Groundwater Impacted System Management Plan

Marlborough, River Kennet

January 2021

Version control

Version	Date	Amendment	Author	Checked	Reviewed
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Introduction

This document sets out Thames Water's approach to the management of groundwater infiltration in sewerage systems where the influence of groundwater infiltration is viewed as being significant and likely to lead the sewerage system, on occasions, becoming over- whelmed

All sewerage systems combined and separate will experience some groundwater infiltration1 and a nominal allowance in design will be made for this. However, in some catchments the impact of groundwater infiltration can be considerable leading to impacts on service during periods of high groundwater, typically during the winter.

Groundwater can enter the sewerage system through the pipes and manholes, this may occur at a defect (crack, hole, displaced joint) or on a normal joint on the sewer or in the manhole. A key point to note is that where infiltration occurs it is not necessarily an indicator that the sewer is in poor structural state simply that jointing techniques used are not completely watertight.

Ingress of groundwater is not limited to the public system that Thames Water owns and maintains but potentially the private drains, manholes and sewers that connect to our system.

Preventing and reducing the impact of groundwater infiltration is predominately achieved through the lining of sewers and sealing of manholes. This entails the application of a synthetic liner within the pipe that creates a contiguous membrane for the length of the pipe or possibly section if the source of ingress can be narrowed down. For manholes it will typically entail sealing in a similar manner.

To line all sewers and manholes within most catchments would be prohibitively expensive to do so. Our approach to date has been centred on a 'find and fix' basis which has involved monitoring and investigating the networks in periods of high groundwater to identify sources of ingress and fix as we find them. This approach is constrained for the reason that investigations are typically limited to periods of high groundwater and when high groundwater occurs there are limited windows of time in which investigations can be successfully undertaken before flows either subside or the system is fully surcharged meaning CCTV surveys are not possible2. Once sections of sewers have been lined, it will be a case of waiting until high groundwater levels reoccur to assess the effectiveness of the work undertaken, which may not be the subsequent winter but several years later.

1 Sewers for Adoption makes an allowance for 10% of peak wastewater flow to allow for unaccounted flows such as groundwater infiltration.

2 On occasions it is possible to over-pump between manholes to isolate sections of sewer to survey, this is not always feasible when the flows involved are simply too great to over-pump or the location prohibits this approach.

It is recognised that the ‘find & fix’ approach to date lacks a degree of certainty of resolution and for this reason Thames Water has in 2020 undertook a different approach for the medium to long-term management of groundwater, which is covered within this document under the plan section. These plans require significant investment which Thames Water will seek to secure through the price review process as ser- vice enhancement. In the meantime, we will continue to investigate sources of infiltration when it occurs and where feasible, undertake the work through our capital maintenance budgets. We refer to these as ‘quick win’ opportunities i.e. where we have high degree of certainty of reducing point sources of infiltration and can do so with reasonable costs and time.

The structure of this document has been created with input from the Environment Agency and structured around the Environment Agency’s Regulatory Position Statement (RPS) for ‘Discharges made from Groundwater Surcharged Sewers’ (Dated: December 2016). Sections covered in this document include our ‘Outline Plan’ with timescales, locations of anticipated ‘Unavoidable discharges’, Mitigation i.e. how we intend to manage the risk until our plan is fully implemented and when we will publish future updates on progress against this plan. If we need to make an unavoidable discharge, we will provide an authorisation document to the Environment Agency seeking their approval for any temporary discharge of groundwater surcharged sewers.'

Brief description of Marlborough catchment

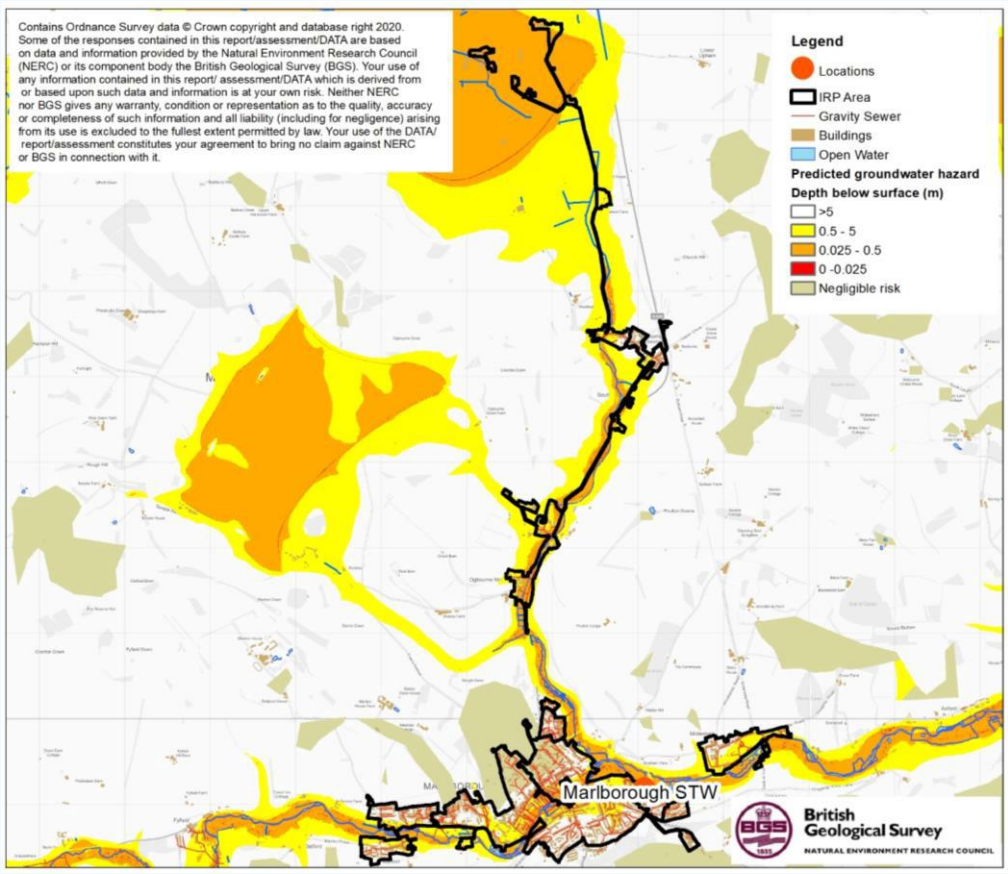


Figure 1.0 – East Shefford catchment

Marlborough is located on the River Kennet in Wiltshire, England, 10 miles South of Swindon. Marlborough serves a population equivalent[3] of 9,930 with a predominantly separate sewerage network totalling some 64 km in length excluding private drains and sewers. The extent of the catchment is shown in Figure 1.0 above.

Problem characterisation

Groundwater has potential to enter our sewers when levels are high, which reduces their capacity and increases their risk of the network becoming overwhelmed. There is a strong link between the rising groundwater levels across the Marlborough area and the drainage issues some of our customers have experienced, including sewer flooding and restricted use of their toilets and bathrooms. The catchment is situated in an area that is prone to significant seasonal fluctuations in groundwater levels, with the added likelihood of rainfall induced infiltration owing to its permeable soils.

[3] Population equivalent or unit per capita loading, (PE), in waste-water treatment is the number expressing the ratio of the sum of the pollution load produced during 24 hours by industrial facilities and services to the individual pollution load in household sewage produced by one person at the same time.

In recent years the foul sewerage system in the Marlborough catchment has become overwhelmed in some locations for weeks and even months, following pro- longed heavy rainfall. This has resulted in some properties suffering from sewer flooding and restricted toilet use. We believe that the system has surcharged predominantly due to a combination of groundwater infiltration into both public and private foul drainage networks, groundwater run-off, surface water inundation from highways, public spaces and properties, surface water misconnections (i.e. downpipes from roofs), and river water overflowing from the Rivers Kennet and Og.

'Look and Lift' and CCTV surveys in the Marlborough catchment in 2018 found points in the Ogbourne Maizey area where groundwater is entering our network through cracks and other defects. Additional locations have been identified in the 2019/20 surveys (see Appendix).

The root causes of sewer surcharges are therefore numerous and resolution of issues complex, requiring all stakeholders responsible for drainage in the catchment to work together to resolve them.

In recent years the problems associated with the foul sewerage network have led to surcharging sewers causing spills out of some public manholes, long term restricted toilet use in Kennet Place, intermittent discharges from storm tanks at Marlborough STW, flooding around Bay Bridges sewage pumping station due to pump failure and blockages and flooding in the Port Hill area due to bursting of the Bay Bridges rising main.

To prevent the STW becoming overwhelmed, during periods of high flow, excess flows are piped to a balancing tank and storm tanks, which are sequentially filled and returned to treatment. In accordance with the consent for the works, excess storm flows discharge to the River Kennet when the storm tanks are full and so receive only settlement and screening prior to discharge.

Our permit conditions for Marlborough STW state:

"The discharge shall only occur when and only for as long as the flow passed forward is equal to or greater than the overflow setting indicated due to rainfall and/or snowmelt. Off-line storm storage must be fully utilised before a discharge occurs. It shall only fill when the flow passed forward is equal to or greater than the overflow setting indicated due
to rainfall and/or snow melt and shall be emptied and its contents returned to the continuation flow as soon as reasonably practicable. The minimum off-line storm storage required is specified in table S3.3." (Table within the permit).

The Flood and Water Management Act 2010 places a responsibility on Lead
Local Flood Authorities (LLFAs), to manage flood risk from surface and groundwater, plus a duty on all Risk Management Authorities (RMAs), to cooperate regarding flood risk. In our role as an RMA, Thames Water will work with Wiltshire County Council as the lead local flood authority and planning authority, and the Environment Agency to ensure that a collaborative approach can be developed to address the problems.

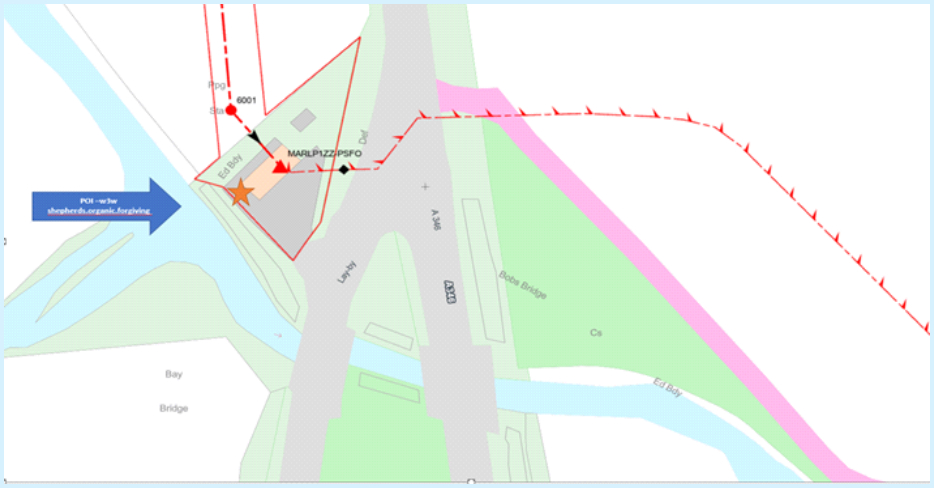
Thames Water also has a statutory obligation to comply with environmental legislation. The Water Framework Directive establishes a strategic approach to managing the water environment, which the Environment Agency achieves through River Basin Management Plans and setting environmental objectives for groundwater and surface water. The environment is also protected from adverse effects of discharges of urban wastewater through the Urban Wastewater Treatment Directive, which requires us to improve and extend the sewerage system according to section 94 of the Water Industry Act (1991).

Anticipated unavoidable discharges

The works identified within this plan should reduce groundwater infiltration and the risk of sewage escapes. However, in the short to medium term these unavoidable discharges may continue to occur in times of high groundwater levels.

The strategy to mitigate the risk of infrequent sewage escapes to the local river from the impact of groundwater involves the deployment of an ATAC Biofilter at the affected location. In 2023/24, an ATAC was deployed at Bay Bridges SPS.

Multiple tankers are required at Bay Bridges SPS to manage flows in high groundwater conditions. There is a risk of internal property flooding and Restricted Toilet Use (RTU) in the upstream villages of Ogbourne Maizey and Ogbourne St Andrew. RTU has been reported in both of these villages and surcharge from foul water chambers entering the River Og has been reported in Ogbourne St Andrew. The filter at Bay bridges SPS manages this risk and negates the need for tankering which may not be able to keep up in prolonged periods of high groundwater.

Anticipated unavoidable discharges	
Location	The ATAC filter unit will be in situ within the Bay Bridges Pump Station compound (W3W /// massive.motel.golden), taking flows directly from the wet well and discharging to the River Og (W3W /// shepherds.organic.forgiving), which runs to the rear and side of the pump station on the A346. 
Discharges	10-20l/s
Likely Periods	The Trigger Level for engaging the proposed temporary discharge is 0.18mAD. This level was established through a survey of historical river and groundwater levels, cross referenced against flooding events. Based on mitigation data, the ATAC filtration unit would be turned on when Bay Bridges SPS is unable to manage incoming flows into the station, impacting residents in nearby Ogbourne Maizey.

Mitigation	In order to ensure the current system is working to maximum capability the following actions will be carried out: • Regular sewer investigations (and resultant sewer cleaning) to remove any blockages. • Ongoing investigations and remediation of priority infiltration sources as outlined in this document. • Identifying and taking actions to minimise where surface water ponding may be inundating manholes. • Tankering where appropriate in other areas of the system. Issues have been identified in the network which we will be rectifying during spring/ summer 2024, pending funding approval. Recent diversion of the River Og is also believed to have resulted in increased inflow into the system via foul manhole covers, steps have been taken to ensure that the relevant section of the river is re-diverted.
Monitoring	During periods of discharge, flow in the Og will be monitored upstream and downstream to assess impact on the river amenity, use and quality. The following parameters at a minimum will be tested every other day: • Biological Oxygen Demand • Ammonia • E. Coli
Contact	If discharges occur the Environment Agency will be informed (by logging through the Agency's National Incident Communication Service). For any other reporting please use the Environment Agency pollution reporting number 0800 807060. In addition, local community representatives will be informed. If the ATACs are deployed, signage will be placed in the locality and local letter drops are carried out to inform residents. An example of the type of signage and information displayed is shown in the appendix of this document.

General outline plan & timescale

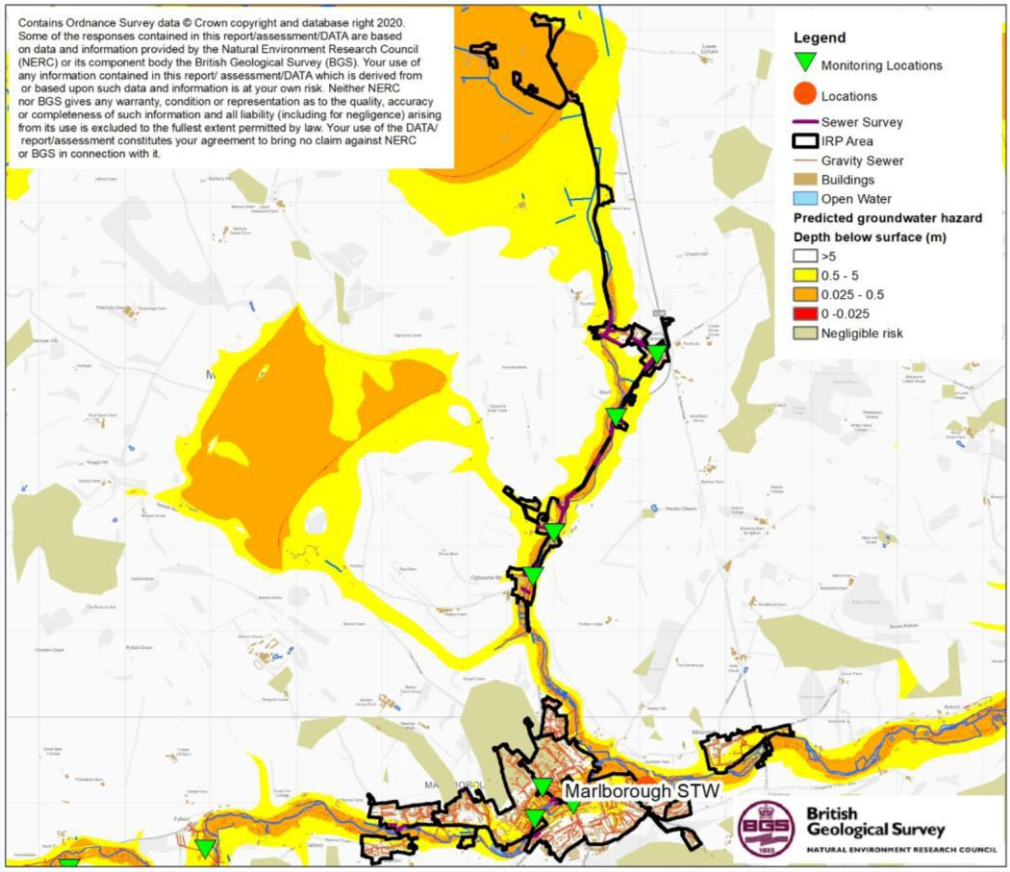


Figure 2.0 – Marlborough monitoring and infiltration zones

Key to bringing the impact of groundwater infiltration under control will be an enhanced monitoring regime. We have identified and have installed several telemetered depth monitor locations around the Marlborough system – see Figure 2.0.

Complementing the flow [at the treatment works] and depth measurement [in the sewer network] we will use pumping station run time data, rainfall data, river level data, and groundwater level data to create a full picture of movement and source of flows around the catchment.

Zones of Groundwater Risk

We engaged with JBA Consulting to develop plans for Marlborough that identify zones of groundwater risk, see Figure 2.0. These zones are modelled areas where the groundwater has been determined to be above the sewer and hence pose a potential risk for groundwater ingress.

The sewer depth monitors referred to earlier are being sited in and around these zones to verify and calibrate the risk in each of the zones.

If following the proposal to sealing in part or wholly[4] of the high-risk zones, should it be required, the system is found to be still experiencing excessive infiltration we would then look to potentially seal 'private' laterals and/or drains along with starting to seal the medium to low-risk zones.

This document sets out an unconstrained approach to resolve the impact of groundwater infiltration within the system. Investment to address infiltration will be assessed and prioritised against other drivers e.g. STW upgrades, both in the catchment and across the region at each price review.

With this plan we remain committed to minimising the impact of groundwater on the sewerage system in Marlborough.

Our general medium-to-long-term plan is therefore to apply a hierarchy to sealing the sewer as follows:

Activity	When	Description
Model Zones	2020/21	JBA have been engaged to undertake modelling activities to identify the areas to be targeted for sealing in the 56 systems identified as being impacted by infiltration.
Install monitors	2020	Monitors have been installed in the zones to help calibrate and validate the zones. Each year completeness / coverage monitors will be reviewed and added to / or modified, as necessary.
Calibrate zones	Refined each year	Following each winter, we intend to review the data from the monitors and if necessary, redefine the zones.
Look & Lift	Each Winter	The look & lift surveys have two purposes, firstly to complement the monitoring and secondly to identify 'quick fixes' that we would address through our normal capital maintenance.
CCTV	2020-2023	Required to confirm sewer condition and provide information to assist with costing any sewer lining.

4 Decisions regarding the extent of sealing will be based on outcomes of works undertaken to date, result of monitoring and successful submission of our plans for investment.

Minor Works	2020-2023	As mentioned, if we detect minor works being required, we will look to resolve these as and when we find them.
PR24 / Price review	2023-2024	Ideally through monitoring and on-going investigations work towards managing the infiltration risk, in AMP7, will be successful. However, in the absence of evidence justifying the need not to undertake sealing of the high-risk zone this is to be included as part of PR24 investment plan. This work will be subject to Cost Benefit Analysis and Best Technical Knowledge Not Entailing Excessive Cost (BTKNEEC) assessments.
High risk zone sealing	2025-2030	Sealing of high-risk zone undertaken subject to need being demonstrated.

Marlborough Infiltration Management Plan

As detailed above the impact of Infiltration is experienced both at the sewage treatment works and within the sewerage network with infrequent sewage escapes.

Our approach to the resolution of infiltration impacting the Marlborough sewerage system is outlined below.

High level approach statement

For Marlborough our approach to tackling infiltration will be undertaken as follows:

1. To deal with the infiltration experienced we will investigate the network with a view to identifying sources of ingress of infiltration that are cost effective[5] to address. To investigate the network, we/will
- Undertake a desktop analysis to determine infiltration high to low-risk zones (October 2020)
- Installed additional monitoring to back up the analysis and to aide focusing of locations for identification of infiltration (2020 to 2023). Each year we will assess the completeness of monitoring and if required add to or modify the current locations.
- Undertake sample CCTV in the high to low-risk zones to assess the general asset health of the sewers and manholes (ongoing).
- Review results of Winter 2019/20 and 2020/21 with historic data to build up evidence to support interventions in the network (Summer 2021).

2. Where interventions can be undertaken as part of normal sewer maintenance activities these will be communicated and progressed.
3. If significant investment is identified as being required, then this will need to be considered in terms of relative need compared to other systems being investigated for infiltration reduction. However, where viable opportunities are identified these will be included in our AMP9 (2030-35) programme of investment. Significant investment needs may need to be included in our future investment cycles.

Investigations

As mentioned above JBA Consulting have been supporting by undertaking an exercise involving assessing groundwater elevation data to determine which areas of the network are potentially below the groundwater table during high groundwater periods.

Site investigations, undertaken by Dene- Tech and our Customer Field Services (Thames Water Operations) have included 'look & lift' surveys, CCTV and where necessary dye tracing to confirm connectivity.

A table of the work undertaken is included in the appendix to this report.

5 Assessment of cost effectiveness is based on assessment of the ratio of the cost of a solution to the monetised benefit gained from implementing the solution i.e. reduction in flood/pollution risk and/or reduced operating costs.

Monitoring

Sewer Depth Monitors have been installed in the catchment in 2020(see Figure 2.0). These devices are telemetered and provide real time data on the level of flow in the sewer.

The purpose of these units is to act as alerts for high groundwater impact in the sewer, calibration of the zones of infiltration risk and to demonstrate benefit gained from work undertaken to reduce infiltration.

To provide evidence in the future of further need to manage the impact of infiltration.

Mitigation

On occasions to avoid flooding of properties or to manage the risk of damage to the environment we may undertake tankering from (manholes) points on the network, make use of pumps to manage flows or deploy settlement tanks to part treat sewage before release to the environment.

With regard to Marlborough, we are considering the deployment of one ATAC unit as detailed above. We would only look to deploy this mitigation either where all other approaches have ceased to be effective or where property flooding and / or pollution would be a likely risk had we not undertaken the mitigations.

Updates

Work on the Groundwater infiltration management plan will continue, and we will aim to provide updates annually by the end of October each year.

Appendix

Groundwater infiltration potential analysis

The sewer network classified by the groundwater infiltration risk zones. The lengths of sewers within these zones are presented in the table below.

Risk category	Description	Length (km)	Percentage
High	Predicted groundwater extreme >1m above pipe invert	12.58	24.6
Medium	Predicted groundwater extreme 0-1m above pipe invert	6.20	12.1
Low	Predicted groundwater extreme 0-1m below pipe invert	4.56	8.9
Very Low	Predicted groundwater extreme >1m below pipe invert	27.89	54.4
Total		51.23[6]	100.0

In addition, the table below presents the surface water flood risk classification for manholes within the catchment.

Manholes by Surface Water Inundation Risk Category

Risk category	Description	Number	Percentage
High	Inundation risk in 3.3% AEP fluvial or pluvial event	127	7.2
Medium	Inundation risk in 1% AEP fluvial or pluvial event	96	5.4
Low	Inundation risk in 0.1% AEP fluvial or pluvial event	189	10.7
Very Low	All other manholes	1355	76.7
Total		1767	100.0

6 Total of sewer length is for length of mapped sewers only and will not include unmapped S105a transferred sewers in all cases.

Investigations & remedial work undertaken since 2019/20 and future plans

The three tables below summarise the findings of the survey and implementation work identified in the 2019/20 period. The final table summarises our current known plans for remediating groundwater infiltration issues.

2019/20 Survey Statistics

Elements		Units	Value	Comment
Planned Survey		m		No CCTV surveys were possible in this period due to water levels but manhole inspections were completed- we will carry out further surveys across the winter periods where viable.
Survey Completed		m		
		%		
		Lengths (No.)	62	
Clear Flow Observed		m	0	
		%		
Sewer Infiltration Locations Identified	Infiltration Gushing	No.		
	Infiltration Gushing at Joint			
	Infiltration Running			
	Infiltration Running at joint			
	Infiltration Dripping			
	Infiltration Dripping at joint			
	Infiltration Seeping			
	Infiltration Seeping at joint			
	Grand Total			

Elements		Units	Value	Comment
Manhole Infiltration Locations Identified	Infiltration around pipe	No.	8	19 groundwater infiltration locations were identified at manhole locations. Of those 2 were identified as "gushing" and therefore should be the focus of repair as soon as possible.
	Infiltration through benching			
	Infiltration through chamber wall		4	
	Gushing		2	
	Running			
	Dripping		1	
	Seeping		4	
	Grand Total		19	
Monitoring Locations Active		No.	7	
Details of other Surveys				

2019/20 Implementation Works

Activities	Value	Comment
Sewer Lining Length (m)	186	This work was completed in September – December 2020. In addition to the lengths lined we have carried out 3 patch repairs. We are progressing the Priority 1 manhole sealing locations through governance for approval, this progress is also being monitored by the EA.
Infiltration Points Targeted (no.)	7	
Manhole Sealing (no.)	1	

Pumps at Bay Bridges SPS were also replaced in 2020. The root cause of the failure is being burn out due to excessive flows. Infiltration lining works have helped reduce the burden on the SPS to help prevent this root cause from recurring and will also reduce pressure on the Bay Bridges rising mains.

Future Works

	Priority 2020/2021	Known follow On Work
Survey	See main text – we will carry out further surveys across the winter periods where viable.	
Sewer Lining	Plans to be developed when further monitoring can be undertaken or analysed.	
Manhole Sealing – Infiltration Ingress	2 gushing locations identified	17 weeping locations identified in 2019/20 Locations identified in Future Surveys
Manhole Sealing – Pluvial and Fluvial Ingress	Plan to be developed based on at risk manholes identified in JBA analysis	
Sewage Treatment Works Upgrade	N/A	

Example information and signage

Thames Water

Your reference ~~number~~
BB973534

thameswater.co.uk

0800 316 9800
We're open 24/7

03 April 2020

Working in Aldbourne

This ATAC Eco filter is a mobile sewage filtering unit which will operate 24 hours a day.

How it works?

The Eco filter works using the same basic principles as our traditional Sewage Treatment Works. A pump will feed dirty water into the unit so it can be filtered. Any contaminants within the water are broken down and once water has passed through the Eco filter it can safely be returned to the environment.

Why is this needed?

The high groundwater levels experienced recently have caused extra water to enter our sewers and overwhelm them causing sewer flooding. This is one of the measures being put in place to address the issue and by installing this unit, we will improve the quality of the water which we are not able to prevent from escaping.

What does it look like?

Outside view:

Dirty water entering the filter unit to be treated and then pumped to the top of the unit

Treated water leaving the unit and returning to the environment

Inside view:

Dirty water being pumped into the unit and working its way through the filter system.

Glossary of terms

AEP – Annual Exceedance Potential

AMP – Asset Management Plan

CCTV – Closed Circuit Television

EA - Environment Agency

IRP – Infiltration Reduction Plans

MH – Manhole

STW – Sewage Treatment Works

WINEP – Water Industry National Environment Programme

Addendum – Annual Update 2021
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Overview

This addendum to the Marlborough Groundwater Impacted System Management Plan 2020 (GISMP) provides an update on performance/work undertaken in the Hydrological Year September 2020 to September 2021. The key points covered include:

- Hydrological conditions
- How the sewerage system has performed over this period
- Mitigation / remedial measures progressed over the last year and being planned
- Summary and plan for 2022/23

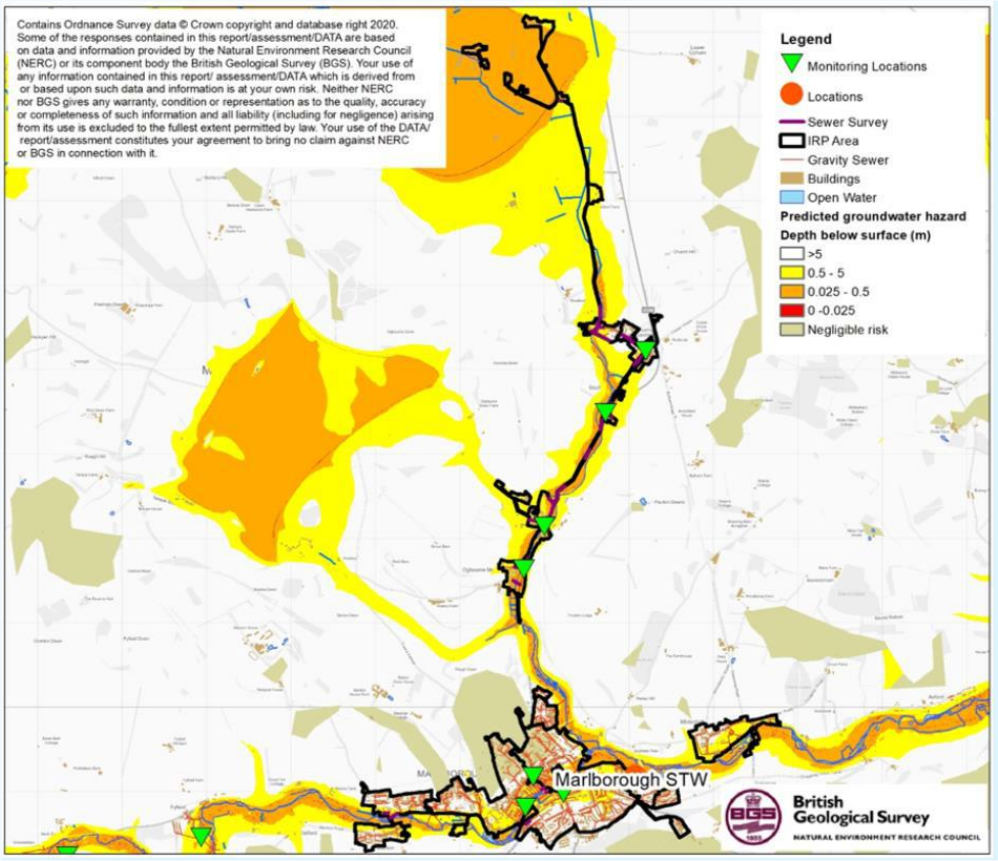

Figure 1: Marlborough monitoring and infiltration zones

7 Happy New Water Year! | National River Flow Archive (ceh.ac.uk)

Hydrological Review – 2020-2021

This section summaries the hydrological conditions at Marlborough in the period.

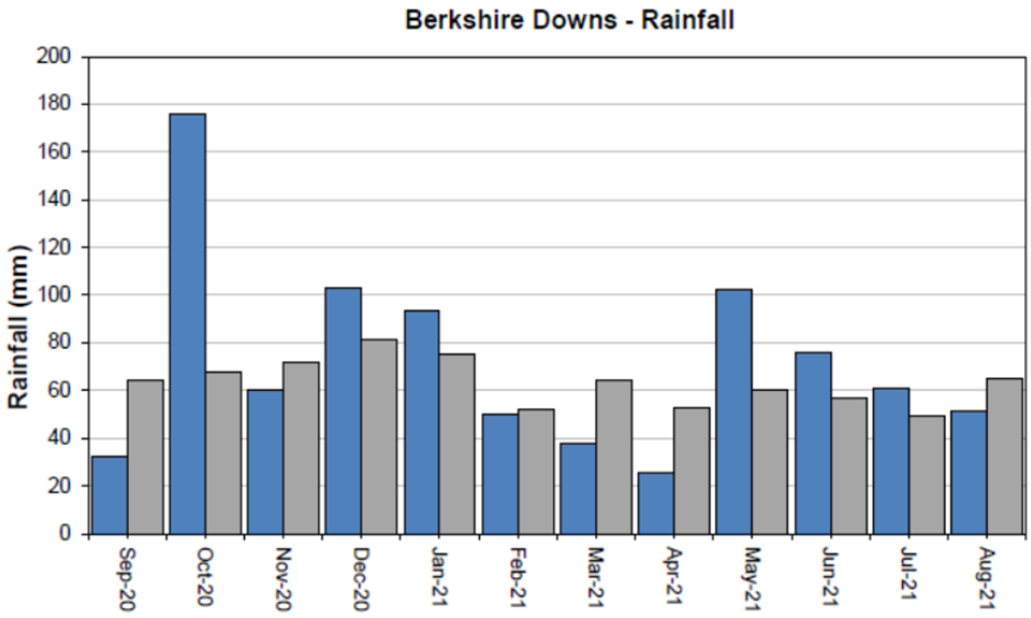

Figure 2 – Monthly rainfall depths local to the system

Marlborough is situated in the Berkshire Downs water resources area. Figure 2 shows the monthly rainfall total depths against the long-term average rainfall in the location of Marlborough over the period taken from the *Environment Agency Water Situation Report August 2021.*[1]

The graph indicates that monthly rainfall at times in the last year has significantly exceeded long-term averages this was especially notable in October 2020 due to Storm Alex.

Figure 3 shows the location of the British Geological Survey (BGS) monitoring borehole at Rockley which has been monitoring since 1932. Figures 4 and 5 show river levels in the River Kennet at Marlborough which are a good indication of local groundwater levels over time. Figure 6 and 7 show the last two and ten years of groundwater level data overlain on expected ranges. This shows how recent groundwater levels have compared against the expected range, they show that generally over the last two winters groundwater levels have been notably high in 2019 and above normal in 2020.

1 Environment Agency Water Situation Report August 2021
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1016481/Thames_Water_Situation_Report_August_2021.pdf

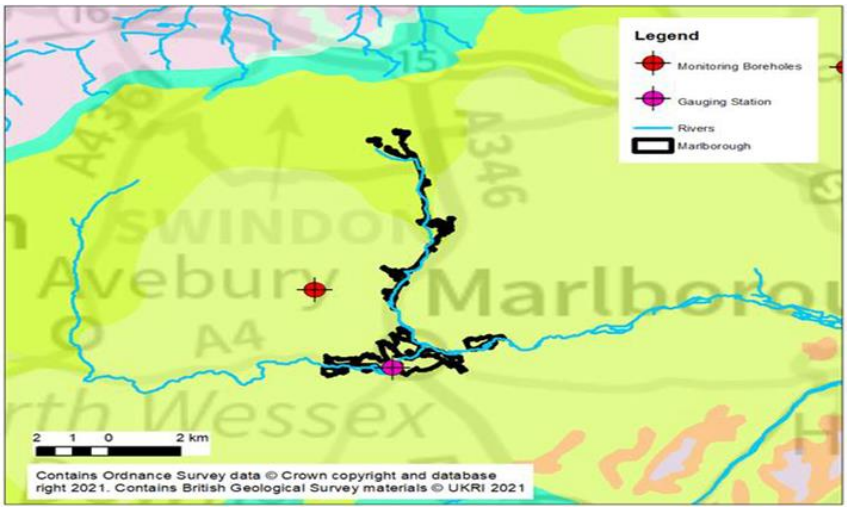

Figure 3 – Location of Rockley Park Monitoring Borehole Relative to Marlborough

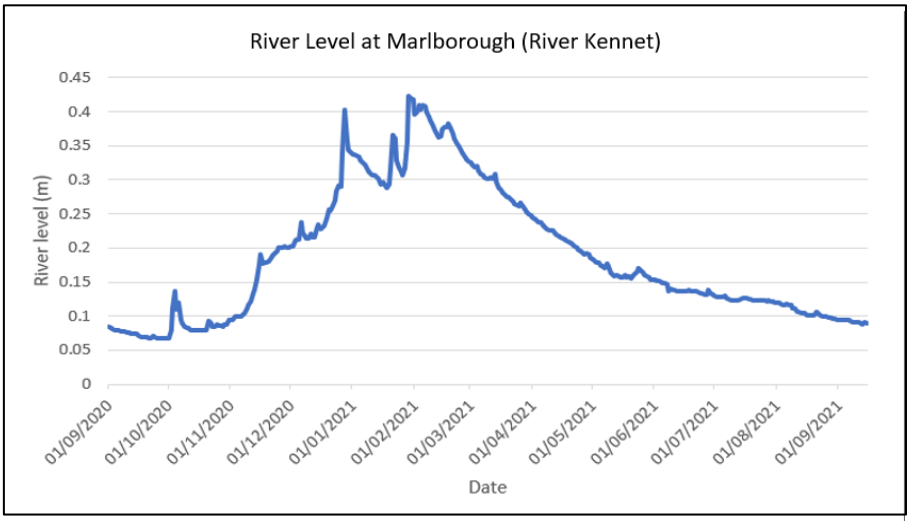

Figure 4 – 2020-2021 River levels at Marlborough (River Kennet) – River Levels UK (riverlevels.uk).

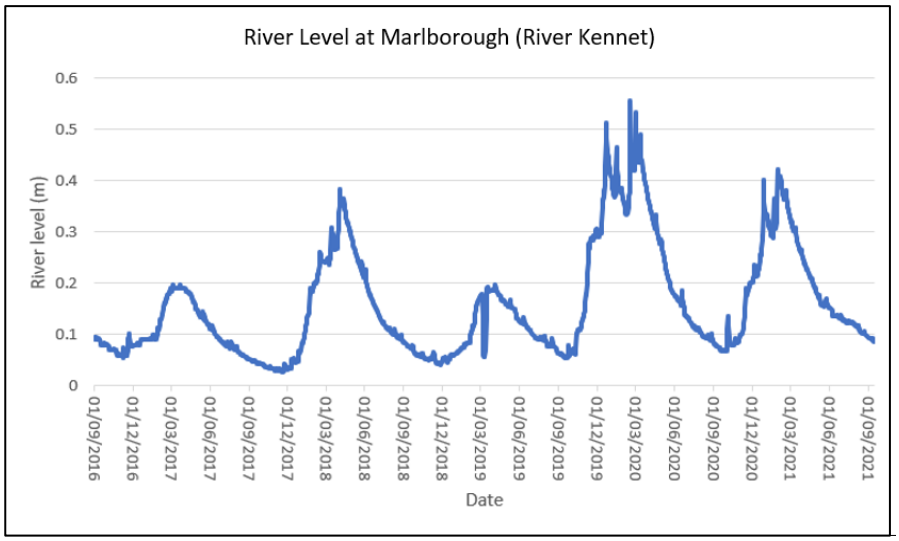

Figure 5 – 2016-2021 River levels at Marlborough (River Kennet) – River Levels UK (riverlevels.uk).

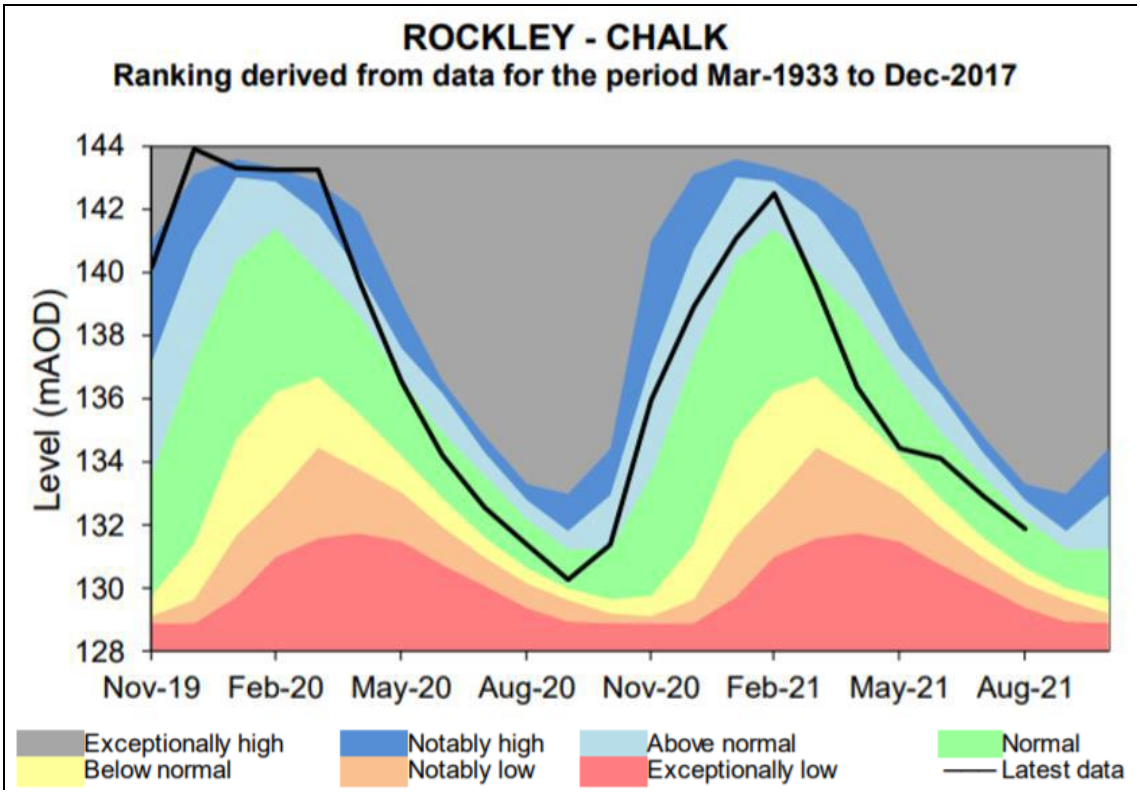

Figure 6 – 2019-2021 Groundwater levels at Rockley. (Environment Agency Water Situation Report August 2021)

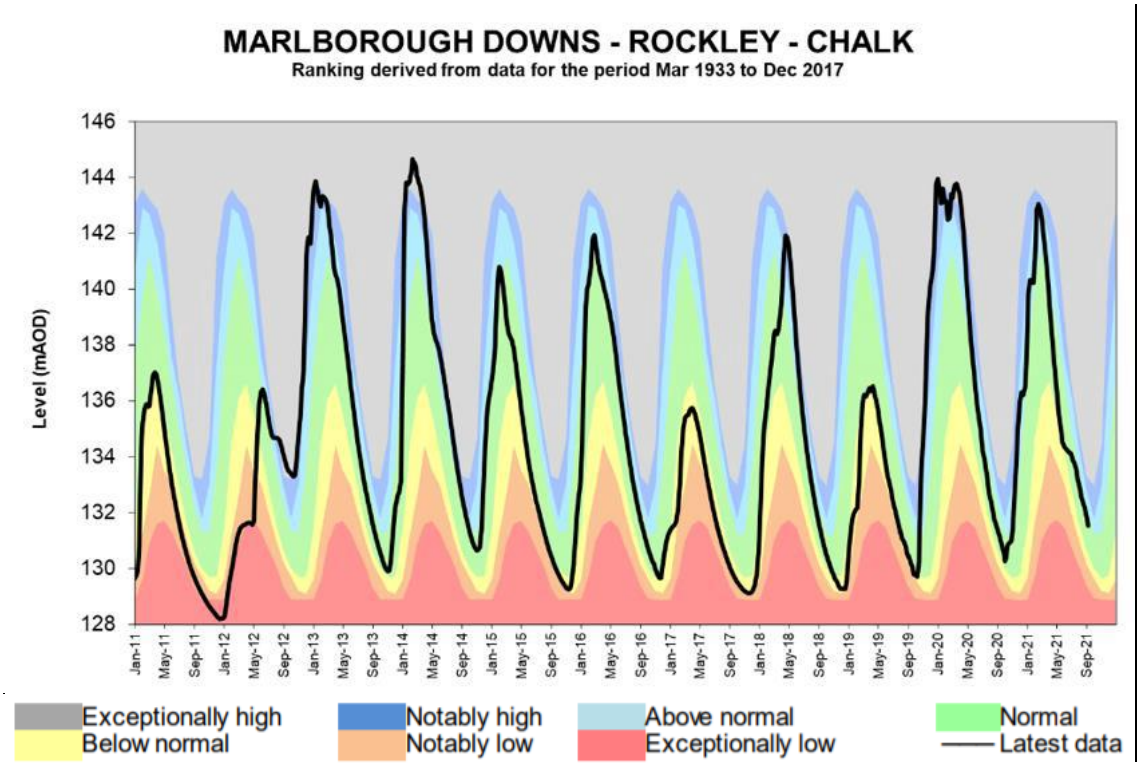

Figure 7 – 2011-2021 Groundwater levels at Rockley. (Environment Agency Water Situation Report August 2021)

Investigations & remedial work undertaken in the period and future work

The two tables below summarise remediation work undertaken in the period

Remediation work in period

Activities	Value	Comment
Sewer Lining Length (m)	30m of sewer liner. An additional 50m is due to be complete by November 2021.	Remaining work subject to site conditions being suitable.
Manhole Sealing (no.)	1 manhole complete. An additional 2 manholes are to be sealed by November 2021.	

Future Works

Activity	Planned work in 2021/22	Known follow On Work
Survey	Our Operational teams are continuing to investigate the network upstream of Bay Bridges SPS.	To be confirmed
Sewer Lining	Plans to be developed when further monitoring can be undertaken.	To be confirmed
Manhole Sealing – Infiltration Ingress	Plans to be developed when further monitoring can be undertaken.	To be confirmed
Manhole Sealing – Pluvial and Fluvial Ingress	Plan to be developed based on at risk manholes identified in JBA analysis.	
Sewage Treatment Works Upgrade	N/A	

2020-21 Infiltration Review

This section looks at the impact of infiltration in Marlborough over the period.

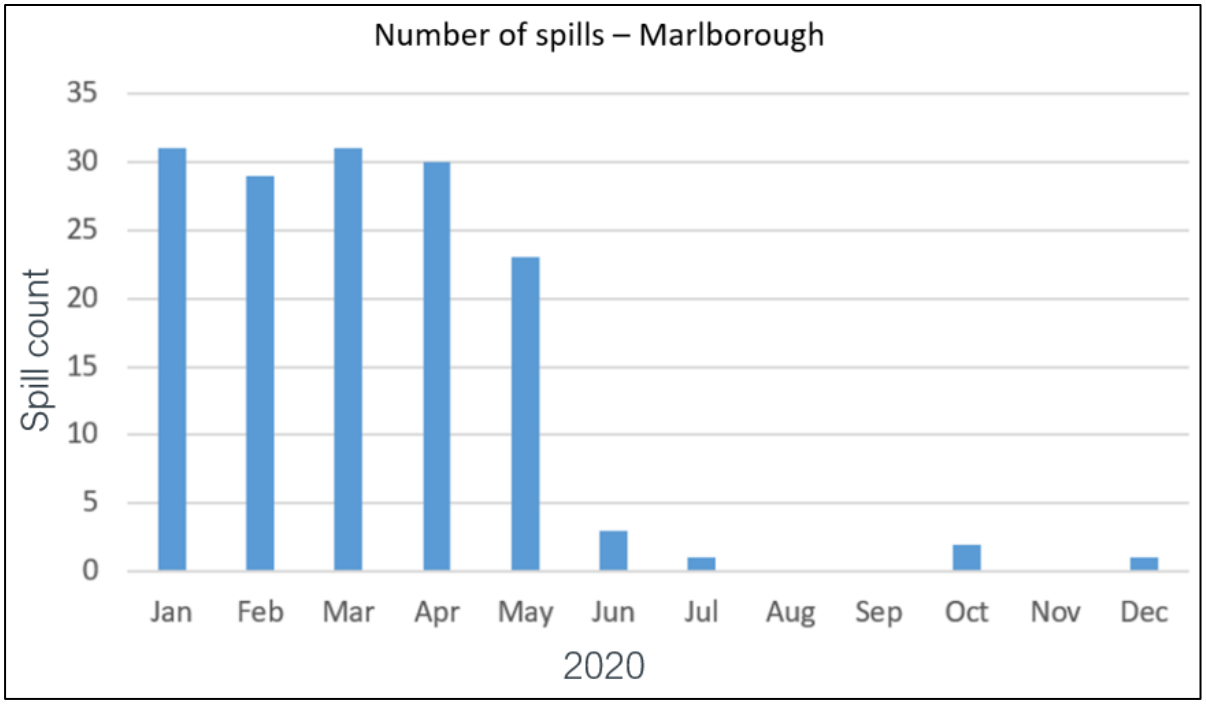

Figure 8 – Number of spills (discharge count) at Marlborough STW (taken from Event Duration Monitor (EDM) Data).*

Figure 8 shows the number of spills per month from Marlborough Sewage Treatment Works (STW). January to May 2020 saw the greatest number of discharges. In the summer period the number of spills were much lower, highlighting the influence of groundwater infiltration/winter flows on the system. This Combined Sewer Overflow location has met the trigger for the EA's Storm Outfall Overflow Assessment Framework (SOAF) and is currently under further investigation with regards to root cause and impact.

Last winter saw impact in the Marlborough network. Tankering was deployed from Bay Bridges SPS in order to reduce the risk of pollution and property flooding.

*2020 verified and audited EDM data. 2021 calendar year data is awaiting verification before being published.

Summary

The winter of 2020-21 was a wet winter with groundwater levels in the chalk aquifer beneath Marlborough notably high for long periods. This was reflected in the discharges see at the Sewage Treatment works from the Event Duration Monitoring (EDM) Data and the need for tankering from Bay Bridges SPS to reduce the risk of flooding and pollution within the network.

Spill frequency at the STW were significantly above the 40 spills per annum trigger set

in the Sewer Overflow Assessment Framework (SOAF). We are investigating the impact of the high spill frequency with view to understanding the environmental impact. The investigations undertaken as part of the GISMP will be used to inform the SOAF investigations with a view to aligning the two pieces of work.

Remedial measures continue to be implemented from previous surveys. Lift and look and CCTV surveys will be undertaken in remaining wet winter periods if conditions allow and subject to funding and available capacity. The aim of this is to find further priority locations for remediation and investigating/justifying the need for future larger scale lining as part of our Price Review (PR) process if required.

Addendum – Annual Update 2022
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Overview

This addendum to the Marlborough Groundwater Impacted System Management Plan 2021 (GISMP) provides an update on performance/work undertaken in the Hydrological Year October 2021 to September 2022. The key points covered include:

- Hydrological conditions
- How the sewerage system has performed over this period
- Mitigation / remedial measures progressed over the last year and being planned
- Summary and plan for 2022/23

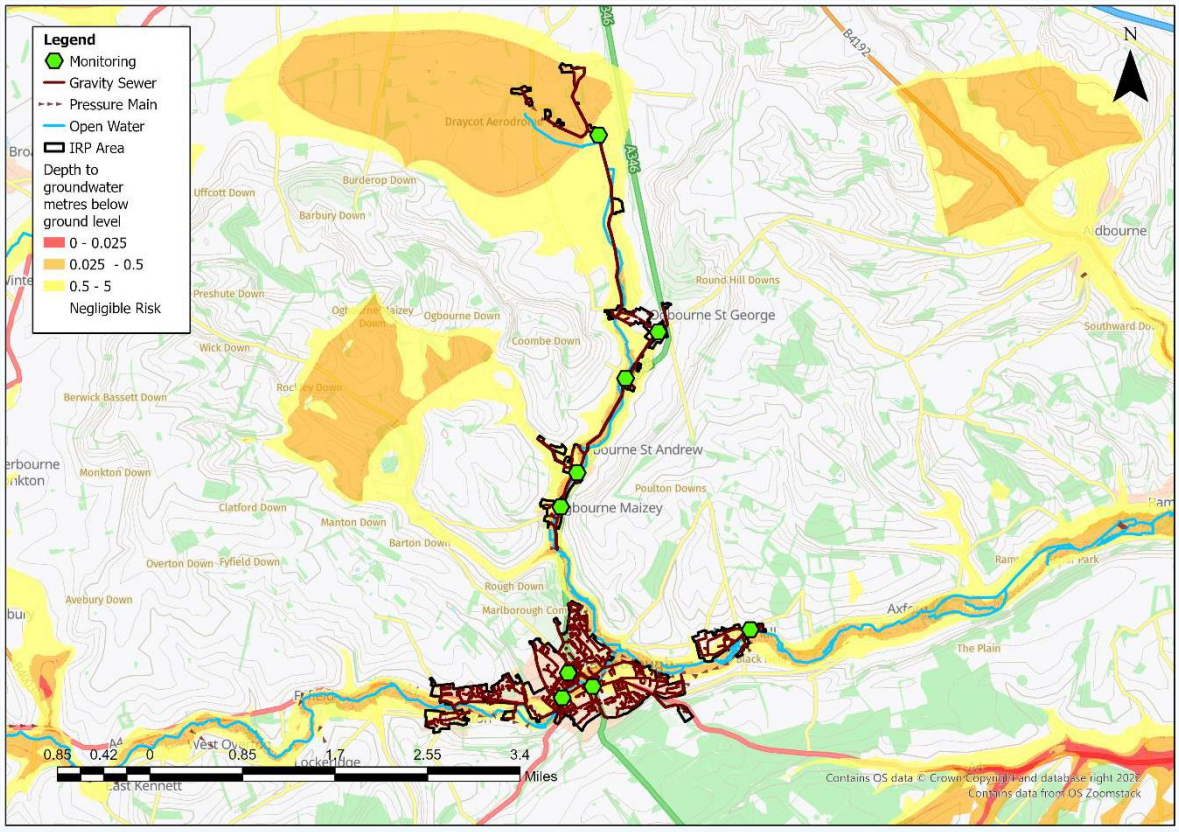


Figure 1: Marlborough Monitoring Plan

Hydrological Review – 2021-2022

This section summarises the hydrological conditions within the Marlborough catchment within the period under investigation and provides comparison against previous year's performance to put the annual performance into context. The hydrological review has been undertaken based on the Hydrological Year which runs October 1st to September 30th.

Catchment Rainfall

Representative Radar rainfall has been used to generate monthly data at catchment level for comparison with average data generated by local Met Office Weather Station Records. Figure 2 presents the comparison of this data for the last three hydrological years to support longer term trends within the local system.

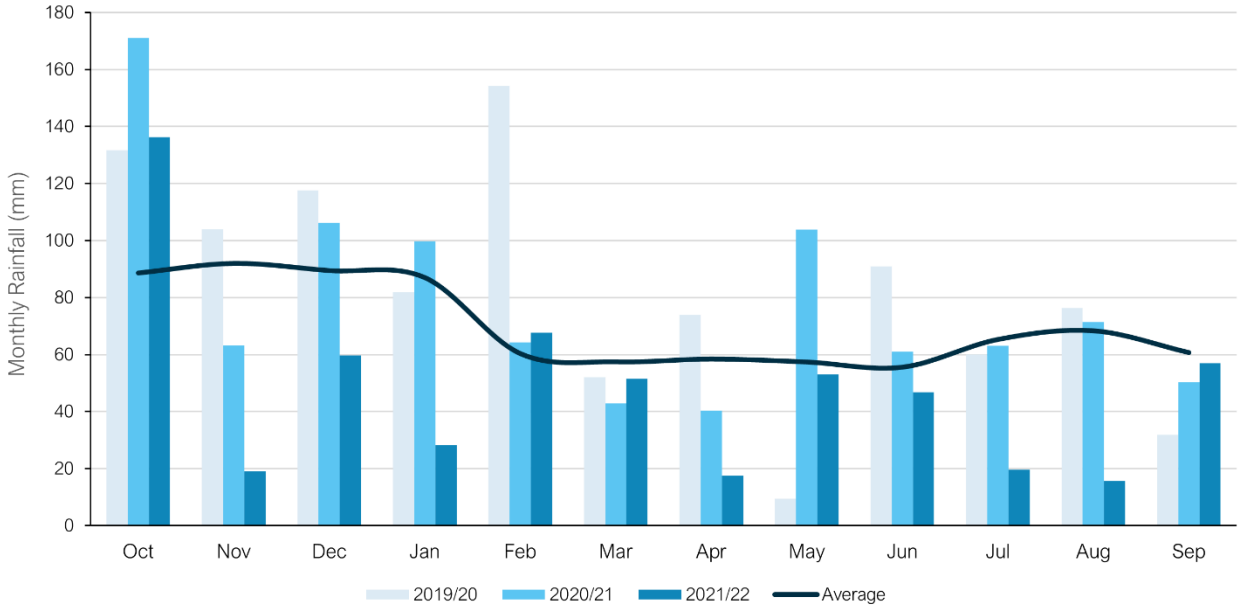


Figure 2: Monthly Rainfall Performance

(Average Values taken from Met Office Weather Station at High Wycombe based on the period 1991-2020)

The total rainfall for the 2021/22 hydrological year is 31% below the annual average total. Total rainfall values are presented in Table 3 below.

Average (mm)	2019/20 (mm)	2020/21 (mm)	2021/22 (mm)
841	984	938	579

Table 3: Total Rainfall Based on Hydrological Year

Groundwater / Local River Level

The Marlborough catchment is situated in the Berkshire Downs water resources areas. It sits in the Lewes Nodular Chalk Formation, New Pit Chalk Formation and the Holywell Nodular Chalk Formation, all of carbonate material. These are designated principal aquifers within the UK.

The Environment Agency has gauging stations on local watercourses measuring stage and observation boreholes measuring groundwater levels locally to the catchment which can be used to provide indicative local groundwater performance.

From previous investigations we have identified the following sites are good indicators of groundwater levels within the catchment.

- River Kennet, Marlborough
- River Og, Poulton Farm
- Rockley OBH
- Draycot Foliat OBH

These sites are illustrated in the figure below, alongside the closest groundwater reference station and closest gauging station from the Water Situation Report. The closest groundwater reference station from the WSR is also Rockley OBH and the closest gauging station from the WSR is also at Marlborough on the River Kennet.

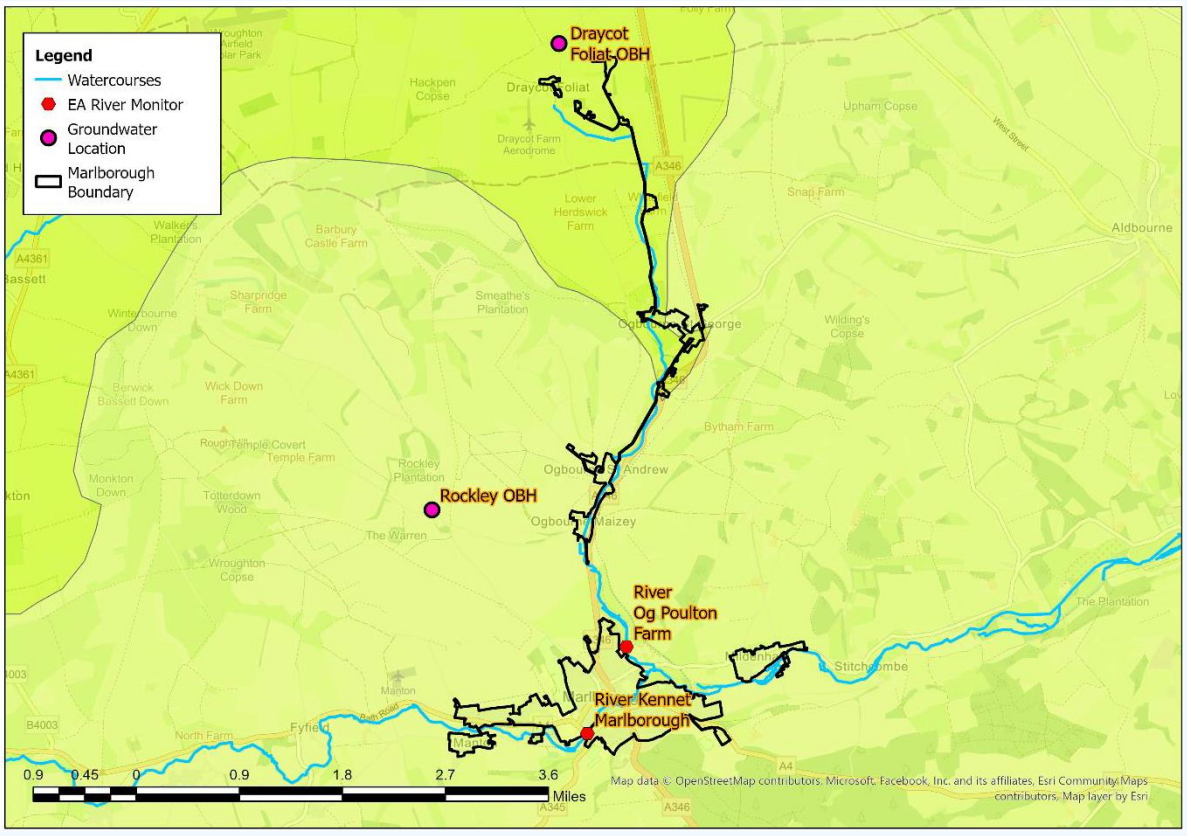


Figure 4: Local Monitoring Stations

The following figures represent the last three hydrological years of level information at the indicator sites to build a picture of the relative conditions prevalent in the current year. It is presented against both the daily total rainfall values for the catchment and a rolling 15-day total rainfall.

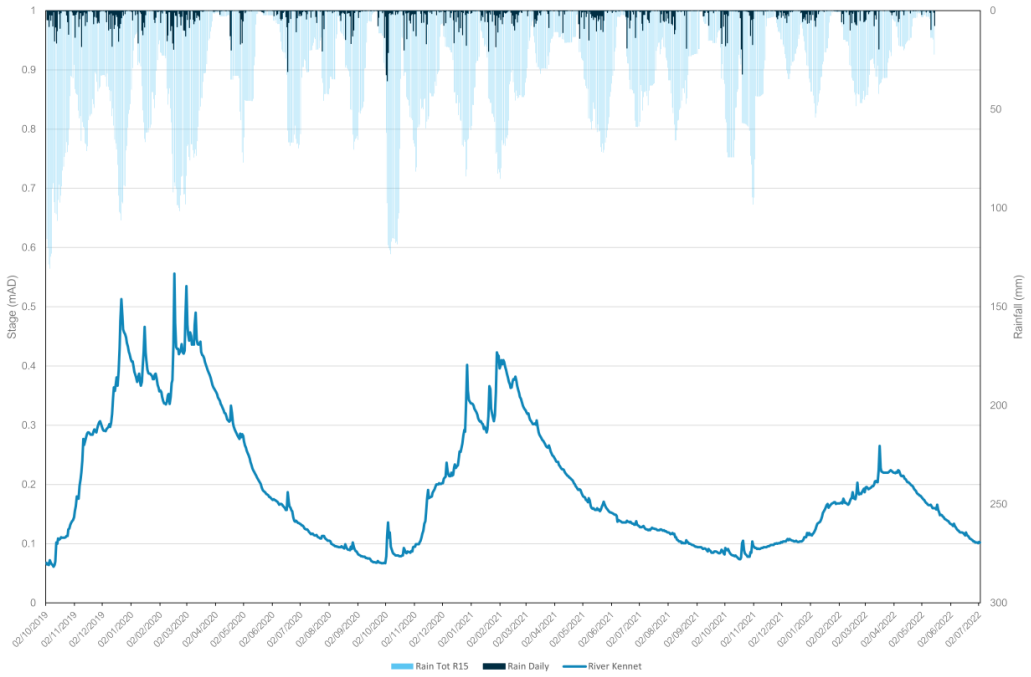


Figure 5A – River Kennet at Marlborough

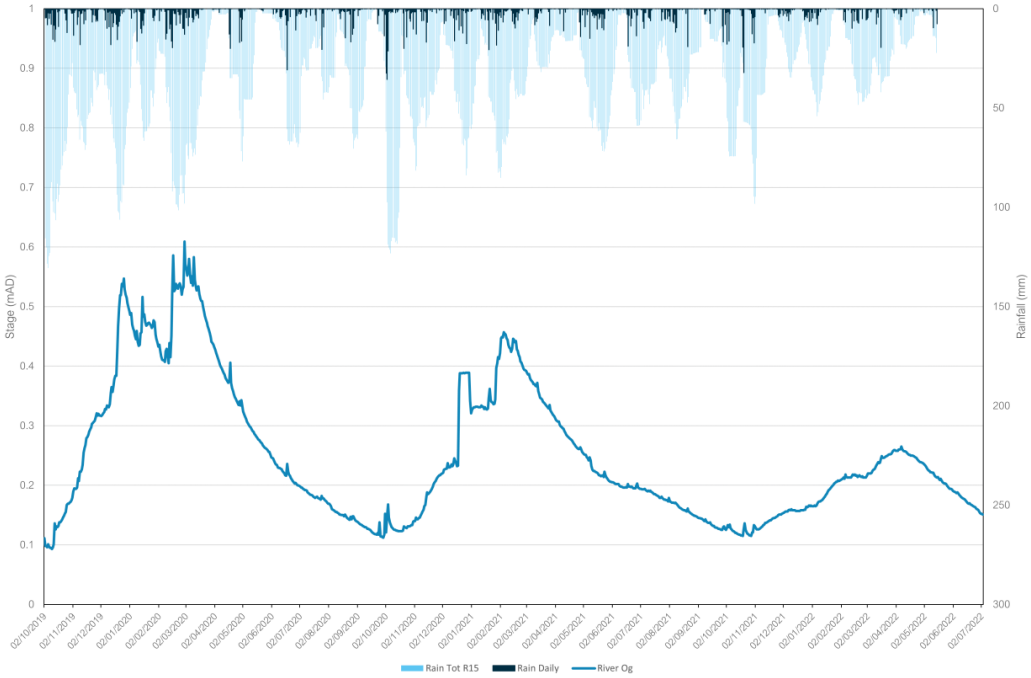


Figure 5B – River Og at Poulton Farm

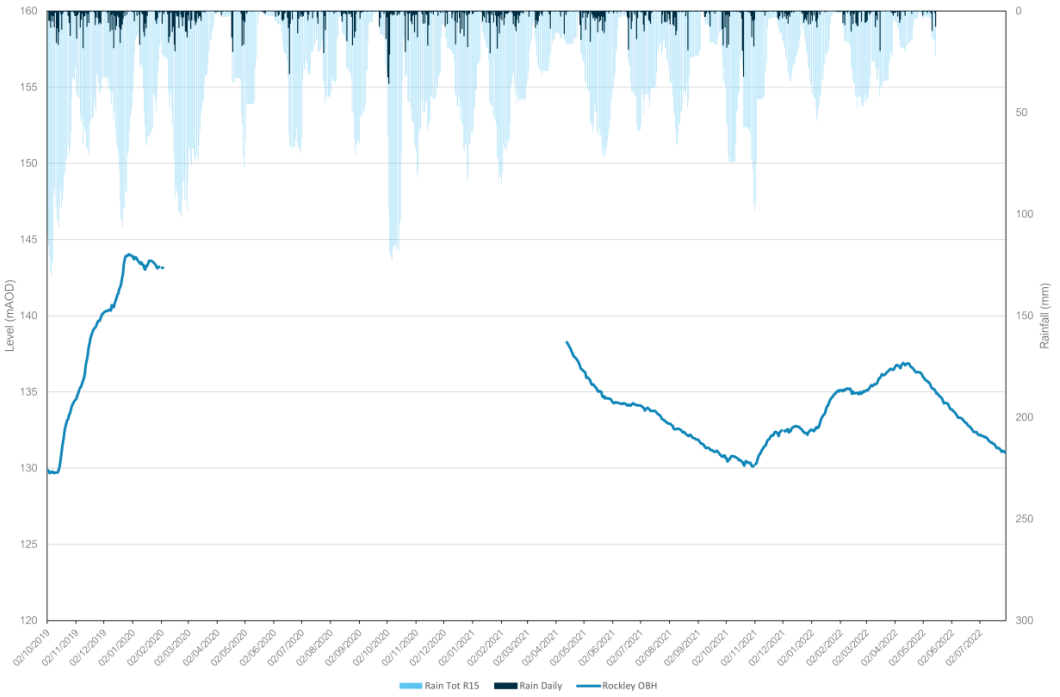


Figure 5C – Rockley OBH

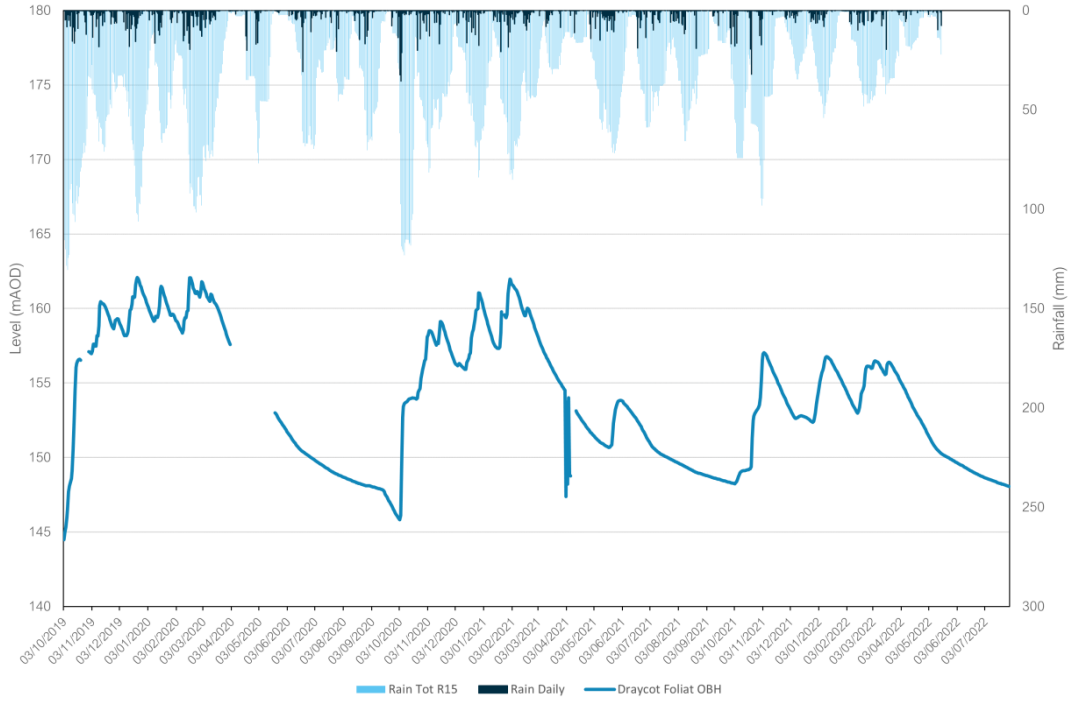
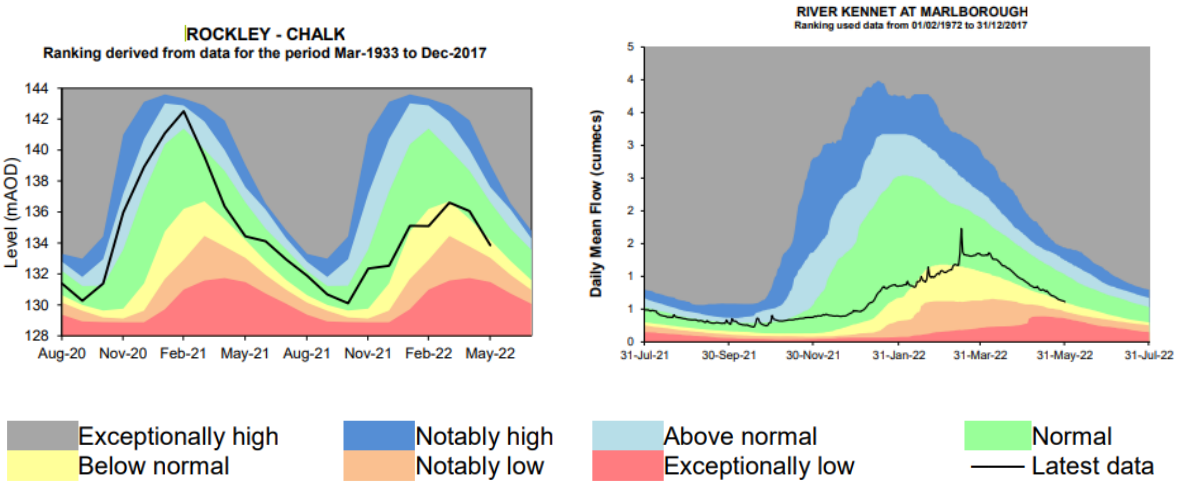


Figure 5D – Draycot Foliat OBH

In addition to these specific stations, the wider groundwater context is illustrated in the Water Situation Report for the Berkshire Downs. The nearest groundwater reference station is Rockley OBH. This site shows significantly lower overall groundwater than the previous year. This can be seen in the figure below alongside the river indicator location at Marlborough on the River Kennet.



Extract from - [Water Situation Report (publishing.service.gov.uk)]

Figure 6 – Water Situation Report

Network Performance

Within the Marlborough catchment there is one site detailed within the Environment Agency Consents Database which has an Event Duration Monitor (EDM) fitted.

Table 7 below details the last 2 years performance of overflows within the catchment.

Event Duration Monitoring	2020		2021	
Overflow	Annual Spills	Duration (hours)	Annual Spills	Duration (hours)
Marlborough STW	151	2872.22	42	407.77

Table 7: Event Duration Monitoring

A critical part of the assessment of EDM performance and its relation to groundwater inundation is to review the month-on-month spill performance, against previous years and the monthly total rainfall values to give context to the performance. Figure 8 below presents the EDM performance trend and rainfall for recent years.

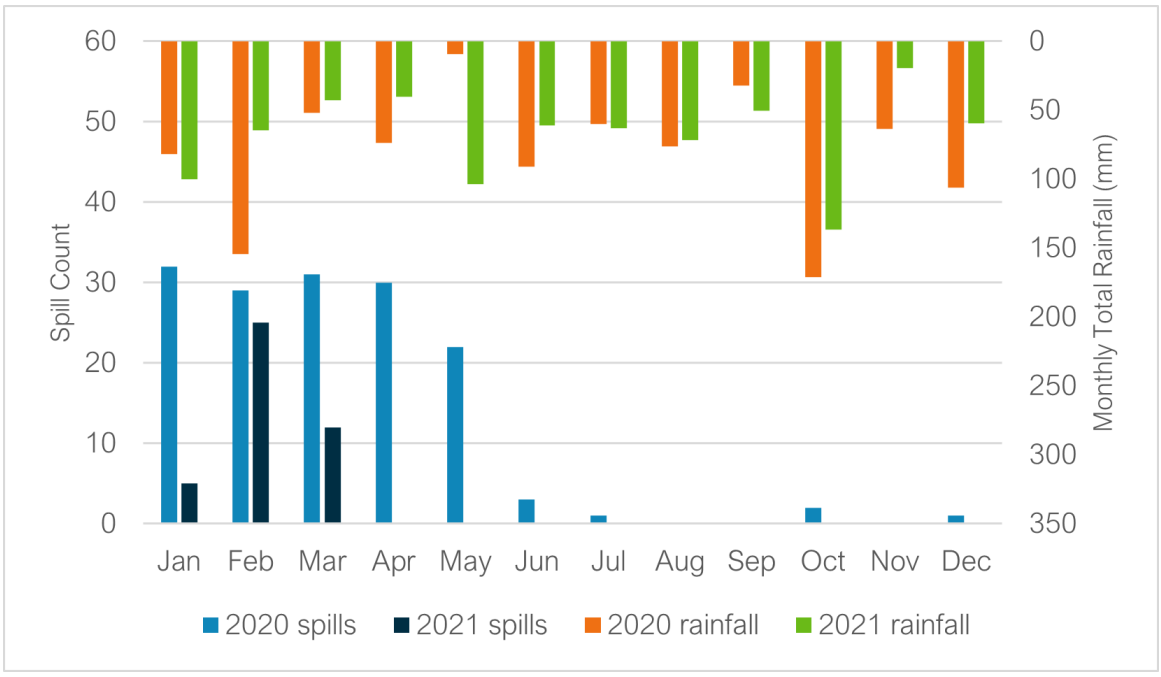


Figure 8 – EDM Monthly Performance

The trend in spill performance across the two recorded years does show variation in spills, with a focus on spills during the winter and spring months. The data suggests a wider relationship between rainfall, elevated groundwater levels and spill frequency. A slower tail off in spills is evident within the first half of 2020, when the indicator sites suggest groundwater levels in the catchment were higher than within the first half of 2021.

Investigations & Interventions

This section details the activities that have been undertaken within the catchment within the Hydrological Year 2021-22.

Monitor Installations

The sewer depth monitor (SDM) programme supports long term groundwater understanding within GISMP catchments. Currently, there are a total of 9 monitors installed within the Marlborough catchment. There are currently no further monitor installs planned.

The data from these will be cross-referenced with other long-term records (where available) within the catchment.

Remediation Works Undertaken this Hydrological Year

Table 9 below provides a summary of the investigations and remediation works undertaken or planned within the Marlborough catchment in the 2021-22 Hydrological Year.

Investigation/remediation type	Number/length undertaken
CCTV Survey	387 meters planned by end of November 2022
Look and lift survey	N/A
Sewer lining	50 meters
Patch lining	N/A
Manhole sealing	2 manholes
Manhole sealing plates	N/A
Manhole covers and frames replaced	N/A

Table 9: Works Undertaken in the 2021/22 Hydrological Year

With the seasonal trends in groundwater being low in comparison with previous years, the larger scale survey, identification and remediation of the sewerage network has not been possible within the 2021/22 hydrological year.

Summary

Rainfall in the Marlborough catchment over the 2021/22 hydrological year has been below average, with groundwater levels in the aquifer beneath Marlborough not reaching the levels seen in previous years which triggered groundwater ingress into the sewerage network and elevated flow/depth readings at monitoring sites.

Lift and look and CCTV surveys will be undertaken in remaining wet winter periods if conditions allow and subject to funding and available capacity. The aim of this is to find further priority locations for remediation and investigating/justifying the need for future larger scale lining as part of our Price Review (PR) process if required.

Addendum – Annual Update 2023
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Overview

This addendum to the Marlborough Groundwater Impacted System Management Plan 2021 (GISMP) provides an update on performance/work undertaken in the Hydrological Year October 2022 to September 2023. The key points covered include:

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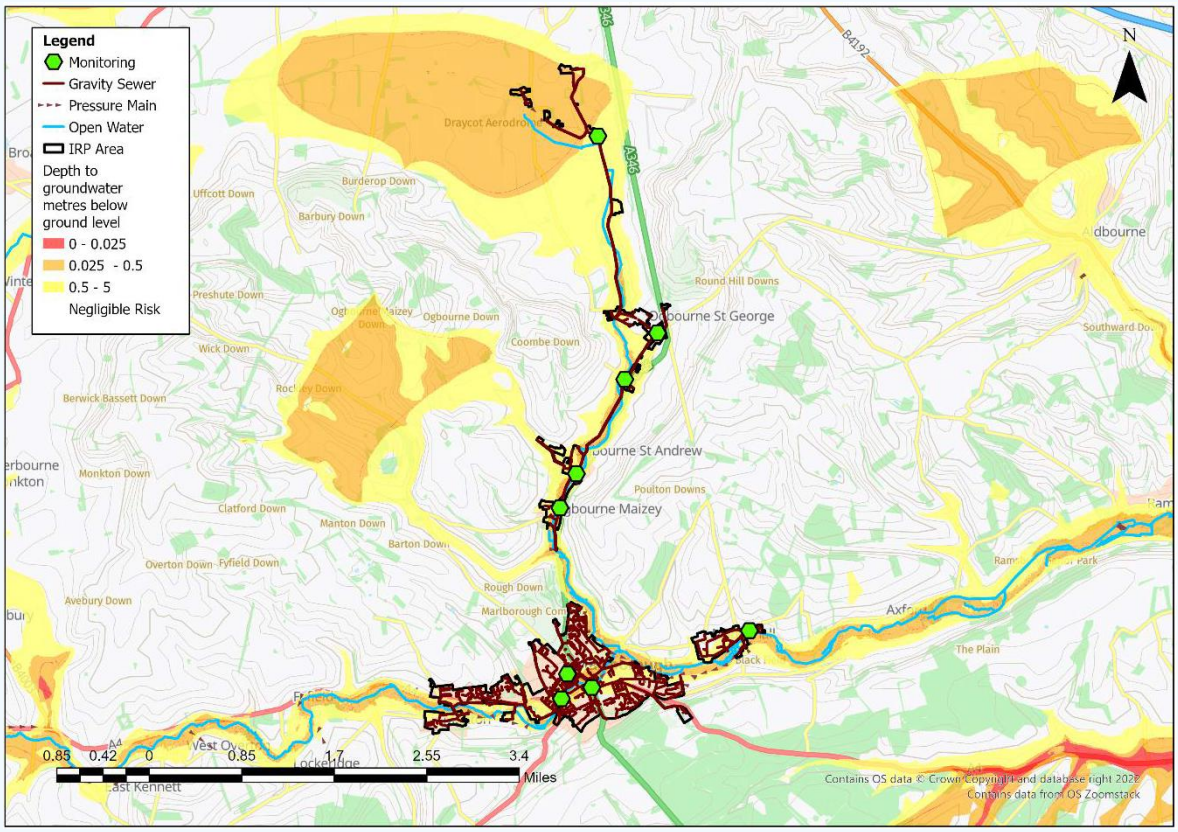
- Summary and plan for 2023/24



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This section summarises the hydrological conditions across the Marlborough catchment within the period under investigation and provides comparison against previous year's performance to put the annual performance into context. The hydrological review has been undertaken based on the Hydrological Year which runs October 1st to September 30th.

Catchment Rainfall

Representative Radar rainfall has been used to generate monthly data at catchment level for comparison with average data generated by local Met Office Weather Station Records. Figure 2 presents the comparison of this data for the last four hydrological years to support longer term trends within the local system.

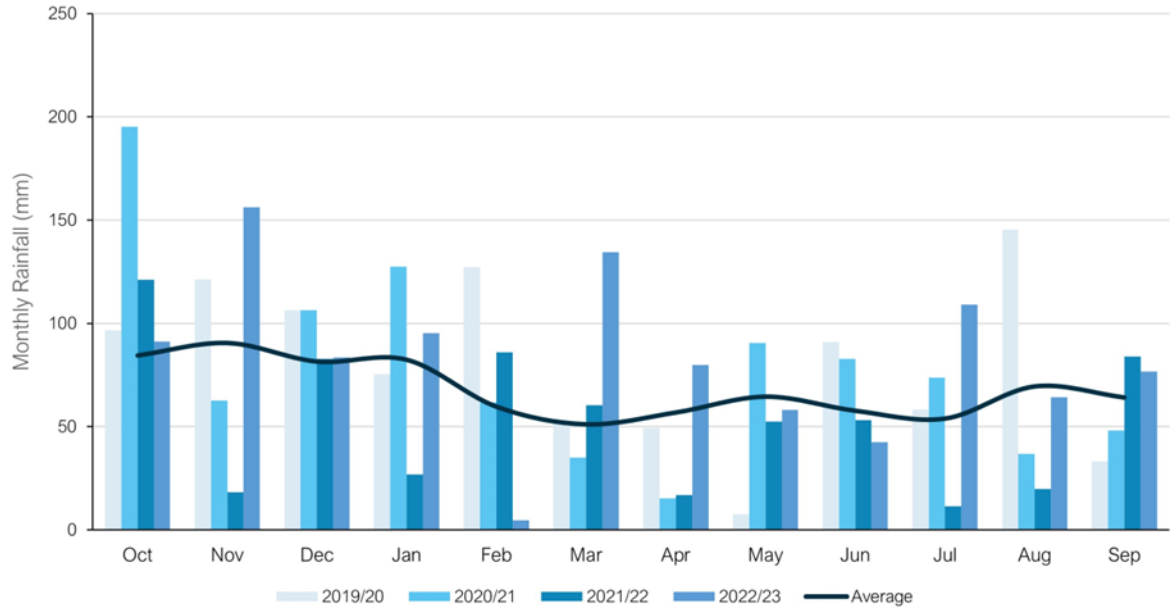


Figure 2: Monthly Rainfall Performance

(Average Values taken from Met Office Weather Station at High Wycombe based on the period 1991-2020)

The total rainfall for the 2022/23 hydrological year is 31% above the annual average total. Total rainfall values are presented in Table 3 below.

Average (mm)	2019/20 (mm)	2020/21 (mm)	2021/22 (mm)	2022/23 (mm)
841	984	938	579	1100

Table 3: Total Rainfall Based on Hydrological Year

Groundwater / Local River Level

The Marlborough catchment is situated in the Berkshire Downs water resources areas. It sits in the Lewes Nodular Chalk Formation, New Pit Chalk Formation and the Holywell Nodular Chalk Formation, all of carbonate material. These are designated principal aquifers within the UK.

The Environment Agency has gauging stations on local watercourses measuring stage and observation boreholes measuring groundwater levels locally to the catchment which can be used to provide indicative local groundwater performance.

From previous investigations we have identified the following sites are good indicators of groundwater levels within the catchment.

- River Kennet, Marlborough
- River Og, Poulton Farm
- Rockley OBH
- Draycot Foliat OBH

These sites are illustrated in the figure below, alongside the closest groundwater reference station and closest gauging station from the Water Situation Report. The closest groundwater reference station from the WSR is also Rockley OBH and the closest gauging station from the WSR is also at Marlborough on the River Kennet.

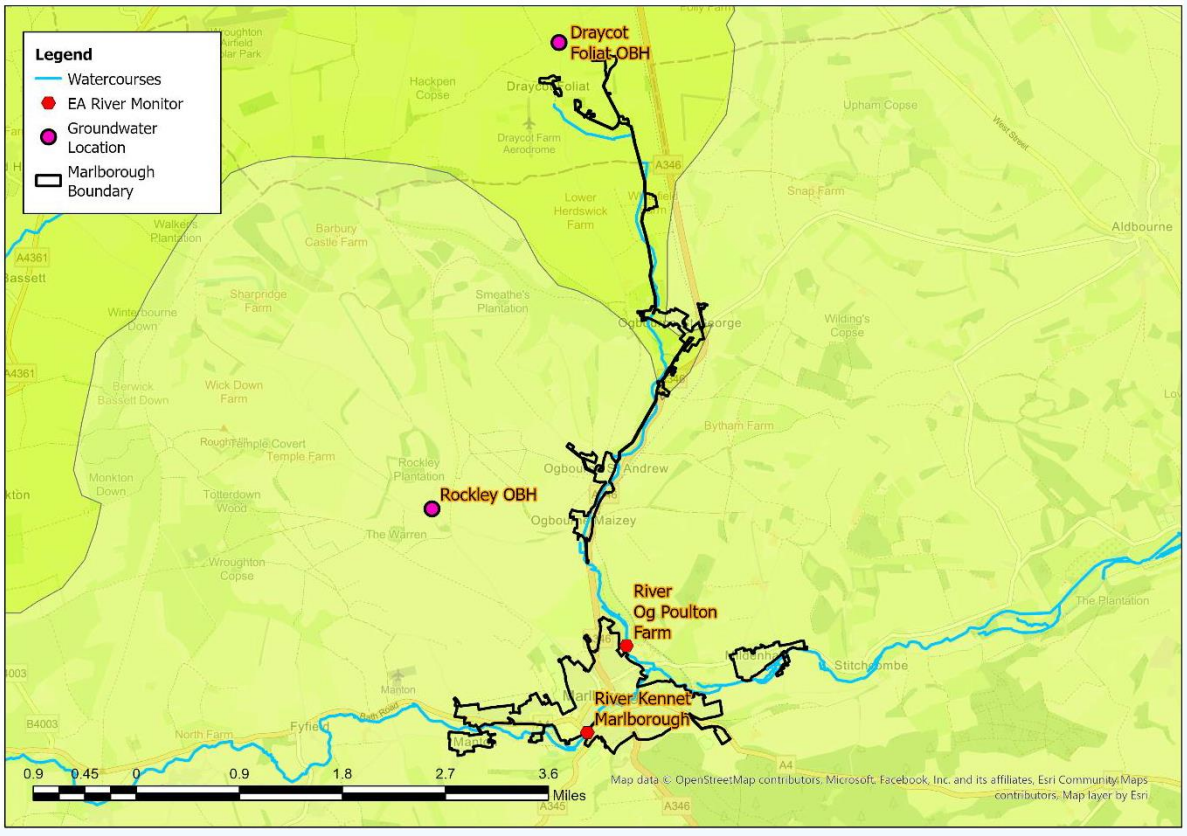


Figure 4: Local Monitoring Stations

The following figures represent the last three hydrological years of level information at the indicator sites to build a picture of the relative conditions prevalent in the current year. It is presented against both the daily total rainfall values for the catchment and a rolling 15-day total rainfall.

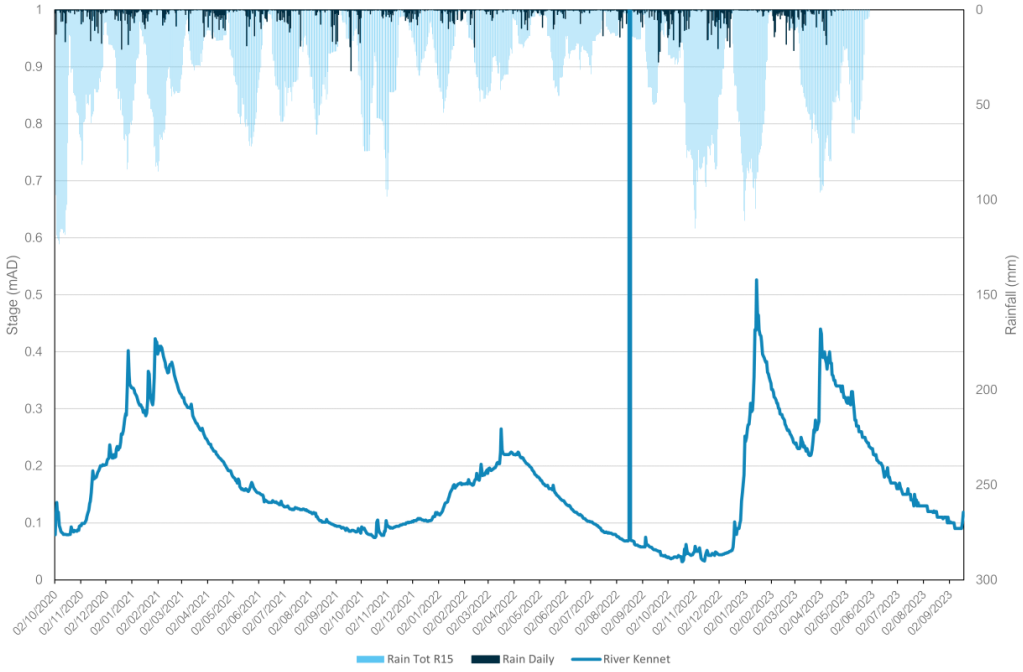


Figure 5A – River Kennet at Marlborough

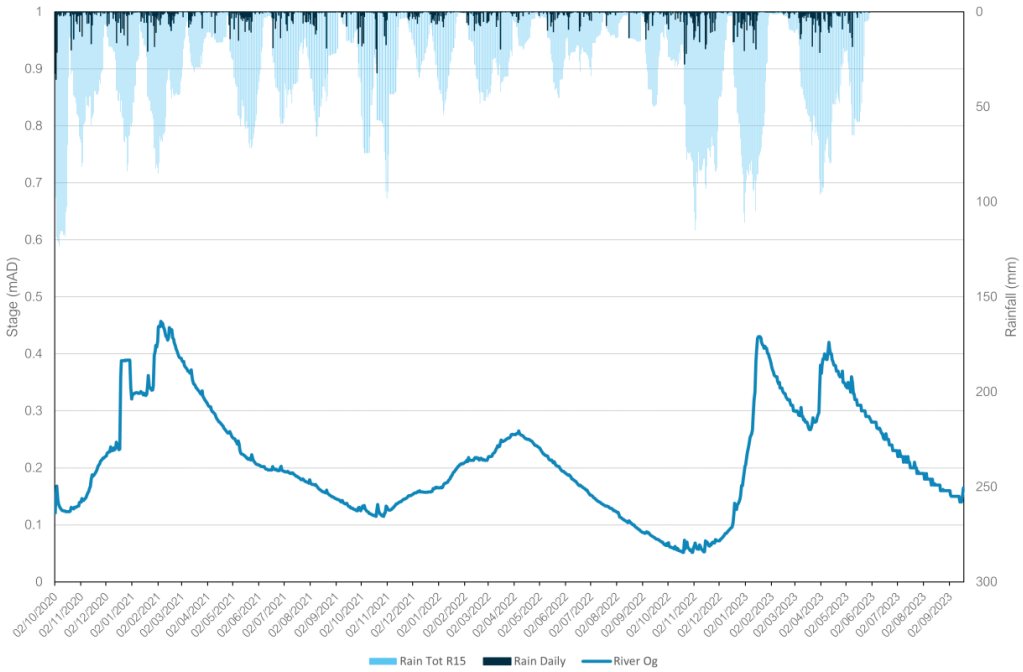


Figure 5B – River Og at Poulton Farm

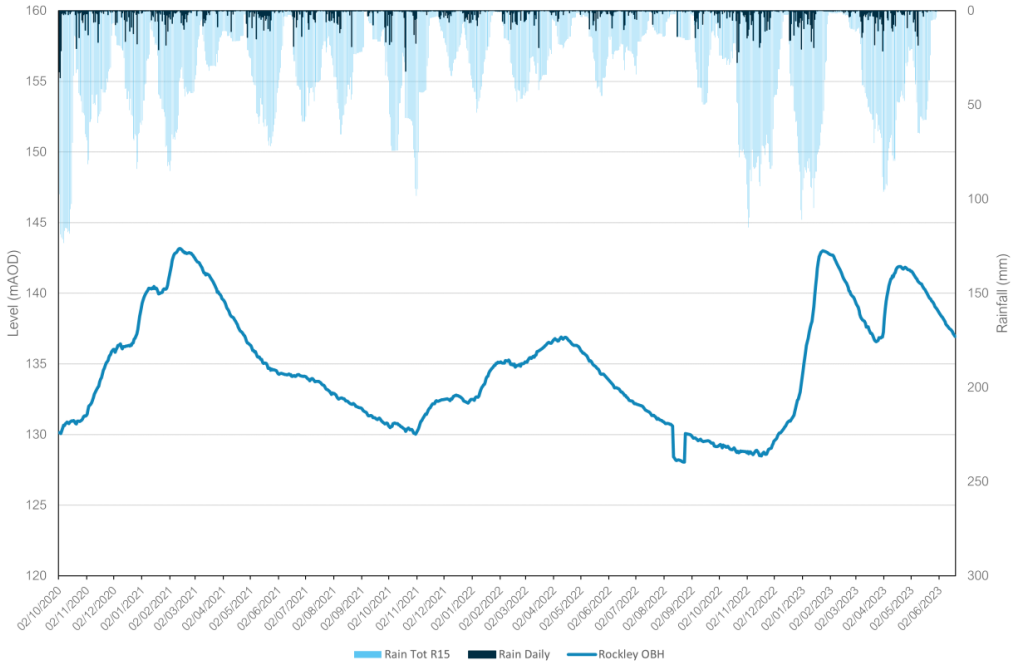


Figure 5C – Rockley OBH

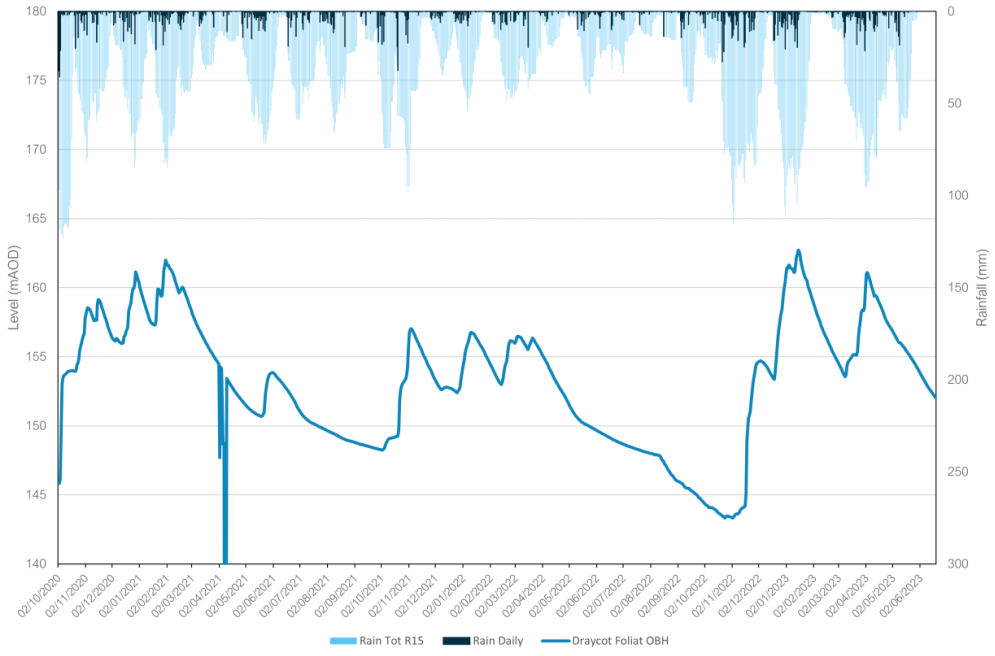
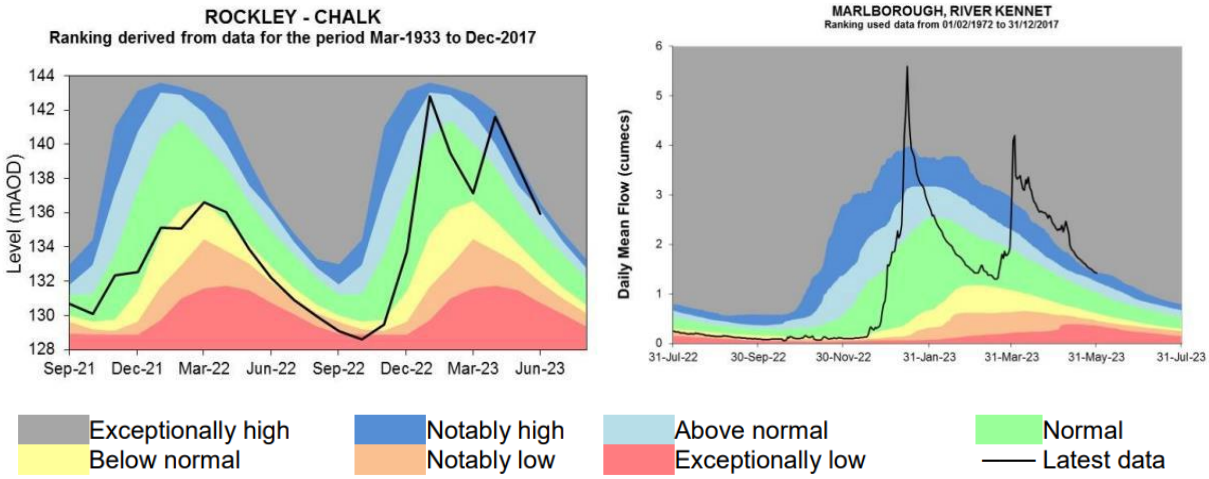


Figure 5D – Draycot Foliat OBH

In addition to these specific stations, the wider groundwater context is illustrated in the Water Situation Report for the Berkshire Downs. The nearest groundwater reference station is Rockley OBH. This site shows groundwater levels generally at below normal or notably low levels in 2022. Groundwater levels rise towards the end of the year and are observed at above normal levels in December 2022. Groundwater levels in 2023 have remained higher than the equivalent periods in 2022. This can be seen in the figure below alongside the river indicator location at Marlborough on the River Kennet.



Extract from - [Water Situation Report (publishing.service.gov.uk)]

Figure 6 – Water Situation Report

Network Performance

Within the Marlborough catchment there are three sites detailed within the Environment Agency Consents Database which have an Event Duration Monitor (EDM) fitted. As part of the ongoing process of matching GISMP catchments to EDM sites, two additional EDM site 'London Road' and 'Draycott Foliat' have been identified in the Marlborough catchment. These sites were not detailed in last year's addendum report. For both overflows, no EDM spills were recorded in 2022 or in 2021. Note however, that the EDM at overflow 'Draycott Foliat' was only operational for 44% of the year in 2022.

Table 7 below details the last 2 years performance of overflows within the catchment.

Event Duration Monitoring	2021		2022	
Overflow	Annual Spills	Duration (hours)	Annual Spills	Duration (hours)
Marlborough STW	42	407.77	0	0

Table 7: Event Duration Monitoring

A critical part of the assessment of EDM performance and its relation to groundwater inundation is to review the month-on-month spill performance, against previous years and the monthly total rainfall values to give context to the performance. Figure 8 below presents the EDM performance trend and rainfall for recent years.

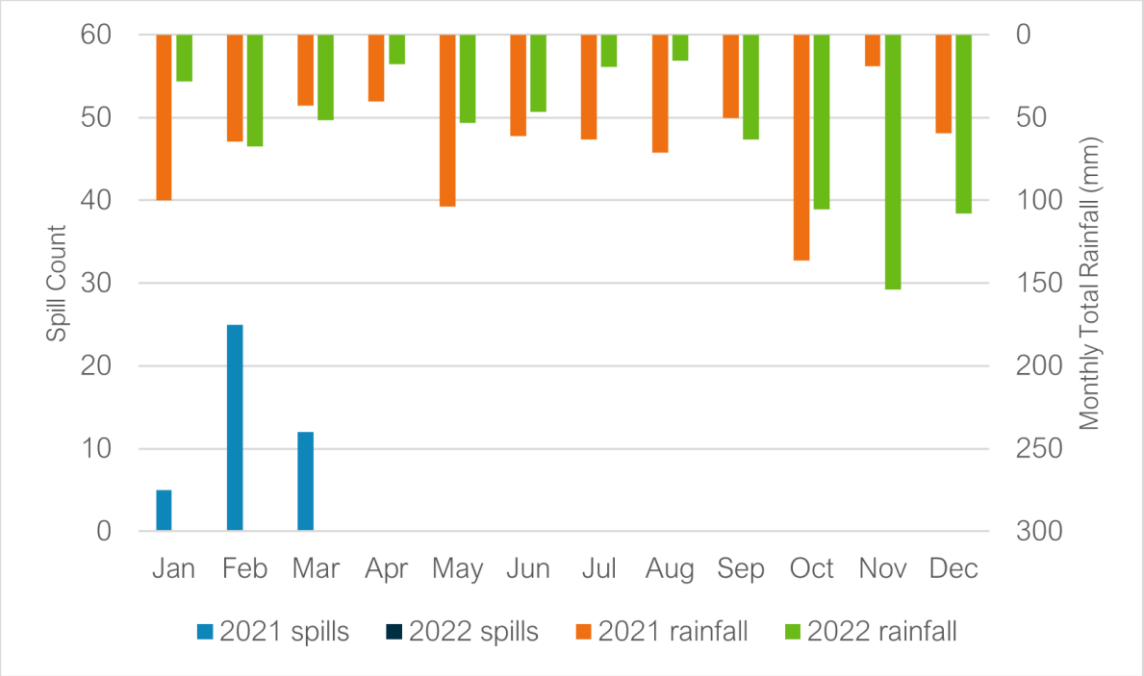


Figure 8 – EDM Monthly Performance

The data suggests a wider relationship between rainfall, elevated groundwater levels and overflow spill frequency. Despite broadly similar rainfall totals, no spills were recorded at Marlborough STW February – March 2022, however a significant number of spills were recorded February – March 2021. The indicator site data shown in Figure 5, suggests groundwater levels in the catchment were significantly more elevated over the period in 2021.

Investigations & Interventions

This section details the activities that have been undertaken within the catchment within the Hydrological Year 2022-23.

Monitor Installations

The sewer depth monitor (SDM) programme supports long term groundwater understanding within GISMP catchments. Currently, there are a total of 9 monitors installed within the Marlborough catchment. There are currently no further monitor installs planned.

The data from these will be cross-referenced with other long-term records (where available) within the catchment.

Remediation Works Undertaken this Hydrological Year

Table 9 below provides a summary of the investigations and remediation works undertaken or planned within the Marlborough catchment in the 2022-23 Hydrological Year, as well as works undertaken in the 2021-22 Hydrological Year, 2020-21 Hydrological Year and 2019-2020 Hydrological Year.

Investigation / remediation type	2019/20	2020/21	2021/22	2022/23
CCTV surveys	N/A	N/A	N/A	380 meters*
Look and lift surveys	N/A	N/A	N/A	2
Sewer lining	186	30	50 meters	N/A
Patch lining	N/A	N/A	N/A	2
Manhole sealing	1	1	2	6 manholes outstanding
Manhole sealing plates	N/A	N/A	N/A	N/A
Manhole covers and frames replaced	N/A	N/A	N/A	N/A

Table 9: Works Undertaken in the 2022/23 Hydrological Year, 2021/22 Hydrological Year, 2020/21 Hydrological Year & 2019/20 Hydrological Year

*Marked as outstanding in last year's addendum report and completed this hydrological year.

In addition to the above investigations and interventions detailed, the potential for further strategic sewer lining is under review for AMP8 whilst we develop our Storm Overflow Spills Programme.

An upgrade is also planned for Marlborough STW. This will improve its ability to treat the volumes of incoming sewage, reducing the need for untreated discharges to the environment. The scheme is due to be completed in 2026.

Summary

Indicator site data suggests groundwater levels in the Marlborough catchment were generally lower in 2022 than in 2021, with EDM data indicative of the role of groundwater infiltration on spills in the catchment. This hydrological year (October 2022 – September 2023), indicator site data suggests groundwater levels in the Marlborough catchment have reached higher levels than the previous hydrological year, and EDM data for 2023 will be analysed once available to continue to examine the relationship between groundwater levels and overflow spills in the catchment.

Lift and look and CCTV surveys will be undertaken in remaining wet winter periods if conditions allow and subject to funding and available capacity. The aim of this is to find further priority locations for remediation and investigating/justifying the need for future larger scale lining as part of our Price Review (PR) process if required.

Addendum – Annual Update 2024
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Overview

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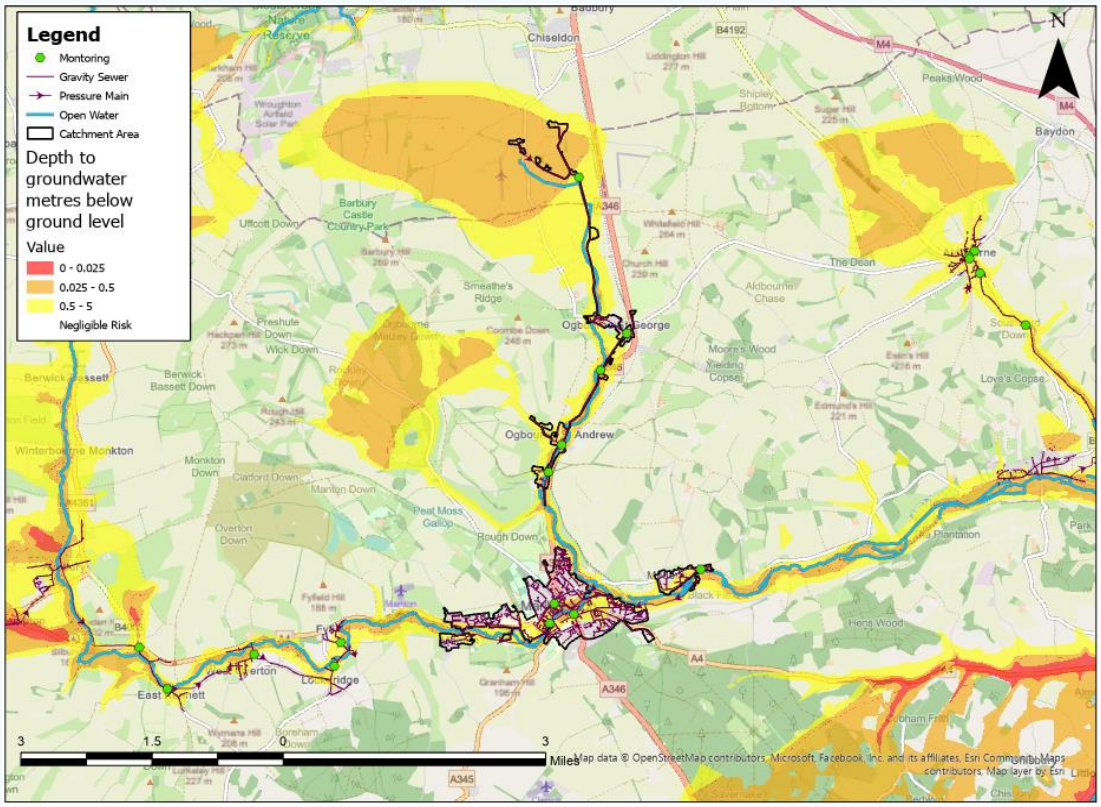

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Catchment Rainfall

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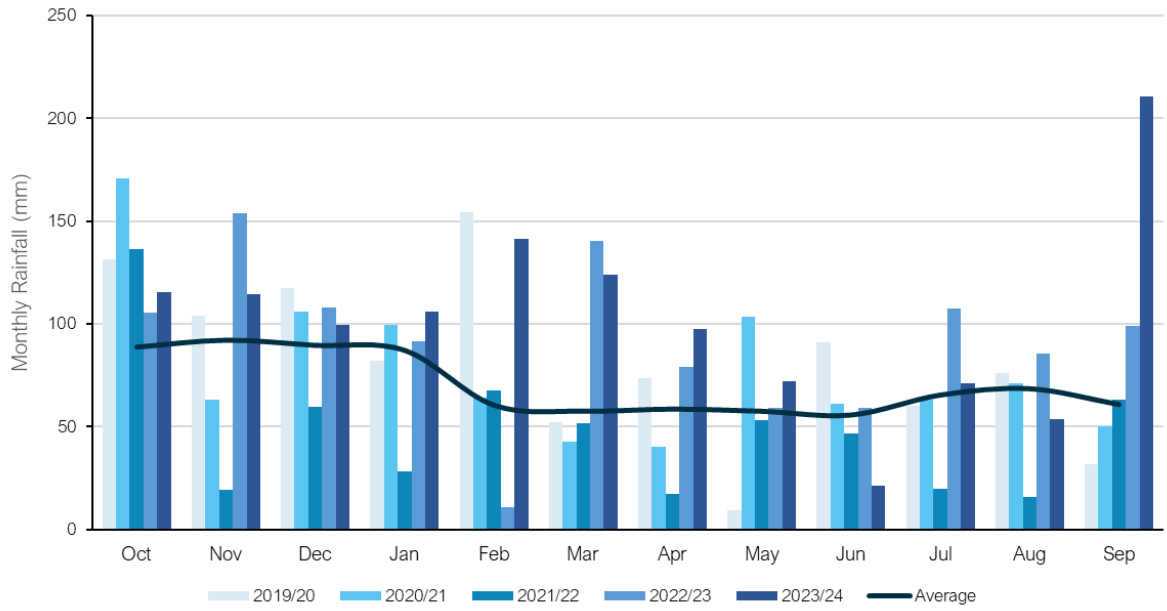

Figure 2: Monthly Rainfall Performance

(Average Values taken from Met Office Weather Station at High Wycombe based on the period 1991-2020)

The total rainfall for the 2023/24 hydrological year is 46% above the annual average total. Total rainfall values are presented in Table 3 below.

Average (mm)	2019/20 (mm)	2020/21 (mm)	2021/22 (mm)	2022/23 (mm)	2023/24 (mm)
841	984	938	579	1100	1227

Table 3: Total Rainfall Based on Hydrological Year

Groundwater / Local River Level

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- Rockley OBH
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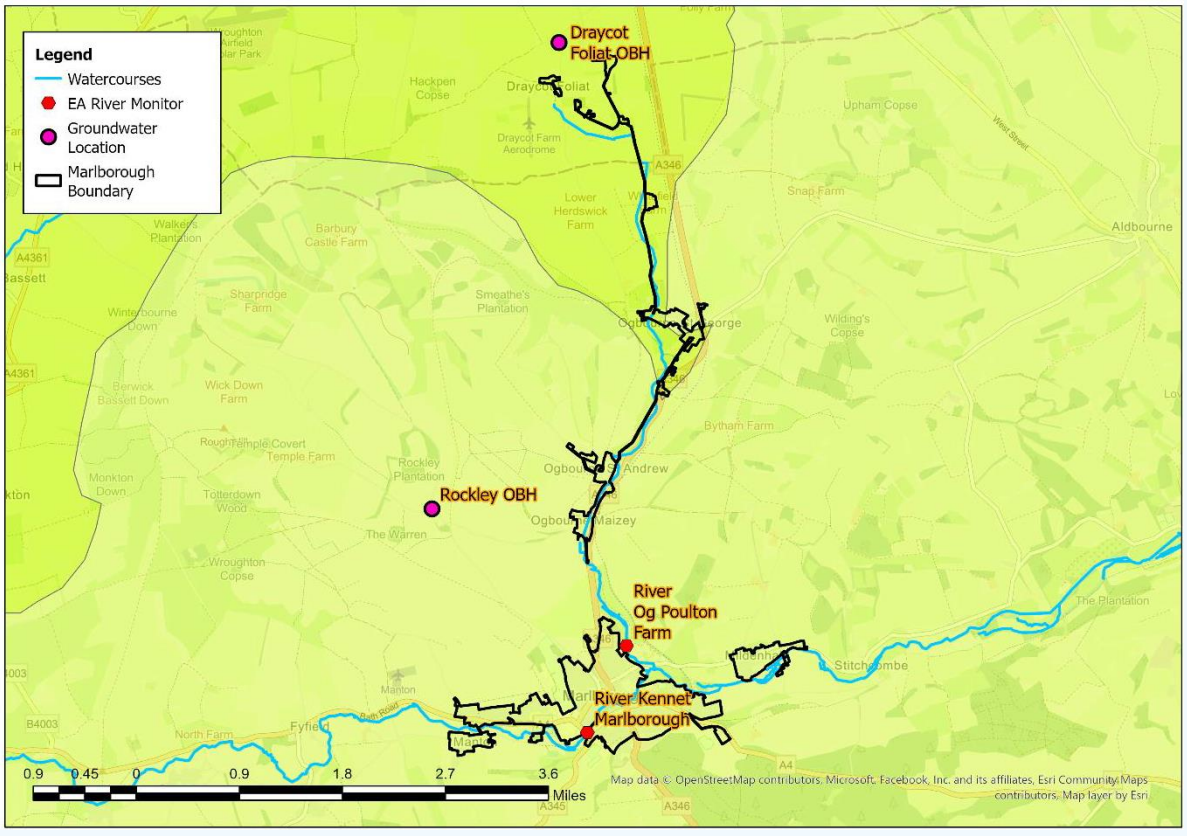

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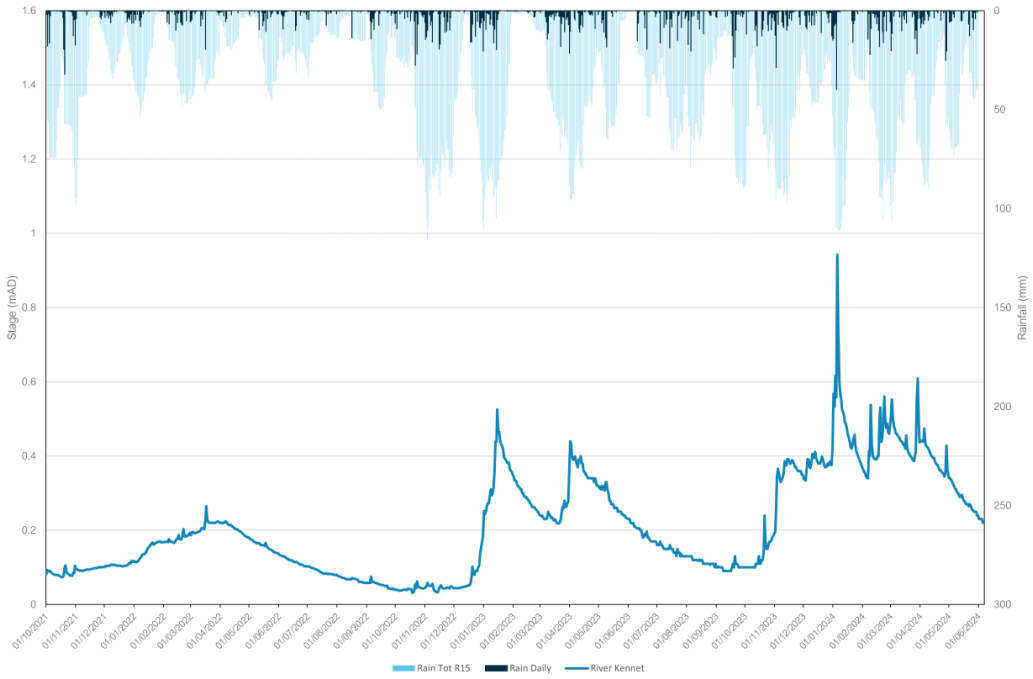

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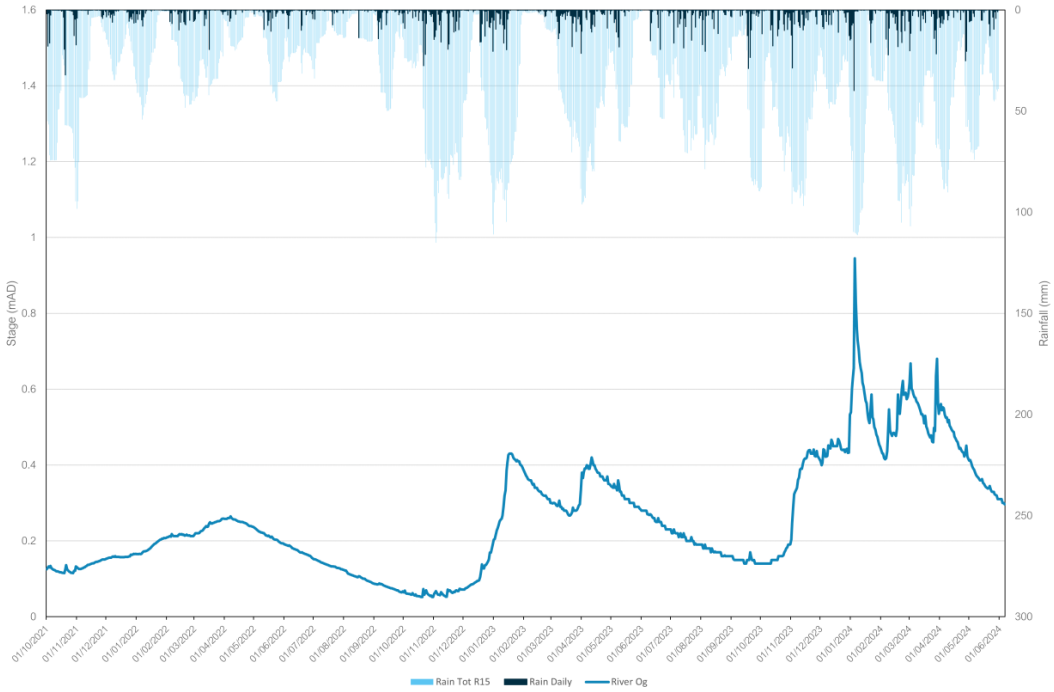

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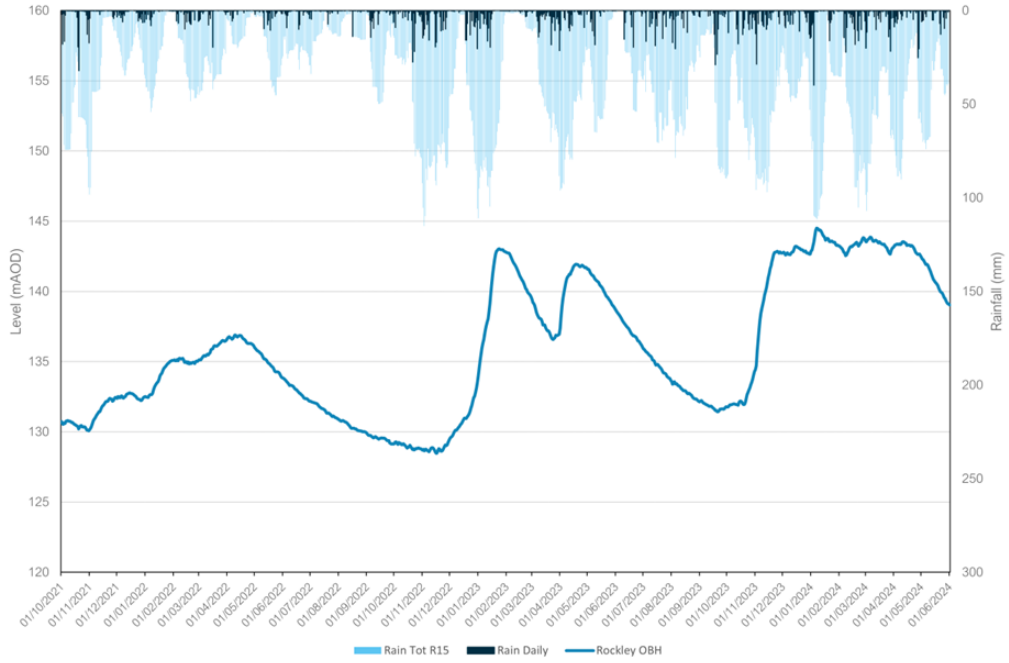


Figure 5C – Rockley OBH

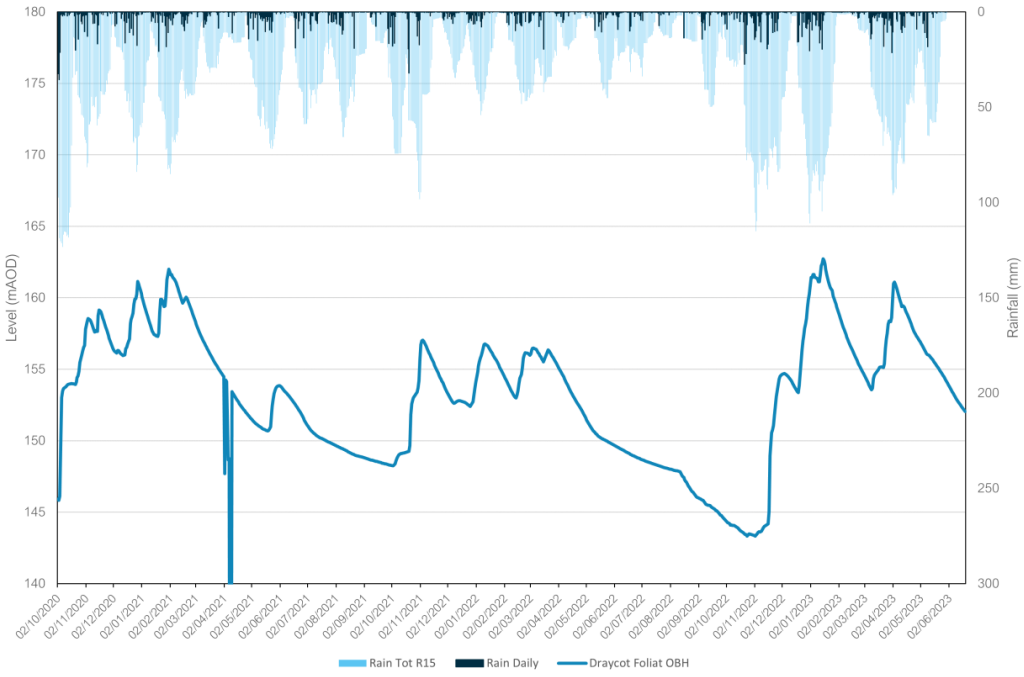
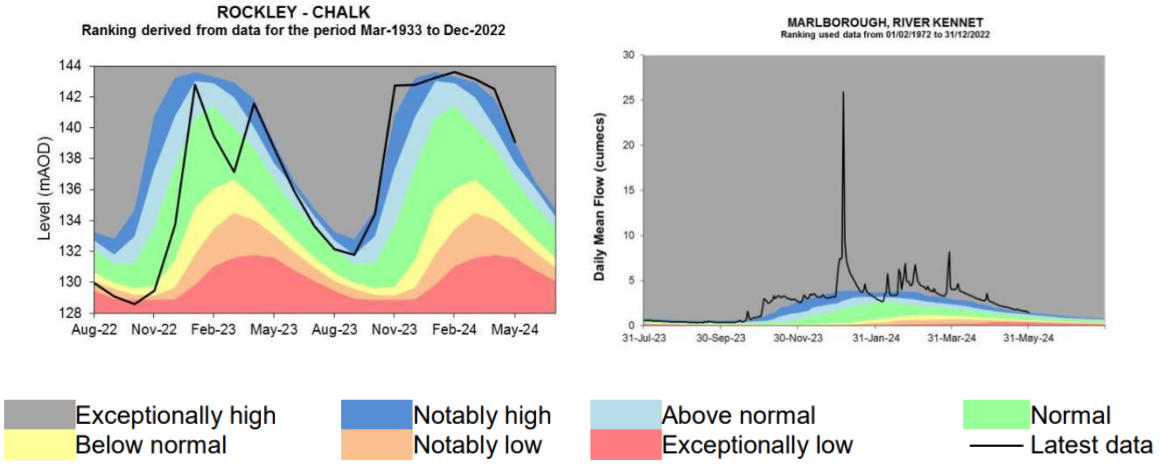


Figure 5D – Draycot Foliat OBH

In addition to these specific stations, the wider groundwater context is illustrated in the Water Situation Report for the Berkshire Downs. The nearest groundwater reference station is Rockley OBH. This site shows groundwater levels peaked at above normal/ notably high levels in 2023. Groundwater levels have been higher during the first half of 2024 compared to the equivalent

period in 2023, consistently at notably high/ exceptionally high levels. This can be seen in Figure 6 alongside the river indicator location at Marlborough on the River Kennet.



Extract from - [Water Situation Report (publishing.service.gov.uk)]

Figure 6 – Water Situation Report

Network Performance

Within the Marlborough catchment there are three sites detailed within the Environment Agency Consents Database which have an Event Duration Monitor (EDM) fitted: 'Marlborough STW', 'London Road SPS' and 'Draycot Foliat CSO'. No spills were recorded at 'Draycot Foliat CSO' in 2022 or in 2023. Note however, the EDM was only operational for 44% of the year in 2022 and 77% of the year in 2023, which may have impacted the recorded spill counts.

Table 7 below details the last 2 years performance of overflows within the catchment.

Event Duration Monitoring	2022		2023	
Overflow	Annual Spills	Duration (hours)	Annual Spills	Duration (hours)
Marlborough STW	0	0.00	172	2383.25

Table 7: Event Duration Monitoring

A critical part of the assessment of EDM performance and its relation to groundwater inundation is to review the month-on-month spill performance, against previous years and the monthly total rainfall values to give context to the performance. Figure 8 below presents the EDM performance trend and rainfall for recent years.

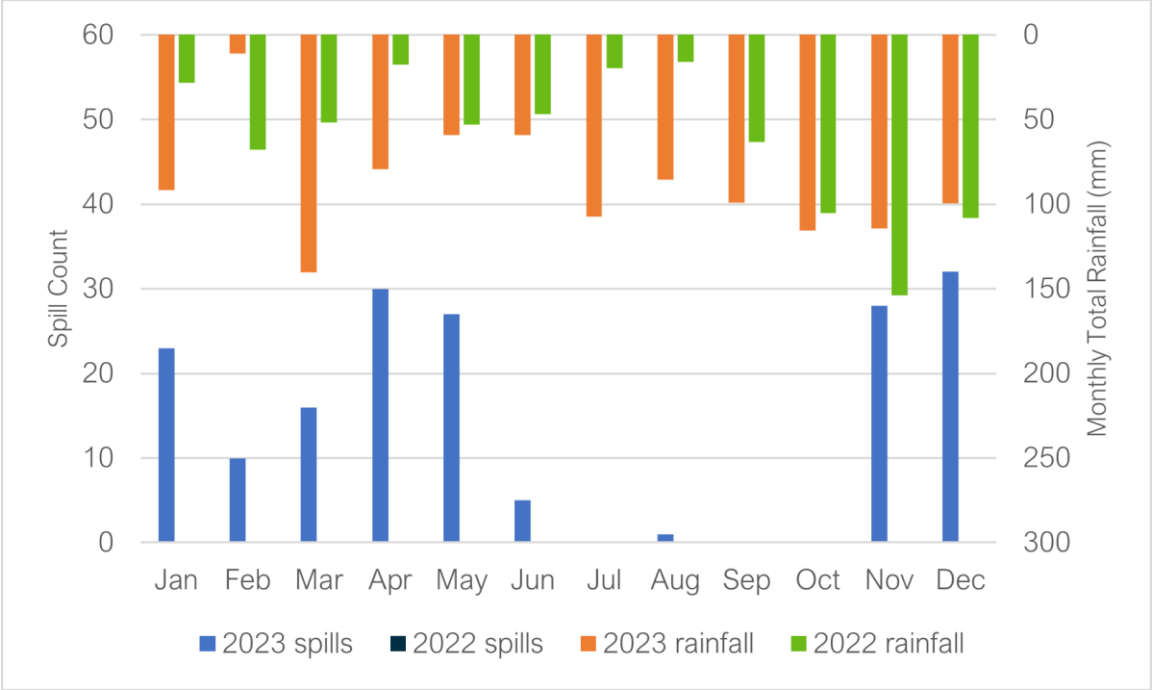


Figure 8 – EDM Monthly Performance

The data suggests a wider relationship between rainfall, elevated groundwater levels and overflow spill frequency. No spills were recorded at Marlborough STW in 2022, however 172 spills were recorded in 2023. The indicator site data shown in Figure 5, suggests that groundwater levels in the catchment were generally more elevated throughout 2023, reaching higher levels than those observed in 2022. The high threshold level for groundwater infiltration into the network, which is when significant levels of groundwater infiltration begin to occur, has been assigned as 0.3 mAD at the River Kennet at Marlborough indicator site. As can be seen in Figure 5A, this level was not reached in 2022 when no spills at Marlborough STW were recorded, however was exceed for significant periods in 2023. These periods coincide with

when the majority of spills were recorded at Marlborough STW, indicating a wider relationship between groundwater levels and spills at the overflow.

Table 9 below details the last 2 years performance of overflows 'London Road SPS' in the catchment.

Event Duration Monitoring	2022		2023	
Overflow	Annual Spills	Duration (hours)	Annual Spills	Duration (hours)
Marlborough STW	0	0.00	2	1.50

Table 9: Event Duration Monitoring

A critical part of the assessment of EDM performance and its relation to groundwater inundation is to review the month-on-month spill performance, against previous years and the monthly total rainfall values to give context to the performance. Figure 10 below presents the EDM performance trend and rainfall for recent years.

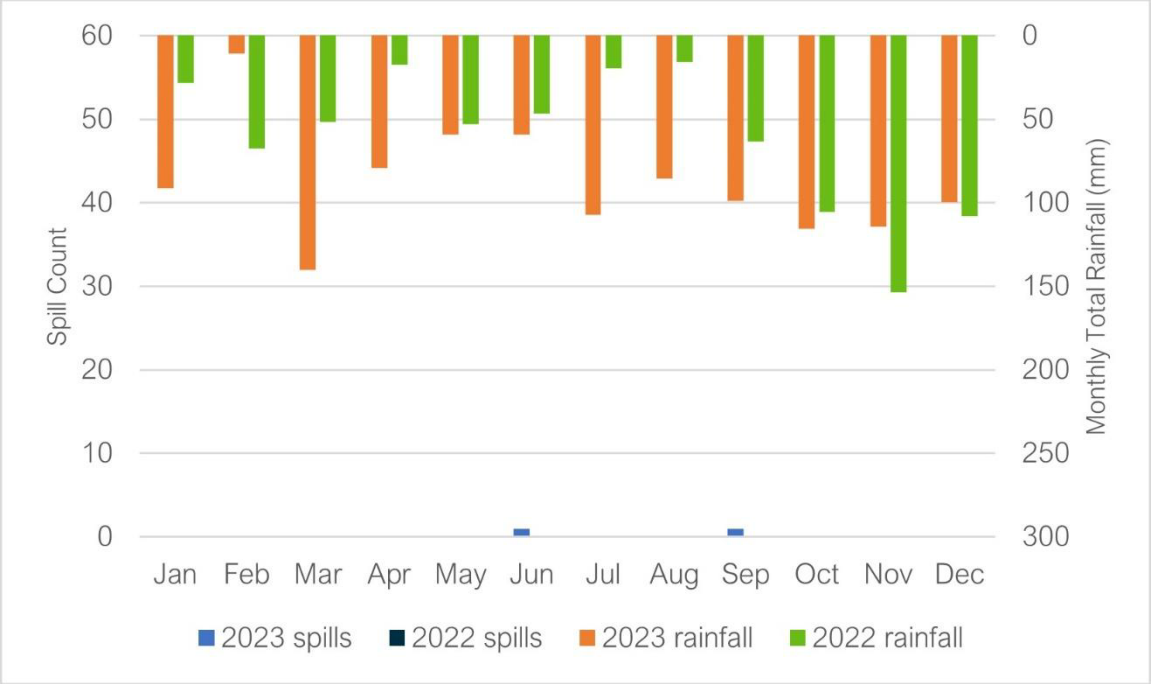


Figure 10 – EDM Monthly Performance

The data for London Road SPS is not indicative of a winder relationship between rainfall, elevated groundwater levels and spill frequency at the overflow. No spills were recorded in 2022, and only two spills were recorded in 2023, which occurred outside of periods of elevated groundwater levels. Note however, tankering was required upstream of the pumping station at the end of the year, to manage flows during this period of high groundwater levels, which may have reduced the spill frequency here. The EDM data for 2024 will be analysed once available, to continue to understand if there is a relationship between groundwater levels and spills at the overflow. The indicator site data shown in Figures 5 and 6, suggests that groundwater levels in the catchment reached higher levels in 2024 than in 2023.

Investigations & Interventions

This section details the activities that have been undertaken within the catchment within the Hydrological Year 2023-24.

Monitor Installations

The sewer depth monitor (SDM) programme supports long term groundwater understanding within GISMP catchments. Currently, there are a total of 9 monitors installed within the Marlborough catchment. There are currently no further monitor installs planned.

The data from these will be cross-referenced with other long-term records (where available) within the catchment.

Remediation Works Undertaken this Hydrological Year

Table 11 below provides a summary of the investigations and remediation works undertaken or planned within the Marlborough catchment in the 2023-24 Hydrological Year, as well as works undertaken in the previous four hydrological years.

Investigation / remediation type	2019/20	2020/21	2021/22	2022/23	2023/24
CCTV surveys	N/A	N/A	N/A	380 meters*	3.727 km planned
Look and lift surveys	N/A	N/A	N/A	2	6 surveys
Sewer lining	186	30	50 meters	N/A	N/A
Patch lining	N/A	N/A	N/A	2	N/A
Manhole sealing	1	1	2	6 manholes outstanding	N/A
Manhole sealing plates	N/A	N/A	N/A	N/A	N/A
Manhole covers and frames replaced	N/A	N/A	N/A	N/A	N/A

Table 11: Works Undertaken in the 2023/24, 2022/23, 2021/22, 2020/21 & 2019/20 Hydrological Year

In addition to the above investigations and interventions detailed, the potential for further strategic sewer lining in the catchment is under review for AMP8 whilst Thames Water develops it Storm Overflow Spills Programme.

Tankering was required within the Marlborough catchment during the 2023/24 Hydrological Year, a total of 88 days of flow management was undertaken across three locations: Ogbourne St George SPS, London Road SPS and Bay Bridges SPS.

The ATAC (temporary bio-filter) unit at Bay Bridges in the Marlborough catchment was utilised in the 2023/24 Hydrological Year, this was operational 12/12/2023 - 11/06/2024. No sewage related visuals/rag/discolouration were observed from treated water at the ATAC and dissolved oxygen levels remained above 80% at the point of interest. Ammonia (NH3) was recorded on four occasions and an average ammonium cation (NH4) reading of 0.15mg/l was recorded at the point of interest.

An upgrade is planned for Marlborough STW. This will improve its ability to treat the volumes of incoming sewage, reducing the need for untreated discharges to the environment. The scheme

is due to be completed in 2026, however, delivery dates are being managed at a programme level, delivery dates stated are based upon current views and are subject to change.

Summary

Indicator site data suggests groundwater levels in the Marlborough catchment were generally higher in 2023 than 2022, with EDM data strongly indicative of the role of groundwater

infiltration on spills in the catchment. This hydrological year (October 2023 – September 2024), indicator site data suggests groundwater levels in the Marlborough catchment have reached higher levels than the previous hydrological year, and EDM data for 2024 will be analysed once available to continue to examine the relationship between groundwater levels and overflow spills in the catchment.

Lift and look and CCTV surveys will be undertaken in remaining wet winter periods if conditions allow and subject to funding and available capacity. The aim of this is to find further priority locations for remediation and investigating/justifying the need for future larger scale lining as part of our Price Review (PR) process if required.

Addendum – Annual Update 2025
Table of contents

Overview

This addendum to the Marlborough Groundwater Impacted System Management Plan 2021 (GISMP) provides an update on performance/work undertaken in the Hydrological Year October 2024 to September 2025. The key points covered include:

- Hydrological conditions
- How the sewerage system has performed over this period
- Mitigation / remedial measures progressed over the last year and being planned
- Summary and plan for 2025/26

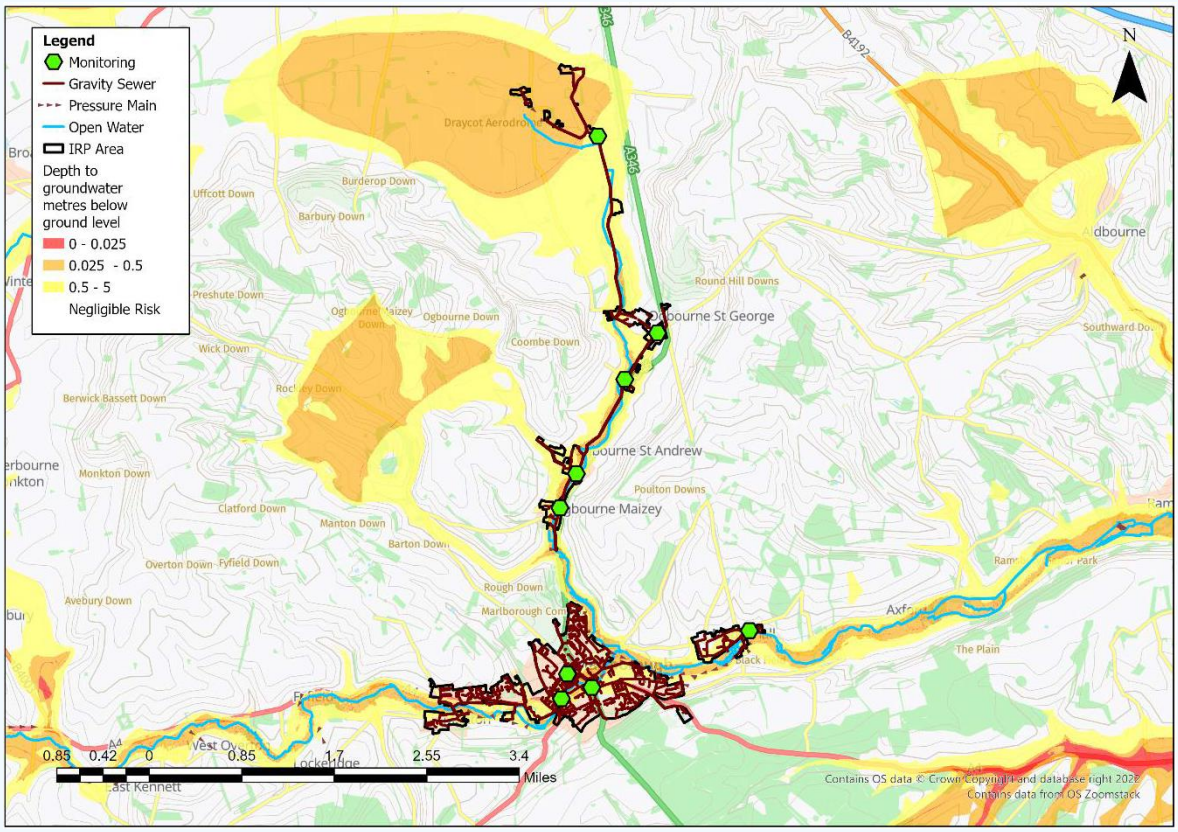


Figure 1: Marlborough Monitoring Plan

Hydrological Review – 2022-2023

This section summarises the hydrological conditions across the Marlborough catchment within the period under investigation and provides comparison against previous year's performance to put the annual performance into context. The hydrological review has been undertaken based on the Hydrological Year which runs October 1st to September 30th.

Catchment Rainfall

Representative Radar rainfall has been used to generate monthly data at catchment level for comparison with average data generated by local Met Office Weather Station Records. Figure 2 presents the comparison of this data for the last four hydrological years to support longer term trends within the local system.

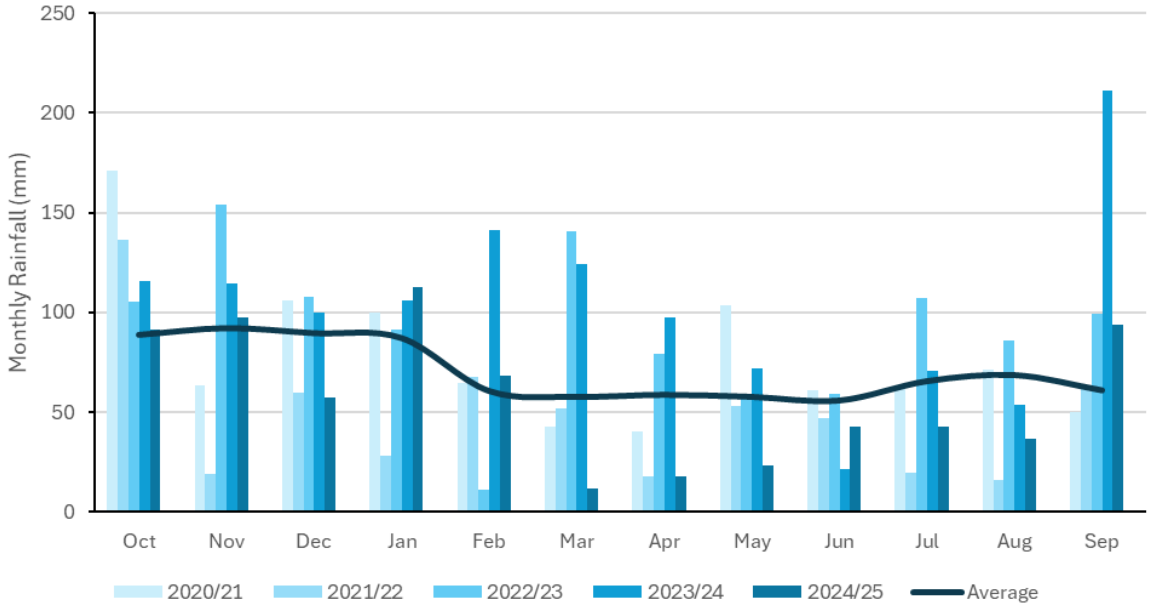


Figure 2: Monthly Rainfall Performance

(Average Values taken from Met Office Weather Station at High Wycombe based on the period 1991-2020)

The total rainfall for the 2024/25 hydrological year is 17% above the annual average total. Total rainfall values are presented in Table 3 below.

Average (mm)	2019/20 (mm)	2020/21 (mm)	2021/22 (mm)	2022/23 (mm)	2023/24 (mm)	2024/25 (mm)
841	984	938	579	1100	1227	696

Table 3: Total Rainfall Based on Hydrological Year

Groundwater / Local River Level

The Marlborough catchment is situated in the Berkshire Downs water resources areas. It sits in the Lewes Nodular Chalk Formation, New Pit Chalk Formation and the Holywell Nodular Chalk Formation, all of carbonate material. These are designated principal aquifers within the UK.

The Environment Agency has gauging stations on local watercourses measuring stage and observation boreholes measuring groundwater levels locally to the catchment which can be used to provide indicative local groundwater performance.

From previous investigations we have identified the following sites are good indicators of groundwater levels within the catchment.

- River Kennet, Marlborough
- River Og, Poulton Farm
- Rockley OBH
- Draycot Foliat OBH

These sites are illustrated in the figure below, alongside the closest groundwater reference station and closest gauging station from the Water Situation Report. The closest groundwater reference station from the WSR is also Rockley OBH and the closest gauging station from the WSR is also at Marlborough on the River Kennet.

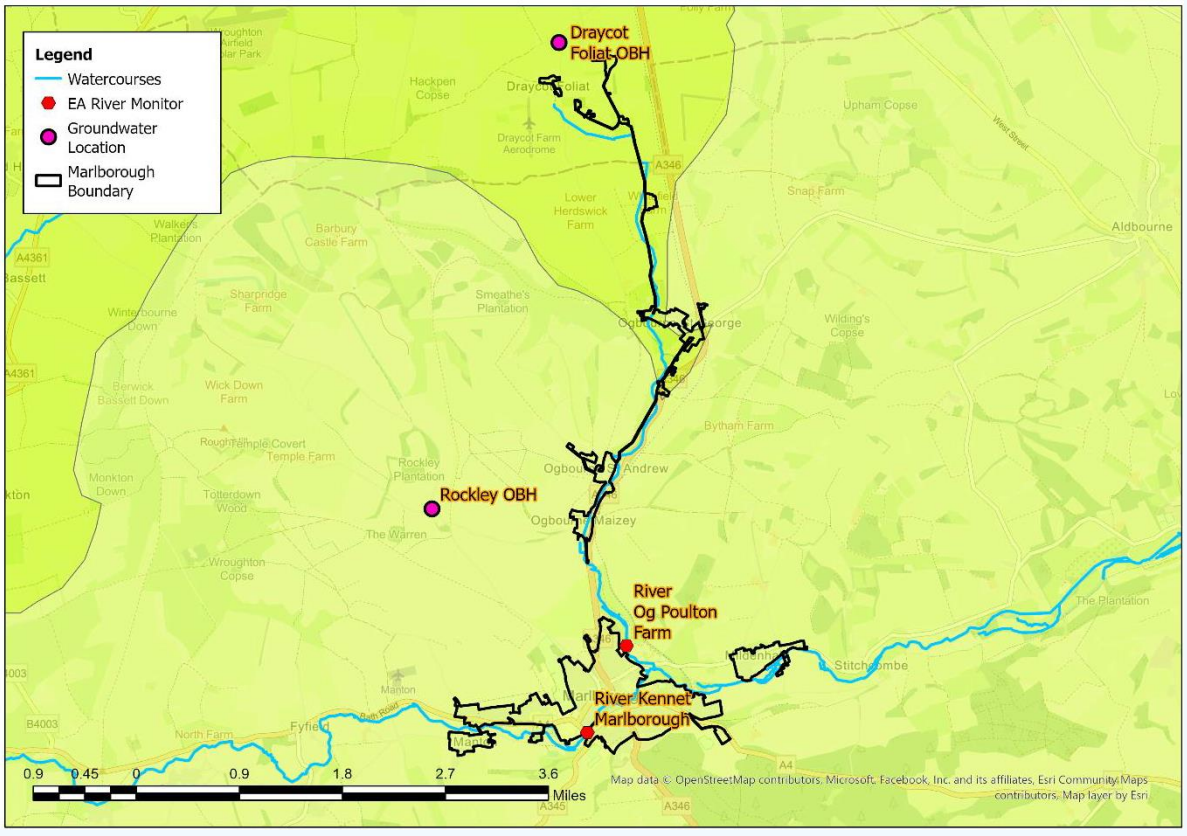


Figure 4: Local Monitoring Stations

The following figures represent the last three hydrological years of level information at the indicator sites to build a picture of the relative conditions prevalent in the current year. It is presented against both the daily total rainfall values for the catchment and a rolling 15-day total rainfall.

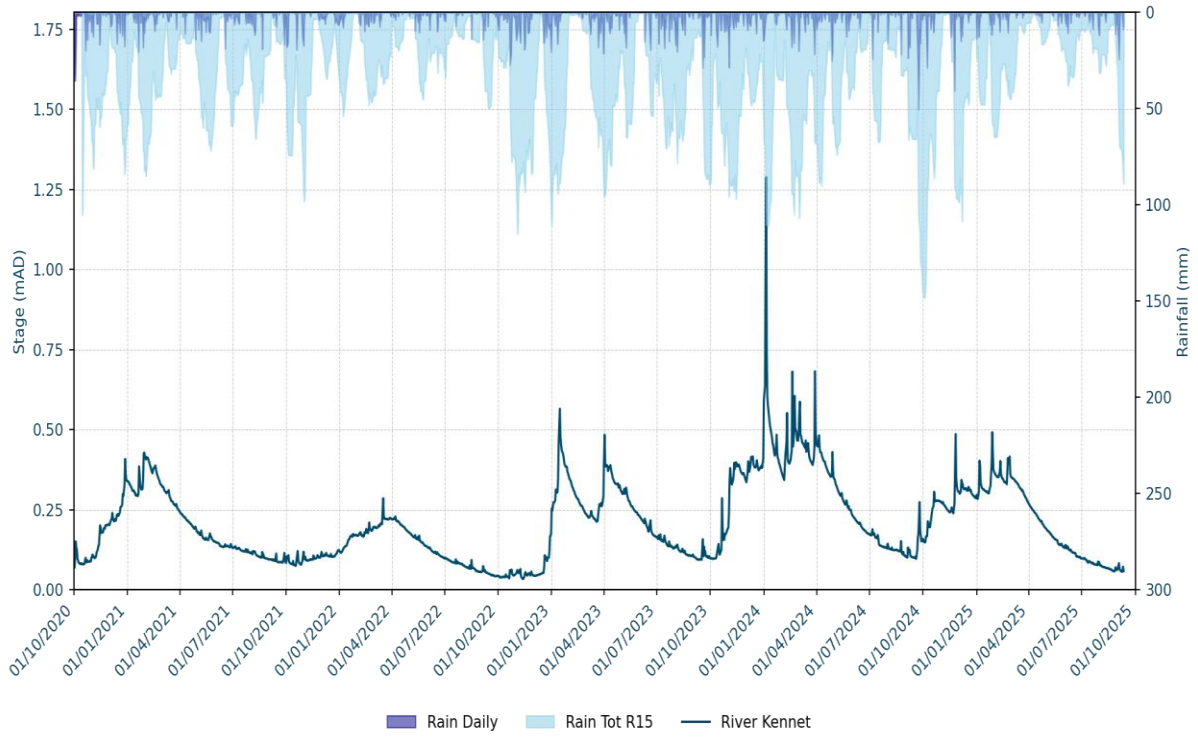


Figure 5A – River Level for River Kennet at Marlborough

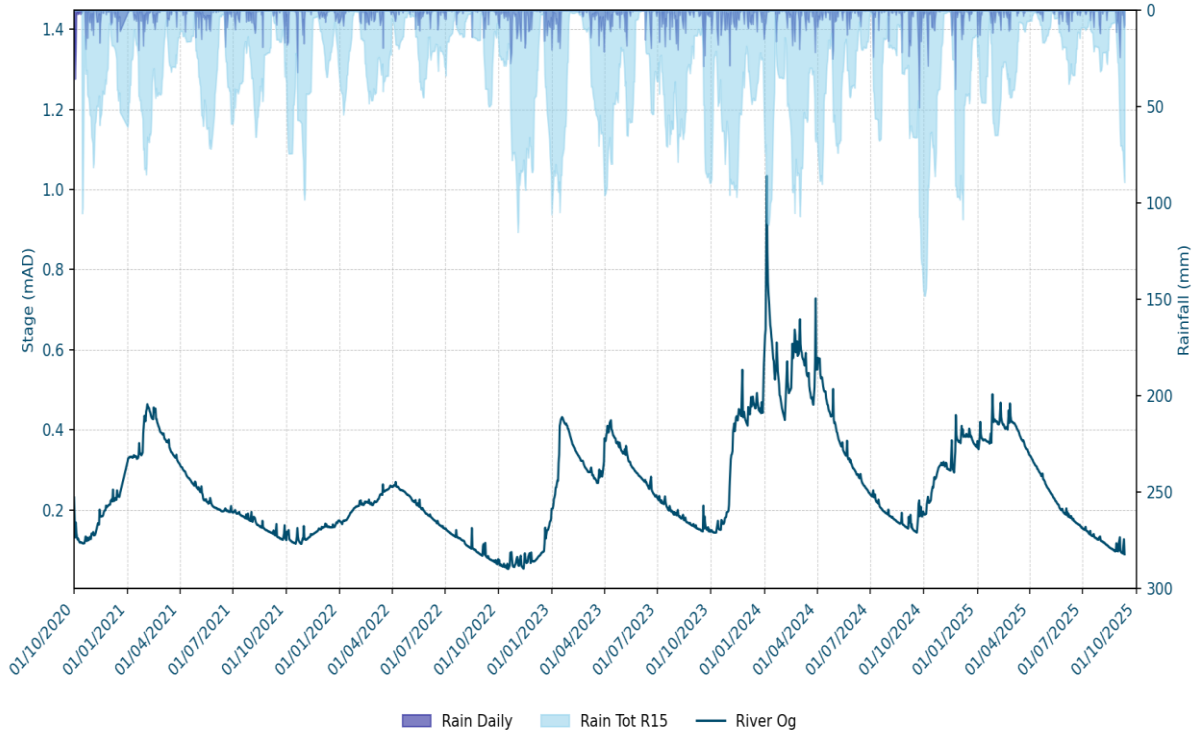


Figure 5B – River Level data for River Og at Poulton Farm

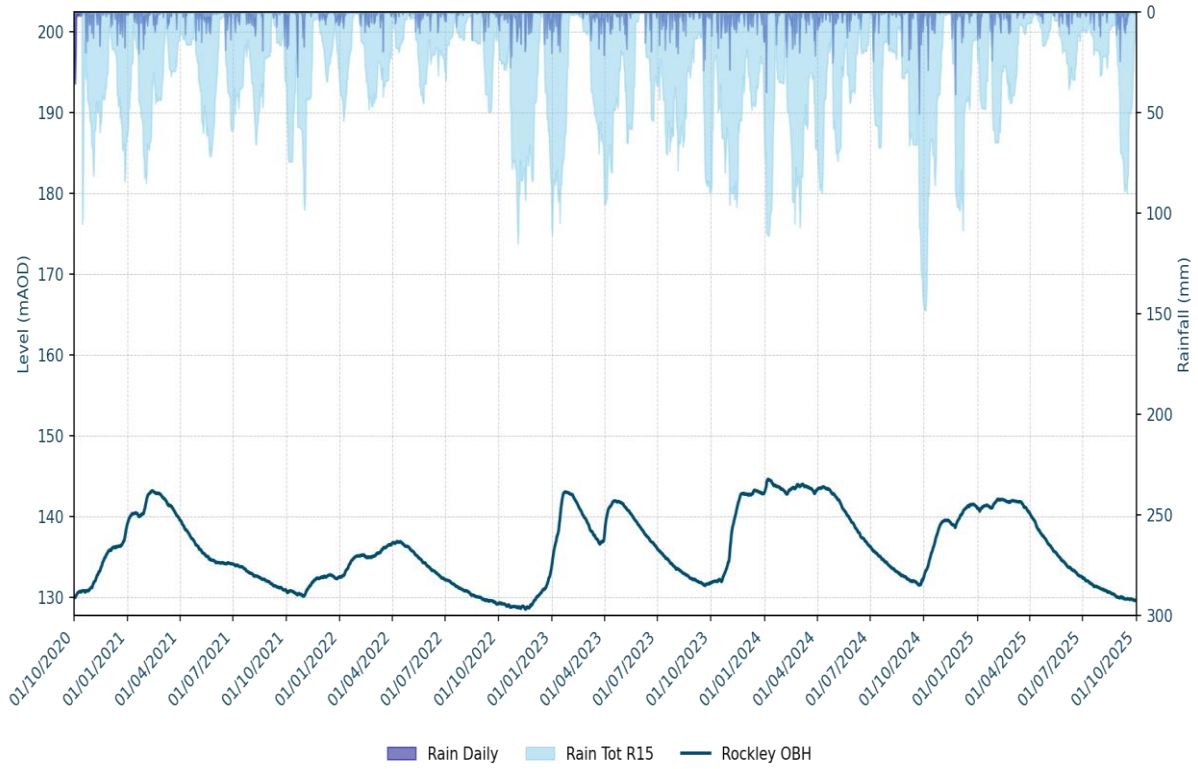


Figure 5C – River Level data for Rockley OBH

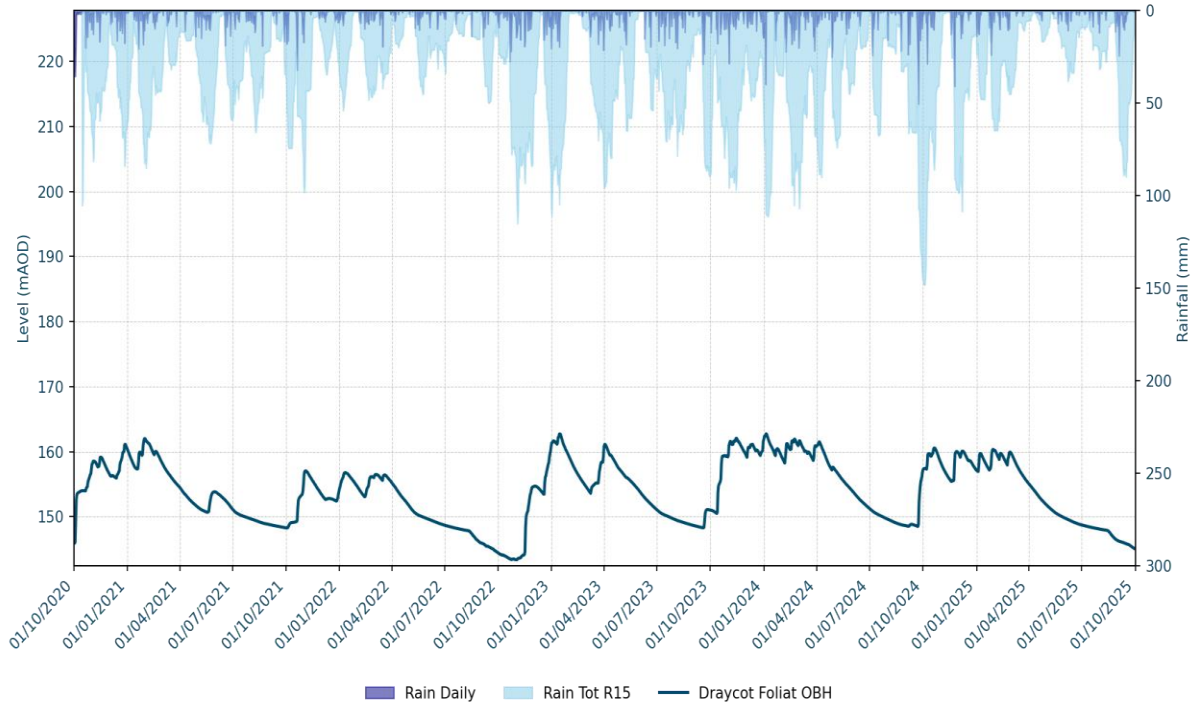
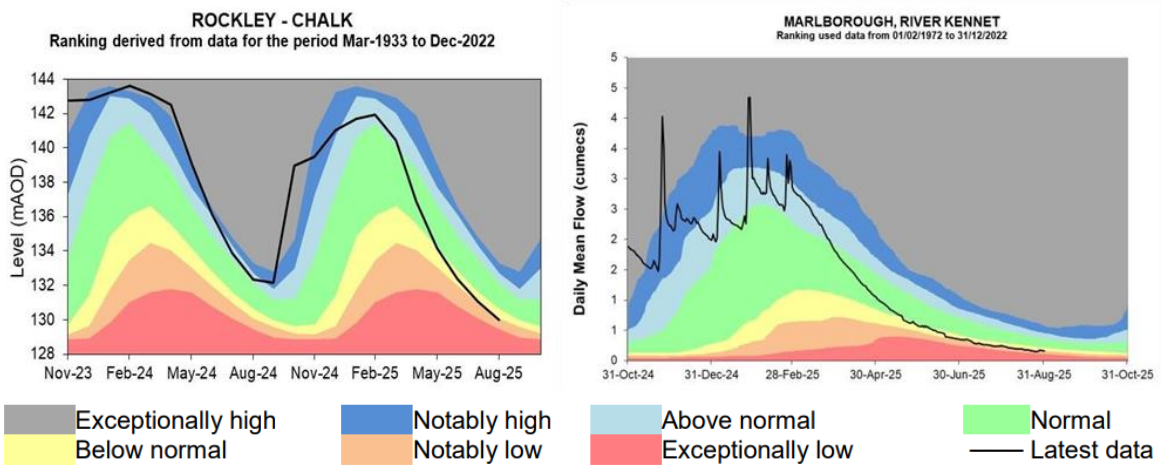


Figure 5D – River Level data for Draycot Foliat OBH

In addition to these specific stations, the wider groundwater context is illustrated in the Water Situation Report for the Berkshire Downs. The nearest groundwater reference station is Rockley OBH. This site shows groundwater levels at this site remained exceptionally high throughout 2024, with a slight decline observed between May and August, though levels still stayed notably high during that period. In 2025, groundwater levels continued to be notably high until mid-year, after which a gradual decline was observed. This can be seen in Figure 6 alongside the river indicator location at Marlborough on the River Kennet.



Extract from - [Water Situation Report (publishing.service.gov.uk)]

Figure 6 – Ground Water Situation Report

Network Performance

Within the Marlborough catchment there are three sites detailed within the Environment Agency Consents Database which have an Event Duration Monitor (EDM) fitted: 'Marlborough STW', 'London Road SPS' and 'Draycot Foliat CSO'.

Table 7 below details the last 2 years' performance of overflow 'Marlborough STW' in the catchment.

Event Duration Monitoring	2023		2024	
Overflow	Annual Spills	Duration (hours)	Annual Spills	Duration (hours)
Marlborough STW	172	2383.25	172	2786

Table 7: Event Duration Monitoring

A critical part of the assessment of EDM performance and its relation to groundwater inundation is to review the month-on-month spill performance, against previous years and the monthly total rainfall values to give context to the performance. Figure 8 below presents the EDM performance trend and rainfall for recent years.

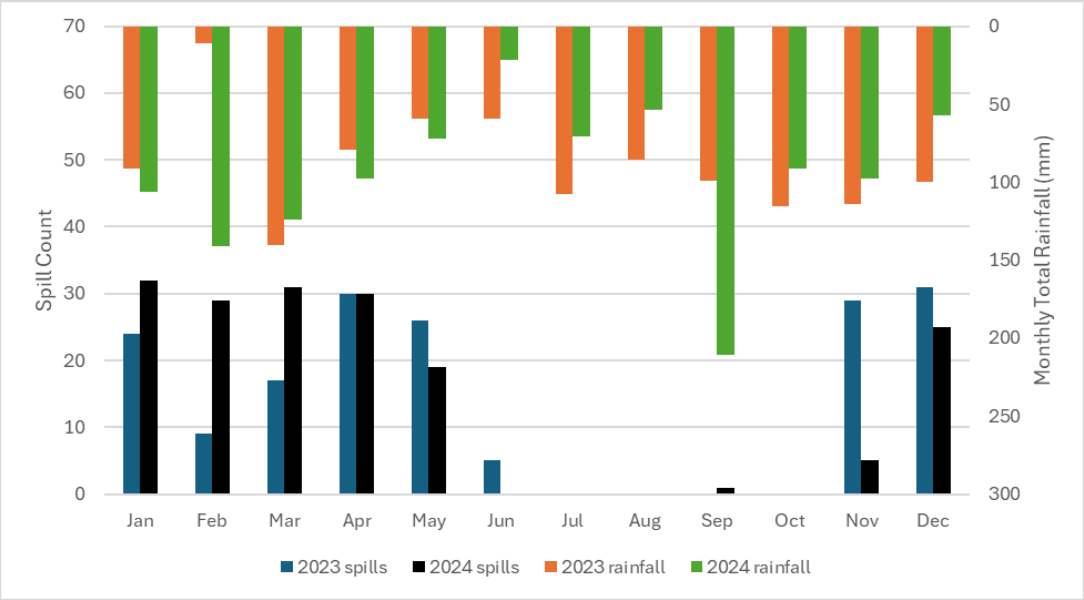


Figure 8 – Monthly rainfall data versus monthly spill count for 2023 and 2024 – Marlborough STW

The data suggests a wider relationship between rainfall, elevated groundwater levels and overflow spill frequency. A total of 172 spills were recorded at Marlborough STW in 2024 which is the same number of spills recorded in the previous year, however, in 2024, spill duration increased. The high threshold level for groundwater infiltration occurred during the winter period, which is when significant levels of groundwater infiltration begin to occur. As can be seen in Table 7, the higher number of spills occurred during the winter period, correlating with the levels of groundwater and river levels being higher during this period (see Figure 5A-D and 6). This indicates the wider relationship between groundwater levels and spills at the overflow.

Table 9 below details the last 2 years performance of overflows ‘London Road SPS’ in the catchment.

Event Duration Monitoring	2023		2024	
Overflow	Annual Spills	Duration (hours)	Annual Spills	Duration (hours)
London Road SPS	2	1.5	11	59.45

Table 9: Event Duration Monitoring

A critical part of the assessment of EDM performance and its relation to groundwater inundation is to review the month-on-month spill performance, against previous years and the monthly total rainfall values to give context to the performance. Figure 10 below presents the EDM performance trend and rainfall for recent years.

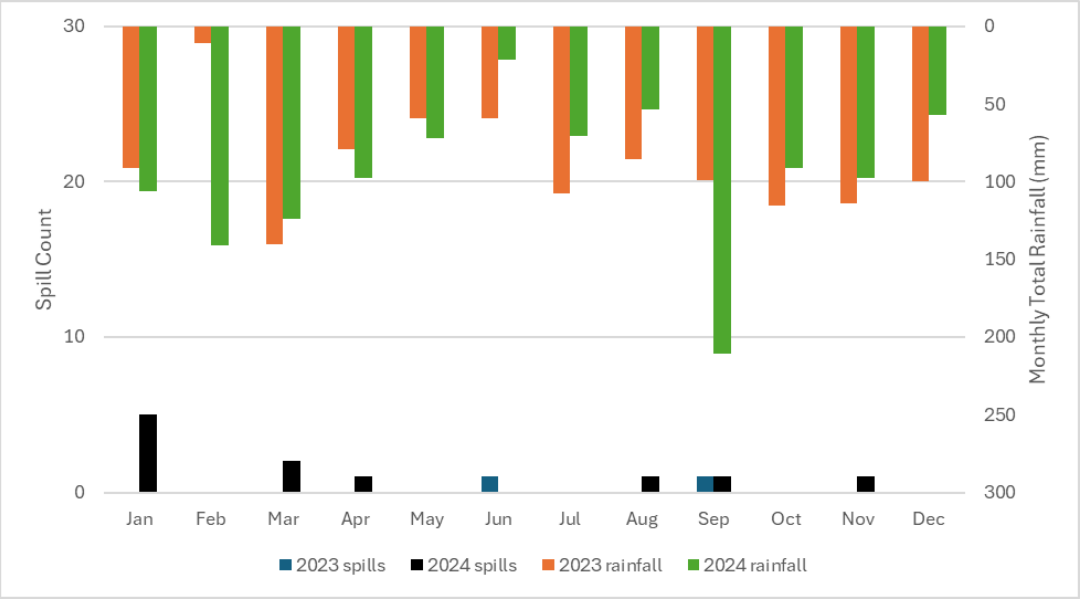


Figure 10 – Monthly rainfall data versus monthly spill count for 2023 and 2024 – London Road SPS

The data suggests a wider relationship between rainfall, elevated groundwater levels and overflow spills. A higher number of spills were recorded at London Road SPS in 2024, with Figure 10 suggesting average rainfall for 2024 increased during the 2023/24 period compared to the previous year, and the river level data shown in Figure 5A-D suggesting they were significantly higher than in 2022/23. However, it is important to note the potential impact of asset availability on spills in 2025.

Investigations & Interventions

This section details the activities that have been undertaken within the catchment within the Hydrological Year 2024-25.

Monitor Installations

The sewer depth monitor (SDM) programme supports long term groundwater understanding within GISMP catchments. Currently, there are a total of 9 monitors installed within the Marlborough catchment. There are currently no further monitor installs planned.

The data from these will be cross-referenced with other long-term records (where available) within the catchment.

Remediation Works Undertaken this Hydrological Year

Table 11 below provides a summary of the investigations and remediation works undertaken or planned within the Marlborough catchment in the 2024-25 Hydrological Year, as well as works undertaken in the previous four hydrological years.

Investigation / remediation type	2020/21	2021/22	2022/23	2023/24	2024/25
CCTV surveys	-	-	380m	-	3.7km
Look and lift surveys	-	-	2 surveys	6 surveys	-
Sewer lining	30	50m	-	-	-
Patch lining	-	-	2	-	-
Manhole sealing / plates / covers and frames replaced	1	2	6	-	-
ATAC unit deployment	-	-	-	1	1

Table 11: Works Undertaken in the 2024/25, 2023/24, 2022/23, 2021/22, 2020/21 & 2019/20 Hydrological Year

Interventions/ investigations were carried out in the catchment in the 2024/25 Hydrological Year. The interventions/ investigations included 3.7 kilometers of CCTV survey to assess structural integrity and potential sources of infiltration. However, the system will further be monitored and investigations/ interventions carried out as appropriate.

The 3.7km CCTV survey was undertaken in the area upstream of the ATAC, the Ogbournes down to Bay Bridges. The CCTV has been reviewed, and there were no major gushers found. The footage has highlighted an area of interest where a number of private connections cross the river kennet before discharging in the sewer. Operations are currently liaising with the customers about gaining access to review these private lines this winter.

In addition to the above investigations and interventions detailed, the potential for further strategic sewer lining in the catchment is under review for AMP8 as part of our Asset Health Improvement programme.

The ATAC (temporary bio-filter) unit at Bay Bridges in the Marlborough catchment was utilised in the 2024/25 Hydrological Year, this was operational from 25/11/2024 – 01/05/2025. Sampling during its operation showed the Dissolved Oxygen levels to be below 70% on one occasion & Ammonia (NH3) presence on one occasion of 0.01(mg/l).

Summary

Indicator site data suggests river levels in the Marlborough catchment were generally higher in 2024 than 2023, with EDM data strongly indicative of the role of groundwater infiltration on spills in the catchment during the winter period, increasing 2024 compared 2023. Indicator site data for 2025 suggests groundwater levels in the Marlborough catchment have reached lower levels than the previous hydrological year 2023/24, and EDM data for 2025 will be analysed once available to continue to examine the relationship between groundwater levels and overflow spills in the catchment.

Lift and look and CCTV surveys will be undertaken in remaining wet winter periods if conditions allow and subject to funding and available capacity. In addition to the above investigations and interventions detailed, we are working with Ofwat to agree investment in these catchments in AMP8 to remove the need for temporary overflows


Thames
Water