River, Pond & Wetland Restoration

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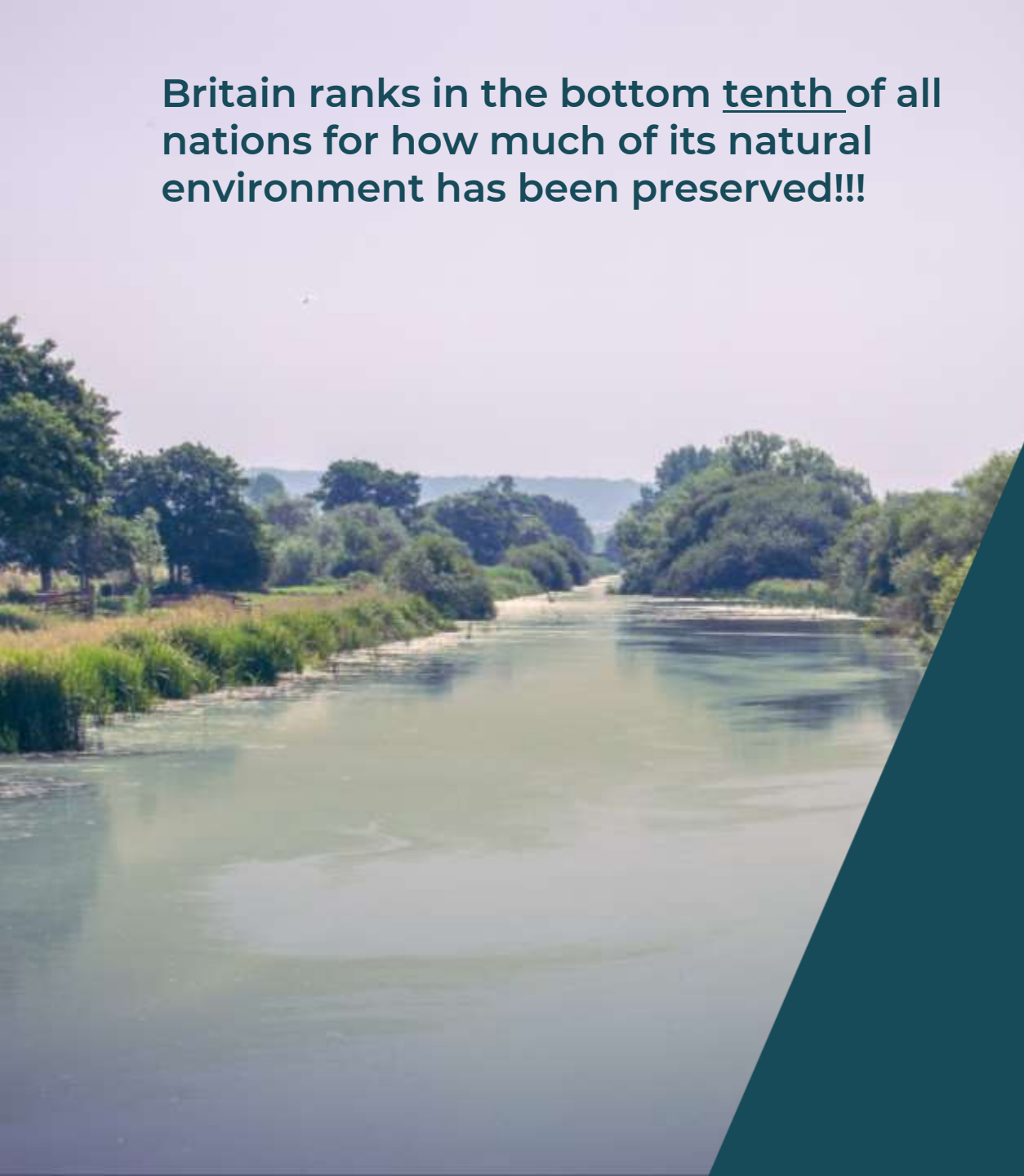
Why Restore?

For millions of years our waterways have been the lifeblood of the planet and continue to be so in the 21st Century.

Britain ranks in the bottom tenth of all nations for how much of its natural environment has been preserved!!!



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Human-Led Change

Since the middle ages humans have canalised, channeled, and straightened almost every watercourse across the globe.

Many water systems have seen a dramatic increase
in nutrients & sediments, clogging them up so they are eutrophic and moribund except for dark algae and sewage fungus.

Benefits of Wetlands

- Wetlands can store between 81 to 216 metric tons of carbon per acre, depending on their type and location.
- Mangroves and coastal wetlands sequester carbon 10x faster than mature tropical forests. They also store 3-5x more carbon per equivalent area.
- ‘Infrastructure-like’ biodiverse wetland ecosystems provide a variety of benefits and services to humans including growing food, generating electricity, and supplying water to our cities.
- The estimated annual global value of wetland ecosystem services for human health, wellbeing and security is $35 trillion.

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Restored Waterways

- Increased biodiversity
- Cleaner water
- Decreased flood risk
- Increased social and economic benefits

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Natural Flood Management

- NFM provides upper catchment solutions mitigating flooding whilst increasing biodiversity and assisting with the removal of nutrients
- Generally simpler/cheaper flood mitigation than hard engineering
- In-channel blockages
- Reconnection of channels to their relict floodplains
- Floodplain blockages

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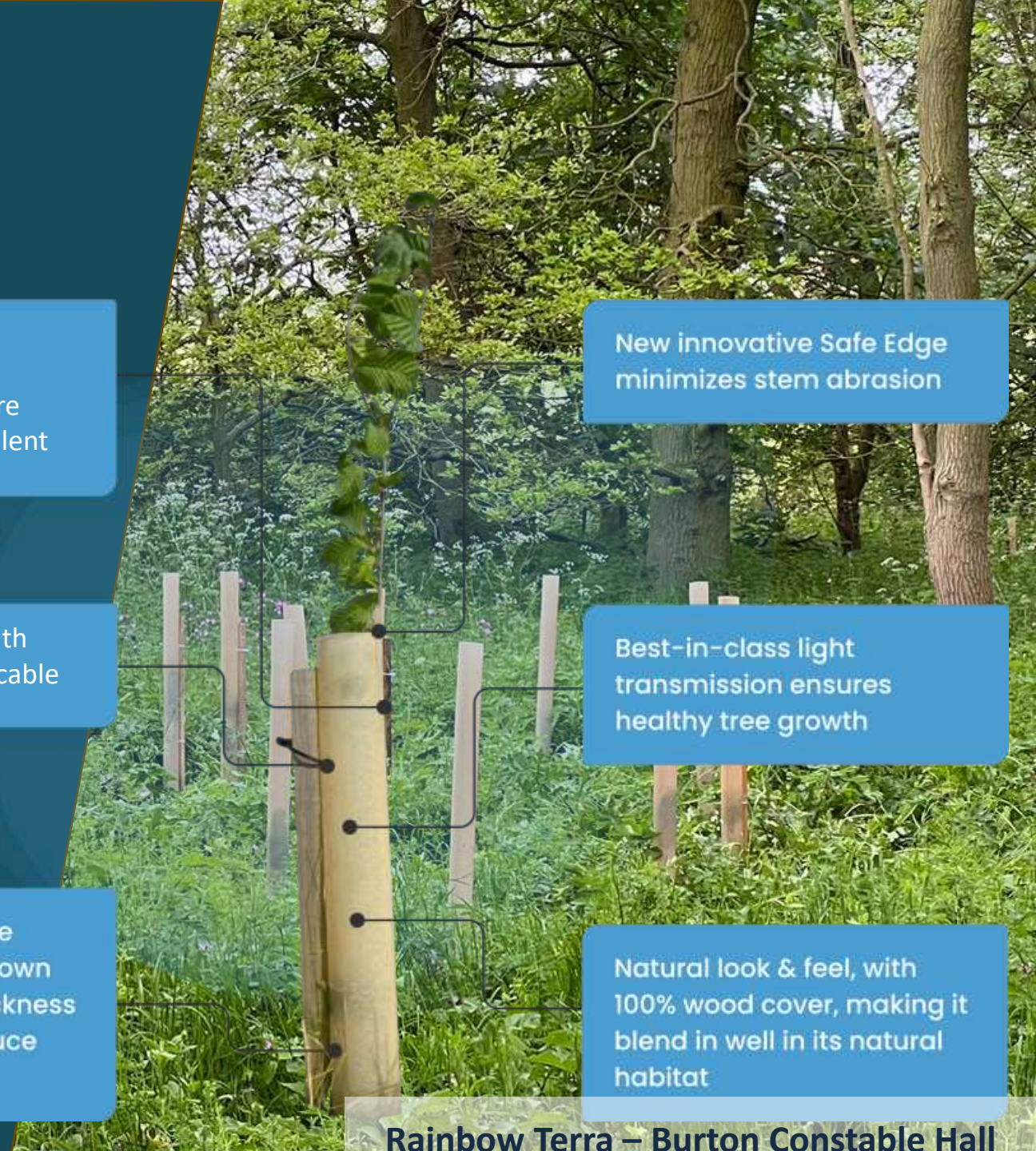
River Soar Project

- Between 2018-21, we were part of the Environment Agency's pilot
- 15 buildability reports
- 440 wet woodland trees planted and protected using Rainbow Spiral guards
- 2000m3 spoil excavated
- Large In-channel features
- 16 withy wood bundles created
- Recreation of Oxbow pond bundle

Rainbow Terra – Use it. Leave it.

- **Uniquely designed to maximize tree survival rates**
- **Certified biodegradable in any environment (see next slide)**



Rainbow Terra – Burton Constable Hall

Rainbow Terra - Leeds

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Rainbow Terra is the only sustainable solution for riparian tree planting

1. **Supports riparian buffer design** – Different environments (soil, river water, marine) have different micro-organisms. Rainbow Terra biodegrades in every environment

2. **Protects ecologically sensitive areas & biodiversity**– Rainbow Terra is suitable for highly sensitive biodiversity areas, due to timely biodegradation, no adverse effects on the environments & contribution to nutrient cycling

>> Guaranteed to safeguard primary project goals of improving quality of soil & water - OK Biodegradable SOIL, WATER, MARINE certification

SOIL OK bio-degradable TÜV AUSTRIA SOIL

WATER OK bio-degradable TÜV AUSTRIA WATER

MARINE OK bio-degradable TÜV AUSTRIA MARINE

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HS2

In 2018 HS2 started on the largest tree planting project in UK to offset the damage caused by the construction of the rail line

With the goal of planting over 50 million trees, Ecosulis - using a range of guards (both plastic and cardboard) have planted in excess of 250,000 with varying levels of success

Attenborough NR &
Vale Lake

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Nutrient Reduction

- Use of natural processes to remove sediments and nutrients
- We’re exploring what is possible
- In 2016, Ecosulis designed and installed UK’s largest floating reedbed for Environment Agency at Attenborough Nature Reserve
- Allows deep water establishment
- Reduces nutrient from outflows

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Attenborough NR

- Ecosulis planted 250,000 reeds & marginals in addition to the floating reedbed
- Translocated an additional 400m2 of reeds
- Re-worked and developed the ridge and furrow areas
- Over 5000 trees planted
- Created & maintained 2.5ha of wildflower grassland

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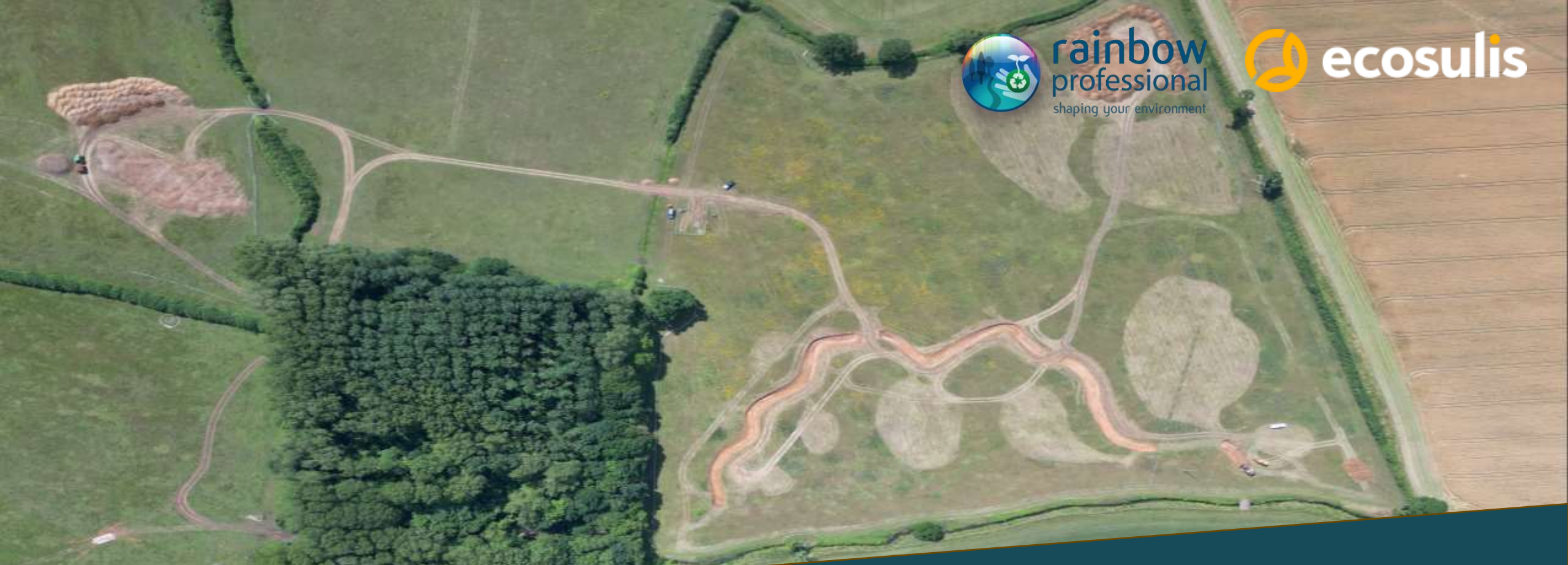
Vale Lake

- Supply and installation of a unique revetment along 2 sides of 2ha lake.
- Supply & installation of 16,000 marginal plants
- Use of amphibious Excavator to translocated reedbed 4 years after initial works to further enhance nutrient reduction



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Belmont Estate

Sometimes a very special project comes along
With the sole purpose of:

- slowing the flow
- Reconnecting the river with its floodplain
- Increasing biodiversity

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Boosting Biodiversity

The sole aim of our work improves biodiversity

- Adders at Clays Lake
- Reconnection of water course to floodplain at Belmont
- Fish at Kingshurst Brook
- Invertebrates at Attenborough NR
- Flora at Vale Lake, Uni of B’ham
- Grass snakes on the River Sowy

Socio-Economic Benefits

- University of Birmingham – Vale Lake
- Kingshurst Brook in 2021
- In a Post-COVID world, more of us are seeking to reconnect with nature

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Challenges

- No two jobs are ever the same!!!
  - Different set of logistics / access / staff
  - H&S
  - Weather
  - Water Depths
  - Ancient / Historic monuments & Archaeology
  - GCN

- NFM @ Enderby
  - The weather played a massive role in this project
  - 7 days of high-water levels – flooded compound
  - All in the casting shadow of COVID

Overcoming

- Collaborative approach between client, contractor & designer?
- Early contractor engagement – buildability reports
- The right team in the right place
- The right supply chain
- Back-office experience and knowledge
- Acceptance from all that the works are in a very dynamic situation

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Summary

Ultimately, the aim of all wetland works is to ‘Slow the Flow’ and also heterogeneity in the channels.

By doing so, to improve the water quality and reduce flood risks.

University of Warwick

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Outlook

‘The world’s wetlands are in danger. More than a third of these carbon-storing, biodiversity-generating systems have been degraded or destroyed since 1970—and at a rate three times faster than forests.

Damaged wetlands—just like rainforests—can shift from being an efficient carbon sink to a harmful carbon source.’

The Economist

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Your Questions

Thames Water - Rainbow Bio Spiral