements for Moor Pond (Tatton Mere catchment)

A Hybrid Solution as Part of a CaST Approach?

An alternative hybrid option is currently being considered which might provide a greater range of environmental benefits and includes consideration of the following factors:

1. **Storage** – a target spill reduction target from a storage volume that will significantly reduce spills but not meet full cessation requirement.
2. **SuDS retrofit/optimised storage** – optimising storage and *realistic* SuDS retrofit identified using modelling/Atkin SuDS studio tool
3. Offset of residual modelled spill with **additional Moor Pool management/mitigation** including sediment removal – targeting *internal* P load.

UU/EA/NE collaborative discussion ongoing to determine whether proposed Hybrid option based on CaST principals is feasible and can meet regulatory requirements.

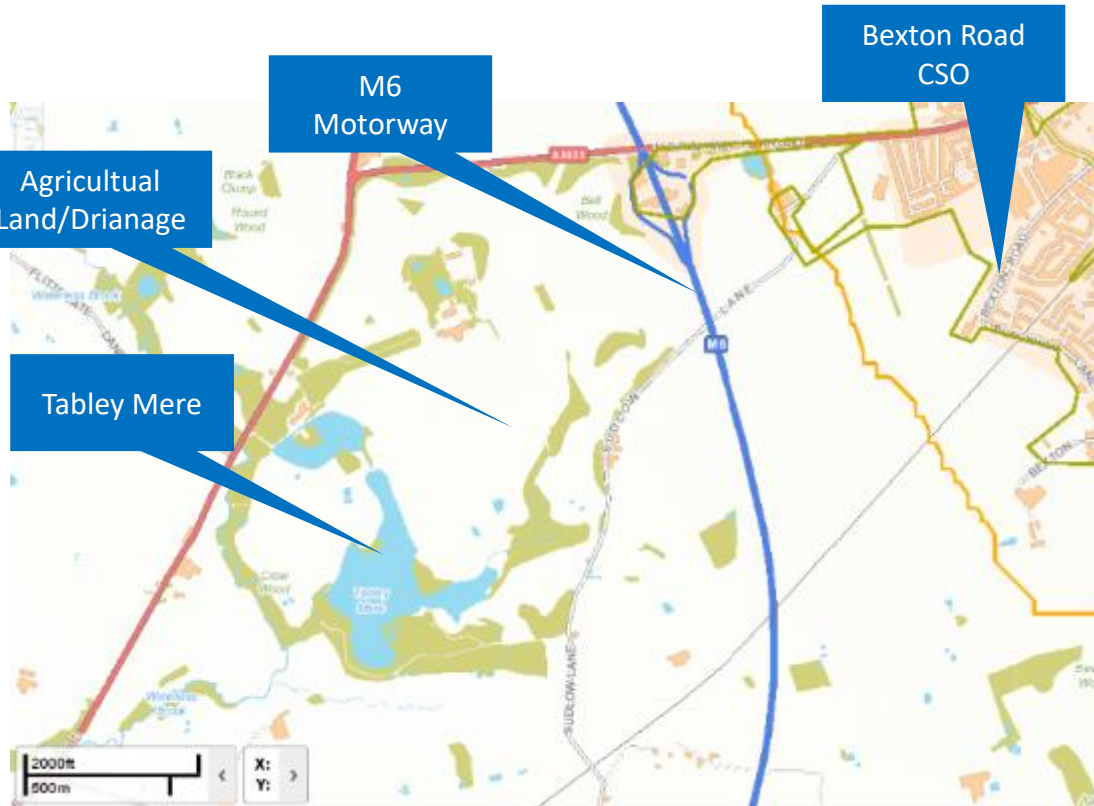


Potential local storage locations – greater range of options if storage volumes reduced



Visual observations of satellite imagery was used in tandem with SuDS Studio analysis to determine 6 delineated subcatchment areas with the highest likelihoods for high impact SuDS opportunity implementations

AMP7 (2020-2025) Water Quality Investigation at Tabley Mere



- UU AMP7 WINEP Investigation into Water Quality Issues at Tabley Mere (Phosphorus driver)
- UU MAC0001 Bexton Road CSO suspected as potentially contributing to Tabley P load.
- ICM investigation will consider other pollutant load sources
- Extensive sampling programme ongoing – private discharges, field drains, local watercourses, highway/road run off, surface waters
 - Interesting initial results – in water body ammonia concentration upstream of UU assets 5mg/l Ammonia!
- Recommendation to collaborative consider findings and consider through collaborative catchment action plan based on CaST principles
- Opportunity to discuss outputs/catchment planning through **Cheshire Hub**

Summary

- Evolution of SCaMP to broader Catchment Systems Thinking (CaST) – has included lessons on establishing partnerships and developing collaborative catchment action plans
- CaST approach key to identifying and mitigating water issues at Windermere as part of long term adaptive plan
- Targeted water company investment improving wastewater discharges has been an important part of improving water quality across NW lakes network.
- **However**, water company investment *alone* does not always meet water quality improvement/compliance objectives. There remains a need to take a CaST approach to tackle water quality at a catchment scale, requiring collaboration to
 - Develop a robust evidence base to establish and agree pollution source apportionment
 - Set of realistic long term water quality targets
 - Develop a catchment action detailing water quality improvement opportunities, delivery plans etc.
 - Alignment with water company Price Review planning/WINEP development process where water company investigation/investment may be required
 - Establish benefits realisation process to test efficacy of approaches



