Environment Agency	**EPR Compliance Assessment Report**	Report ID: S/0745272

This form will report compliance with your permit as determined by an Environment Agency officer

Site	Oxford (Sandford), Oxford (Sandford), -	Permit Ref	TEMP.2827		
Operator/ Permit holder	THAMES WATER UTILITIES LTD				
Date	30/06/2021	Time in	10:50	Out	12:45
What parts of the permit were assessed	Wastewater Treatment Works / STW settled storm sewage, Wastewater Treatment Works / STW storm sewage overflow				
Assessment Type	Site inspection: Wastewater Treatment Works - Operator Self Monitoring (OSM)	EPR Activity:	Water Discharge		
Recipient's name/position	Compliance Assessment Report Inbox & [redacted]				
Officer's name	Rose Bull, R Davis, J Outhwaite, E Bilankulu, [redacted]	Date issued	25/11/2021		

Section 1 - Compliance Assessment Summary

This is based on the requirements of the permit under the Environmental Permitting Regulations. A detailed explanation and any action you may need to take are given in the "Detailed Assessment of Compliance" (section 3). This summary details which conditions we have assessed, where we believe any non-compliance with the permit has occurred, the relevant condition and how the non-compliance has been categorised using our Compliance Classification Scheme (CCS). For more details of our CCS scheme, contact your local office.

KEY: **C1, C2, C3, C4** = CCS breach category **A** = Assessed (no evidence of non-compliance

Activities and Permit Conditions Assessed	CCS Category	Condition(s) breached
1 - Wastewater Treatment Works / STW settled storm sewage		
2.3d. Overflow to storage PFF/ due to rainfall or snowmelt (b5)	C3	3.1
2.3e. Storage provided and emptied (b5)	C2	3.1
2 - Wastewater Treatment Works / STW storm sewage overflow		
3.3d. EDM Monitoring (g1)	A	N/A

Descriptive Works Fail	N/A	Number of breaches recorded	2

If the total no of breaches is greater than zero, then please see Section 3 for details of our proposed enforcement response

Section 2 – Compliance Assessment Report Detail

This section contains a report of our findings and will usually include information on:

- the part(s) of the permit that were assessed (e.g. maintenance, training etc)
- where the type of assessment was 'Data Review' details of the report/results triggering the assessment
- any non-compliances identified
- any non-compliances with directly applicable legislation
- details of any multiple non-compliances
- details of advice given
- any other areas of concern
- all actions requested
- any examples of good practice.
- a reference to photos taken

This report should be clear, comprehensive, unambiguous and normally completed within 14 days of an assessment.

Thank you to Performance Manager [redacted] for accompanying us during this site inspection of Oxford Sewage Treatment Works (STW). Jackie Outhwaite was also in attendance with two newly recruited Environment Officers (Ebun Bilankulu and [redacted]) for training purposes.

The main purpose of the visit was threefold: (i) to conduct a routine regulatory visit; (ii) to inspect storm overflow infrastructure following concerns in relation to the operation of the storm overflow and (iii) to inspect storm separation and flow to full treatment (FtFT) control following concerns relating to FtFT compliance including concerns raised by third parties such as members of the public, the Angling Trust and Windrush Against Sewage Pollution; and in response to an incident on 19 April 2021 (NIRS 01924826) where sludge from the AD process spilled into the watercourse. The full context of the inspection was explained to DF by Robert Davis (RD) at the start of the inspection including the wider storm overflow compliance assessment being undertaken for this site for the period 1 October 2019 – 15 April 2021.

Please note there are two Compliance Assessment Report (CAR) forms which relate to this inspection. See this CAR form (Report ID: S/0745272) which relates to aspects of the inspection relevant to Environmental Permit TEMP.2827 and CAR form Report ID: S/0745271 which relates aspects of the inspection relevant to Environmental Permit CTCR.0709. There is some repetition between these CAR forms, but the two should be read together.

The effluent process was inspected from inlet to outlet (please see CAR form Report ID: S/0745271) including the storm infrastructure on the site. The following observations made on the day of inspection:

Inlet:

- All flows are pumped into Oxford STW from 6 pressure mains. A balancing tank receives influent from 4 of them and 2 (from Littlemore SPS) go directly into the inlet.
- We were informed that it can be difficult to manage flows coming into the site:
- The pumping stations - particularly Littlemore SPS (the largest SPS outside of London), has a pumping regime that at times conveys too much flow into the inlet of the site. This can result in the inlet being temporarily overwhelmed due to an intermittent influx of flow and we understand this can cause overflows into storm tanks before FtFT is met and / or in dry weather.
- Groundwater infiltration is an issue which can result in sustained high flows into the site including during dry periods. One issue in particular is infiltration into brick sewers close to the River Thames.
- The catchment size is large (approx. a 20 km reach) which means sewerage catchment drain down time can take a while as effluent and rainfall is drained and pumped through the catchment to the STW.

- We were informed that as a result of a combination of the above, and in particular infiltration issues, the site routinely makes sustained overflows from storm infrastructure on consecutive dry days (e.g. up to 5-7 dry days). Please note this raises a significant and serious compliance concern. As TWUL is aware we are conducting an initial storm overflow compliance assessment for this site and we will in due course communicate the outcome of that via formal written channels in Compliance Assessment Report (CAR) forms.

Additional observations and understanding relating to the operation of the inlet and storm separation:

- The site receives high volumes of 'rag'. We observed piles of rag which had accumulated near the inlet screens. There is a crane system in place to manually remove this on a regular basis. The volume of 'rag' is a serious problem for Oxford STW due to the relatively high population equivalent and sewer abuse (e.g. disposal of wet wipes into sewers etc.).

- The influent is passed over 3 'Mechana' conveyor screens - the number in operation at any moment in time depends on the volume of flow being received which is detected by a sensor. A sensor also detects when wash-down is required and triggers this when necessary. The screens had recently been maintained and all were fully operational. There are plans to install a further two screens at the site as part of a significant upgrade under Price Review (PR) 19 U_IMP5 to increase the FtFT the site is capable of treating.

- The flow then moves to a detritor to remove grit. We were informed the detritor is effective and grit wasn't a particular issue for the site despite the relatively urban catchment.

- A penstock and hydrobreak work in tandem to control FtFT, with additional flows going over the penstock weir to storm storage. We were informed during the inspection that the current FtFT is 1047 l/s. The Site Operating Manual states: FtFT of 1040 l/s.

- The flow was running smoothly along the channels and was quite dark in colour. We were informed this unusually dark discolouration was a known characteristic of the sewage at this site due to the nature of the mixed liquors returned to the inlet (please see the fourth bullet point below in this section) and the effluent coming in from Littlemore SPS which can sit in a large wet well at the SPS with risk of becoming dark and septic before being pumped to the site.

- There was an inlet flow meter on each of the two channels which measure the amount of flow being passed forward into the process. These meters are calibrated approximately once per year and provide reliable data.

    - Data from these two meters is added together to calculate FtFT.

    - MCERTs final effluent flow data is a good proxy for FtFT at this site within a ~10-15% margin of error.

    - We were informed inlet flow data is reliable and so TWUL is confident it is passing forward FtFT when required using the penstock and hydrobreak to control what is passed forward into the effluent process.

    - The combined total of the inlet flow meters have a higher reading than the FE monitor as they also measure return liquors (see **'**Sample Points & MCERTS Final Effluent flow Monitoring') below for further details**.**

- Having looked at the Process Block Diagram for the site and the Site Operating Manual it appears that return liquors come back into the inlet upstream of the hydrobrake and storm weir. This presents the risk that high strength liquors could be lost to the environment when FtFT is being met and when the storm overflow is operational. We recommend TWUL look at this making sure FtFT can be met when required taking into account the impact of return

liquors on flow. Introducing return liquors downstream of the hydrobrake and storm weir would ensure the liquors always enter the effluent process and so undergo secondary biological treatment which will reduce environmental risk. It also appears cess imports enter the inlet upstream of the hydrobrake and storm weir. This presents a compliance risk if cess imports are occuring when FtFT is being met and when the storm overflow is operational. Cess imports should only be made when there is the headroom to treat the effluent.

Primary Settlement:

- After flow has passed through the inlet it then goes to 8 circular and 3 rectangular Primary Settlement Tanks (PSTs).
- We were informed one of these rectangular tanks was historically supposed to be used as a balancing tank or additional storm tank, but it never has been and never could be used by TWUL for these purposes. This is because TWUL need to use it as a PST 100% of the time and do not have the redundancy to take it out so cannot use it as a balancing tank or storm tank. Additionally, a lot of maintenance would be required should they ever chose to do this which would not be practicable. This is contrary to the position stated in the Site Operating Manual for the site which on page 20 of 411 states "There are 3 x rectangular Storm tanks and a 4th Tank that can be used either as a Storm Tank or as a Primary Settlement Tank". However, it is our understanding the 4th tank is not in fact available and it would not be practicable to use it so should not be factored in to storm storage capacity. The stated Storm Tank Capacity is 6855m3, but it is not clear if this includes the volume of the 4th tank which is not in practice available. We recommend you update the Site Operating Manual accordingly.
- For further detail relating to PSTs please refer to CAR form Report ID: S/0745271.

Storm Tanks:

- The site has 3 large storm tanks, which are separated by partition walls with gaps at the top and bottom to allow the tanks to fill and drain sequentially. The tanks fill consecutively then spill once the third tank has been filled.
- Please refer to 'Inlet' for known issues with flow management and storm tank use.
- The channels leading to the storm tanks were wet and the sludge at the base of the tanks was wet, indicating they had been used recently. On the day we attended the weather conditions were dry. These observations raise potential compliance concerns.
- While at the storm tanks the first tank began to fill which we were informed was due to pumping station regimes feeding into the inlet (please see Photograph 1). **This is a breach of condition 3.1 of Environmental Permit TEMP2827 because the storm tank was filling not due to rainfall / and or snowmelt and was being used as a balancing tank and there was also a build up of sludge at the base of the storm tanks that had not been removed because it would require manual intervention. Therefore, the overflow is not being maintained in an effective operational condition and this presents environmental risk.**
- We were informed that initially effluent fills a deep channel at the back of the tank – if the channel overtops into the main tank then it is likely due to rainfall, but if it is contained in the channel it's likely due to an influx of effluent due to the pumping regimes from the SPS(s) that feed into Oxford STW. Flows from storm tanks are returned to the inlet.
- RD & JO discussed with DF the potential need for TWUL to add another balancing tank to the inlet to address this issue. We were informed a balancing tank was needed to prevent storm tanks being used due to pumping regimes from relevant SPSs.

- Please note storm tanks should only fill or discharge due to rainfall and / or snowmelt (i.e. not due to SPS pumping regimes or due to groundwater infiltration). Please see below section of 'Groundwater Infiltration' for further information about storm overflow compliance.
- The tanks had all recently been used due to the heavy rain there had been over the previous weekend (26-27/06/21). There was a layer of sludge on the base of each tank. We discussed the need to clean this before it goes septic – we were informed this is usually done once it crusts over (please see Photographs 2-4).
- Once all storm tanks are full effluent spilling from the final storm tank passes through a large underground pipe / void to the storm sample chamber, which is a concrete chamber where the EDM monitor is located.
- The chamber itself holds residual storm sewage and also holds back what remains in the pipe, thereby effectively acting as a fourth storm tank / storm tank sewer which never drains out.
- This results in sewage going black and septic which gets pushed out on first flush. During our site inspection dark septic sewage was evident in this chamber. **This has the potential to increase the polluting effects of the discharge and could in certain conditions cause a significant pollution incident.**
- We have already detected water quality impact from storm overflows that may potentially be being intensified by this first flush of septic sewage. We have detected this impact using an instream water quality monitor which is situated in the watercourse downstream of Oxford STW to assess water quality following a series of reported concerns from members of the public.
- The volume of potentially septic sewage stored in this underground wide diameter pipe / void is significant. We were informed TWUL had tried to drain it down at one point using tankers, but despite tankering effluent all day (when the 3 main storm tanks were empty) the effluent kept coming and the pipe / void was not emptied successfully (see Photograph 5). This indicates that a significant amount of potentially septic non-storm sewage is stored in the chamber, pipe and underground cavity.
- **This is a breach of condition 3.1 of Environmental Permit TEMP2827 because the overflow is not being maintained in an effective operational condition because the storm tank system cannot be fully emptied and returned to the process. We have recorded this a significant (CCS2) permit breach because the first flush of this concentrated non-storm sewage could cause a significant impact in low summer flows due to lack of dilution in the receiving watercourse.**

Storm Sample Point & MCERTS Final Effluent Flow Monitoring:

- The storm sample point was observed.
- The FE MCERTS flow monitor data is used in combination with the inlet flow meter to check FfFT is being passed forward when required.
- At the time of the visit, the FE MCERTS flow monitor read 859.65 l/s and the combined total of the inlet flow meters was checked within the same c.10 minute timeframe and read 961 l/s.

Groundwater Infiltration:

We are concerned about the impact groundwater infiltration may be having on the operation of the storm overflow at Oxford STW. We are aware there is a Groundwater Impacted System

Management Plan (GISMP) for this site and we note there is a Storm Overflow Assessment Framework (SOAF) investigation into the root cause and impact of spills arising from the storm overflow at Oxford STW.

It was clear from information gathered during the inspection, and from the existence of the GISMP, that groundwater infiltration is an issue at Oxford STW. We are concerned this may be causing or contributing to prolonged overflows made from storm infrastructure in dry weather. We generally do not expect to see discharges from storm overflows occurring after one dry day (i.e. after 24 hours of under 0.25mm of rainfall) which, if occurring, may indicate non-compliance although catchment hydraulics would need to be taken into account in any compliance assessment. We recognise Oxford STW serves a relatively large catchment. As TWUL is aware we are conducting an initial storm overflow compliance assessment for this site for the period 1 October 2019 – 15 April 2021. This assessment will also check compliance in relation to a number of incidents (duplicated to NIRS 01889917) that have been reported which we believe may be related to overflows made from storm infrastructure at Oxford STW between 21/01/21 and 15/02/21. We will write to TWUL via Compliance Assessment Report (CAR) form in due course in relation to the outcome of this assessment. For further information please refer to our letter to [redacted] (TWUL Director of Science and Environmental Assurance) of 25 October 2021.

Please note discharging from storm overflows to the environment is not permitted where the cause is groundwater infiltration (i.e. not due to rainfall and/or snowmelt) or other factors like SPS pumping regimes, irrespective of whether FtFT (stated overflow setting in the permit or design capacity where no overflow setting is stated) is being met.

Please see actions relevant to the points above in this CAR form in Section 4 and 4b.

Section 2 – Photographic Evidence

Photograph 1 - Effluent entering Storm Tank 1



Photograph 2 - Sludge in Storm Tank 1



Photograph 3 - Sludge in Storm Tank 2



Photograph 4 - Sludge in Storm Tank 3



Photograph 5 - Dark septic sewage being held up between storm overflow and Storm Tank 3



Section 3- Enforcement Response	Only one of the boxes below should be ticked
You must take immediate action to rectify any non-compliance and prevent repetition. Non-compliance with your permit conditions constitutes an offence and can result in criminal prosecutions and/or suspension or revocation of a permit. Please read the detailed assessment in Section 2 and the steps you need to take in Section 4 below.	
Other than the provision of advice and guidance, at present we do not intend to take further enforcement action in respect of the non-compliance identified above. This does not preclude us from taking enforcement action if further relevant information comes to light or advice isn't followed.	
In respect of the above non-compliance you have been issued with a warning. At present we do not intend to take further enforcement action. This does not preclude us from taking additional enforcement action if further relevant information comes to light or offences continue.	
We will now consider what enforcement action is appropriate and notify you, referencing this form.	**X**

Section 4- Action(s)

Where non-compliance has been detected and an enforcement response has been selected above, this section summarises the steps you need to take to return to compliance and also provides timescales for this to be done.

Where the **CCS Category** is marked **N/A** then the specified action does not relate to a permit condition.

Criteria Ref.	CCS Category	Action Required / Advised	Due Date
See Section 1 above			
1 - 2.3d	C3	Please take action to move back into compliance. This may involve investigating the issue and adjusting SPS pumping regimes and / or installing a balancing tank and removal sludge build up in the base of the storm tanks.	31/12/2021
1 - 2.3e	C2	Please investigate the configuration ohe pipe between the final storm tank and storm overflow chamber. Please provide an estimation of the volume of this effluent and inform us of the chosen compliance solution and timeframe for delivery.	31/12/2021
OA01	N/A	We recommend TWUL investigates the impact of groundwater infiltration on the operation of the storm overflow at Oxford STW to establish if overflows after one full dry day are occurring.	31/12/2021
OA02	N/A	If TWUL identifies overflows from storm infrastructure are occurring after one full dry please investigate and address the root cause (s) taking catchment hydraulics into account. Please notify us if TWUL identify potential permit non-compliance.	31/12/2021
OA03	N/A	Please calculate the storm storage capacity of the site and provide us with this figure confirming whether or not that includes the fourth storm tank / Primary Settlement Tank taking into account the concerns raised in this CAR form.	31/12/2021

Section 5 - Compliance notes for the Operator

To ensure you correct actual or potential non-compliance we may

- advise on corrective actions verbally or in writing
- require you to take specific actions in writing
- issue a notice
- require you to review your procedures or management system
- change some of the conditions of your permit
- decide to undertake a full review of your permit

Any breach of a permit condition is an offence and we may take legal action against you.

- We will normally provide advice and guidance to assist you to come back into compliance either after an offence is committed or where we consider that an offence is likely to be committed. This is without prejudice to any other enforcement response that we consider may be required.
- Enforcement action can include the issue of a formal caution, prosecution, the service of a notice and or suspension or revocation of the permit.
- A civil sanction Enforcement Undertaking (EU) offer may also be available to you as an alternative enforcement response for this/these offence(s).

See our Enforcement and Civil Sanctions guidance for further information

This report does not relieve the site operator of the responsibility to

- ensure you comply with the conditions of the permit at all times and prevent pollution of the environment
- ensure you comply with other legislative provisions which may apply.

Non-compliance categories

CCS category	Description
C1	A non-compliance which could have a **major** environmental effect
C2	A non-compliance which could have a **significant** environmental effect
C3	A non-compliance which could have a **minor** environmental effect
C4	A non-compliance which has **no** potential environmental effect

Section 6 – General Information

Data protection notice

The information on this form will be processed by the Environment Agency to fulfill its regulatory and monitoring functions and to maintain the relevant public register(s). The Environment Agency may also use and/or disclose it in connection with:

- offering/providing you with its literature/services relating to environmental matters
- consulting with the public, public bodies and other organisations (e.g. Health and Safety Executive, local authorities) on environmental issues
- carrying out statistical analysis, research and development on environmental issues
- providing public register information to enquirers
- investigating possible breaches of environmental law and taking any resulting action
- preventing breaches of environmental law
- assessing customer service satisfaction and improving its service
- Freedom of Information Act/Environmental Information Regulations request.

The Environment Agency may pass it on to its agents/representatives to do these things on its behalf. You should ensure that any persons named on this form are informed of the contents of this data protection notice.

Disclosure of information

The Environment Agency will provide a copy of this report to the public register(s). However, if you consider that any information contained in this report should not be released to the public register(s) on the grounds of commercial confidentiality, you must write to your local area office within 28 days of receipt of this form indicating which information it concerns and why it should not be released, giving your reasons in full.

Customer charter

What can I do if I disagree with this compliance assessment report?

If you are unable to resolve the issue with your site officer, you should firstly discuss the matter with the officer's line managers. If you wish to raise your dispute further through our official Complaints and Commendations procedure, phone our general enquiry number 03708 506 506 (Mon to Fri 08.00–18.00) and ask for the Customer Contact team or send an email to enquiries@environment-agency.gov.uk. If you are still dissatisfied, you can make a complaint to the Ombudsman. For advice on how to complain to the Parliamentary and Health Service Ombudsman phone their helpline on 0345 015 4033.