Written evidence submitted by Professor Peter Hammond BA MSc PhD MSc

How adequate are the monitoring and reporting requirements around water company discharges?

How can technology improve and assist with transparency and enforcement?

1 Summary https://www.researchgate.net/profile/Peter_Hammond2/research

1.1 I am a mathematician with 40+ years' experience as a university academic, the last 20 at UCL's Institute of Child Health and Oxford's Big Data Institute, applying image analysis of neurofacial anatomy in medical genetics and teratology. I am retired with recent/current visiting research posts at the UK Centre for Ecology & Hydrology (2018-20) and Dept. of Human Genetics, Leuven University, Belgium (2017-21). I also work in conjunction with Windrush Against Sewage Pollution (WASP). A paper on untreated sewage spills and artificial intelligence is forthcoming:

1.2 Hammond P, Suttie M, Lewis V, Smith A, Singer A. Detection of untreated sewage discharges to watercourses using machine learning, *Clean Water* (2021), in press.

1.3 I have lived in a converted mill on the River Windrush for 18 years with direct experience of its decline in terms of increases in turbidity, algal growth and riverbed silt; decrease in river weed growth; population decline of invertebrates, fish, watervoles and waterfowl in the river; and, complete loss from my riverside garden of common lizards, grass snakes and otters. The two contrasting views of the River Windrush at the same location (Annexe 1), taken from my garden, illustrate the river's decline between 2009 and 2017. Sewage pollution may not be the sole culprit for this ailing ecosystem but aquatic and environmental scientists suggest it is affecting flora and fauna at the bottom and middle of the food chain with inevitable consequences.

1.4 The decline of the River Windrush and rivers nationally, and a growing awareness of spills of sewage into watercourses, stimulated my interest in how spills arise, are self-reported by the Water Companies (WCs), are detected by event duration monitors (EDMs) and how permits to discharge sewage to watercourses are enforced by the Environment Agency (EA). My evidence is selected from an analysis of data gathered over 3 years via Environment Information Requests (EIRs) for **2009-2021** covering **100 sewage treatment works (STWs) in detail**, **300 or so superficially,** and interactions with OFWAT, EA, WCs, other scientists and members of the public affected by sewage spills.

1.5 The evidence I have selected suggests that

- there are many more spills than reported by the general public and WCs
- spills are not infrequent and due to short-lived "storm" events as claimed by WCs
- EDM devices are not yet fully reliable in the detection of spills
- the EA needs expertise in Big Data analysis to cope with the volume of accumulating sewage treatment and monitoring data to assist their enforcement of permit conditions

- terms in EA permits are being abused and need precise definition (e.g. “rainfall” needs a technical definition; “effluent” must not mean a mix of untreated sewage and treated effluent)
- citizen science contributes to spill detection and permit enforcement and deserves more funding
- WCs should publish effluent quality, metered flow and spill start/stop times, a month in arrears
- volumes of untreated sewage spills are essential to understand their impact on river ecosystems and to inform punitive fines to discourage poor STW maintenance and management

2 The primary focus around which the evidence has been organised

2.1 The most relevant constituent of an EA permit here is the condition defining permitted discharges

> untreated sewage can be diverted to, or discharged from filled, temporary **storm storage** only if **sewage treatment continues** above a specific **overflow setting** and
> the spill is due to **rainfall** and/or **snow melt**

2.2 The **overflow setting** and the **minimum storm storage** volume at a STW are defined in its EA permit. There is no specified threshold of rainfall that distinguishes permitted from unpermitted spills even though EU regulations use the term “exceptional rainfall”. In addition, operators are obliged to record start/stop times of spills from storm storage using event duration monitors (EDMs). Before EDMs were introduced in recent years, WCs were only obliged to self-report spills that **they** deemed in breach of a permit. Now, all spills detected by EDM must be reported. The acquisition of the data supporting my analysis, and the evidence provided here, was inevitably influenced by the investigation of an individual STW:

> consult the EA discharge permit that governs its operation
> obtain sewage flow data and times/dates of known spills to help detect unreported spills
> obtain telemetry alarm data to detect equipment failure and potential STW mismanagement
> consider permit compliance of spills, both reported and unreported, and permit enforcement

2.3 In the remainder of this submission:

3 Evidence of possible non-compliant spills detected using Artificial Intelligence techniques

3.1 Artificial Intelligence techniques can be used to train so-called machine learning (ML) algorithms to recognize changes in the pattern of daily sewage flow through a STW when it spills untreated sewage. In dry weather, the sewage flow entering, and the treated effluent leaving, a STW has two peaks coinciding with early morning and late evening. Over 24 hours, its profile is shaped like a camel's twin humps. When a STW diverts untreated sewage to storm storage and/or spills into a watercourse, the profile is flattened as a result of the diversion. A full 24 hrs of spilling produces a largely flat profile often detectable by eye. ML algorithms can be trained to provide more objective detection of the full range of changes in profile of sewage flow induced by spills of variable duration.

3.2 I recently led a team of citizen and professional scientists using ML analysis of sewage flow through 2 STWs operated by the same WC. We used 18 months of sewage flow data and known start/stop times of spills confirmed by EDM monitors to train ML algorithms to learn the flow profile change of days where spills had occurred. The trained algorithms were then set loose on flow data alone from 10 additional years before EDM monitoring was made statutory. This resulted in the detection of 926 days when a putative spill had occurred. More than three hundred of these putative spills lasted for a full 24 hours, some as long as 10 days and a few for a month without a break.

3.3 The ML analysis detected hundreds of potentially non-compliant spills between 2009 and 2018 at STW1 where during spills it failed to continue to treat the minimum amount of sewage required by its EA permit. The evidence for this non-compliance was that the flow of treated effluent leaving STW1 was often as low as 60% of the minimum treatment level. In response to an EIR request, the EA said that only 2 pollution incidents had been reported at STW1 between 2009 and 2019.

3.4 The ML analysis detected putative spills at STW2 during periods of unexceptional or no rainfall suggesting that groundwater ingress has been causing untreated sewage spills there for at least nine years. In 2012, the European Commission ruled that the UK had failed to fulfil its obligation under the Urban Wastewater Directive 91/271/EEC and that untreated sewage discharges were only permitted in exceptional circumstances. Several senior EA staff have said emphatically and recently that groundwater ingress is not an acceptable reason for spilling untreated sewage. Yet, the EA does not appear to be enforcing this with any vigour. Some WCs are resisting this interpretation of "rainfall" suggesting that its interpretation as including groundwater ingress needs to be tested in court.

3.5 Follow up use of our ML approach has established similar results at other STWs operated by the same operator and other WCs in England and Wales. Indeed, these ML techniques could be applied automatically to sewage treatment and EDM monitoring data to help identify which of the thousands of STWs in England and Wales have been, and are, underperforming. In order to enable such across the board application, STW operators should publish online all flow and EDM data for at least the past 10 years. This would enhance both retrospective and prospective enforcement of discharge permit conditions.

3.6 The ML approach described above is also being considered for linking STW flow and EDM data with multiple river quality parameters measured by and communicated from real-time devices (known as sondes) placed in rivers up and downstream of STWs. This would significantly improve the scientific

understanding of the polluting effects of untreated sewage spills and enable third parties to study pollution incidents soon afterwards, and possibly even before they have had deleterious effects.

4 Evidence of possible non-compliant spills of untreated sewage from a range of STWs

4.1 **Stanton Harcourt STW (Thames Water)** Population Equivalent served: 1,865

Annexe 2 uses simple charts to demonstrate that Stanton Harcourt STW spilled untreated sewage almost continuously, day and night, for six months between October 2019 and March 2020. Furthermore, throughout that period, it appears to breach its permit by spilling untreated sewage while continuing to treat sewage below its permit minimum. Retrospective analysis from 2009 established similar potentially non-compliant spills from 2013 that became common place from 2018 onwards. Stanton Harcourt discharges into the Chil Brook whose deteriorating ecological and chemical classification by the EA is clear from the table below

Classification Item	2013	2014	2015	2016	2019
Overall Water Body	Good	Poor	Poor	Poor	Poor
Ecological	Good	Poor	Poor	Poor	Poor
Chemical	Good	Good	Good	Good	Fail

(http://environment.data.gov.uk/catchment-planning/WaterBody/GB106039030310)

4.2 **Oxford STW (Thames Water)** Population equivalent served: 215,546

Annexe 3 highlights examples of spills of untreated sewage from Oxford STW on at least 16 days possibly breaching EA permits in March 2019 and February 2020. During these spills, the rate at which sewage continued to be treated appears to be below the storm overflow rate set in its EA permit even allowing for the 8% error margin accepted by the EA.

4.3 **Ben Rhydding STW (Yorkshire Water)** Population equivalent: 4,303

Ben Rhydding STW has a reputation for spilling when there is no or very little rainfall. Annexe 4 demonstrates an approach to defining exceptional rainfall that has been proposed by the UK Met Office in conjunction with the University of East Anglia. This was applied to 40 years of daily rainfall data at a location close to Ben Rhydding STW to produce an “exceptionality” grading of rainfall on a scale 0 to 10 with grades 6/7 to 10 (accounting for the top 10%) being nominated as “exceptional”. This approach suggested that in March 2018 only 2 days had “exceptional” rainfall whereas spills occurred on 24 days, many for 24 hrs.

5 Evidence of EDM devices not detecting untreated sewage spills from STWs

5.1 **Standlake STW (Thames Water)** Population equivalent served**:** 1,865

For 2018 and 2019, Thames Water returned only 1 spill of 0.4 hrs across the two years for Standlake STW. EDM start/stop times were provided as a result of an EIR but were obviously determined as “unreliable”. In Annexe 5, even a cursory inspection of the effluent slow shows periods of spilling for long periods. This suggests the EDM missed many days when spills occurred despite being operational for between 96% and 99% of the reporting periods.

5.2 **Mogden STW (Thames Water)** Population equivalent served**:** 2.1 million

Mogden STW is the third largest STW in the UK. It is one of few STWs (only one known to me) that discloses the volume of its spills of untreated sewage. Annexe 6 documents incidents in the past 2 years or so where the installed EDM device has failed to detect spills that the volume meter has recorded. One missed spill involved the equivalent of 240 Olympic sized pools worth of untreated sewage being discharged in a single day. In November 2020, more than 1 billion litres of untreated sewage were discharged on each of two successive days. The total annual volume of spills from Mogden STW has increased steadily from 0.5 billion to 7.5 billion litres between 2015 and 2020 according to figures Thames Water publishes online.

6 Faults and fixes: data access and transparency

Analysis of the performance of an individual STW requires access to and acquisition of its EA permit, its operator's records of sewage treatment and start/stop times of spills detected by an EDM device. EIR requests to STW operators have to be answered within 20 working days.

Fault 6.1 The EA's online "Public Register" allows perusal of brief details of **a permit** which **has to be requested by email** with a delay of up to 10 working days (only to find later the wrong permit was requested).

Fix 6.1.1 Many permits are in PDF format so **make permits viewable immediately online** and avoid delay.

Fix 6.1.2 The EA has been introducing a generic permit format which should enable most of the text of a permit to be configured by software from entries in a table of STW variations – **introduce an online table of STW parameters (e.g., storm overflow rate, storm tank size, effluent quality parameters) that can be easily and quickly updated by the EA**.

Fault 6.2 **Some operators abuse the 20 working-day reply period when sent an EIR request** by emailing a request for "clarification" on the due day or by announcing a further 20 working-day delay.

Fix 6.2.1 **Introduce penalties for such obvious delaying tactics**

Fix 6.2.2 **Introduce & publish an EIR efficiency metric as part of a transparency audit within the annual EA/OFWAT review of the water industry**.

Fault 6.3 Checking that ***treatment of sewage continues*** *above* ***the overflow setting*** at a specific STW during sewage spills requires an EIR request to the operator to provide treatment flow data and EDM start/ stop times of spills. Most water companies support EIR request via a specific email address. Only **one company, Severn Trent Water, requires EIR requests by letter** (use of a quill pen is optional!). **Severn Trent took 10 months to provide data on Ludlow STW and only after intervention by Philip Dunne, MP for Ludlow and chair of the EAC**.

Fix 6.3.1 **Insist that water companies publish effluent quality results, metered flow data and EDM spill start/stop times online, say a month in arrears**. Wessex Water and Southern Water have initiated limited online access to flow and spill data. **The format used is not always transparent or convenient.**

Fault 6.4 Even during a spill, operators are obliged to continue to treat sewage at a minimum level. Yet, **for decades, the EA has not obliged operators to measure continuing treatment during spills**. Indeed, **33% of STWs do not have a meter to record continued treatment**

during spills and so enforcement is impossible (Wastewater Treatment Works Flow To Full Treatment - Monitoring And Compliance Assessment Method Development – UKWIR 18/WW/21/17). The current price control period (AMP7) requires appropriate meters for measuring continued treatment to be installed by April 2025.

Fix 6.4.1 Immediately require spills of 24 hrs to be associated with a minimum daily volume of treated effluent (which is almost universally recorded) defined as a % of the volume equivalent of 24hrs flow at the storm overflow level (with allowance for the EA's acceptance of 8% meter error). During a long spill, the major difference between sewage passed forward for treatment and effluent are sludge (1%-2.5%) and some small losses during the treatment process.

7 Gaps in data completeness

STW operators are obliged to provide an annual report of the total daily volume of flow through a STW. This will be a daily total of either the sewage passed to the treatment process or the treated effluent discharged in the usual way to an adjacent watercourse. Before 2019, the EA guidance was that such a series of 365/366 daily totals should not have more than 37 missing values in total or a contiguous gap of more than 14 values. Otherwise, the STW is in breach of permit. During the analysis of STW performance, it became clear that gaps in such data frequently herald equipment failure and obscure unreported, unpermitted spills.

Gap 7.1 A gap in total daily volume data for Northleach STW of **three and a half months during 2016** was reported to both the operator, Thames Water, and the EA in 2019. Further investigation described in Annexe 7 identified an unreported discharge on Feb 9th 2016 of untreated sewage onto land outside the works used by pedestrians, dog walkers and grazing livestock. This was found by inspecting log book entries by operational staff. Thames Water in response to an EIR said that no spills had been reported at the works at the time.

Gap 7.2 An analysis of Southern Water's online total daily volume data for STWs discovered significant 78 apparent breaches for 2017-2019 across 119 STWs. Notable breaches were:

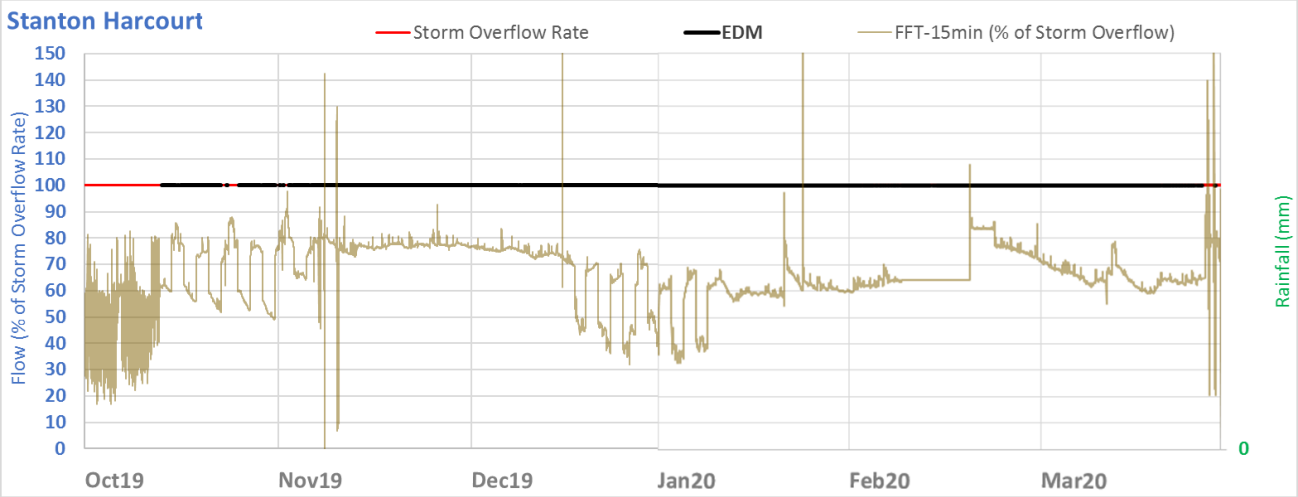
2017: **Tillington** STW had 3 contiguous gaps of more than 14 records and a total of **108** missing records i.e. almost 30% of annual return;
2017: **28** contiguous missing daily records at **West Wellow** STW included a spill of untreated sewage lasting more than 8 days; continued minimum treatment during the spill cannot be verified;
2018: **Beaulieu Village** STW had 2 contiguous gaps of more than 14 records and a total gap 0f **100** records;
2018: **Beaulieu Village** and **East Boldre** STWs had contiguous gaps of more than 14 records that included spills of untreated sewage when continued minimum treatment cannot be verfified;
2019: a total gap of **88** daily records at **Quickbourne Lane**, **Northiam** STW;
2019: **Petworth** STW had a contiguous gap of **25** daily records during which spills of untreated sewage occurred on 8 days; continued minimum treatment cannot be verified during the spill;
2017, 2018 and 2019: **Iden** & **Petworth** STWs appear to breach one or both completeness criteria.

Annexe 8 contains a full table of the 78 breaches identified.

Annex 1 Comparison of River Windrush in 2009 and 2017 illustrating its decline

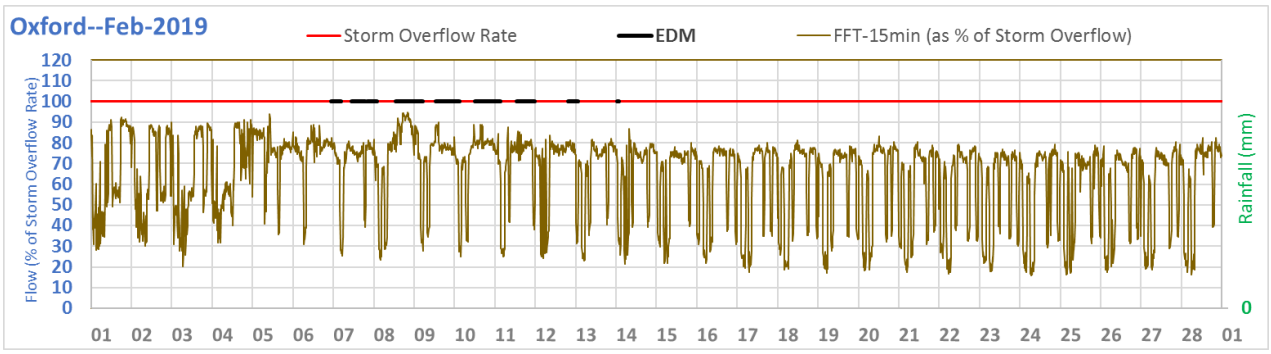
Annexe 2 Apparent permit breaches Oct 2019-Mar 2020 at Stanton Harcourt STW (Thames Water)

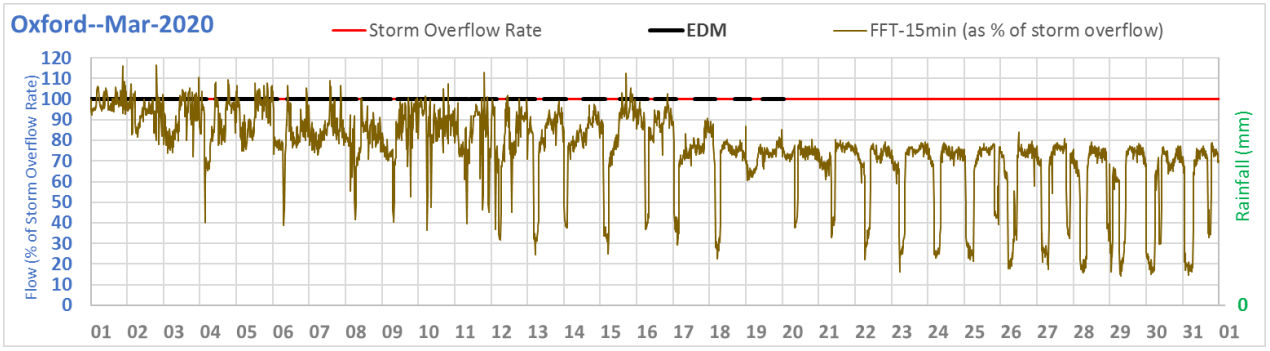
The chart below shows the flow rate passed on for treatment (brown curve) at Stanton Harcourt STW, for Oct 2019-Mar 2020, expressed as a percentage of the storm overflow rate (red line) which is the minimum rate for continued treatment when a sewage spill occurs. The black horizontal line represents the start and stop times, as recorded by the EDM (Event Duration Monitor) device, when untreated sewage was spilled to the adjacent watercourse. The charts show that this STW spilled untreated sewage every day for three months, except for one or two days at the end of March. In order to be compliant with its discharge permit the rate of continued treatment flow (the brown curve) should be "above the storm overflow rate" (the red line). The EA allow an 8% meter error which in practice means the minimum continued treatment rate is 92.6% (100/1.08) of the storm overflow rate. Given that the brown curve remains well under 92.6%, it appears that Stanton Harcourt STW spilled untreated sewage in breach of its permit almost every day.



Annexe 3 Apparent permit breaches in 2019 and 2020 at Oxford STW (Thames Water)

Taking into consideration the 8% error margin allowed by the EA, the continued flow passed to the treatment process at a STW must be at least 92.6% of its storm overflow rate during a spill. Moreover, this minimum limit must be surpassed even before there is permissible diversion of untreated sewage to the temporary storm storage and for the entire duration of the spill. The charts below show examples where this appears not to be the case in February 2019 and March 2020 where the continued flow rate (brown curve) is below the required minimum (red line) for whole days and also for parts of some days when spills occur (horizontal black intervals).





Annexe 4 Rainfall exceptionality applied to groundwater ingress at Ben Rhydding (Yorkshire Water)

A Met Office/University of East Anglia study (Osborne et al, 2000) proposed a grading scheme for rainfall severity based on long term rainfall in a locality based on a scale from 0 to 10, with 0 being a dry day, 1 for lightest rainy days totalling 10% of all daily rainfall values, 2 for next lightest rainy days covering next 10%, etc.

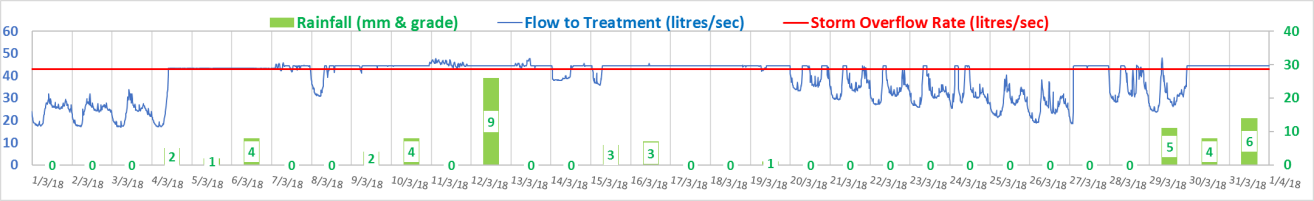
https://rmets.onlinelibrary.wiley.com/doi/epdf/10.1002/%28SICI%291097-0088%2820000330%2920%3A4%3C347%3A%3AAID-JOC475%3E3.0.CO%3B2-C

By way of demonstration, I applied this approach to **Ben Rhydding STW (Yorkshire)** using 40 years of rainfall data downloaded from UK Centre for Ecology and Hydrology to produce the following table of thresholds for the ten grades

Grade	Threshold (daily rain in mm)	*Days*	Proportion
1	3.1	8095	53%
2	5.2	1959	13%
3	7.3	1301	9%
4	9.4	977	6%
5	11.6	771	5%
6	14.2	629	4%
7	17.5	514	3%
8	22.1	414	3%
9	29.7	319	2%
10		212	1%
	TOTAL	15191	

Table Grading of 40 years data to define "exceptional" rainfall for Ben Rhyding STW

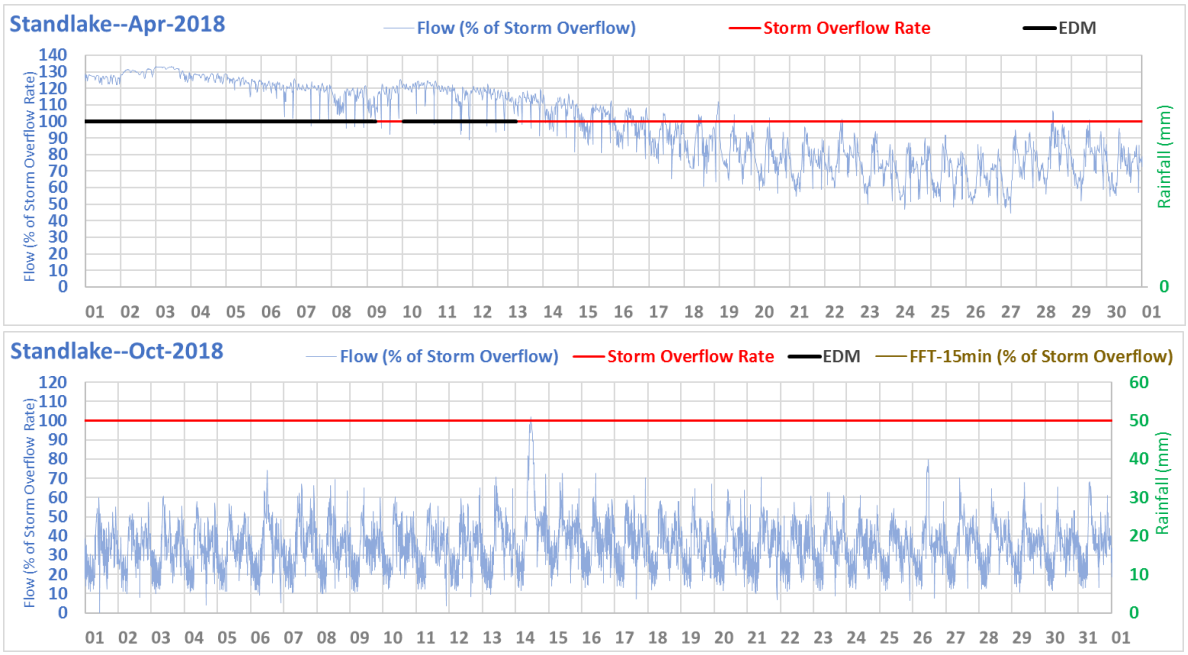
In the chart below showing sewage flow passed to the treatment process (FFT) (blue curve), the daily rainfall (mm) is included as a column inset by the grade to see how "exceptional" it is. The heaviest rainy days of the top 10% might be considered exceptional i.e. over grade 6/7. 10% is quite a generous range for exceptional but still gives an interesting interpretation. For example, for March 2018 you arrive at only **2 days when rainfall might be considered exceptional** whereas **spills occurred on 24 days** (26 mm is a grade 9 for instance). The continued flow clearly exceeds the storm overflow rate during the horizontal flow episodes corresponding to spills. However, this would suggest that many of the spills are caused by groundwater ingress since they occur when there is no or negligible rainfall.



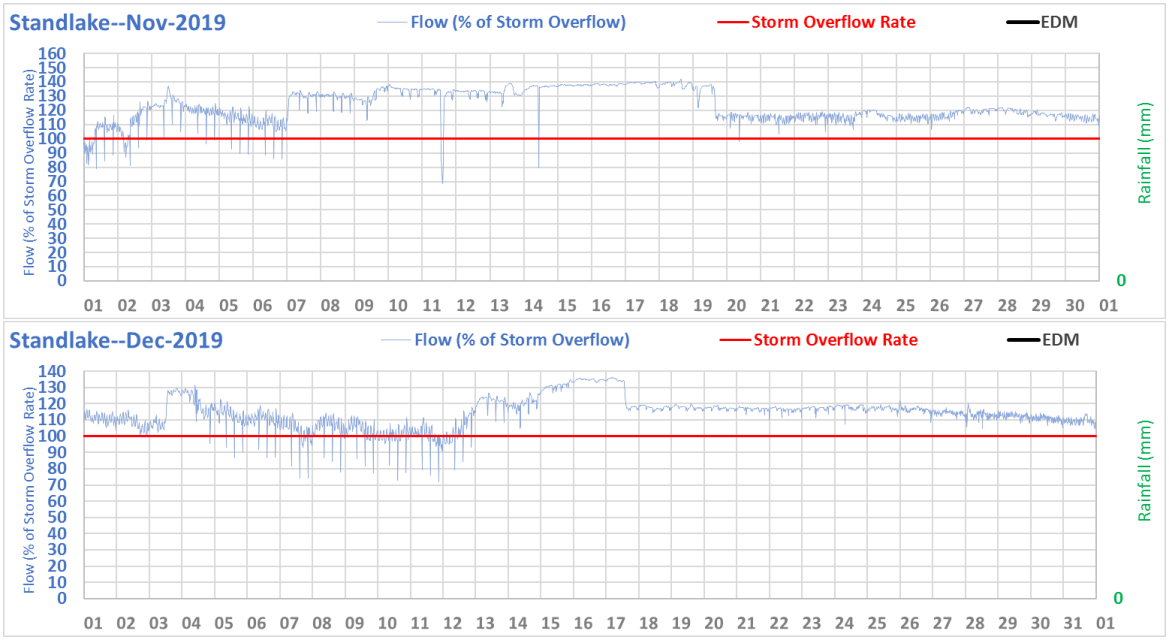
Sewage flow receiving full treatment at Ben Rhydding STW (Yorkshire Water)

Annexe 5 EDM devices appear to miss spills at Standlake STW (Thames Water)

In their spill detection return to the EA for 2018, Thames Water reported that at Standlake STW the EDM device was operational for 99% of the time with 1 spill of 0.4 hrs detected. Through an EIR request, EDM data was provided for 2018 with a proviso that the data had not been verified. The treated effluent flow for April 2018 with an overlay of EDM data shows typical flattened flow during a spill. In contrast, the normal diurnal flow during dry weather is shown immediately after for October 2018.



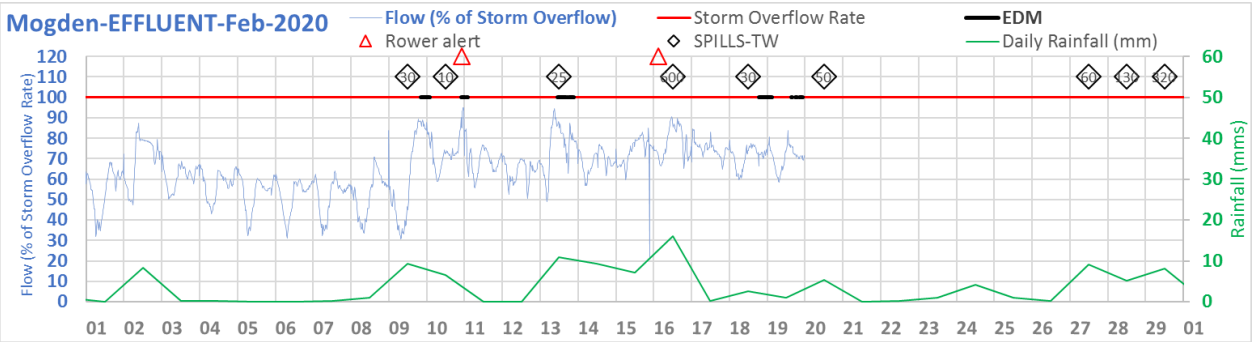
In their spill detection return to the EA for 2019, Thames Water reported that at Standlake STW the EDM device was operational for 96% of the time and that no spills were detected. Yet, both treated effluent charts for November and December 2019 show strong evidence of untreated sewage spills.



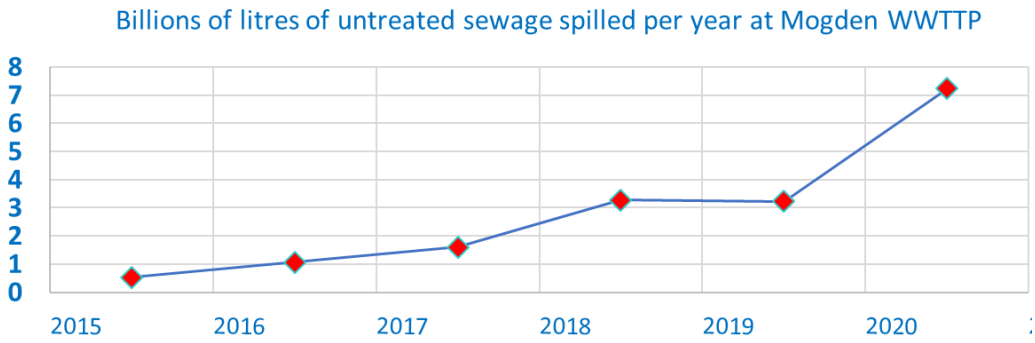
Annexe 6 EDM devices appear to miss spills at Mogden STW (Thames Water)

Mogden STW, operated by Thames Water and the third largest plant in England, is unique in that spills of untreated sewage are recorded in three different ways. Besides the EDM device, Mogden has a meter that records the volume of untreated sewage spilled and Thames Water send out warnings for rowers and other users that a spill is imminent or has occurred, typically within the previous hour.

On February 16th 2020, a spill of 600 million litres of untreated sewage was recorded by the volume meter but was missed by the EDM device. This is equivalent to 240 Olympic sized swimming pools of untreated sewage being released to the River Thames in one day.



In 2019, the EDM also failed to register a spill on 7 of 26 days when diluted sewage was released. This should be of concern given that the volume of untreated sewage discharged from Mogden STW during the period 2015 to 2020 has increased seven-fold. Notable are two days in November when more than 1 billion litres of untreated sewage was released on each day – equivalent to 400 Olympic sized pools per day.



Figures derived from Thames Water monthly records published on their website

Annexe 7 Unreported spill identified from logbook entries at Northleach STW (Thames Water)

Attention was drawn to Northleach STW in autumn 2018 when effluent flow data for 2016 was provided by Thames Water under EIR_4_12. It was immediately noticed that the treated flow out of the works was recorded as "zero" between January 31st and May 23rd 2016 as in Fig. 1 below:

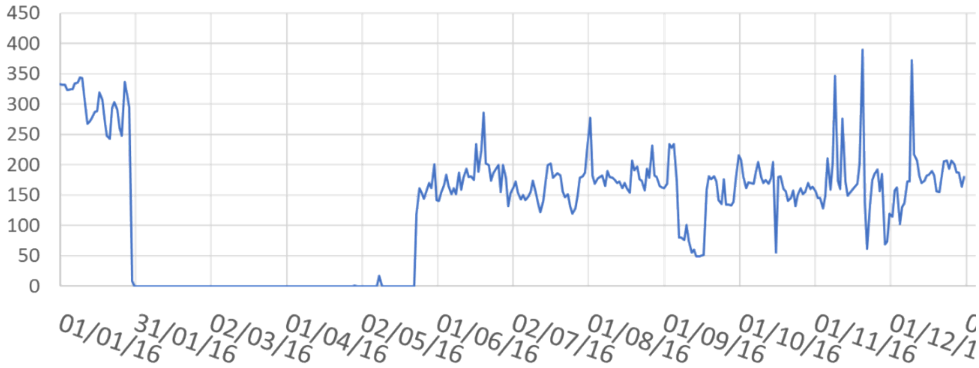


Figure 1: zero recorded effluent flow at Northleach STW Jan 31st to May 23rd 2016

When this long period of "zero" outflow was reported to Thames Water and EA staff, both suggested a faulty flow meter as a likely explanation. EIR requests were used to obtain telemetry alarm data and log book entries by visiting operational staff. On February 9th 2016, the operator had noted the following:

> *Pumped a lot of flood water out on to storm land … found **SEWAGE COMING UP FROM GROUND OUTSIDE**… ordered MTS on site for 10/02/16 to clear site and properly locate issue*

This spill was never reported to the EA.

Annexe 8

Apparent breaches of completeness of treatment records (Southern Water, 2017-2019)

Southern Water (SW) has provided access to TDV records for 119 STWs (2015-2019) on its website. Tables 1-3 summarise apparent breaches of the completeness of these records for 2017, 2018 and 2019.

county	STW	year	total missing > 37	contiguous gap > 14		
Hants	Chilbolton	2017	41	29	26/05/17	23/06/17
Hants	Kings Somborne	2017	49	33	12/08/17	13/09/17
Hants	Ludgershall	2017		29	19/10/17	16/11/17
Hants	West Wellow	2017		28	28/01/17	24/02/17
Kent	Camber	2017		24	01/01/17	24/01/17
Kent	Cherry Gardens Goudhurst	2017		19	25/09/17	13/10/17
Kent	Crowborough Redgate Mill	2017		15	12/01/17	26/01/17
Kent	Headcorn	2017		18	01/01/17	18/01/17
Kent	**Iden**	2017	48	29	21/01/17	18/02/17
Sussex	Nutley	2017	39	N/A		
Kent	Paddock Wood	2017	38	38	12/09/17	19/10/17
Kent	Rolvenden Layne	2017		19	11/03/17	29/02/17
Kent	Tunbridge Wells South	2017		28	22/05/17	18/06/17
Sussex	Goddards Green	2017	41	32	08/05/17	08/06/17
Sussex	Thornham	2017	73	31	01/01/17	31/01/17
Sussex	Blackboys	2017		15	24/02/17	10/03/17
Sussex	Chephurst Copse, Rudgwick	2017		20	28/07/17	16/08/17
Sussex	Grayswood	2017		31	25/10/17	24/11/17
Sussex	**Petworth**	2017		24	01/01/17	24/01/17
Sussex	Poynings	2017		21	04/05/17	24/05/17
Sussex	Storrington	2017		17	29/05/17	14/06/17
Sussex	Tillington	2017	108	40	01/01/17	09/02/17
Sussex	Tillington	2017		18	10/07/17	27/07/17
Sussex	Tillington	2017		42	14/09/17	25/10/17
IoW	Wroxall	2017		15	29/03/17	12/04/17

Table 1: 32 apparent breaches of EA requirements for sewage treatment records for Southern Water for 2017

county	STW	year	total missing > 37	contiguous gap > 14		
Hants	Beaulieu Village	2018	100	24	27/06/18	20/07/18
Hants	Beaulieu Village	2018		70	23/07/18	30/09/18
Hants	East Boldre	2018		17	18/03/18	03/04/18
Hants	Whiteparish	2018		15	23/07/18	06/08/18
Kent	**Iden**	2018		19	09/11/18	27/11/18
Kent	Lamberhurst	2018		15	06/09/18	20/09/18
Kent	Teynham	2018	39	N/A		
Kent	Warehorne	2018	95	78	26/02/18	14/05/18
Kent	Westfield	2018	59	N/A		
Sussex	Ardingly	2018		34	24/01/18	26/02/18
Sussex	Ashington	2018		15	21/09/18	05/10/18
Sussex	Barcombe New	2018	46	N/A		
Sussex	Blackboys	2018		15	26/09/18	05/10/18
Sussex	Fernhurst	2018		20	27/11/18	16/12/18
Sussex	**Petworth**	2018		22	27/03/18	17/04/18
Sussex	Sidlesham	2018		15	24/03/18	07/04/18
Sussex	Slinfold	2018		15	02/07/18	16/07/18
Sussex	Staplefield	2018		16	19/02/18	06/03/18
Sussex	Storrington	2018		18	09/11/18	26/11/18

Table 2: 21 apparent breaches of EA requirements for treatment record completion for 2018

county	STW	year	total missing > 37	contiguous gap > 14		
Hants	Wickham	2019		17	24/09/19	10/10/19
Kent	Crouch Farm, Mayfield	2019		18	24/07/19	10/08/19
Kent	Ferry Hill, Winchelsea	2019	45	N/A		
Kent	Headcorn	2019	46	39	23/06/19	31/07/19
Kent	**Iden**	2019	43	29	01/07/19	29/07/19
Kent	Meres Farm Mayfield	2019		17	27/07/19	12/08/19
Kent	Quickbourne Lane Northiam	2019	88	N/A		
Kent	Robertsbridge	2019	49	N/A		
Kent	Rolvenden Layne	2019		18	03/11/19	20/11/19
Kent	Sutton Valence	2019		20	13/07/19	01/08/19
Kent	Underhill Goudhurst	2019	41	N/A		
Kent	Weatherlees B	2019		21	10/07/19	30/07/19
Kent	West Hoathly	2019	38	1	05/12/19	31/12/19
Sussex	Bury	2019	57	N/A		
Sussex	Liss	2019	57	N/A		
Sussex	Newick	2019	76	N/A		
Sussex	Ockley West	2019	46	16	20/08/19	04/09/19
Sussex	Park Road Handcross	2019	45	N/A		
Sussex	**Petworth**	2019		25	14/07/19	07/08/19
Sussex	Wivelsfield	2019	43	15	21/08/19	04/09/19

Table 3: 25 apparent breaches of EA requirements for treatment record completion for 2019

February 2021