

# Site Visit Report

Under the European Union (Drinking Water) Regulations 2014 as amended, the Environmental Protection Agency is the supervisory authority in relation to Irish Water and its role in the provision of public water supplies. This Audit was carried out to assess the performance of Irish Water in providing clean and wholesome water to the visited public supply.

The audit process is a sample on a given date of the facility's operation. Where a finding against a particular issue has been reported this should not be construed to mean that this issue is fully addressed.

Water Supply Zone	
<b>Name of Installation</b>	Erris RWSS
<b>Organisation</b>	Irish Water
<b>Scheme Code</b>	2200PUB1007
<b>County</b>	Mayo
<b>Site Visit Reference No.</b>	SV20177

Report Detail	
<b>Issue Date</b>	30/03/2020
<b>Prepared By</b>	Michelle Roche

Site Visit Detail			
<b>Date Of Inspection</b>	03/03/2020	<b>Announced</b>	No
<b>Time In</b>	13:00	<b>Time Out</b>	15:30
<b>EPA Inspector(s)</b>	Michelle Roche Daryl Gunning		
<b>Additional Visitors</b>			
<b>Company Personnel</b>	Irish Water: Thomas Gibbons, Tommy Kearney Mayo County Council: Michael Conmy, Eileen Cavanagh, James Belfer, Phelim Conway, Eithne McDevitt, Colette Scahill		

## > Summary of Key Findings

1) The audit found that the Erris water treatment plant was being operated to a high professional standard. The plant had very high standards of hygiene and operational controls and records were well maintained.

2) On the morning of the audit the pH correction (soda ash) dose had not operated correctly as dosing lines became blocked. This resulted in a small amount of floc carry-over into filter no. 2, which was observed during the audit. Irish Water should investigate the cause of this incident and take preventative action to ensure that all chemical dosing equipment is working optimally, for effective coagulation.

## > Introduction

The Erris public water supply is sourced from Carrowmore Lake and serves just under 3,900 people in Bangor Erris, Belmullet and the surrounding areas. The supply also provides approximately 500m<sup>3</sup>/day of treated drinking water to three public group water schemes. The Erris water treatment plant is currently operating at 80% of its capacity and is running 24 hours a day. Caretakers are on-site at the treatment plant 7 days a week. Treatment on the Erris supply includes, pH correction of the raw water with soda ash prior to coagulation with aluminium sulphate, clarification, rapid gravity filtration and disinfection with sodium hypochlorite. The supply also has two chlorine booster stations in the network, one at the Tullagh Towers reservoir in Belmullet, and one in the town of Bangor Erris.

The audit was carried out as a routine audit to assess the performance of Irish Water in providing clean and wholesome drinking water in the Erris public water supply.

## > Supply Zones Areas Inspected

All areas of the treatment process at the Erris water treatment plant were inspected during the audit, including pH and coagulant dosing equipment, three flat-bottomed clarification tanks, three rapid gravity filters, disinfection dosing equipment and the on-site reservoir. The lake source was not inspected during this audit and neither were the two chlorine booster locations.



## 1. Source Protection

		Answer
1.1	Is the abstraction source(s) adequately protected against contamination?	Yes
<b>Comment</b>		
<p>The Carrowmore Lake is the water source for the Erris public water supply. The abstraction point on the lake is fitted with one coarse outer screen and two finer screens on the inside. The abstraction point has online monitoring for pH, colour, UVT and turbidity.</p>		



## 2. Coagulation Clarification Flocculation (CFC) Stage

		Answer
2.1	Is the pH within a suitable range for the coagulant used?	Yes
<b>Comment</b>		
<p>The raw water pH is in the range of 6.5 to 7, however the lake has naturally low alkalinity, therefore soda ash is dosed on the raw water to increase the alkalinity before coagulation. The soda ash dose is manually controlled according to extensive jar test dosing charts developed by Mayo County Council. Jar tests are also repeated on a monthly basis to ensure the dosing charts reflect current raw water conditions.</p> <p>A pH of 6.1 to 6.5 is aimed for before coagulation. A pH meter and alarm is in place on the rising main into the coagulation blending tank, before the aluminium sulphate coagulant is dosed. The pH meter has a low alarm of 5.8 and a high alarm of 6.8. This ensures that the pre-coagulation water pH is suitable for the aluminium sulphate coagulant to work effectively.</p> <p>Aluminium sulphate is dosed flow proportionally at 130mg/l prior to the blending tank. The water then falls over a cascade weir into the blending tank and polyacrylamide coagulant aid is dosed after the blending tank.</p>		

		Answer
2.2	Were the CFC tanks, channels and weirs observed to be clean, level and well maintained during the audit?	No
<b>Comment</b>		
<p>The coagulated water enters three flat bottomed clarification tanks after the blending tank. Sludge bleeds from the clarification tanks operate every 40 minutes for 60 seconds.</p> <p>Some of the clarification channels were observed to be tilted and water flow was not even through these channels. Mayo County Council staff stated that channel bolts needed to be tightened to rectify the issue and this would be carried out following the audit. Erris water treatment plant is located on a hilltop overlooking Erris Bay and the exposed location means that the clarification tanks can be affected by strong winds. Mayo County Council have installed high wooden fencing around the clarification tanks in order to minimise any affects.</p> <p>It was observed during the audit that each clarification tank had a metal pipe coming up the clarifier wall and bending back over the water surface within the clarifier. Mayo County Council informed the auditors that this was an air release pipe coming from beneath the clarifier laterals. During the audit, air and a small amount of water was being released from these pipes and the water was dropping back into the clarifiers. This has the potential to cause disturbance to the sludge blanket in the clarifiers, however, at the time of the audit the blanket was observed to be low in the clarifiers and no obvious disturbance was noted.</p>		

		Answer
2.3	Were the CFC processes visually observed to be operating appropriately during the audit?	No
<b>Comment</b>		

A small amount of pin floc was observed in clarification tank no.1 during the audit. Mayo County Council stated that soda ash dosing failed in the early morning on the day of the audit. Dosing lines blocked and the pH meter before the blending tank was reading a low pH of 5.2. The pH meter alarm was activated but the alarm did not call out to Mayo County Council staff as communications at the water treatment plant also failed at this time. The fault was noted when the caretaker arrived to the plant at 7am on the morning of the audit. The caretaker was able to clear the blocked line and restore soda ash dosing.

The failure of the soda ash dosing also resulted in a small amount of floc carryover into filter no. 2, which was observed during the audit. Final water turbidity at the time of the audit was 0.113 NTU, which indicates no adverse impacts of the soda ash dosing incident on final water quality. Final water turbidity trends from the week prior to the audit were examined and all turbidities were below 0.2 NTU.



### 3. Filtration

3.1

Was there visual indication that the filters were operating appropriately?

**Answer**

Yes

**Comment**

The Erris water treatment plant has three rapid gravity filters. Filter walls were observed to be clean and all three filters were fitted with new nozzles and re-sanded in 2019.

A small amount of floc carryover was observed in filter no. 2. This was suspected to be as a result of the soda ash dosing failure that occurred early on the morning of the audit. This incident is discussed in more detail in Section 2.3 of the audit report.

Filters are backwashed based on headloss and time. A backwash was observed in filter no. 1 during the audit. Air scour was even and no issues of mudballing were noted during the backwash. At the time of the audit filters were being brought back online with a slow start, following a backwash. A run to waste system was installed but had not yet been commissioned and connected to SCADA.

Final water turbidity was 0.113 NTU at the time of the audit.



## 4. Disinfection

		Answer
4.1	Is the disinfection system verified using monitors and alarms, with trended data recorded and accessible?	Yes
<b>Comment</b>		
<p>Filtered water is treated with 10-12% sodium hypochlorite disinfectant. Sodium hypochlorite is dosed flow proportionally using a duty/standby dosing pump arrangement with automatic switchover between the pumps. The dose is automatically corrected based on the chlorine residual readings at the outlet of the reservoir.</p> <p>There is a chlorine residual monitor at the water treatment plant with a contact loop in place and also two chlorine residual monitors on the outlet of the reservoir. The two sampling points on the outlet of the reservoir act to validate each other. All high and low chlorine residual set-points are alarmed and alarms call out to Mayo County Council staff on a cascade system. The water treatment plant will shut-down based on a low chlorine reading of 0.1 mg/l at the outlet of the reservoir and a high chlorine reading of 2.1 mg/l.</p> <p>A chlorine residual reading of 1.34 mg/l was recorded at the outlet of the reservoir during the audit.</p> <p>The Erris water supply has two chlorine booster stations in the distribution network to ensure the minimum chlorine residual requirement of 0.1 mg/l can be met at the network extremities. The booster stations are located at Tullagh Towers in Belmullet and in Bangor Erris town. Both booster stations are equipped with chlorine residual monitors and alarm set-points call out to Mayo County Council staff on a cascade system.</p>		

		Answer
4.2	Is there a chlorine residual $\geq 0.1$ mg/l throughout the network?	Yes
<b>Comment</b>		
<p>Chlorine residuals are manually sampled on a daily basis in the water distribution network. Network chlorine residual records were examined during the audit and all results were above the minimum recommended level of 0.1 mg/l.</p>		



## 5. Reservoirs and Distribution Networks

		Answer
5.1	Is treated water in tanks and reservoirs suitably protected against contamination?	No
<b>Comment</b>		
<p>The single celled reservoir at Erris water treatment plant was inspected during the audit. The reservoir was cleaned in 2017.</p> <p>Reservoir vents were covered in mesh, however, the mesh openings were large enough for small animals to crawl through. Reservoir vents should be covered in as fine a mesh as possible to protect against ingress of animals and possible contamination of the treated water. All reservoir inspection hatches were Padlocked.</p>		

## Recommendations

Subject	Erris Audit Recommendations	Due Date	30/04/2020
Action Text	<p data-bbox="272 398 533 432"><b>Recommendation(s)</b></p> <ol data-bbox="300 510 1433 1093" style="list-style-type: none"><li data-bbox="300 510 1433 629">1. Irish Water should ensure that all settled water clarification channels are level and secured firmly so that an even flow of water is maintained through the channels at all times. Clarification channels should be inspected daily and if an uneven flow is observed actions should be taken to rectify the cause.</li><li data-bbox="300 656 1433 775">2. Irish Water should investigate the current position of the outlet of the clarifier air release pipes. A mixture of air and water is currently being intermittently released into the clarifier and this may cause disturbance to the flocculation blanket. Irish Water should change the position of the outlet if possible.</li><li data-bbox="300 801 1433 920">3. Irish Water should investigate the incident where pH (soda ash) dosing lines blocked prior to coagulation. Irish Water should ensure that all dosing equipment is working optimally so the coagulation process operates effectively.</li><li data-bbox="300 947 1433 1066">4. Irish Water should commission the new run to waste facility on the rapid gravity filters. A run to waste facility would allow Irish Water better operational control on bringing filters back in to service follow a backwash.</li><li data-bbox="300 1093 1433 1211">5. Irish water should ensure that all reservoir vents are covered in suitably fine mesh to prevent against ingress of animals into the treated water.</li></ol> <p data-bbox="272 1178 810 1211"><b>Follow-Up Actions required by Irish Water</b></p> <p data-bbox="272 1234 1433 1290">During the audit, Irish Water representatives were advised of the audit findings and that action must be taken as a priority by Irish Water to address the issues raised.</p> <p data-bbox="272 1317 1433 1350">This report has been reviewed and approved by Aoife Loughnane, Drinking Water Team Leader.</p> <p data-bbox="272 1377 1433 1433">Irish Water should submit a report to the Agency on or before 30th April 2020 detailing how it has dealt with the issues of concern identified during this audit.</p> <p data-bbox="272 1460 1433 1516">The report should include details on the action taken and planned to address the various recommendations, including time frame for commencement and completion of any planned work.</p> <p data-bbox="272 1543 1433 1599">The EPA also advises that the findings and recommendations from this audit report should, where relevant, be addressed at all other treatment plants operated and managed by Irish Water.</p> <p data-bbox="272 1626 1433 1682">Please quote the Action Reference Number in any future correspondence in relation to this Report.</p>		