



# Drinking Water Audit Report

<b>County:</b>	Dublin City	<b>Date of Audit:</b>	12 <sup>th</sup> May 2016
<b>Plant(s) visited:</b>	Vartry Reservoir	<b>Date of issue of Audit Report:</b>	16 <sup>th</sup> May 2016
		<b>File Reference:</b>	DW2009/397
		<b>Auditors:</b>	Mr. Darragh Page Ms Michelle Roche Mr Conor Waters
<b>Audit Criteria:</b>	<ul style="list-style-type: none"> <li>• The <i>European Union (Drinking Water) Regulations 2014 (S.I. 122 of 2014)</i>.</li> <li>• The <i>EPA Handbook on the Implementation of the Regulations for Water Services Authorities for Public Water Supplies (ISBN: 978-1-84095-349-7)</i></li> <li>• The recommendations specified in the <i>EPA Drinking Water Report</i>.</li> <li>• EPA Drinking Water Advice Notes No.s 1 to 15.</li> <li>• The recommendations in any previous audit reports.</li> </ul>		

## MAIN FINDINGS

- i. The Vartry Reservoir and associated water supply zones is on the EPA Remedial Action List due to the inherent vulnerability of the Callow Hill Tunnel and also due to intermittent THM exceedances in some of the supply zones served by the treatment plant. Irish Water intend to address these concerns by upgrading the Vartry Reservoir Water Treatment Plant and by replacing the Callow Hill Tunnel with a rising main from the plant to the distribution network after the existing tunnel. This work is scheduled for completion in 2020.
- ii. Irish Water should consider replacing the Callow Hill Tunnel sooner (subject to planning permission) by including the construction of the pump station in the rising main project rather than the upgrade of the water treatment plant as the upgrade is a more lengthy project.

## 1. INTRODUCTION

Under the *European Union (Drinking Water) Regulations 2014* 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 in response to the notification by Irish Water of the intermittent detection of low levels of *Cryptosporidium* in the Vartry Reservoir supply.

The Vartry Reservoir water treatment plant was originally constructed in the 1860's with treatment consisting of slow sand filtration, chlorination and fluoridation. The treatment plant produces approximately 75,000 – 80,000 m<sup>3</sup>/day and serves a population of approximately 210,000 persons. This audit focused on the catchment protection and operation and management of the slow sand filters. The chlorination and fluoridation systems were not examined during this audit.

Photographs taken by Darragh Page during the audit are attached to this report and are referred to in the text where relevant.

The opening meeting commenced at 10.00am at the Vartry Reservoir Water Treatment Plant. The scope and purpose of the audit were outlined at the opening meeting. The audit process consisted of interviews with staff, review of records and observations made during an inspection of the treatment plant. The audits observations and recommendations are listed in Section 2 and 4 of this report. The following were in attendance during the audit.

**Representing Irish Water:**

Andrew Boylan, Regional Water Compliance Monitoring Liaison Specialist, Irish Water

Tom Cuddy, Water Operations Lead Eastern Midland Region, Irish Water

Fran Glancy, Compliance Analyst, Irish Water

Brian Boylan, Compliance Analyst, Irish Water

Shane Tynan, Water Engineer, Irish Water

Geoff O'Sullivan, Irish Water – Ervia

Ned Fleming, Plant Engineer, Dublin City Council

Tom Kinirons, Plant Engineer, Dublin City Council

Imelda Averill, Senior Scientific Officer, Dublin City Council

Sheila Hourigan, Executive Chemist, Dublin City Council

**Observers:**

Margaret Fitzgerald, Director of Public Health East Region, HSE

Helen Murray, Specialist in Public Health, HSE

Aoife McCarthy, Registrar in Public Health, HSE

Niamh McGrath, Principal Environmental Health Officer, HSE

Marie Ryan, Principle Environmental Health Officer, HSE

Derek Bauer, Environmental Health Dublin City, HSE

**Representing the Environmental Protection Agency:**

Mr. Darragh Page, Senior Inspector

Ms Michelle Roche, Inspector

Mr Conor Waters , Intern

## **2. AUDIT OBSERVATIONS**

*The audit process is a random sample on a particular day of a facility's operation. Where an observation or recommendation against a particular issue has not been reported, this should not be construed to mean that this issue is fully addressed.*

<b>1.</b>	<b>Progress Update on Remedial Works</b> <ol style="list-style-type: none"><li>a. At the start of the audit Irish Water provided an update on progress in the upgrade of the Vartry Reservoir water treatment plant and the replacement of the Callow Hill Tunnel as well as an update on the covering of the Stillorgan Reservoir.</li><li>b. Mr. O'Sullivan presented the details of the upgrade of the WTP. A planning application was lodged with Wicklow County Council on 8<sup>th</sup> April 2016 for the upgrade of the existing WTP. This will involve the construction of a new treatment plant (with the type of</li></ol>
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	<p>treatment yet to be decided) adjacent to the existing filters but within the boundary of the property owned by Irish Water. Irish Water stated that new land is not required for the upgrade of the plant. The works will also include improvements to the existing inlet and spillway. Irish Water stated that 3 submissions have been received which are being considered at present.</p> <ul style="list-style-type: none"> <li>c. A second planning application will be submitted for the replacement of the Callow Hill Tunnel. The two options of boring a new tunnel or laying a rising main were assessed and it was determined that laying a new rising main was the least cost long term option. Irish Water stated that they are in negotiations with landowners at the moment and that if concluded successfully a planning application was likely to be submitted in July 2016. Irish Water stated that a rising main would require the construction of a new pump station and associated energy recovery system at Callow Hill. This pump station was to be constructed as part of the upgrade to the WTP.</li> <li>d. Irish Water stated that the construction of the new WTP was the critical path and that if planning permission was granted the rising main could be constructed ahead of the water treatment plant.</li> <li>e. The EPA queried whether the pump station could be constructed as part of the rising main project as this would potentially allow the tunnel to be replaced sooner. Irish Water stated that there was no technical reason that this could not be done and agreed to investigate the inclusion of the pump station as part of the rising main project.</li> <li>f. The overall timeframe for the construction of the new water treatment plant is 2020 assuming no delays in the planning process. Irish Water will continue to submit quarterly progress reports to the EPA as part of the quarterly tracker.</li> </ul>
<p><b>2.</b></p>	<p><b>Source Protection</b></p> <ul style="list-style-type: none"> <li>a. The recent discovery of an overflow from the Vartry Heights estate into the Vartry Reservoir was discussed. This was identified by researchers carrying out an EPA funded project on the cause of algal blooms on the Vartry Reservoir. It was reported to Irish Water and Wicklow County Council on 3rd and 4th November 2015 respectively. It came to the attention of the EPA on 20<sup>th</sup> April 2016 following a request for an update on 10<sup>th</sup> March 2016 that Wicklow County Council had failed to investigate the source of this discharge (Irish Water confirmed at the time that it was not coming from the wastewater treatment plant at Roundwood). As outlined in correspondence to the EPA on 27<sup>th</sup> April, Wicklow County Council carried out an investigation comprising of inspections, dye testing of routes of discharge from foul and surface water pipes and sampling of the tributary at entrance to Vartry Heights at Main Street, Roundwood on 21<sup>st</sup> April 2016. This investigation found that there was a foul drain connection to the surface water pipe at Ashwood housing estate serving approximately 14 no. houses. This surface water pipe discharges to a stream. This stream is culverted under the entrance road to Vartry Heights from the Main Street, Roundwood. The stream flows onto the Lower Vartry Lake. It also found that there is a grey concrete pipe linked to the roadside gully at entrance to Vartry Heights which also discharges at a much smaller rate to the stream. The discharges from the grey concrete pipe and surface water pipe smelled of sewage. The road gully connected to the grey pipe did not smell of sewage. When dye testing was carried out on the foul drainage from 2 adjacent houses, no dye appeared in the grey pipe. Analysis of samples taken showed that the discharges were consistent with being sewage. The works to re-direct the foul sewage at Ashwood housing estate to foul sewer were completed on 27<sup>th</sup> April 2016.</li> <li>b. Irish Water stated that CCTV surveys are now being carried out in the Roundwood sewer network to determine whether any other issues are present while an examination of flow through the plant is also being carried out.</li> <li>c. Irish Water also stated that a survey of the channel around the lake is being carried out to identify the actions required to reduce the risk of overflow.</li> <li>d. The auditors carried out a visual observation of some of the air shafts including some of the blind shafts. The immediate area around the head of the air shaft appeared to be fenced off to prevent animal access. One of the air shafts was opened and there appeared to evidence of water ingress into the air shaft no.2.</li> <li>e. An inspection of the Callow Hill tunnel exit point and break pressure tank was carried out. It was noted that the concrete roof of the break pressure tank was inadequate and ingress</li> </ul>

	was possible through the gaps in the concrete slats (see Photo 1).
<b>3.</b>	<p><b>Filtration</b></p> <ol style="list-style-type: none"> <li>a. The filters are operated for a period of approximately 6 weeks (depending on raw water quality) before being skimmed and brought back into service.</li> <li>b. Once the filters have been skimmed and cleaned they are refilled and run to waste for a period of time. The turbidity levels are examined from the turbidity monitors and once the levels are &lt;0.5 NTU the filters are brought back into service. Mr. Fleming reported that different filters taken different lengths of time to come back into service depending on how quickly the levels return below 0.5 NTU. The results were observed on the SCADA and confirmed that this is the practice in place. The turbidity monitors are also alarmed if the turbidity goes above 1.0 NTU for more than 15 mins.</li> <li>c. Spot samples are collected from different filters each day to check that the levels reported on the monitors are accurate.</li> <li>d. At the time of the audit the calibration of the turbidity monitors was overdue and should have been carried out by 4<sup>th</sup> March 2016.</li> <li>e. During the previous audit the collection chamber on the older filters were leaking and ingress into the chambers was observed on the three filters examined. Remedial works have since been carried out on these and leaks are no longer occurring.</li> </ol>

### 3. AUDITORS COMMENTS

The Vartry Reservoir and associated water supply zones is on the EPA Remedial Action List due to the inherent vulnerability of the Callow Hill Tunnel and also due to intermittent THM exceedances in some of the supply zones served by the treatment plant. Irish Water intend to address these concerns by upgrading the Vartry Reservoir Water Treatment Plant and by replacing the Callow Hill Tunnel with a rising main from the plant to the distribution network after the existing tunnel. Planning permission for the former has been submitted while the latter is likely to be submitted in July.

Based on the information presented at the audit there appears to be scope to replace the Callow Hill Tunnel sooner (subject to planning permission) by including the construction of the pump station in the rising main project rather than the upgrade of the water treatment plant as the upgrade is a more lengthy project. Irish Water should consider this as it would address the EPAs primary concern about the vulnerability of this supply.

### 4. RECOMMENDATIONS

#### General

1. Irish Water should assess whether the construction of the pump station can be included in the project for the construction of the rising main rather than with the upgrade of the water treatment plant and therefore expedite the replacement of the Callow Hill Tunnel.

#### Source Protection

2. Irish Water should continue to carry out regular inspections of the Vartry Reservoir and the Callow Hill Tunnel air shafts and ensure that any issues identified are addressed without delay.

#### Filtration

3. Irish Water should calibrate the turbidity monitors and ensure that appropriate checks are in place to ensure that monitors are calibrated when scheduled.

### Distribution Network

4. Irish Water should ensure that ingress into the Callow Hill break pressure tank is prevented and that the necessary remedial works are carried out to the cover to prevent such ingress.

### FOLLOW-UP ACTIONS REQUIRED BY IRISH WATER

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. This report has been reviewed by Ms. Michelle Roche, Inspector.

Irish Water is recommended to put such measures in place as are necessary to implement the recommendations listed in this report. The actions by Irish Water to address the recommendations taken will be verified by the Agency during any future audits.

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.

Please quote the File Reference Number in any future correspondence in relation to this Report.

Report prepared by:



Date:

16<sup>th</sup> May 2016

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Inspector



Photo 1. Cover of the Callow Hill Break Pressure Tank