

# 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>	Foxford PWS
<b>Organisation</b>	Irish Water
<b>Scheme Code</b>	2200PUB1014
<b>County</b>	Mayo
<b>Site Visit Reference No.</b>	SV20168

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

Site Visit Detail			
<b>Date Of Inspection</b>	04/03/2020	<b>Announced</b>	No
<b>Time In</b>	10:00	<b>Time Out</b>	11:55
<b>EPA Inspector(s)</b>	Michelle Roche Daryl Gunning		
<b>Additional Visitors</b>			
<b>Company Personnel</b>	Irish Water: Pat O'Sullivan and Tommy Kearney Mayo County Council: Eileen Cavanagh, Brian Conmy, Patrick Forde, Deirdre Beattie and Eddie Munnelly.		

## > Summary of Key Findings

- 1) The sand filter media depth was at the minimum recommended depth of 300mm at the time of the audit. Irish Water should ensure that media depths are measured regularly and replacement media is ordered in a timely manner, to improve the management and control of the filtration process at Foxford water treatment plant.
- 2) Network chlorine residual monitoring was often carried out only once every two or three weeks. Irish Water should increase the frequency of network chlorine residual monitoring to every 2-3 days, in order to detect any water quality issues in the distribution network at the earliest opportunity.

## > Introduction

The Foxford public water supply is sourced from Lough Muck which is approximately 7km away from the Foxford water treatment plant. Water is gravity fed from Lough Muck to Foxford water treatment plant and is treated by coagulation, clarification in a Multiflow package clarifier, slow sand filtration and chlorination. The supply serves approximately 600 people in the Foxford area and a number of public group water schemes. The water treatment plant operates based water levels in the reservoir, which is located at the treatment plant.

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 Foxford public water supply.

## > Supply Zones Areas Inspected

Areas inspected during the audit included the Multiflow clarifier, three rectangular slow sand filters and one circular slow sand filter, the sodium hypochlorite dosing equipment and the on-site reservoir. Records of daily checks at the plant and raw water and network monitoring were also inspected.



## 1. Coagulation Clarification Flocculation (CFC) Stage

	Answer
1.1	Were the CFC processes visually observed to be operating appropriately during the audit? <b>Comment</b> <p>Two different coagulants are used at the Foxford water treatment plant depending on seasonal temperatures. Poly-aluminium chloride (PAC) is used during the colder months and a polyacrylamide coagulant aid (poly) is required with PAC. Aluminium sulphate is used during the warmer months, when temperatures reach approximately 12 degrees Celsius. No coagulant aid is required when using aluminium sulphate.</p> <p>At the time of the audit PAC was in use as the coagulant. 10% PAC is dosed at a concentration of 115mg/l before the static mixer. The poly coagulant aid is dosed further down the line as the water enters the Multiflow clarifier. Dosing of both PAC and poly is manually controlled based on site specific dosing charts. The raw water characteristics of Lough Muck are relatively stable and online monitors for turbidity, pH and temperature are in place. Monthly jar tests are also carried out to confirm dosing rates.</p> <p>The Multiflow clarifier is a hopper bottomed clarifier. Flow through the clarifier channels was observed to be even and no pin floc was observed in the clarifier. Sludge bleeds were operating every 10 minutes for 4-5 minutes at a time. Sludge bleeds are discharged to the public wastewater sewer.</p>

2.1

	Answer
Are the filters designed and managed in accordance with EPA guidance?	No
<p><b>Comment</b></p> <p>Foxford water treatment plant has four slow sand filters, three rectangular shaped filters, which operate as one filter system and one circular filter. The three rectangular filters and the circular filter operate in rotation. The rectangular filters were not operating at the time of the audit as they were coming back online after cleaning and the circular filter was in use. Both filter systems have sufficient capacity to operate independently. Cleaning of the slow sand filters is initiated based on headloss and there is no run to waste facility for bringing filters back online.</p> <p>Sand filter media depth is measured every time a filter is cleaned, however, at the time of the audit approximately 300mm of sand media was measured in all filters. A sand depth of 300mm was the minimum recommended media depth outlined in the EPAs Filtration Manual published in 1995. The Filtration Manual is currently being revised and the minimum recommended media depth is now 600mm, to ensure effective performance of slow sand filters. Mayo County Council stated that replacement sand media has been ordered and was due to be delivered the week following the audit. Mayo County Council stated that there are some delays between them ordering replacement media with Irish Water and the order being approved within Irish Water.</p> <p>The three rectangular filters combine at one outlet point and there is a combined filtered water turbidity monitor on this outlet. There is also a filtered water turbidity monitor on the outlet of the circular filter and a final water turbidity monitor before chlorination. Final water turbidity at the time of the audit was 0.039NTU.</p> <p>Irish Water's Coagulation, Flocculation, Clarification (CFC) programme has assessed the Foxford water treatment plant and approved two new self-cleaning pressure filters to replace the slow sand filters. The new filters are due to arrive on site within the next month and Irish Water will provide installation and commissioning dates to the EPA in relation to these. The medium-term plan for Foxford water treatment plant is to discontinue the use of the slow sand filters.</p>	



### 3. Disinfection

		Answer
3.1	Is the chlorine dosed appropriately?	Yes
<b>Comment</b>		
<p>Filtered water is dosed with sodium hypochlorite as the disinfectant. Sodium hypochlorite is dosed flow proportionally using a duty/standby dosing pump arrangement with automatic switchover between the pumps. The sodium hypochlorite dose is automatically corrected based on the chlorine residual reading at the outlet of the reservoir.</p> <p>The chlorine dosing points were inspected during the audit and the chamber housing the dosing points had some standing water in the bottom of the chamber.</p> <p>There is a chlorine residual sampling point at the water treatment plant with a contact time loop in place and also a chlorine residual sampling point at the outlet of the on-site reservoir. All high and low chlorine residual set-points are alarmed and alarms call out to Mayo County Council staff on a cascade system. The chlorine residual reading at the outlet to the reservoir was 0.93mg/l at the time of the audit.</p>		

		Answer
3.2	Is there a suitable monitoring frequency for residual chlorine in the network with records available?	No
<b>Comment</b>		
<p>The caretakers daily log book was inspected during the audit and chlorine residual monitoring in the network was typically only recorded once every two or three weeks. This frequency is not often enough to detect any water quality issues in the distribution network in a timely manner.</p> <p>Network chlorine residual results were all above the recommended 0.1mg/l.</p>		



## 4. Reservoirs and Distribution Networks

		Answer
4.1	Is treated water in tanks and reservoirs suitably protected against contamination?	No
<b>Comment</b>		
<p>The Foxford public water supply reservoir is a single celled reservoir located at the water treatment plant. There is approximately 10-12 hours storage time in the reservoir.</p> <p>Reservoir inspection hatches were examined during the audit and though hatches were heavy and of good quality there were no locks on the hatches. The water treatment plant, including the reservoir, is surrounded by palisade fencing and locked when not manned, however a risk of unauthorised access to treated drinking water still remains from the unlocked inspection hatches.</p> <p>Reservoir vents were inspected during the audit and vent openings were not covered. These openings could serve as a pathway for contamination of the treated water.</p>		



## 5. Treatment Process Chemicals

	Answer
5.1 Are treatment process chemicals appropriately managed and stored?	No
<b>Comment</b>	
It was observed during the audit that both full and empty sodium hypochlorite drums were being stored on pallets on the ground. The pallets were not banded. This action poses a high risk to the surrounding environment as a chemical spill would not be contained and would have the potential to result in ground contamination.	

## Recommendations

<b>Subject</b>	Foxford Audit Recommendations	<b>Due Date</b>	30/04/2020
<b>Action Text</b>	<p><b>Recommendation(s)</b></p> <ol style="list-style-type: none"> <li>1. Irish Water should ensure that the minimum depth of slow sand filter media (excluding the gravel layer) is maintained as per the design specification of the treatment plant. Irish Water should replenish the sand media to ensure the minimum recommended design depth of 600mm is present.</li> <li>2. Irish Water should provide a timeframe to the EPA for when the new self-cleaning pressure filters will be operational and commissioned on-site.</li> <li>3. Irish Water should ensure that the chamber housing the sodium hypochlorite dosing points is maintained free of water so that the dosing equipment is not damaged.</li> <li>4. Irish Water should review the network chlorine residual monitoring programme to ensure that the frequency and sample locations are sufficient to verify that at least 0.1mg/l free chlorine residual is present at the extremities of the distribution network, for adequate disinfection of the water supply. Irish Water should aim to monitor network chlorine residuals every 2-3 days.</li> <li>5. Irish Water should ensure that all vents and inspection hatches on the reservoirs are secured against ingress of animals or deliberate introduction of any contaminant or acts of vandalism</li> <li>6. Irish Water should review chemical storage arrangements at the treatment plant. Chemicals must be stored in bunded areas capable of containing at least 110% of the volume of chemicals stored therein. Refer to EPA guidance document "IPC Guidance Note on Storage and Transfer of Materials for Scheduled Activities".</li> </ol> <p><b>Follow-Up Actions required by Irish Water</b></p> <p>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>This report has been reviewed and approved by Aoife Loughnane, Drinking Water Team Leader.</p> <p>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>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>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>Please quote the Action Reference Number in any future correspondence in relation to this Report.</p>		