Site Visit Report

Under the *European Union (Drinking Water) Regulations 2023*, the Environmental Protection Agency (EPA) is the supervisory authority in relation to Uisce Éireann and its role in the provision of public drinking water supplies. This audit was carried out to assess the performance of Uisce Éireann in providing clean and wholesome water to the public water supply named below.

The audit process is a sample of the performance of a water treatment plant and public water supply on a given date.

Water Supply Zone

Name of Installation	Bailieboro RWSS
Organisation	Uisce Éireann
Scheme Code	0200PUB0102
County	Cavan
Site Visit Reference No.	SV31953

Report Detail

Issue Date	12/11/2025
Prepared By	Veronica Boland

Site Visit Detail

Date Of Inspection	07/10/2025	**Announced**	Yes
Time In	11:10	**Time Out**	13:10
EPA Inspector(s)	Veronica Boland Donal Howley		
Additional Visitors			
Company Personnel	Uisce Éireann: Ambrose Galligan, Geraldine Friel, John McDonald, Regina Burke. Cavan County Council (working in partnership with Uisce Éireann): Declan Galligan.		

Summary of Key Findings

1. While there are plant shutdown setpoints in place for critical treatment processes at Kilmacross Water Treatment Plant (WTP), there is an absence of warning alarm setpoints on these processes to alert operators to deteriorating water quality or the failure of critical treatment processes before a plant shutdown occurs.
2. There is no combined filtered water turbidity monitor with appropriate alarms and inhibits installed at the WTP.
3. The final water turbidity and chlorine residual alarm time delay setpoints are not in accordance with the *EPA Water Treatment Manuals: Filtration and Disinfection*.

Introduction

The Bailieborough Public Water Supply (PWS) is supplied by Kilmacross water treatment plant (WTP) which produces 3,330 m3/d of treated water and serves a population of 8,932. The treatment at the plant comprises pH adjustment, manganese removal (via potassium permanganate), coagulation, flocculation, clarification by dissolved air flotation (DAF), rapid gravity filtration (RGF), chlorination and fluoridation. The raw water abstraction is from Lough Skeagh.

The audit was undertaken to assess Uisce Éireann's performance in producing clean and wholesome water with a focus on protozoal barriers.

Supply Zones Areas Inspected

The site areas inspected during the audit included:

• WTP treatment processes.

1. Management and Control

		Answer
1.1	Are suitable plant shutdowns/inhibits in place to prevent the entry of inadequately treated water entering the distribution network?	No

Comment

1. A final water turbidity shutdown setpoint of 0.6 NTU was in place at the treatment plant and had a time delay of 30 minutes. This shutdown time delay is not in accordance with the three consecutive minutes time delay (at a turbidity of 1NTU) as specified in the *EPA Water Treatment Manual: Filtration*.
2. The final water chlorine residual alarm setpoints of 0.4mg/l (Low) and 3mg/l (High), both with a time delay of 30 minutes are not in accordance with the recommended 5 minute time delay set out in the *EPA Water Treatment Manual: Disinfection*.
3. There is no shutdown/inhibit on final water pH. The Drinking Water Regulations 2023 state that the pH of treated water must be between 6.5 and 9.5 pH.

		Answer
1.2	Are suitable alarm settings in place to alert operators to deteriorating water quality and/or the failure of a critical treatment process?	No

Comment

1. When a shutdown set point is reached, the plant shuts down to prevent inadequately treated water leaving the plant. The WTP operational staff receive an alarm text notification that a shutdown has occurred. However, there are no warning alarms set at lower values that would alert the operator in the event of deteriorating water quality or the failure of a critical treatment process prior to reaching the shutdown setpoint. This limits the opportunity for early intervention and corrective action before automatic shutdown is triggered.

2. Protozoal Barriers Audits 2025

		Answer
2.1	Has UÉ identified the protozoal compliance log treatment requirement for the water treatment plant?	Yes

Comment

1. A source and sanitary survey was carried out and peer reviewed in 2022, and a log 3 protozoal treatment requirement is assigned to the Kilmacross WTP.

		Answer
2.2	Is the log treatment requirement achieved at the water treatment plant?	No

Comment

1. There is no turbidity monitor with alarms and inhibits for the combined filtered water at the WTP and therefore the plant is not being operated in accordance with the log credit performance approach.

		Answer
2.3	Are the filters designed and managed in accordance with EPA guidance?	No

Comment

1. There are three rapid gravity filters (RGF) at the Kilmacross WTP. Uisce Éireann staff advised that the filter media design depth is 1540mm. The current media is in place since pre 2014 and was assessed in 2017/2018 by a contractor. However, the current filter media depths were unknown as the filter media depth is not measured as part of operational checks.

		Answer
2.4	Does continuous turbidity monitoring indicate that the filters are operating effectively?	Yes

Comment

1. At the audit the filter turbidity readings were: Filter 1 - 0.034 NTU, Filter 2 - 0.025 NTU, Filter 3 - 0.038 NTU.
2. Trend data reviewed for the RGFs no. 1 and no. 3 indicated that the turbidity levels were below the 0.3 NTU *Cryptosporidum* barrier threshold. However, analysis of turbidity trends for RGF No. 2 identified occasional spikes exceeding the 0.3 NTU threshold, indicating possible issues with filter efficiency. The cause and duration of turbidity spikes above 0.3 NTU in RGF No. 2 (August and September 2025) should be investigated.

		Answer
2.5	Are there suitable plant controls to protect the protozoal barrier(s) and prevent inadequately treated water from entering the distribution network?	Yes

Comment
1. There are turbidity controls in place on each filter whereby backwash is triggered on time (24 hours), turbidity (0.3 NTU for 15 minutes), and headloss (2 bar for 10 minutes), runs to waste for 5 minutes.

		Answer
2.6	Are relevant alarms dialled out to allow a timely response by operational staff?	No

Comment
1. The Kilmacross WTP alarm notifications relate only to WTP shutdowns as there are no warning alarms installed at the Kilmacross WTP to alert operators. 2. Two operational staff at the WTP receive alarm notifications via text alert at the same time to notify them that the WTP has shutdown. There is no cascade system in place and there is no system in place to verify that alarms have been responded to.

		Answer
2.7	Are alarms and inhibits on each filter, on the combined filtered water and final water in accordance with the EPA Filtration Manual?	No

Comment
1. While there is an inhibit on each rapid gravity filter (RGF) of 0.3 NTU with a time delay of 15 minutes which triggers a backwash, there is no turbidity monitor with associated alarms and inhibits in place for the combined filtered water. 2. See section 1.1 in relation to final water inhibits.

3. Site Specific Issues

		Answer
3.1	Is final water turbidity trend data representative of treated final water quality?	No

Comment

1. Uisce Éireann staff advised that a sample line adjacent to the Clear Water Tank outlet continuously monitors final water turbidity, chlorine, and pH. A review of final water turbidity trends (final water turbidity sample line is adjacent to the CWT outlet) indicated that on occasion turbidity spiked above 1 NTU for more than 3 minutes. Uisce Éireann staff advised that these turbidity spikes are 'false readings' and not representative of the treated water quality leaving the WTP, that these spikes are due to a number of reasons including coating of sample line from manganese residual, to a surge on sample pump, and that until the turbidity sensor is cleaned, and potentially the sample line is flushed, the trended value of the final turbidity will remain high.

2. Following the audit, Uisce Éireann stated that a trial will be carried out later this year to determine if a different sampling set-up for the final water turbidity can be implemented once a suitable instrumentation/infrastructure is sourced and installed. The *EPA Drinking Water Advice Note No. 5: Turbidity in Drinking Wate*r and *EPA Water Treatment Manual: Filtration* guidance material should be consulted.

Recommendations

Subject	Protozoal Audit 2025 Recommendations	Due Date	12/12/2025
Action Text	**Uisce Éireann is responsible for ensuring a clean and wholesome supply of drinking water and should implement the following recommendations without delay.** 1. Install a turbidity monitor on the combined filtered water with appropriate turbidity alarm settings and inhibits, to ensure the 0.3 NTU *Cryptosporidum* barrier is not compromised and to verify that the plant operates in accordance with the log credit approach as set out in the *EPA Water Treatment Manual: Filtration*. 2. Review the final water turbidity alarm (shutdown) and chlorine residual alarms (shutdown) time delays at Kilmacross WTP (see section 1.1), and implement the appropriate alarm time delay setpoints as detailed in the *EPA Water Treatment Manuals: Filtration and Disinfection.* Submit a copy of the amended alarm setpoints to the EPA. 3. In addition to the shutdown alarms, consider installing appropriate warning alarms at the treatment plant to alert operators of deteriorating water quality or problems with a critical treatment process (refer to *EPA Water Treatment Manuals: Filtration and Disinfection*) and (ii) submit a copy of these warning alarm setpoints to the EPA. 4. Undertake (i) a review of the turbidity trends for filter no. 2 (see section 2.4) to determine cause of spikes and implement measures to ensure the 0.3 NTU Cryptosporidium barrier is not compromised (ii) a filter media assessment of each filter having regard to the *EPA Water Treatment Manual: Filtration* (iii) a method for regularly measuring filter media depth on each filter (iv) regular operational checks of the filters at the Kilmacross WTP and maintain adequate records of these checks in accordance with Table 5.4 and sections 5.5.4 and 5.5.6 of the *EPA Water Treatment Manual: Filtration*. 5. (i) Install low and high pH alarms on the final water and (ii) submit a copy of the pH alarm setpoints to the EPA. 6. Implement measures to ensure that the final water turbidity trend is reflective of the actual treated final water quality leaving the WTP (see section 3.1). 7. Ensure that (i) there is an appropriate cascade system in place for responding to alarms generated at the plant which allows for verification that an alarm has been responded to and (ii) there are documented site specific alarm response procedures and (iii) training is provided to relevant staff on alarm response and incident escalation. **Actions required by Uisce Éireann** Uisce Éireann should submit a report to the EPA on or before the above due date detailing the actions taken and planned, with timescales, to close out the above recommendations. The EPA advises that the findings and recommendations from this audit report should, where relevant, be addressed at other public water supplies.		