Storm Overflows, Ground Water & Wetlands

Joff Edevane – Pathfinder Delivery Lead Wetlands & Harbours

from Southern Water

The Clean Rivers & Seas Task Force

The Clean Rivers and Seas Task Force was set up in 2021, **our aim is to reduce storm overflows** to ensure a healthy environment and a resilient future for water.

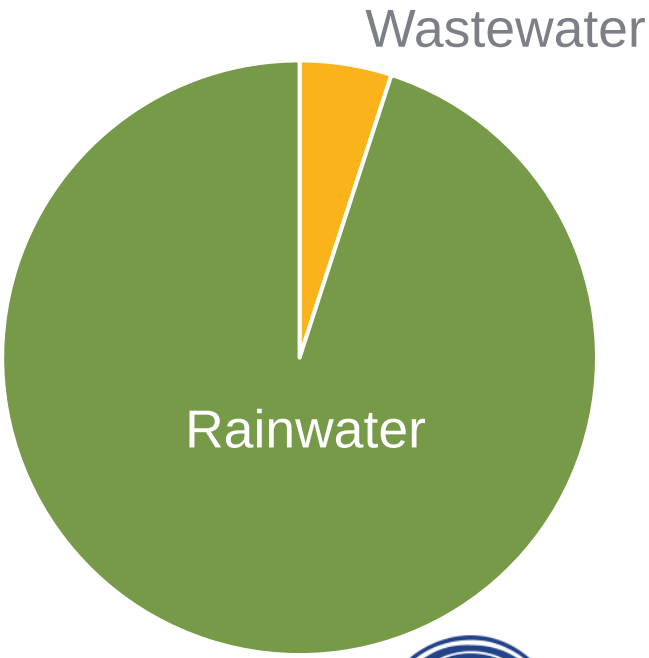
The task force is responsible for **delivering pathfinder projects** through an **accelerated programme.**

We've built our Clean Rivers and Seas (regional) plan.

Heavily diluted – either by rainwater or groundwater

As storm overflows typically happen when there is a huge amount of rainwater and groundwater in the system, the water is heavily diluted and usually screened before being released.

Storm overflow releases can be up to 95% rainwater, and only 5% wastewater. This wastewater comes from toilets, showers, and sink waste, as well as household appliances like dishwashers and washing machines.



Why do we need to tackle them?

As well as the obvious environmental and ethical considerations, there are several other factors that have contributed to this need for change

An increase in extreme weather events

Less permeable land (degreening)

Customer feedback

The release of the government's Storm Overflow Reduction Plan.

How do we tackle them?

There are four main ways to reduce storm overflows and the harm they cause

- Source control
- Infrastructure optimisation
- Stormwater treatment
- Building bigger infrastructure

The problem

Ground Water + Sewers = Overflows

Reducing groundwater infiltration

What is groundwater infiltration?

Groundwater is the water found underground in the cracks and spaces in soil, sand and rock.

Groundwater infiltration is when water from the ground squeezes its way into the system through underground public or private pipework.

If the system is filled with groundwater then there is less space for rain and wastewater, so the sewer system is more likely to become overwhelmed when it rains. This can result in storm overflow releases.

How do we tackle it?

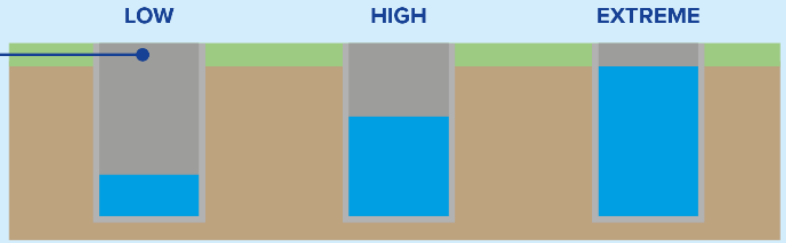
1. Relining our pipework to prevent excess groundwater entering the sewer system.

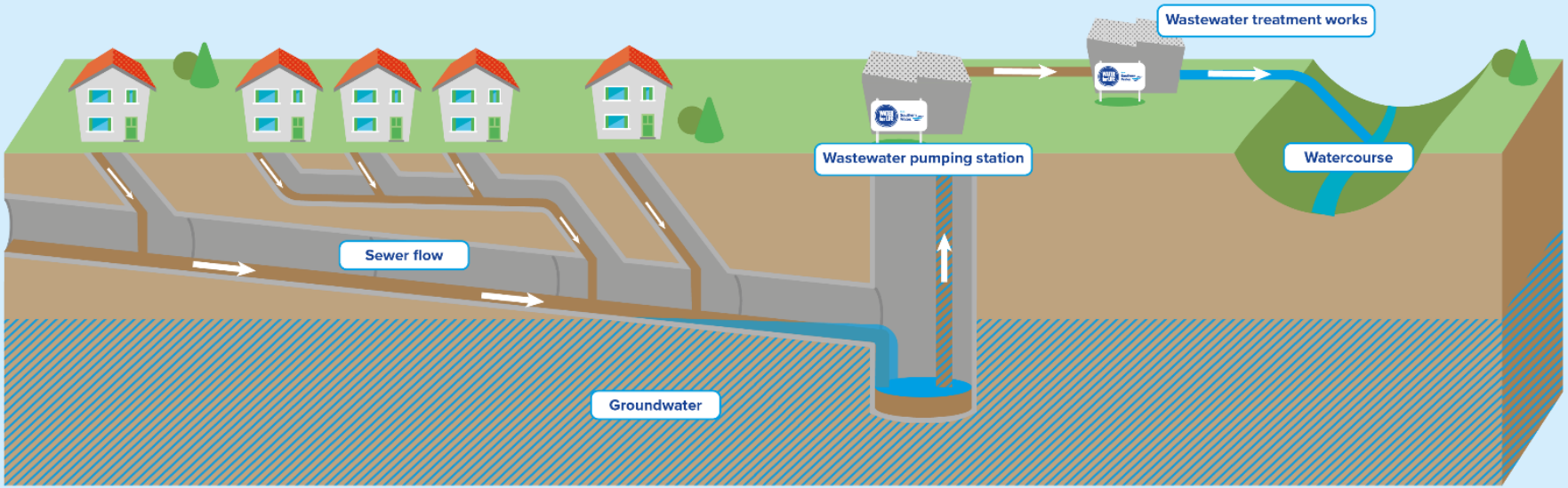
2. Sealing private pipework to prevent excess groundwater entering the sewer system.

3. Monitoring with temperature sensors, boreholes and pipe cameras.

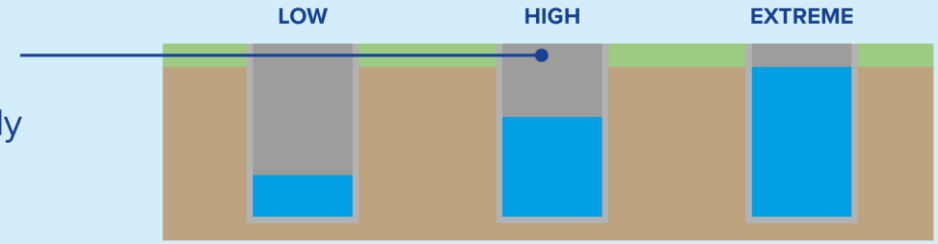
4. Constructing wetlands to soak up, hold and pre-treat excess water.

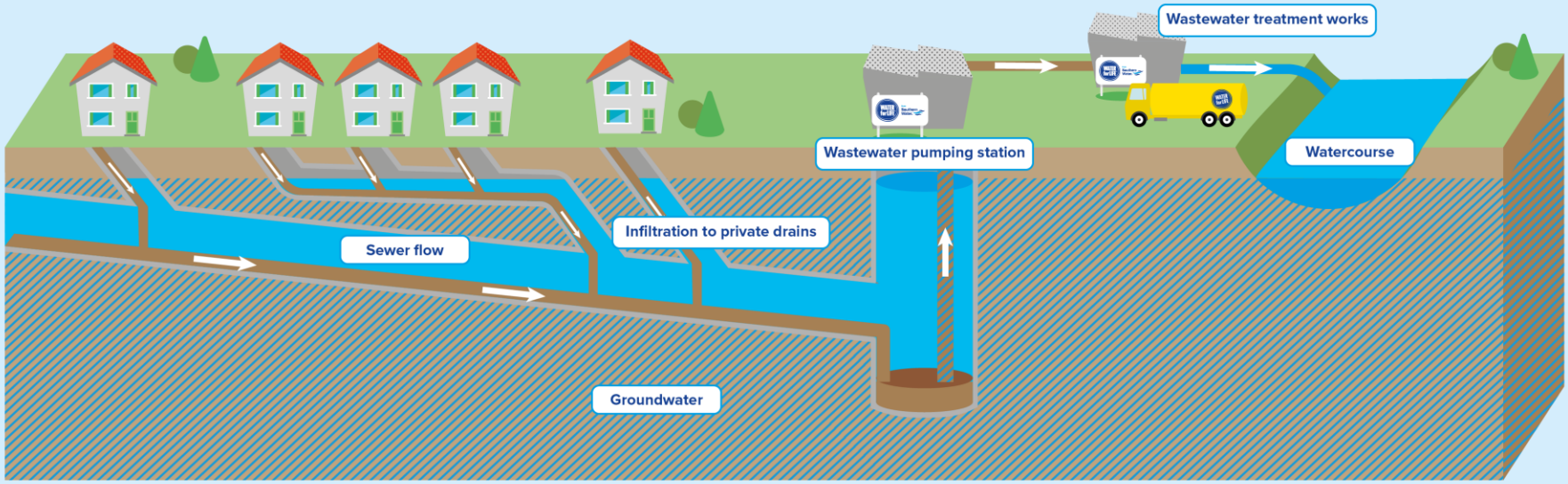
In low groundwater conditions
pumping stations convey the foul flow and a small amount of infiltration to the wastewater treatment works.





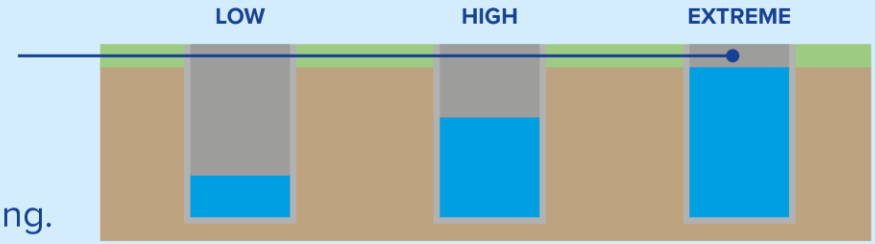
In high groundwater conditions
the flow is largely infiltration. At these levels the pumps are working continuously and tankers are required to keep the sewerage system functioning.

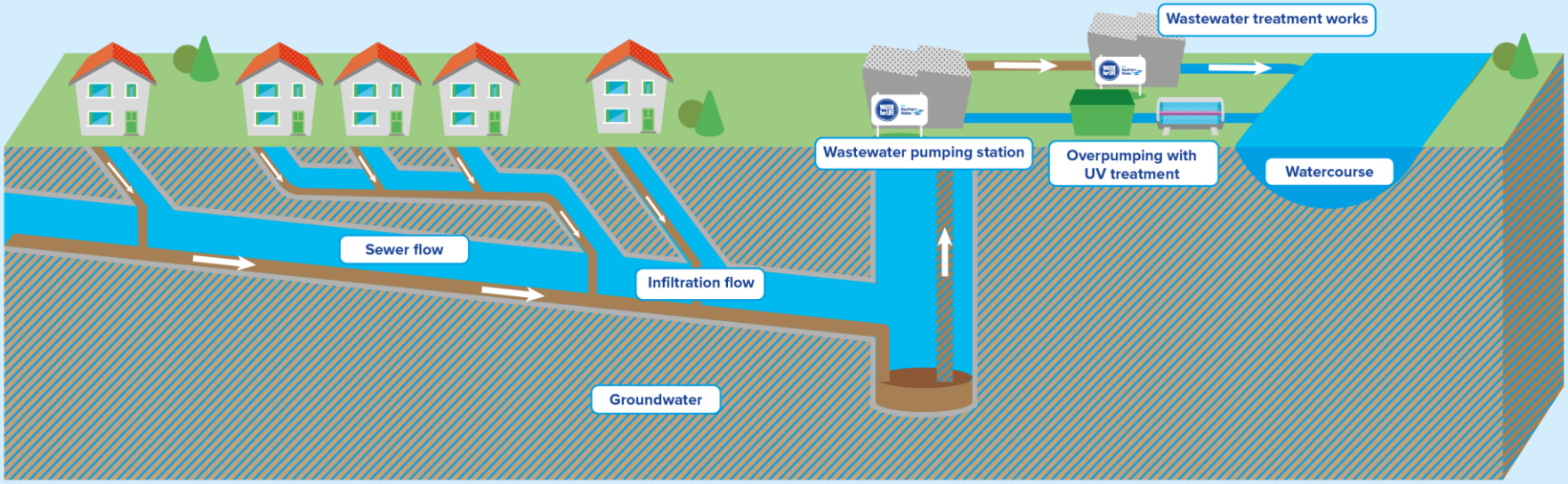




Operational mitigation

In extreme groundwater conditions infiltration gets into the network through all pipes and inundates the pumping stations. Overpumping arrangements with UV treatment are used to prevent property flooding.





Over-pumping

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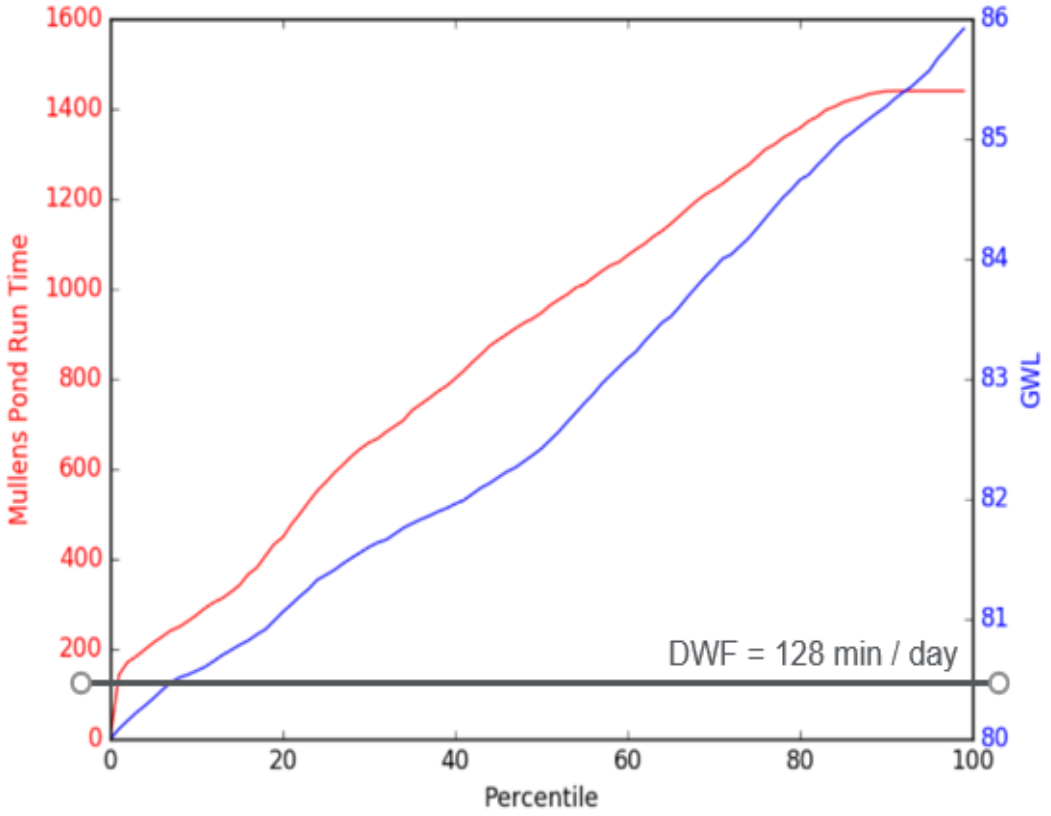
Analysis of network performance

We have been surveying and targeting sewer rehab for decades, why hasn't it resolved the issue?

Different analysis and approach needed…

Groundwater vs Pump Run



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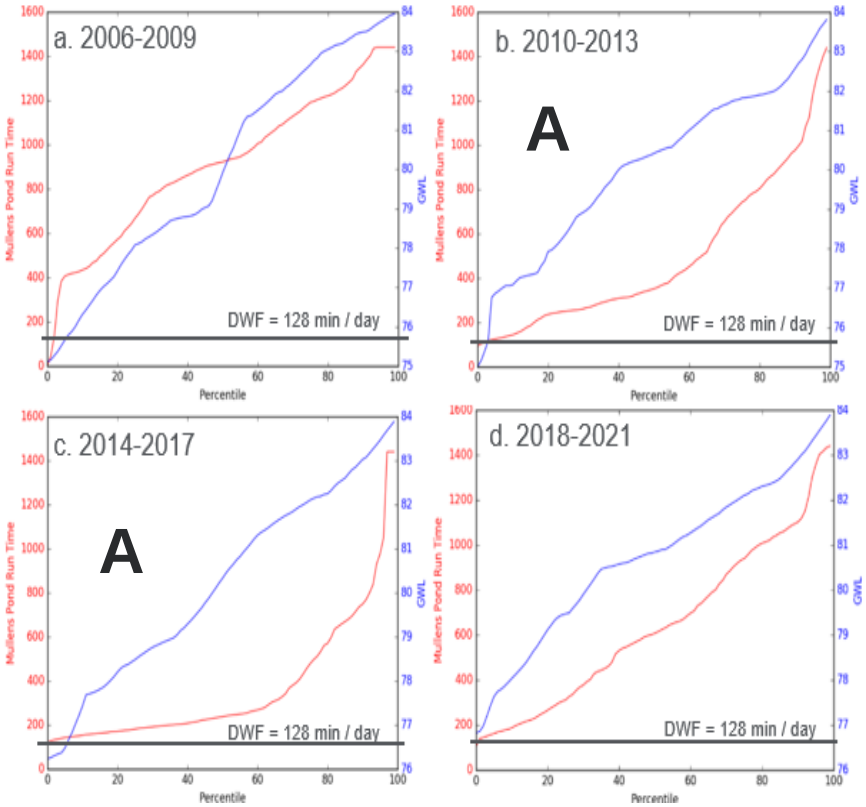
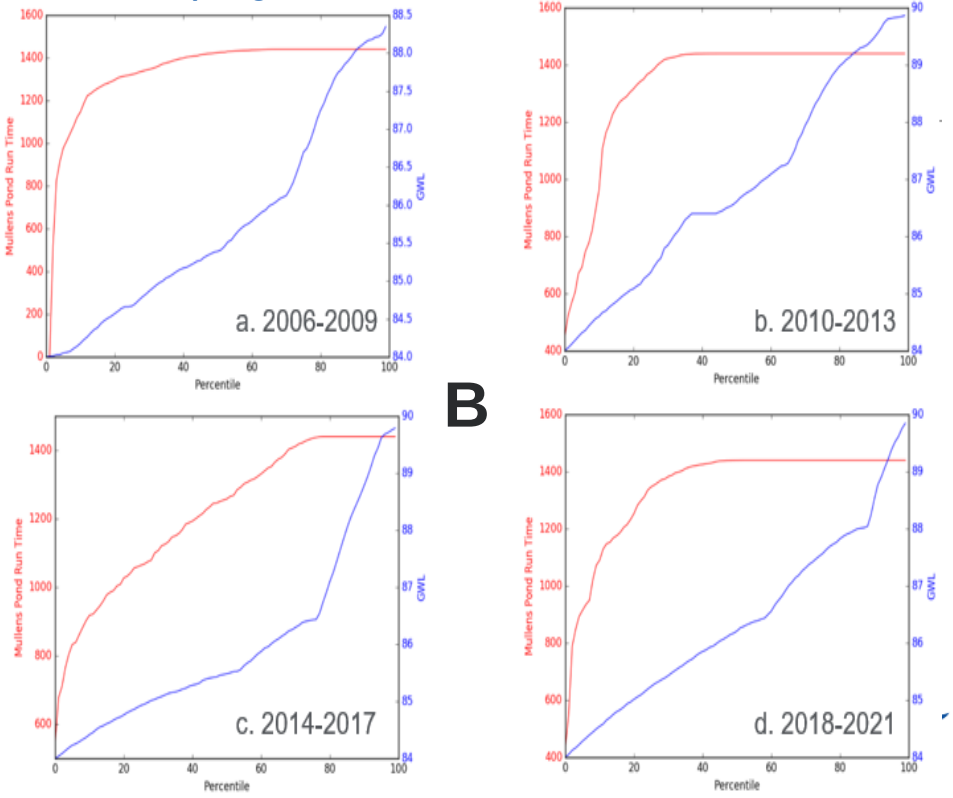
Analysis shows rehab of the public sewer has impact at lower ground water levels but above a threshold the benefit is negligible.

Pumping station A <84mAOD



Pumping station A >84mAOD



So what are the options for managing ground water impact

Option	Does it protect the Environment?	Would it stop the disruption?	Timescales to stop disruption
1 – Operational flow management	To an extent	No	Never
2 – Manage ground water levels artificially	No	Yes	Unlikely to deliver in this catchment
3 – Seal (private & public sewers)	Maybe	Maybe	3 years
4 – Wetland treatment	Yes	Yes	1-2 years

What are Southern Water Plans –

Pathfinder Approach

Option 3 – Seal public & private sewers – Pan Parish Andover

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Option 3 – Seal private sewers – novel tech

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Pan Parish performance

- 2 year project – over 5 parishes
- Swales
- Tanker movements 38 a day for 6 months plus 3 over-pumping sites
- Now – no tankers, no over-pumping
- Used to tanker at 84mAOD, we are now just below 90 AOD with no need for tankers etc
- If you would like to talk to the Parishes involved please let us know

Whilst we are here…. Surface water connections

1) Soakaways / swales

2) Rain planters

3) Water butts

How can the Parish Council and Community help ?

- Access to land / properties
- Communications
  - Set up regular communication channels and forums
  - Who needs to be on that forum? Please tell us

If safe to do so check for:

1) evidence of roofs connected the main sewer, we can help slow the flow – water butts, planters
2) Check private lateral drains – lift cover, any sign of flowing clear water when not using facilities such as sinks, washing machines and toilets
3) Or ask Glenn to do it

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Timescales and Scope

Combination of patching / relining and sealing of private and public network

We are currently working at Monks Gate near Horsham

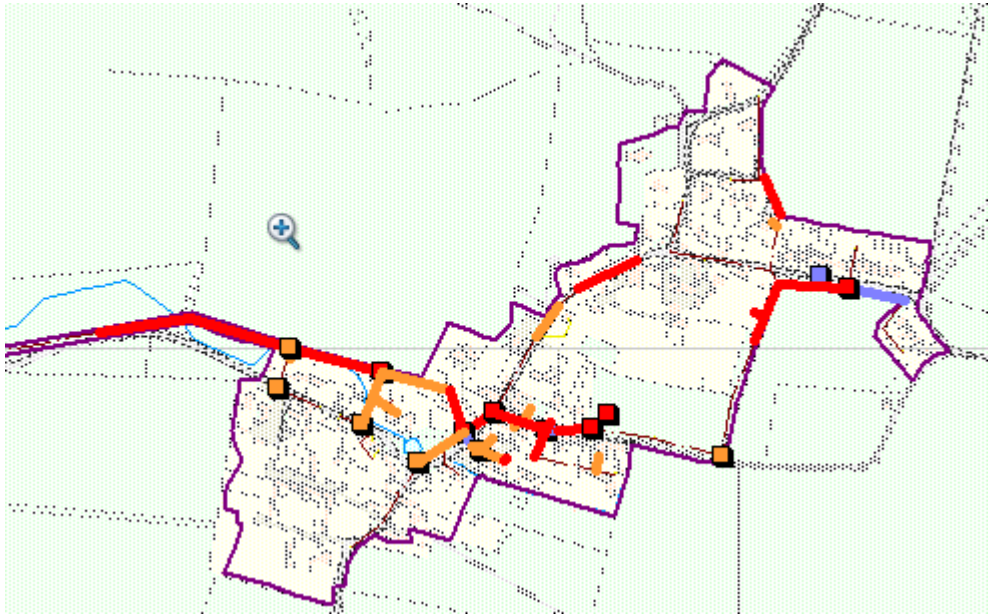
Then move onto East Dean

start mid to late June 2024

Finish hopefully by end of September 2024

Charlton and Singleton April 2025 or possible earlier - **TBC**

Timescales and Scope



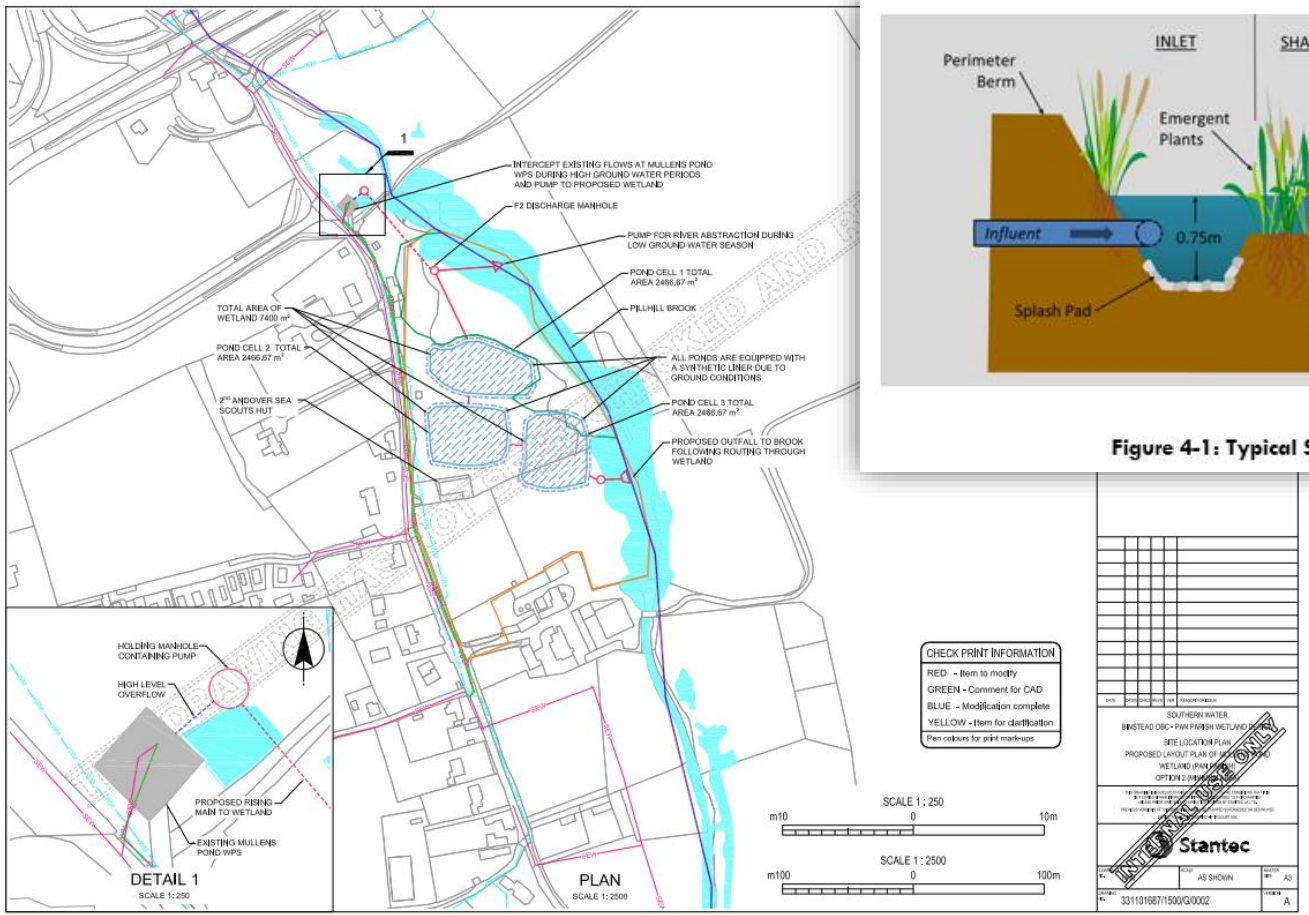
Red – relined previously but we will check all OK

Orange – planned works

Option 4 – Wetland Treatment

Langford Lakes, Wiltshire case study –
Will be the first wetland in the UK to be permitted for the treatment of a storm water overflow

Option 4 – Wetland Treatment



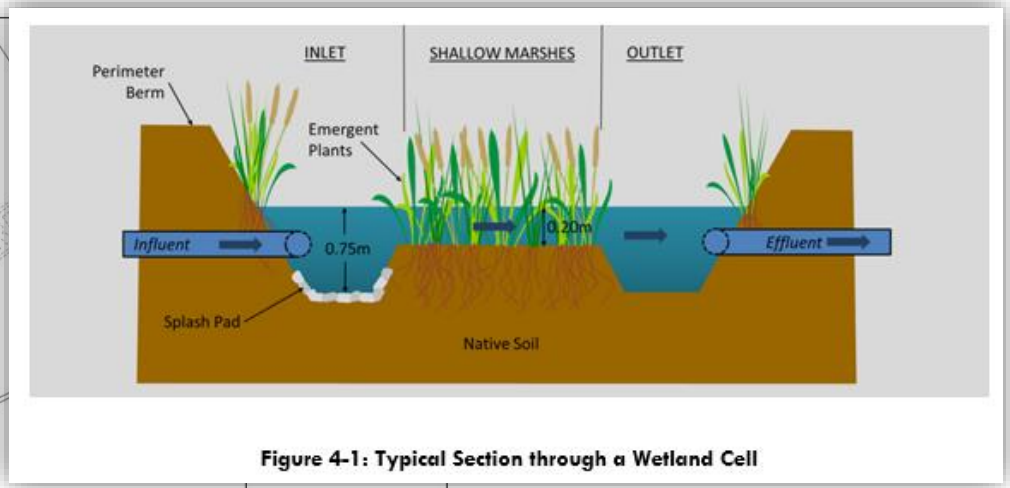


Figure 4-1: Typical Section through a Wetland Cell

from Southern Water

Approaches

- **Aerated wetlands**. BOD and Ammonia oxidisation, solids and some bacteriological removal

- **Free surface water wetlands – as above plus nutrients, larger footprint**

- **Increase volume of flow treated to permitted final effluent standards or**

- **Treat storm flows only to meet standards required by waterbody subject to EA / Defra agreement**

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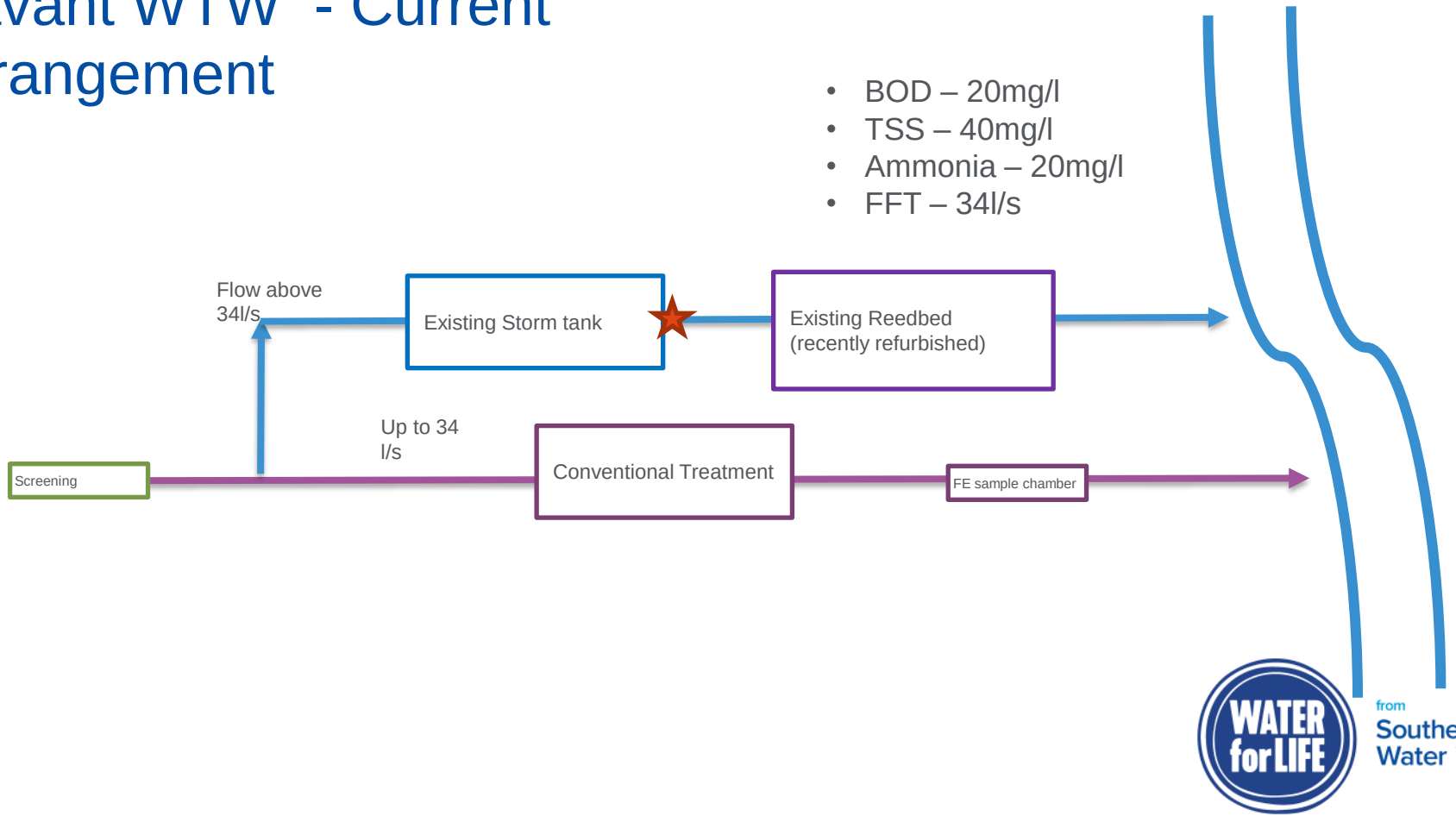
Case Study - Lavant

Lavant WTW - Current arrangement

- BOD – 20mg/l
- TSS – 40mg/l
- Ammonia – 20mg/l
- FFT – 34l/s



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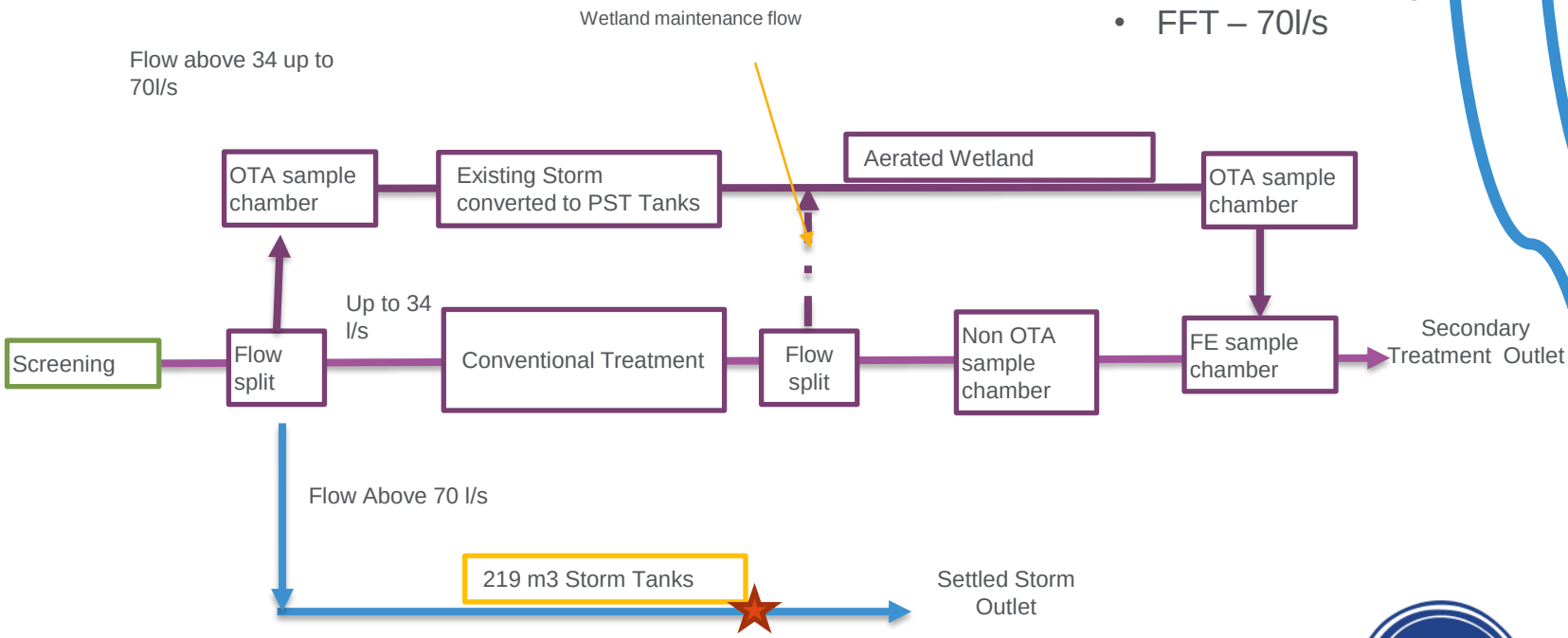
Lavant WTW (Phase 1 Reedbed)

30?

- BOD – 20mg/l
- TSS – 40mg/l
- Ammonia – 20mg/l
- FFT – 70l/s



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Thank you and questions