Bagstone and Tytherington Infiltration Reduction Plan Summary

This provides an update on the last year's groundwater situation, what mitigation actions, if any, were taken and a summary of our action plan to prevent flooding due to groundwater infiltration of our sewer network.

April 2023 – March 2024

Regional Summary

The Wessex region experienced incredibly wet weather across 2023-24, with higher-than-average rainfall in nine months during the period. February 2024 was both the warmest on record and the wettest in 30 years, with the 12-month sequence to the end of February being the wettest since our records began in 1911.

Groundwater levels rose rapidly during the autumn, and whilst drier weather in January 2024 provided a brief reprieve, levels remained high for the majority of the winter.

Warmest February on record for England and Wales - Met Office

Local Summary

The Bagstone and Tytherington catchments were inundated for the majority of winter 2023/24. The Operational Mitigation Action Plan (OMAP) in Bagstone was first instigated at the end of October 2023. The OMAPs for Stidcott Sewage Pumping Station (SPS) and Duck St. Tytherington were actived at the start of November 2023. All three were active nearly the whole winter until April 2024. They were all stood down at similar times in December, January, and February but only for a few days before being reactivated.

Action Plan

Annual Activity
Review asset and operational data and update annual reports.
Continue monitoring system performance using telemetry, rainfall records and local groundwater levels to inform the operational response during high-groundwater periods, and to monitor changing infiltration levels in the catchment.
Undertake pro-active cleaning (jetting) of sewers to maximise capacity.
Use specialist cameras to visually monitor critical assets.
Proactive inspections and maintenance of sewerage assets.

Completed
Installed permanent flow meters at key pumping stations to continuously record pump performance.
Reviewed incidents of sewer flooding.
Sealed sewers and manholes to prevent groundwater infiltration.
Implemented a scheme to improve the local water recycling centre (WRC).

Completed (cont.)
Implemented a scheme to address capacity issues in the sewer network.
Inspected public sewer network to identify points of infiltration.
Used machine learning to predict flows in sewers and proactively identify blockages and other issues.
Installed in-sewer monitors at key locations to better understand flows in the network.
Investigated nature-based solutions in the catchment.
Updated the catchment hydraulic model.
Undertaken pumping station or flow surveys to analyse flows in sewers.
Upgraded pumping stations where appropriate, to improve the reliability and performance of the site.

Short Term
Undertake pro-active inspection of public sewers and manholes using CCTV to identify points of infiltration.
Use machine learning to predict flows in sewers and proactively identify blockages and other issues.
Install in-sewer monitors at key locations to better understand flows in the network.
Investigate nature-based solutions in the catchment.
Update the catchment hydraulic model.

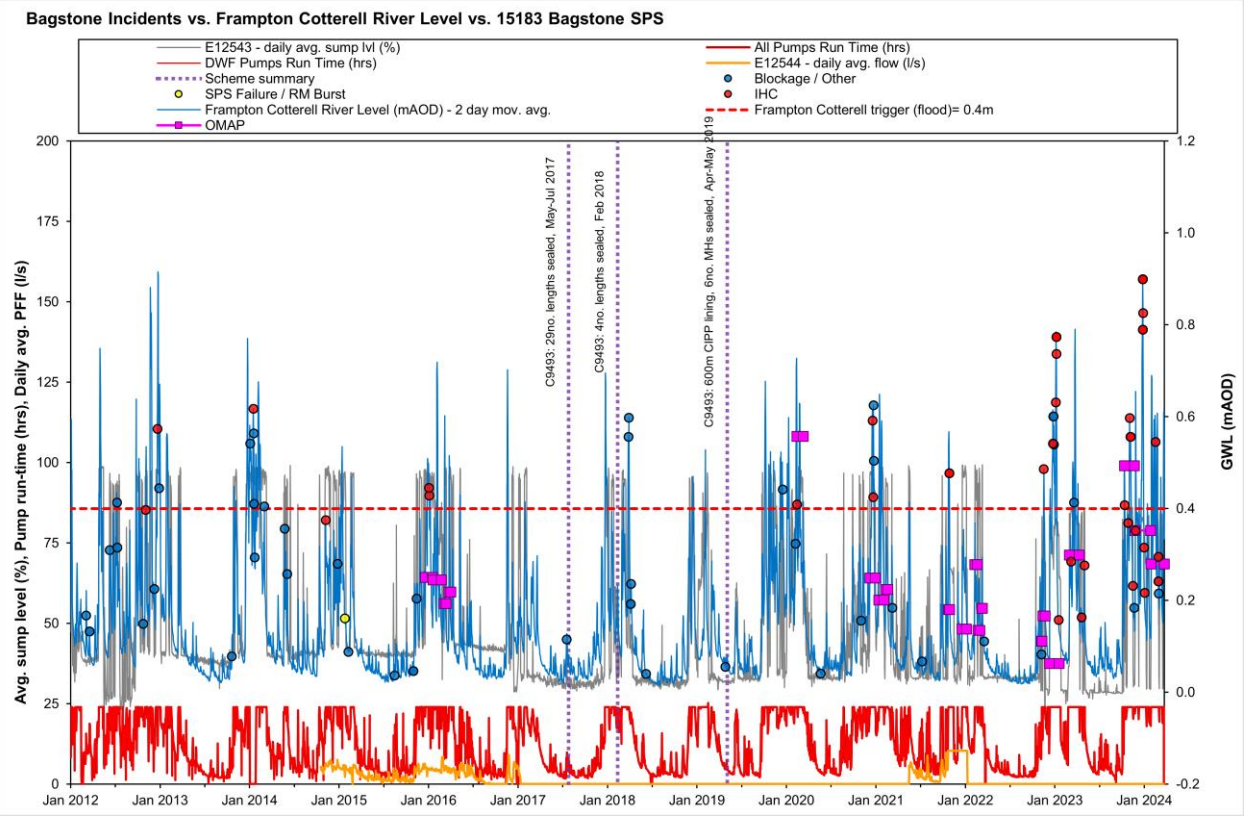
Medium Term
Analyse flows in sewers using pumping station surveys, flow surveys and/or hydraulic modelling.
Consider sustainable solutions to rainwater management, for example above-ground attenuation and property-level interventions.

Long Term
Identify road gullies and other impermeable areas that are connected into the foul sewers.
Inspect private gullies, drains, and manholes where applicable.

When Necessary
Implement emergency tankering procedure for preventing restricted toilet use and sewer flooding during high groundwater periods, in order to protect public health.
Implement Operational Mitigation Action Plan (OMAP) for discharging excess flows to the environment as a last resort, when tankering would not prevent restricted toilet use or sewer flooding, and public health is at risk.

Current Performance

This graph shows incidents against the river level (as measured at Frampton Cotterell) and the flow at Bagstone Sewage Pumping Station. Despite extensive infiltration sealing taking place in 2018 and 2019, the pumping station continues to become inundated when the river level is high. The initiation of the Operational Mitigation Action Plan (OMAP) during these periods has reduced the number of incidents relating to sewer flooding and loss of service in the catchment.



Inspection and sealing since 2011

	2011-20	2020-21	2021-22	2022-23	2023-24
Length of sewer inspected (m)	7,955	1,606	167	-	1,403
Length of sewer sealed (m)	2,769	-	-	-	-