

Stratfield Mortimer Parish Council

Full Council 09/11/2023

Storm Discharges into Foudry Brook

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1. INTRODUCTION

Information on storm overflows into Foudry Brook from the Mortimer Sewage Works was presented at the 2022 and the 2023 Annual Parish Meetings and was considered by the Council in June 2023. The information consisted of discharge data obtained from Thames Water under Environmental Information Requests. Daily rainfall data for Stratfield Mortimer were kindly provided by Dr Stephen Burt FRMetS.

This document updates that information and includes further information and analyses, particularly on Consents to Discharge and Flow Measurements. References are made in this report to other documents which have been included in the meeting papers. Some data and analyses have been kindly provided by Windrush Against Sewage Pollution (WASP). This is registered charity originally concerned with Sewage Pollution of the River Windrush in Oxfordshire.

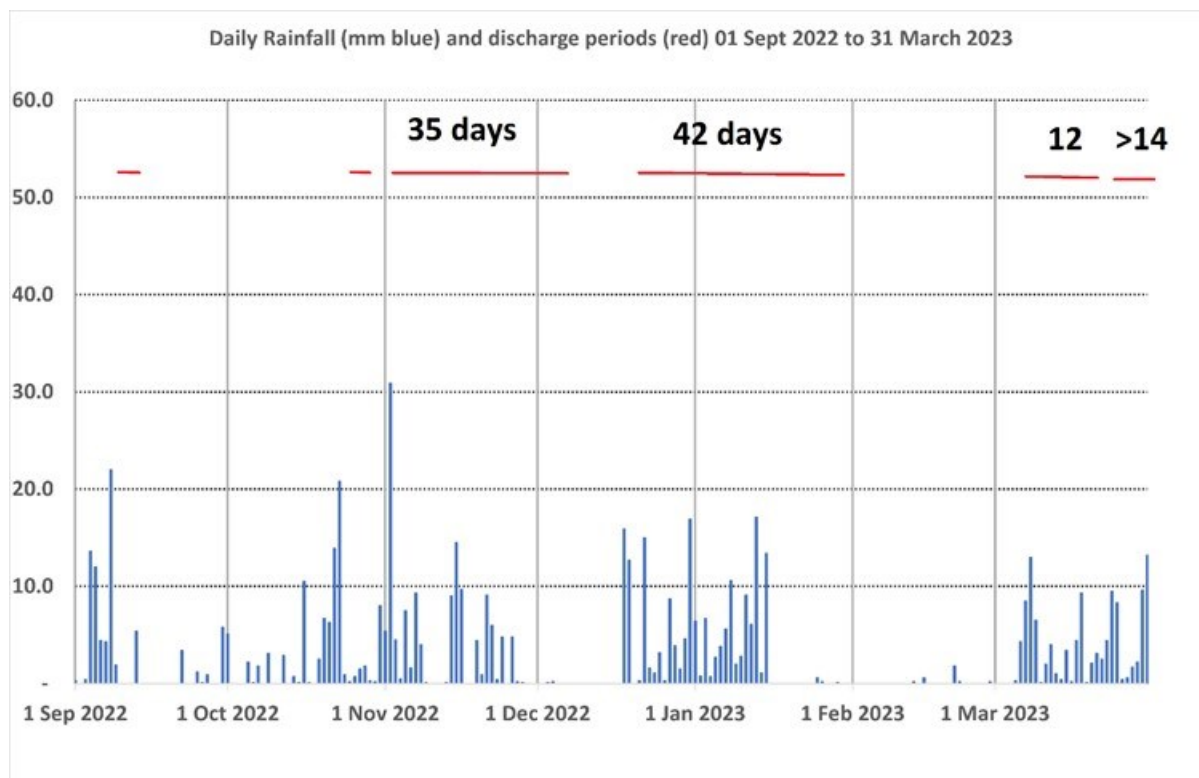
Some of the information presented in June 2023 is included in this report to provide the relevant context.

The discharge data are from Event Duration Monitoring (EDM) which provides the start and finish times of discharging the mixture of rainwater and untreated sewage. In the records there are some short breaks of about a few minutes to an hour. These short breaks have been ignored in the analysis.

2. SUMMARY OF DISCHARGES

Storm discharges occur most frequently between September and April with fewer (but some) in the summer. Summer discharges typically follow heavy rainfall and last for a few days and are not considered in detail in this section.

The graph below shows daily rainfall (blue, in mm) for the period 1 September 2022 to 31 March 2023. The red lines show periods of discharge into the Brook.



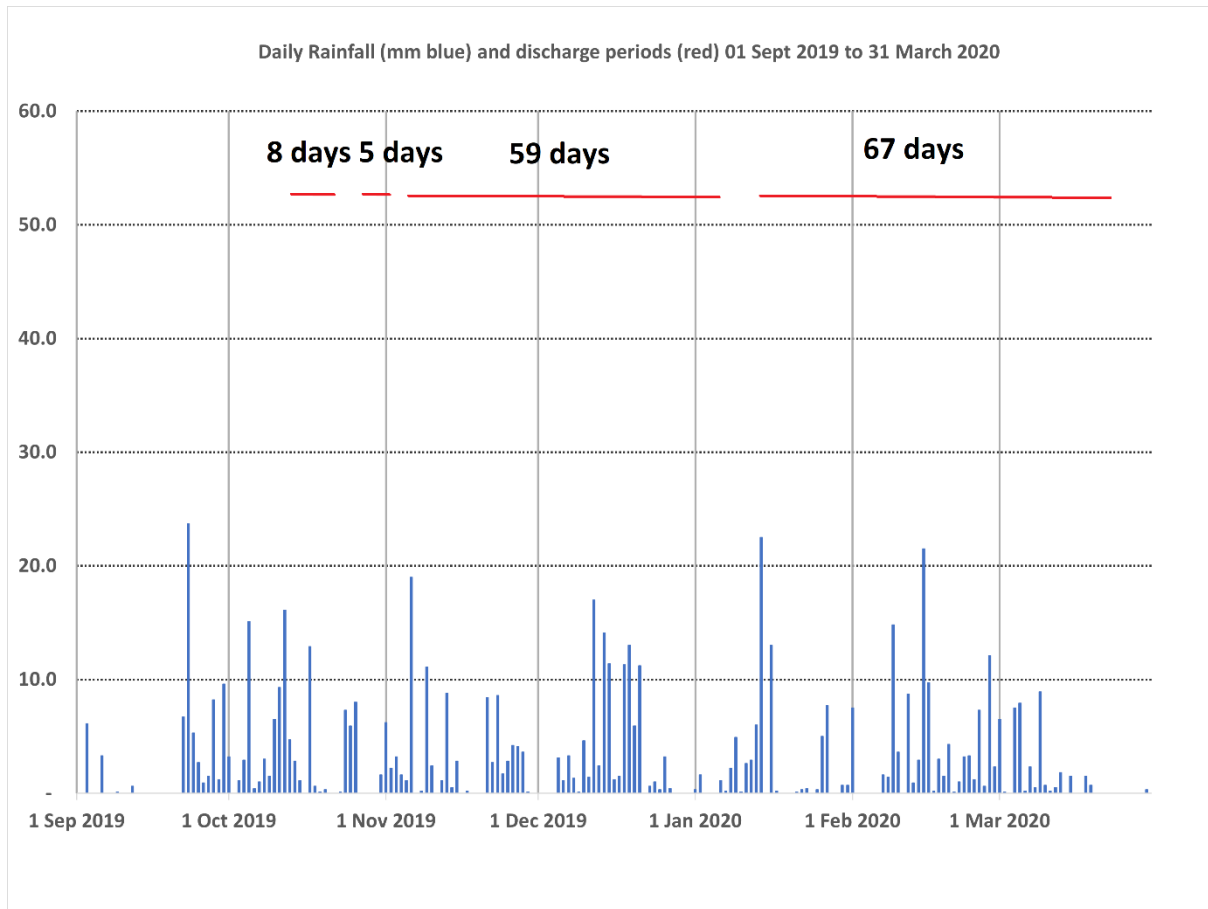
In the period 1st November 2022 to 31st January 2023 there were 77 days of discharge, which leaves only 12 days without discharge.

In 2023, following on from the graph above, further discharges of about 122 hours occurred in April, of 60 hours in August, 55 hours in September and 77 hours in October. Another discharge started on 28th October and is still continuing on 6th November.

The table below summarises the discharges over the last four winter periods.

Period 1 Sept to 31 March	Rainfall (mm)	Days of discharge	Long spells of discharge (days)
2019/20	608	139	67, 59, 8, 5
2020/21	487	123	52, 40, 26, 5
2021/22	341	29	9, 8, 6
2022/23	588	105	42, 35, 14, 12

The graph below shows that in 2019/2020 discharges occurred for the great majority of the time from 10th October to 20th March.



3. CONSENTS TO DISCHARGE

The Full Council meeting in June 2023 agreed that the council should request the Consents to Discharge. Two relevant documents (TEMP.2783/003 and Permit 1990CNTW0404) were obtained from Thames Water (These are documents **23-089 10.2 TEMP.2783/003** and **23-089 10.3 Permit 1990CNTW0404** respectively).

TEMP.2783/003 is dated 23/03/2018 and contains the conditions for storm discharge.

WASP have stated: *“TEMP.2783/003 is a fully consolidated permit for storm discharge and whilst it still contains its original TEMP prefix is no longer a temporary deemed consent and is binding.”*

In summary the important points are:

- The permit is for discharge of settled storm sewage via Outlet 1 (map is at end of document).
- The discharge shall only occur when and only when for as long as the flow passed forward is equal to or greater than the overfall setting indicated due to rainfall and/or snow melt.
- Off-line storage must be fully utilised before a discharge occurs (minimum offline storage capacity is 346 m³).
- The discharge should have passed through screens (the screen size is 6mm by 6mm mesh and the maximum size of solid matter is no greater than 6mm in more than 1 dimension). All screened matter is removed from the discharge.
- The overflow setting is 35 l/s (this is the minimum flow passed forward when the overflow operates).
- An Event Duration Monitor (EDM) must record start and stop times of storm discharges.

Permit 1990CNTW0404

The relevant part of this document are the four pages after the title page which form a **Modification Consent to Discharge**. The date of issue was 10th March 2010 (small print above the signature on page 4).

This modification:

- Sets the consented Dry Weather Flow as not exceeding 1904 cubic metres per day.
- Requires a continuous flow system to be installed and records kept.
- Sets chemical limits on discharges.

The rest of the document consists of earlier permits.

4. ENVIRONMENT AGENCY INSPECTION REPORT

WASP obtained an inspection report for Mortimer Sewage Works carried out by the Environment Agency on 17th March (STW inspection CAR form – **Paper 23-089 10.4 STW inspection CAR form**).

The report detail states that at the time of inspection was a blockage in some pipe work and a tank de-sludge valve was broken. Mention is made of the proposed upgrade scheme, including replacement of the storm return pump with a variable speed system (see report for detail).

The report concludes:

“This inspection found that a number of operations improvements are needed and are in the process of being planned. Some are short-term issues that should be resolved quickly such as the blockage in PST desludge pipework and failed humus tank desludge valve. Other work required under the WAAP programme needs longer investment in replacing or upgrading treatment equipment.

Action required – *Improvement work outlined above must be done as soon as possible where there is a risk of breaching permit conditions or causing pollution. Please inform me of when this work is due to start and it’s estimated completion date.”* (There is a due date of 31 August 2023 for the short-term issues).

5. UPDATES FROM THAMES WATER

In January 2023 Thames Water posted on their website:

“An upgrade is planned for Mortimer STW. This will include an increase on treatment capacity, so will reduce the need for untreated discharges. The £1m project is expected to be complete by December 2023. The date may change as the scheme progresses.”

The Clerk contacted Thames Water for an update on the project and received the following reply on 14th April:

“As you’ll know we provided a statement on the website recently which included a view on when we expect to be carrying out a scheme to improve performance at Mortimer STW. The forecast for us seeing the benefit from that scheme was expected by December of this year. We’ve had indication from the project engineer in the last few days that there is a high likelihood of the end date of this scheme being pushed back into 2024.

Unfortunately there are long lead times on several items required for this project, and although we can’t be certain at this stage, the indication is that a summer 2024 completion date is more likely.

“I should point out that it is not unusual for project delivery dates do vary from month to month, as projects develop and resources and efforts are managed regularly across a portfolio of projects right across the Thames Water estate, so we can only provide a view of the likely timelines at any given time.”

The Clerk contacted Thames Water again in September on the progress of the planned upgrade to Mortimer STW and received the reply below on 22nd September:

“I can confirm that we’re still expecting work to take place in 2024. I don’t have specific dates, but likely to be in the latter half of the year. We anticipate updating the website in the coming weeks.

The scheme will involve a variety of work, including new pumps being installed, modifications to some of the weir heights on storage tanks, replacement pipework between various parts of the process and replacement and modification to some of the telemetry equipment within the site.

While this work won’t prevent discharges taking place, it has been designed to improve the ability of the works to treat the volumes of incoming flow, and ensure robust compliance in all weather conditions against the performance expected within the permit it’s issued from the Environment Agency.

This scheme is one of many taking place across a number of sewage works in our region, with the overall aim of reducing spills by 50% by 2030, and by 80% in sensitive catchments. While our ultimate aim is to eliminate all storm overflows, this is a long-term aspiration and they currently remain a necessary and permitted function to prevent sewers flooding our homes, gardens and streets.

Our recently published Drainage and Wastewater Management Plan (DWMP) 2025 – 2050, which was published for the first time earlier this year starts to detail a medium to long-term plan which looks to address challenges of climate change, population growth and advancements in regulatory targets over the next 25 years. One of our headline targets within the plan is to reach a position where we see less than 10 storm overflow discharges per outfall, per year on average into the environment. This would involve an investment of £10.9 billion, and will require the support and approval of customers and regulators over that period. You can find out more about the plan here - <https://www.thameswater.co.uk/about-us/regulation/drainage-and-wastewater-management>.”

In summary: The work has been put back, currently to the second half of 2024. The latest statement does give some detail of what the upgrade consists of (as requested by the Clerk) but does not specifically say what the likely impact on storm discharges is likely to be. It also appears that some of the items (replacement pipework and telemetry are really routine maintenance.

6. REPORT FROM WASP JUNE 2023

Following our Zoom meeting with WASP in June 2023, WASP produced a document on discharges into the Kennet and its tributaries. Only the first page concerns Foudry Brook and this is reproduced below:

Summary data for R Kennet, Kennet & Avon Canal, R Lambourn, R Enbourn, Foudry Brook

Peter Hammond, June 2023

The first table below summarises the spilling hours submitted to the EA by Thames Water for the years 2020-2022. The second table contains estimates of numbers of days with illegal spills.

Site	ANNUAL SPILL HOURS			TOTAL	PE	Watercourse	Permit
	2020	2021	2022				
Stratfield Mortimer STW	3,222	1,576	1,642	6,440	5,469	Foudry Brook	TEMP.2783
East Shefford STW	2,753	1,424	0	4,178	5,432	Lambourn	CNTD.0032
Marlborough STW	2,872	408	0	3,280	10,213	Kennet	TEMP.2763
Kintbury STW	1,620	789	230	2,638	3,719	Kennet & Avon Canal	TEMP.2706
Fyfield STW	1,764	11	0	1,775	1,534	Kennet	CNTD.0046
Chilton Foliat STW*	594	776	0	1,370	288	Trib of Kennet	TEMP.2478
Newbury (New) STW	929	251	65	1,245	95,411	Kennet	TEMP.2805
Great Bedwyn STW	787	11	10	809	1,376	Kennet & Avon Canal	TEMP.2619
Knights Lane SPS		359	298	657	-	Enbourn	TEMP.1280
East Garston SPS	214	228	6	448	-	Lambourn	TEMP.0882
Midgham STW	206	102	123	430	99	Kennet & Avon Canal	TEMP.2774
Hungerford STW	81	27	56	165	6,721	Kennet	CSSC.2335
Ramsbury STW	11	0	1	11	3,345	Kennet	CSSC.2353
London Road SPS	1	0	0	1	-	Kennet	TEMP.1368
TOTAL	15,055	5,962	2,430	23,446			

* Chilton Foliat soon to be closed down; PE=Population Equivalent

Site	DAYS WITH ILLEGAL SPILLS			
	2020	2021	2022	TOTAL
East Shefford STW	47	21	0	68
Marlborough STW	45	3	0	48
Chilton Foliat STW	34	21	0	55
Stratfield Mortimer STW	29	14	6	49
Fyfield STW	23		0	23
Great Bedwyn STW	9	0	0	9
Kintbury STW	14	1	0	15
Newbury STW	0	0	0	0
TOTAL	201	60	6	267

Only dry spills counted in 2022, need more data to detect early spills

The first table shows that for the three years 2020 to 2022, Mortimer Sewage Works had the highest total spill hours (6,440) of these sewage works relevant to the Kennet. Illegal spills are given in the second table. There are two types of illegal spills. An illegal dry spill occurs when a spill takes place without rainfall. An illegal early spill occurs when a spill occurs if the works is processing at less than flow to full treatment. Note the latter were not estimated in 2022. (PE is Population Equivalent - an estimate of the population served by each works).

7. FLOW DATA

The Permit 1990CNTW0404 referred to in section 1 above requires records of discharge flow to be kept. These were obtained by both the Clerk and WASP from Thames Water for the period 2018 to 2022.

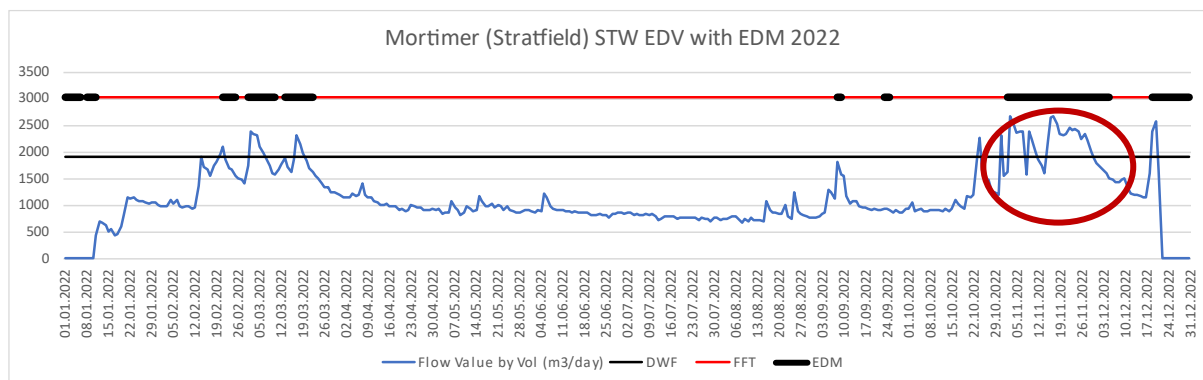
The data came as flows every 15 minutes (l/s) and as daily totals (m³ /day). There are some gaps in both records.

The daily totals are EDV (Estimated Daily Volume) from the main sewage discharge outlet and do not include the storm discharge. The storm discharge outlet does not have any flow measurements and records are simply times of when discharges start and finish.

8. ANALYSIS OF FLOW DATA

WASP kindly did some initial analysis of the daily flow data and this is presented for recent calendar years (reproduced with thanks to Geoff Tombs of WASP). Though WASP have provided most of the graphs and tables that follow, the interpretation and comments have been made by SMPC.

Calendar Year 2022



In this graph:

The blue line shows the Effluent Discharge Volume from the flow measurements (m³/day).

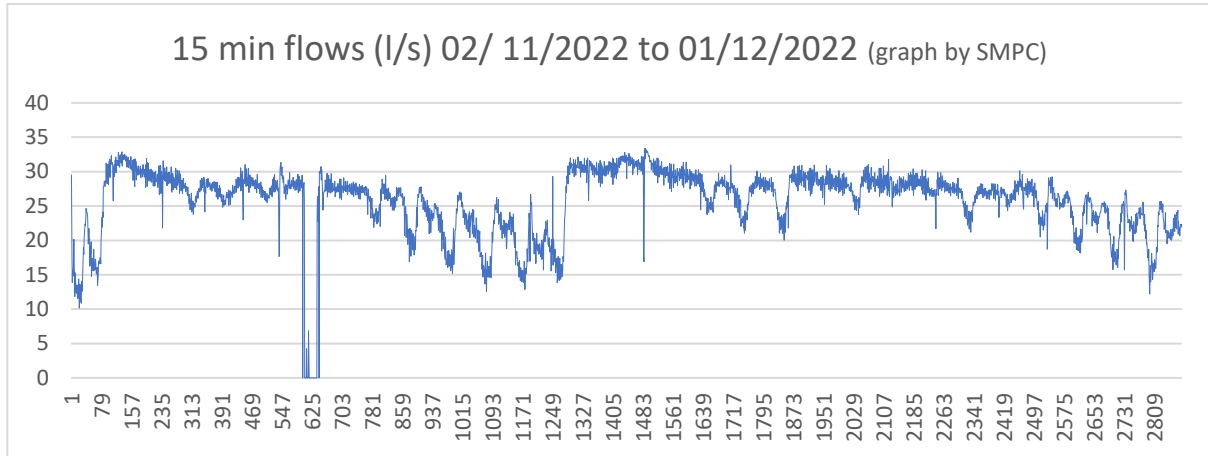
The red line shows the Flow to Full Treatment (m³/day) This is calculated from the consented overflow setting of 35 l/s and here is 3024 m³/day.

The black line shows the dry weather flow (DWF) which is an estimate of the daily flow to the treatment works allowed during a period without rain. There are various ways of calculating this. Here it is 1904 m³/day, as set by Permit 1990CNTW0404.

The black blobs at the top show when storm discharges took place (these agree with the SMPC analysis as shown earlier on first graph in this report).

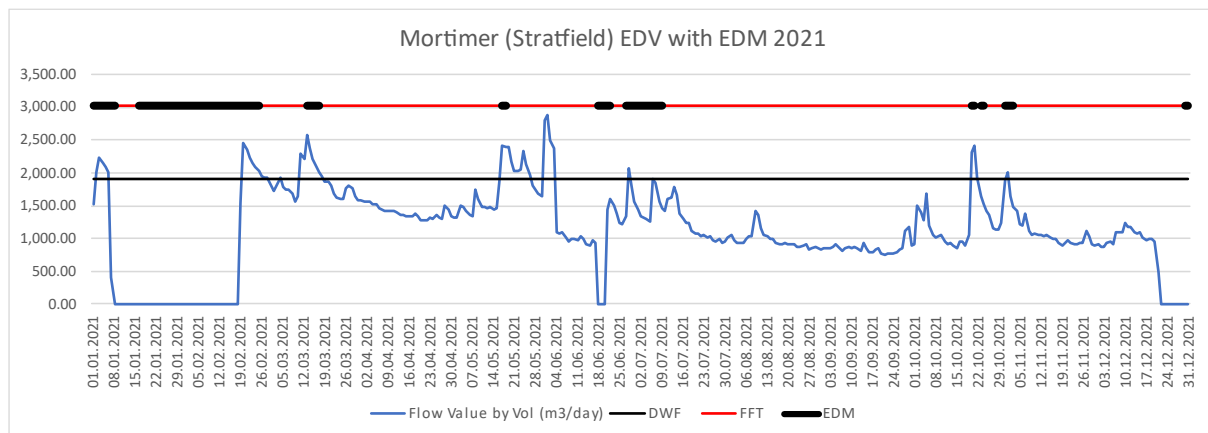
In theory the storm overflow (as recorded by EDM) should not operate until the FFT value is reached – which on a daily basis it never did in 2022. Values of over 2500 m³/day were reached in November (within the red oval which I have added to the graph).

Inspection of the 15 minute flow data for 02/11/2022 to 01/12/22 (shown in the graph below) shows that 35 l/s was not exceeded in this period but that readings around 30 l/s occurred for in mid and late November. Discharge started on 5th November (around point 300 on the X scale) and continued until 5th December (off end of graph).



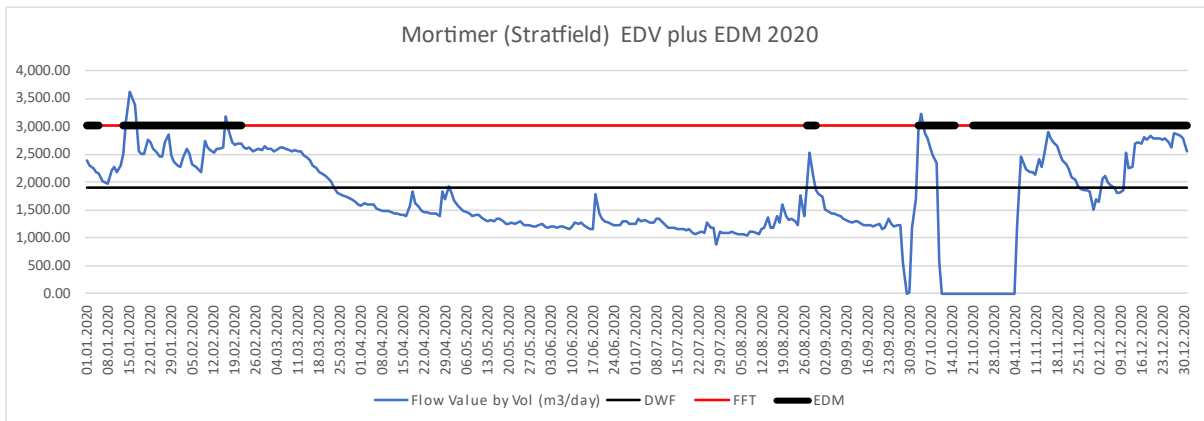
Strictly, this is an early spilling event as FFT has not been reached. However, the highest single 15 minute flow value is 33.38 l/s and this possibly suggests that the works are not able to achieve the FFT value of 35 l/s. The flow rate could possibly be at the maximum achievable for much of mid to late November. The output of the storm discharge pump is not known but it presumably needs to keep operating if the main pumps are working at capacity. The whole system seems to be struggling after the 30.9 mm of rain that fell on 2nd November (which can be seen on the first graph in this report).

Calendar Year 2021



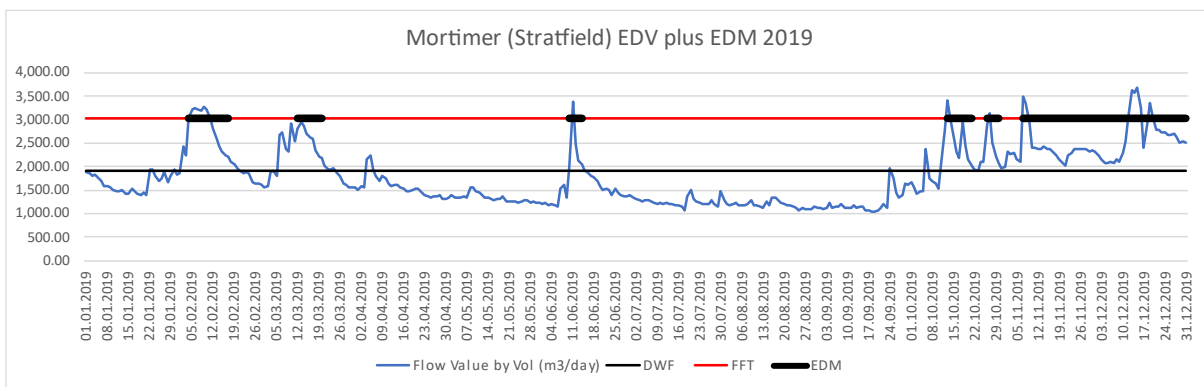
Note that 2021 was relatively dry year and there are also periods when the flow data were not recorded. On a daily basis, flows do not reach FFT. There are discharges in June and July when the flow rate is mostly below the DWF level. On 17th and 18th June rainfall of 53 mm occurred with another 21 mm on 7th July. It appears that on 18th to 20th June there was zero flow and presumably the storm discharge was used.

Calendar Year 2020



In 2020 daily FFT was reached in January and October.

Calendar Year 2019



In 2019 daily FFT was reached in January, March, June and in October, November and December.

In summary, whilst FFT was reached for some limited times in 2019 and 2020 this did not occur in 2021 and 2022 yet period of discharge remained high in these years.

Comparison of calendar years

WASP have also provided some summary statistics.

Year	2017	2018	2019	2020	2021	2022
Annual volume M3	629,268	647,909	655,306	615,008	414,187	411,839
Good readings	365	365	365	338	310	345
Av Daily volume M3	1,724	1,775	1,795	1,820	1,336	1,194
Days on which permit DWF exceeded	92	144	135	140	45	38
Days on which permit FFT exceeded*	24	29	20	6	0	0
Q80 DWF calculation	1,296	1,096	1,226	1,226	926	836

Spills	Duration Hrs	Number	Available
2018	483.7	38	100.00%
2019	2097.14	96	100.00%
2020	3222.12	144	100.00%
2021	1576.22	79	83.03%
2022	1641.82	84	86.20%

2023 1485 hours up to 04.11.2023

From the first table total volume and average daily volume show much lower values for 2021 and 2022 compared to earlier years, with a decrease of around 35%. There does not seem an obvious reason for this, unless Thames Water have relined pipes or taken other steps to reduce the inflow of rainwater.

As noted above, discharge remain high in 2021 and 2022, despite the legal criteria not being met. It will be interesting to see the full flow and discharge figures for 2023.

9. CONCLUSIONS

It is suggested that the Council write to Thames Water requesting information on the following points:

Why have discharges occurred in 2021, 2022 (and probably in 2023) when FFT has not been reached?

Is the system currently capable of normal discharges at the FFT rate?

Why do the storm discharges last so long?

What is the capacity of the current storm discharge pump?

Can you explain the decreases in mean daily flow in 2021 and 2022 compared to earlier years?

Has the maintenance work required by the Environment Agency following their inspection in March been carried out?

With regard to the planned upgrade, could you please provide more details, such as the capacity that the works will be able to process, the effect of changing weir heights on storage capacity and the rate at which the proposed storm discharge pump can operate.

We appreciate that such an upgrade cannot eliminate storm discharges, but what is your estimate of the effect of your upgrade on frequency and intensity of discharges?

Finally, in your announcement in January 2023, Mortimer was identified as one of eight works scheduled for an upgrade and it had a relatively early completion date. We trust you will honour this commitment. Discharges into Foudry Brook not only affect our Parish but potentially the health of the Brook and the Kennet in Reading.