



# Drinking Water Audit Report

<b>County:</b>	Kerry	<b>Date of Audit:</b>	20/09/16
<b>Plant(s) visited:</b>	Templenoe PWS (Scheme Code 1300PUB1062)	<b>Date of issue of Audit Report:</b>	28/09/16
		<b>File Reference:</b>	DW2009/73
		<b>Auditors:</b>	Mr Niall Dunne Ms Criona Doyle Ms Pauline Gillard
<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 existing microfiltration system is not providing adequate treatment and does not provide an effective *Cryptosporidium* barrier. The supply is subject to high turbidity and there have been exceedances above the parametric value for *Cryptosporidium*, THM, pesticides, and iron.
- ii. Works are underway to decommission the Tempenoe Public Supply and connect it to the Kenmare Public Water Supply. These works need to be progressed without delay due to the poor quality of the treated water.

## 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 to assess the performance of Irish Water in providing clean and wholesome drinking water in the Tempenoe Public Water Supply (PWS).

Templenoe PWS is on the EPA Remedial Action List due to poor turbidity removal, inadequate treatment for *Cryptosporidium* and elevated levels of THMs above the standard in the Drinking Water Regulations. Irish Water's proposed action programme is to decommission the source of the supply and replace with Kenmare PWS by December 2017.

The Tempenoe Water Supply serves a population of 377 people with an average daily demand of 97m<sup>3</sup>/d. The source water is abstracted from the Rossacoosane Stream with the intake located approximately 200 m north of the treatment plant. Treatment at the plant consists of microfiltration and disinfection by chlorination. A 136 m<sup>3</sup> above ground storage reservoir is located at the treatment plant.

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

The opening meeting commenced at 11.00am at the Templenoe 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:**

Caomhin Curran, Compliance Analyst, Irish Water.  
 Siobhan Clifford, Compliance Analyst, Irish Water.  
 John Ahern, Acting Senior Executive Engineer, Kerry County Council.  
 Kathleen Casey, Senior Environmental Technician, Kerry County Council.  
 Frank Sheehan, Plant Caretaker.  
 Stephen O’Sullivan, Network Caretaker.

**Representing the Environmental Protection Agency:**

Niall Dunne, Inspector.  
 Criona Doyle, Inspector.  
 Pauline Gillard, Inspector.

## 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.*

1.	<p><b>Source Protection</b></p> <ol style="list-style-type: none"> <li>The surrounding land use includes low intensity agriculture and forestry. Livestock on the catchment include cattle (dry stock) sheep and deer in low numbers. Stock proof fencing was present at the intake but a gap in the fence was observed adjacent to the intake (Photograph No. 1). All livestock potentially have direct access to the feeder streams upstream of the intake. Slurry spreading does not take place on the catchment up gradient of the source. The <i>Cryptosporidium</i> Risk Score was reported as 79 (high risk). The risk assessment did not include the septic tanks within catchment. It was outlined that the risk score would be revised by KCC.</li> <li>Catchment inspections were undertaken by Kerry County Council (KCC) Environment Section in 2014 and 2015. 4 no. landowners are reported up gradient of intake (2 no. farming operations, area of forestry and Ring of Kerry Golf Club). The 2014 catchment inspection indicated one landowner, located nearest to the source, had undertaken herbicide spraying in early Summer 2014 for rush removal.</li> <li>There are 2 to 3 no. private houses likely to be served by domestic waste water treatment systems (DWWTS). One septic tank was observed up gradient of the intake approximately 200m to west in a field with rushes present (Photograph No. 2). None of the septic tanks within the catchment have been assessed under the DWWTS National Inspection Plan.</li> <li>The Rossacoosane stream (source) is an upland stream and exhibits a rapid response (within 2 hours) to rainfall. There are no raw water monitors in place.</li> <li>Raw water monitoring has not been undertaken to date in 2016 but results for 3 sampling dates in 2015 were provided. The colour (90 Hazen) and dissolved organic carbon levels (9.1mg/l) were high in the raw water sample from the 21/09/15. The ammonia</li> </ol>
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	<p>concentration was less than limit of detection on all sampling dates. Low pH was observed (6.3 pH units) on 07/12/15. E. Coli were reported on all raw water sampling dates at concentrations of 5 MPN/100ml (09/02/15), 152.9 MPN/100ml (21/09/15) and 23 MPN/100ml (07/12/15).</p>
<b>2.</b>	<p><b>Exceedances of the Parametric Values</b></p> <ol style="list-style-type: none"> <li>Monitoring data for treated water was presented for 2015 and 2016 (hard copies provided to Agency).</li> <li><i>Cryptosporidium</i> was detected in samples on the 08/03/2016 (0.099 / 10 L &amp; 0.06 / 10 L) and 02/11/15 (0.016 / 10 L). It is proposed to undertake additional <i>Cryptosporidium</i> monitoring in September / October 2016.</li> <li>The following iron exceedances were reported: 14/09/15 result of 272 µg/l; 25/07/16 result of 380 µg/l; 08/08/16 3 no. samples with 485 µg/l, 377 µg/l, 462 µg/l; 22/08/16 242 µg/l. There are no cast iron mains present in the distribution network and the elevated iron is considered to be related to the raw water quality.</li> <li>Exceedances of THMs occurred on 01/12/15 (138 µg/l) and 14/09/2015 (289 µg/l). Monitoring of dissolved organic carbon (DOC) in the raw water monitoring indicates elevated concentrations including 2.6 mg/l in Feb 2015; 9.1 mg/l in September 2015 and 3.8 mg/l in December 2015.</li> <li>During 2015 pesticide exceedances were detected on the 14/09/15 with MCPA at 2.113 µg/l and Total Pesticides 2.110 µg/l. The available results for 2016 to date, sample dated 21/03/16, indicated no exceedances.</li> </ol>
<b>3.</b>	<p><b>Filtration</b></p> <ol style="list-style-type: none"> <li>The microfiltration system was installed in 2001 with a 3 micron filter size. The system contains 192 filter cartridges composed of 4 no. reels with 48 units on each reel. Backwashing is triggered on a pressure differential. Typically 10 no. backwash cycles occur per day. The backwash water is run to waste. There is no standard procedure for replacement of the filter cartridges which is based on visual inspection alone.</li> <li>The operation / shutdown of the microfilter is not linked to the turbidity monitoring.</li> <li>The high level turbidity alarm on the treated water in the reservoir is set at 1.5 NTU. Typically the treated water has a turbidity of the order of 0.8 NTU. On the day of audit the level was 1.35 NTU. Exceedance above the alarm level triggers a text notification to the caretaker however the alarm does not trigger automatic plant shutdown. The turbidity monitors are calibrated and within the calibration dates.</li> </ol>
<b>4.</b>	<p><b>Disinfection</b></p> <ol style="list-style-type: none"> <li>Disinfection is undertaken using 10-15% sodium hypochlorite. The dosing point is located between the break tank and the reservoir. There are duty, standby and assist chlorine pumps present. The pumps are calibrated and within the calibration due dates.</li> <li>The residual chlorine set point is 1.1mg/l. On the date of audit the residual chlorine level was 1.09 mg/l on the online monitor with a residual reading of 1.28 mg/l from a grab sample checked by the caretaker.</li> <li>Monitoring of residual chlorine levels in the network is undertaken once a week and recorded together with details of flushing operations within network.</li> <li>The low level chlorine alarm is set at 0.3 mg/l. The plant does not shut down on a low chlorine alarm. The chlorine monitors are calibrated and within the calibration due dates.</li> <li>A copy of the Chlorination Validation Calculation was provided indicating a Target Ct of 24 mg.min/l and an Effective Ct of 171.88 mg.min/l.</li> </ol>
<b>5.</b>	<p><b>Treated Water Storage and Distribution Network</b></p> <ol style="list-style-type: none"> <li>There were adequate insect screens present on the vents on the reservoir.</li> <li>All covers were adequately locked and sealed.</li> <li>The reservoir is normally cleaned (power wash &amp; disinfected) on an annual basis. It was last cleaned in February 2015.</li> <li>There is a bypass system present at the reservoir if required.</li> </ol>

6.	<p><b>Monitoring and Sampling Programme for treated water</b></p> <ul style="list-style-type: none"> <li>a. Based on the supply volume 1 no. audit sample and 4 no. check samples are required per annum. KCC indicated further sampling for 2016 is expected to take place in September / October 2016. The results presented to date for 2016 indicated 2 no. check samples have been taken (18/01/16 &amp; 22/08/16) and 1 no. audit sample (21/03/16).</li> <li>b. As outlined above, the treated water quality is poor and shows failures to meet the parametric values for <i>Cryptosporidium</i>, turbidity, THMs, iron and pesticides.</li> </ul>
7.	<p><b>Chemical storage and bunds</b></p> <ul style="list-style-type: none"> <li>a. A bund was present on the chlorine day tank and appeared adequate.</li> <li>b. Apart from the day tank sodium hypochlorite is not stored on site. The day tank contains a 3 – 4 day supply. Drums are brought from the Kenmare PWS as required to fill the day tank.</li> </ul>
8.	<p><b>Management and Control</b></p> <ul style="list-style-type: none"> <li>a. Text alarms are in place for (i) high turbidity on the treated water and (ii) low residual chlorine levels.</li> <li>b. There is no automatic shut down at the plant in response to elevated turbidity or low residual chlorine levels.</li> <li>c. Irish Water proposes to decommission the Templenoe Public Supply and connect to the Kenmare PWS. At present the pipework is in place to physically connect to the Kenmare PWS however the construction of 3 no. pumping stations is required to facilitate pumping to the topographically high level areas. Due to landowner issues delays have occurred and the current expected completion date for the remaining works is February 2017. In addition Irish Water is currently undertaking upgrade works on the Kenmare PWS which is scheduled to be completed by the end of December 2017.</li> </ul>

### 3. AUDITORS COMMENTS

The treatment currently being provided at Templenoe water treatment plant is inadequate. The microfiltration system does not provide an adequate barrier to *Cryptosporidium* and there have been issues at the plant with respect to elevated turbidity, iron and THMs. Elevated levels of pesticides have also been detected and greater source protection work needs to be undertaken within the catchment.

Irish Water proposes to connect this supply to the Kenmare PWS with the Templenoe plant to be decommissioned by Q1 2017. At present there is no barrier for *Cryptosporidium* on the Kenmare PWS but it is considered to be a better source for the supply of water to the Templenoe area. The Kenmare PWS is scheduled to be upgraded by the end of 2017.

### 4. RECOMMENDATIONS

#### General

1. Irish Water should replace the Templenoe public water supply with an alternative source of clean and wholesome drinking water. The plans to decommission the source and replace with the Kenmare PWS should be expedited.

#### Source Protection

2. Irish Water should liaise with Kerry County Council to ensure that (i) farm inspections

including pesticide survey and (ii) septic tank inspections on the domestic wastewater treatment system at houses near the source are carried out.

3. Irish Water should ensure that the source protection and catchment risk assessment score for the *Cryptosporidium* risk assessment is reviewed in detail and appropriate measures implemented to reduce the risk. The risk assessment needs to be updated to include the assessment of septic tanks in the catchment.
4. Irish Water should take action to ensure that the source is made secure and fenced off to prevent livestock access.
5. Irish Water should include the Tempenoe PWS under the raw water monitoring programme for 2016.

#### **Filtration**

6. An assessment of the performance of the microfilter should be undertaken followed by any required remedial works.

#### **Management and Control**

7. Irish Water should examine the feasibility of installing an automatic plant shutdown system linked to the high level turbidity alarm.

#### **Monitoring and Sampling Programmes for Treated Water**

8. Irish Water should continue to undertake monthly monitoring for *Cryptosporidium*, pesticides, THMs and iron and submit results to the EPA on a quarterly basis. If any *Cryptosporidium* oocysts are detected during the monitoring programme then Irish Water should immediately contact the Health Service Executive.

#### **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 and approved by Ms Aoife Loughnane, Drinking Water Team Leader.

Irish Water should submit a report to the Agency within one month of the date of this audit report detailing how it has dealt with the issues of concern identified during this audit. The report should include details on the action taken and planned to address the various recommendations, including timeframe for commencement and completion of any planned work.

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 DW2009/73 in any future correspondence in relation to this Report.

**Report prepared by:**

*Criona Doyle*

**Date:**

28/09/16

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Inspector



**Photograph No. 1:** Damaged Fence at abstraction point



**Photograph No. 2:** Septic Tank Located Within 200m of Water Abstraction Location

