SOAF Investigation Output Summary

Dŵr Cymru Welsh Water

Cyfoeth Naturiol Cymru Natural Resources Wales

Reference: SOAF.R 00001

Please see Aurill Statement Technical Guidance for further information

ASSET INVESTIGATION DETAILS					
SAP Asset Name:	Tywyn		**Asset Template reference**	CG0351402-TYWYN STW MORFA GWYLLT TYWYN-2440-Stage 1 - OC-Dwyfor a Meirionnydd	
Investigation Type	SOAF (River)				
Year of breach:	*2019*	**Spill Trigger cause:**	*OC Continuation Restriction (Flow Control)*		
Year of Investigation:	*2022*	**Investigation year performance:**	*35*		
Population of Asset	*5711*	**Modelled Performance: (DESIGN) / (CALIBRATED)**	*0 / 1*		
Permit Details					
Storm Permit ID:	CG0351402	**Storm Permit Name:**	TYWYN SEWAGE TREATMENT WORKS		
Asset NGR:	SH5718801825	**Waterbody ID**	GB41002G203200		
Discharge NGR:	SH5720001920	**Water body Discharge location**	Un-named trib north of Afon Dyffyn-G		

Brief description of asset
(Screen, PFF flow control, Storage, outfall)

Incoming line: 2x 900 mm gravity pipe; CSO Type: High-Sided Weir; Screening: 10mm bar screen; Flow Control: duty + variable speed assist pumps; PFF Pipe: 200 mm + 300 mm rising mains; Storage: 460 m3 (Modelled); Consent: 159 l/s (Permit); SocA: 115.6 l/s

If the inlet pump station pumps fail or are beaten the level in the pump sump rises and the incoming network becomes surcharged. The level in overflow chamber rises and spill flows pass over the weir and through the screen into the overflow pump station, from where spill flows are pumped to the ditch

SOAF STAGE 1	
Details of assessment:	Asset condition surveys supported by hydraulic model assessment of the asset performance against available telemetry information (EDM and radar rainfall datasets). Additional flow and rainfall monitoring was undertaken to improve the baseline model accuracy and assist in defining the root cause of spills.
Permit Compliance	
PFF	Design Compliant – Operational Intervention required to restore
Storage	Compliant
Screening	Compliant
Bespoke/Other	N/A

SOAF Stage 1 findings

Following the hydraulic model assessment, the cause of the high spills at the asset is concluded to be OC Flow Control.

The predicted pass-forward flow is within 10% of consent prior to the first spill. There is uncertainty on whether this is consistently maintained throughout the assessment year.

The model is fit for use, based on the reported spill numbers and telemetry trends.

Spills can occur from the inlet pumping station (3244) or the storm tank (3244#2) at this site.
A spill match could be achieved at 3244#2. The reported (81) and calibrated (88) spill count and overall timing of the depth response between the model and EDM (3E66012) provides confidence in the modelled operation of the treatment works.
A spill match at 3244 could not be achieved whilst maintaining the surveyed/designed discharge rates on the continuation pumps. There is no flow telemetry associated with these pumps, resulting in a lack of visibility on operation.
A bespoke scenario with maximised inflow to 3244 was trialled to see if the reported spill count (35) could be achieved whilst maintaining the surveyed/designed discharge rates. The bespoke scenario provided an improved spill count at 3244 (10), but resulted in a considerable overprediction at 3244#2 (187). The calibrated scenario is deemed to be a better representation of overall operation at the site.
This assessment has therefore concluded based on the available information that the operation of the continuation pumps is contributing to underprediction of spills in the model.

Agreement between timing and duration of depth response and overall spill count between model and 3E66012 at WwTW storm tank 3244#2 provides confidence in the model operation at the treatment works. Despite this, a spill match at CSO 3244 could not be achieved whilst maintaining the surveyed/designed discharge rates on the continuation pumps (inlet pumping station). There is no flow telemetry associated with the continuation pumps, resulting in a lack of visibility on pump operation. This assessment has therefore concluded that the operation of the continuation pumps is contributing to underprediction of spills in the model. Future studies should be aware of the limited data at the time of this assessment that contributed to this outcome.

Cause of spill count :	**Other Cause**	**Yes**	**Catchment Hydraulic**	**No**	**Infiltration & IRP required**	**No**
Future Operational Management Proposal:	*Asset condition surveys supported by hydraulic model assessment of the asset performance against available telemetry information (EDM and radar rainfall datasets).* *Additional flow and rainfall monitoring was undertaken to improve the baseline model occur*					
Operational intervention required:	*Consider installation of ultrasonic sensor within CSO 3244 to gauge spills from this asset without the possible interference of flows from the outfall pumping station.* *Install flow meter on both rising main continuation pumps from inlet wet well to confirm PFF compliance. If this demonstrates the pumps are not consistently achieving the consented PFF, consider the following interventions:* *A) increased servicing and maintenance of continuation pumps.* *B) conduct hydraulic assessment of rising main performance with view to resolving capacity issues identified.* *Once these interventions are in place, the hydraulic modelling indicates the asset will be compliant with it's discharge permit.*					

SOAF Operational Intervention					
Start Date:	**Oct-24**	**Completion Date:**	*TBC*	**Indicative future annual spill performance** *(less than 40 do not continue to stage 2)*	0

Intervention Description:	**Telemetry has been identified as a factor in excess spills at this asset. The Job to the Telemetry maintenance team has been issued to address this problem.** **Pump Performance has been identified as a factor in excess spills at this asset, the assessment has determined that the pump performance requires a review and implementation of recommendations in order to achieve PFF.**				
Target Completion by Date:	**Oct-25**	**Data years to be excluded from future SOAF triggers calculations**	-	**Request to hold stage 2 surveys for environment recovery**	

SOAF STAGE 2					
Receiving Waterbody WFD Status			Moderate		
Stage 2a					
Aesthetic survey:	Spring		**Aesthetic Total score** (inclusive of amenity classification, previous complaints & pollutions)		
	Autumn				
Stage 2b				*Yes / No unable due to culverted watercourse*	
Invertebrate survey:	Spring		**Invertebrate survey score:**		
	Autumn				
Stage 2c Required:				*Yes / No*	
Stage 2c screening:		**Progressed through screening?**	**Stage 2c water quality assessment Score:**		

SOAF STAGE 3 - STEP 1>3							
Options assessed			Traditional Storage			PFF Increase	
Equivalent storage volume required		**Rainscape Cost**				**CBR**	
Bespoke future trigger agreement		**Traditional Storage**				**CBR**	
		Other				**CBR**	
Key Constraints							
Future Active Management Proposal							

Conclusion and Future Spill Reduction Proposals					
Summary	*TYWYN SEWAGE TREATMENT WORKSBased on the direction from the Welsh Government led Better River Quality Task Force, DCWW Storm overflow spill reduction programme will target the elimination of ecological harm and prevention of adverse ecological impact of any SO.* *With a large programme of assets requiring improvement priority will be given to CSOs having the greatest impact in the most sensitive receiving waters.* *To ensure that the improvement delivered is long term, the improvements for each site will be based on the expectation that water quality upstream of the discharge meets good or high ecological status (GES) irrespective of the actual status of the water.* *This approach has formed the basis of DCWW's portfolio investment plan for Storm Overflows.* *TYWYN SEWAGE TREATMENT WORKS was Shown to have an other cause issue resulting in higher spills which are expected to reduce once a resolution has been implemented.* *The asset will under take classification as part of DCWW's GN066 in AMP8, to establish any impact that there might be.*				
Asset Prioritisation Level	-			**Delivery Predicted Period**	-
Asset NEP ID	*N/A*	**Asset NEP Driver Code**	*N/A*	**Detailed Design Predicted Period**	-
Progression to Stage 5 In AMP	*No*	-			

SOAF AGREEMENT					
	Date	**SOAF STAGE**	**Name**	**Contact Details**	**Location of Output**
DCWW Approval	29/10/2024	*Stage 1 - OC*	**Christian Phillips Adams**	christian.phillipsadams@dwrcymru.com	*Email*
Regulator Liaison Date	Click here to enter a date.				
CSO Classification					
Satisfactory	**N**	Unsatisfactory	**Y**	Sub Standard	**N**
		Any operation in dry weather conditions?	**N**	Does not meet modern standards of engineering and aesthetic control for storm overflow structures set out in the British standard BS EN 752:2017 drain and sewer systems outside buildings	**N**

Any operation in breach of permit conditions?	**Y**	Does not have sufficient hydraulic capacity compared to accepted minimum design standards	**N**
Any significant visual or aesthetic impact due to solids or sewage fungus?	**N/A**	Risks becoming unsatisfactory because discharges have increased beyond the original design due to infiltration, growth and urban creep	**N**
Cause or significantly contributes to a deterioration in the biological or chemical status of the receiving water?	**N/A**		
Causes or significantly contributes to failures in bathing water quality standards for identified bathing waters?	**N/A**		
Causes or significantly contributes to failures in shellfish quality standards for identified shellfish waters	**N/A**		
Causes or significantly contribute to failures in water quality standards in coastal and transitional waters?	**N/A**		
Causes pollution of groundwater?	**N/A**		