

# Annual Environmental Report 2014

<b>Agglomeration Name:</b>	<b>Littleton</b>
<b>Licence Register No.</b>	<b>D0480-01</b>



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## Section 1. Executive Summary and Introduction to the 2014 AER

### 1.1 Summary report on 2014

This Annual Environmental Report has been prepared for D0480-01, Littleton, in County Tipperary in accordance with the requirements of the wastewater discharge licence for the agglomeration. Specified assessments are included as an appendix to the AER as follows:

- Priority substances assessment

The agglomeration is served by a wastewater treatment plant with a Design PE of 1000. The treatment process includes the following:-

- Preliminary treatment (including screening)
- Secondary treatment - conventional activated sludge

The final effluent from the Primary Discharge Point was compliant with the Emission Limit Values in 2014.

4. 391,000 kgs sludge (total weight sludge) were removed from the wastewater treatment plant in 2014 as liquid sludge. Sludge was transferred to Roscrea WWTP.

5. The following improvement works were undertaken during 2014:-  
On 29 July 2014 the primary discharge pipe was extended to the main channel of the Breaghagh River at Grid Reference E217577 N154254. This fulfilled one of the items specified under Schedule C: Specified Improvement Programme and Condition 5.4.

An Annual Statement of Measures is included in **Appendix 7.1**.

## Section 2. Monitoring Reports Summary

### 2.1 Summary report on monthly influent monitoring

Table 2.1 - Influent Monitoring Summary

	BOD (mg/l)	COD (mg/l)	SS (mg/l)	Total Ammonia (as N) mg/l	Ortho phosphate as P (mg/l)	Hydraulic Loading (m <sup>3</sup> /d)	Organic Loading (PE/day)
<b>Number of Samples</b>	6	6	6	6	6		
<b>Annual Max.</b>	112	509	217	26.98	3.8	820	1454
<b>Annual Mean</b>	112	509	217	26.98	3.8	372.6	696

#### Significance of results

The annual mean hydraulic loading is less than the Treatment Plant Capacity as detailed further in Section 3.2.

The annual maximum organic loading is greater than the Treatment Plant Capacity as detailed further in Section 3.2.

The design of the wastewater treatment plant allows for peak values and therefore the peak loads have not impacted on compliance with Emission Limit Values.

## 2.2 Discharges from the agglomeration

Table 2.2 - Effluent Monitoring Summary

	cBOD (mg/l)	COD (mg/l)	TSS (mg/l)	Total Ammonia (as N) mg/l	Ortho phosphate as P (mg/l)	pH	Comment
<b>WWDL ELV (Schedule A)</b>	7	125	35	0.55	3	6-9	
<b>ELV with Condition 2 Interpretation included</b>	14	250	87.5	1.1	3.6	6-9	
<b>Number of sample results</b>	2	2	2	2	2	2	2 samples taken since grant of licence. 7 samples taken during 2014 calendar year.
<b>Number of sample results above WWDL ELV</b>	0	0	0	0	0	0	
<b>Number of sample results above ELV with Condition 2 Interpretation included</b>	0	0	0	0	0	0	
<b>Annual Mean (for parameters where a mean ELV applies)</b>	n/a	n/a	n/a	n/a	n/a	n/a	
<b>Overall Compliance (Pass/Fail)</b>	Pass	Pass	Pass	Pass	Pass	Pass	

### Significance of results

The WWTP was compliant with the ELV's set in the wastewater discharge licence.

### 2.3 Ambient monitoring summary

**Table 2.3 - Ambient Monitoring Report Summary**

Ambient Monitoring Point from WWDL (or as agreed with EPA)	Irish Grid Reference	EPA Feature Coding Tool code	Current EQS Status	Does assessment of the ambient monitoring results indicate that the discharge is impacting on water quality?
Upstream monitoring point	E217514 N153993	RS16R310380	Less than Good Status. (Biological Status Not available.)	n/a
Downstream monitoring point	E217411 N154249	RS16R310650	Good Status. (Biological Status Q4 at bridge upstream of Suir Confluence.)	No

The results for the upstream and downstream monitoring are included as in Appendix 7.2.

#### Significance of results

The WWTP was compliant with the ELV's set in the wastewater discharge licence as detailed in Section 2.2.

The discharge from the wastewater treatment plant doesn't have an observable negative impact on the water quality status.

The discharge from the wastewater treatment plant does not have an observable negative impact on the overall water quality status.

### 2.4 Data collection and reporting requirements under the Urban Waste Water Treatment Directive

The electronic submission of data was completed on: 16<sup>th</sup> February 2015

### 2.5 Pollutant Release and Transfer Register (PRTR) - report for previous year

A PRTR is not required as the agglomeration is less than 2000 p.e.



## Section 3 Operational Reports Summary

### 3.1 Treatment Efficiency Report

A summary presentation of the efficiency of the treatment process including information for all the parameters specified in the licence is included below:-

**Table 3.1 - Treatment Efficiency Report Summary**

	cBOD (kg/yr)	COD (kg/yr)	SS (kg/yr)	Total Ammonia as N (kg/yr)	Orthophosphate as P (kg/yr)	Comment
<b>Influent mass loading (kg/year)</b>	15232.	69224	29512	3669.3	516.8	
<b>Effluent mass emission (kg/year)</b>	455.69	2256.66	1068.22	38.88	123.95	
<b>% Efficiency (% reduction of influent load)</b>	97	97	96	99	76	

### 3.2 Treatment Capacity Report

**Table 3.2 - Treatment Capacity Report Summary**

<b>Hydraulic Capacity – Design / As Constructed (dry weather flow) (m3/year)</b>	87600
<b>Hydraulic Capacity – Design / As Constructed (peak flow) (m3/year)</b>	262800
<b>Hydraulic Capacity – Current loading (m3/year)</b>	136000
<b>Hydraulic Capacity – Remaining (m3/year)</b>	126800
<b>Organic Capacity - Design / As Constructed (PE)</b>	1000
<b>Organic Capacity - Current loading (PE)</b>	696
<b>Organic Capacity – Remaining (PE)</b>	304
<b>Will the capacity be exceeded in the next three years? (Yes / No)</b>	No

### 3.3 Extent of Agglomeration Summary Report

In this section Irish Water is required to report on the amount of urban waste water generated within the agglomeration. It does not include any waste water collected and treated in a private system and discharged to water under a Section 4 Licence issued under the Water Pollution Acts 1977 (as amended):



**Table 3.3 - Extent of Agglomeration Summary Report**

	% of p.e. load generated in the agglomeration
Load generated in the agglomeration that is collected in the sewer network	100%
Load collected in the agglomeration that enters treatment plant	100%
Load collected in the sewer network but discharged without treatment	0%

**Load generated in the agglomeration that is collected in the sewer network** is the total load generated and collected in the municipal network within the boundary of the agglomeration.

**Load collected in the agglomerations that enters treatment plant** is that portion of the previous figure which enters the waste water treatment plant

**Load collected but discharged without treatment** is that portion of the first figure which is discharged without treatment.

The data in Table 3.3 above is based on influent monitoring as detailed in Section 2.1 above.

### 3.4 Complaints Summary

A summary of complaints of an environmental nature is included below.

**Table 3.4 - Complaints Summary Table:**

Number	Date & Time	Nature of Complaint	Cause of Complaint	Actions taken to resolve issue	Closed (Y/N)
0	N/A	N/A	N/A	N/A	N/A

### 3.5 Reported Incidents Summary

A summary of reported incidents is included below.

**Table 3.5.1 - Summary of Incidents**

Incident Type (e.g. Non-compliance, Emission, spillage, Emergency Overflow Activation)	Incident Description	Cause	No. of incidents	Corrective Action	Authorities Contacted <small>Note 1</small>	Reported to EPA (Yes/No)	Closed (Y/N)
None	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Note 1: For shellfish waters notify the Marine Institute (MI) Sea Fisheries Protection Authority (SFPA) Food Safety Authority (FSAI) and An Bord Iascaigh Mhara (BIM). This should also include any other authorities that should be contacted arising from the findings of any Licence Specific Reports also e.g. Drinking Water Abstraction Impact Risk Assessment, Fresh Water Pearl Mussel Impact Assessments etc.

**Table 3.5.2 - Summary of Overall Incidents**

<b>Number of Incidents in 2014</b>	0
<b>Number of Incidents reported to the EPA via EDEN in 2014</b>	0
<b>Explanation of any discrepancies between the two numbers above</b>	N/A

### **3.6 Sludge / Other inputs to the WWTP**

'Other inputs' to the waste water treatment plant are summarised in Table 3.6 below. Littleton Waste Water Treatment Plant does not accept sludge/other inputs.

**Table 3.6 - Other Inputs**

<b>Input type</b>	<b>m3/year</b>	<b>PE/year</b>	<b>% of load to WWTP</b>	<b>Is there a leachate/sludge acceptance procedure for the WWTP? (Y/N)</b>	<b>Is there a dedicated leachate/sludge acceptance facility for the WWTP? (Y/N)</b>
Domestic /Septic Tank Sludge	N/A	N/A	N/A	N/A	N/A
Industrial / Commercial Sludge	N/A	N/A	N/A	N/A	N/A
Landfill Leachate (delivered by tanker)	N/A	N/A	N/A	N/A	N/A
Landfill Leachate (delivered by sewer network)	N/A	N/A	N/A	N/A	N/A
Other (specify)	N/A	N/A	N/A	N/A	N/A

**Notes:**

1. Other Inputs include; septic tank sludge, industrial /commercial sludge, landfill leachate and any other sludge that is collected and added to the treatment plant.
2. Sludge that is added to a dedicated sludge reception facility at a waste water treatment plant not included in Table 3.6. Only include sludge which is added to the waste water treatment process stream. Enter zero where there are no inputs

## Section 4. Infrastructural Assessments and Programme of Improvements

### 4.1 Storm water overflow identification and inspection report

The Storm Water Overflow Identification & Inspection report is not included. This report is not due until the second AER. A summary of the significance and operation of Littleton's SWO is included below.

**Table 4.1.1 - SWO Identification and Inspection Summary Report**

WWDL Name / Code for Storm Water Overflow	Irish Grid Ref.	Included in Schedule A4 of the WWDL	Significance of the overflow (High / Medium / Low)	Compliance with DoEHLG Criteria	No. of times activated in 2014 (No. of events)	Total volume discharged in 2014 (m3)	Total volume discharged in 2014 (P.E.)	Estimated /Measured data
TPEFF2800 D0480SW0 03	E2176 57, N154 236	Yes (include in Schedule A3 of the WWDL)	Low	Not yet assessed	Unknown	Unknown	Unknown	Unknown

**Table 4.1.2 - SWO Identification and Inspection Summary Report**

How much sewage was discharged via SWOs in the agglomeration in the year (m3/yr)?	Unknown
How much sewage was discharged via SWOs in the agglomeration in the year (p.e.)?	Unknown
What % of the total volume of sewage generated in the agglomeration was discharged via SWOs in the agglomeration in 2014?	Unknown
Is each SWO identified as non-compliant with <a href="#">DoEHLG Guidance</a> included in the Programme of Improvements?	Unknown (local knowledge indicates that the SWO is compliant)
The SWO assessment includes the requirements of Schedule A3 & C3	List the relevant section of the SWO Report
Have the EPA been advised of any additional SWOs / changes to Schedule C3 and A4 under Condition 1.7?	No. There are no changes.

### 4.2 Report on progress made and proposals being developed to meet the improvement programme requirements.

This is the first AER for this agglomeration – an Improvement Programme will be included in the 2<sup>nd</sup> AER as required.

**Table 4.2.1 - Specified Improvement Programme Summary**

Specified Improvement Programmes (under Schedule A and C of WWDL)	Licence Schedule (A or C)	Licence Completion Date	Date Expired? (N/NA/Y)	Status of Works ((i) Not Started; (ii) At planning stage; (iii) Work ongoing on-site; (iv) Commissioning Phase; (v) Completed; (vi) Delayed;)	% Construction Work Completed	Timeframe for Completing the Work	Comments
Extend Primary Discharge Point Pipe.	C.1.	31/10/14	N/A	Completed	100	31/10/14	Completed on 29/07/14
Provide Tertiary Treatment to meet Orthophosphate ELV	C.1.	22/12/2015	N	Not Started	0	22/12/2015	Expected to be completed in latter part of 2015. <i>The improvement programme will be reviewed by Irish Water to assess the works required to comply with the licence condition on a prioritised basis</i>

A summary of the status of any improvements identified by under Condition 5.2 is included below.

**Table 4.2.2 - Improvement Programme Summary**

Improvement Identifier	Improvement Description	Improvement Source	Progress (% completed)	Expected Completion Date	Comments
n/a	n/a	WWTP assessment (Condition 5.2).	n/a	n/a	Not applicable as WWTP is achieving it's ELVs.
<i>Sewer Integrity Study</i>	<i>Sewer Integrity Study</i>	<i>Sewer Integrity Tool (Condition 5.2).</i>	<i>100</i>	<i>completed</i>	
n/a	n/a	SWO assessment (Condition 4 & 5.2).	0	31/12/2015	n/a

n/a	n/a	<i>Improved Operational Control</i>	n/a	n/a	n/a
n/a	n/a	<i>Incident Reduction</i>	n/a	n/a	n/a
n/a	n/a	<i>Elimination/Reduction of Priority Substances</i>	n/a	n/a	n/a

**Improvements identified above also include measures taken to prevent environmental damage anticipated following events or accidents/incidents associated with discharges or overflows from the waste water works and as such are considered to fulfil any Statement of Measures requirements. Refer also to Appendix 7.1 which summarises the Annual Statement of Measures.**

**Table 4.2.3 - Sewer Integrity Risk Assessment Tool Summary**

<b>The Improvement Programme should include an assessment of the integrity of the existing wastewater works for the following:</b>	<b><i>Risk Assessment Rating (High, Medium, Low)</i></b>	<b><i>Risk Assessment Score</i></b>	<b><i>Comment</i></b>
Hydraulic Risk Assessment Score	<i>Medium</i>	<i>100</i>	
Environmental Risk Assessment Score	<i>Low</i>	<i>245</i>	
Structural Risk Assessment Score	<i>High</i>	<i>150</i>	
Operation & Maintenance Risk Assessment Score	<i>Low</i>	<i>4</i>	
Overall Risk Score for the agglomeration	<i>High</i>	<i>499</i>	

## Section 5. Licence Specific Reports

Licence Specific Reports Summary Table

Licence Specific Report	Required in 2014 AER or outstanding from previous AER	Included in 2014 AER	Reference to relevant section of AER (e.g. Appendix 2 Section4.
Priority Substances Assessment	Yes	Yes	Summary of findings on page 12. Full report in Appendix 7.7

Licence Specific Reports Summary of Findings

Licence Specific Report	Recommendations in Report	Summary of Recommendations in Report
Priority Substances Assessment	Yes	Further sampling and analysis needed to determine impacts.

### 5.1 Priority Substances Assessment

The Priority Substances Assessment report is included in Appendix 7.7. A summary of the findings of this report is included below.

Table 5.1 - Priority Substance Assessment Summary

	<i>Licensee self- assessment checks to determine whether all relevant information is included in the Assessment.</i>
<b>Does the assessment use the Desk Top Study Method or Screening Analysis to determine if the discharge contains the parameters in Appendix 1 of the EPA guidance</b>	Desk Top Study <i>and</i> Screening Analysis
<b>Does the assessment include a review of Trade inputs to the works?</b>	Yes
<b>Does the assessment include a review of other inputs to the works?</b>	Yes
<b>Does the report include an assessment of the significance of the results where a listed material is present in the discharge? (e.g. impact on the relevant EQS standard for the receiving water)</b>	Yes
<b>Does the assessment identify that priority substances may be impacting the receiving water?</b>	Yes
<b>Does the Improvement Programme for the agglomeration include the elimination / reduction of all priority substances identified as having an impact on receiving water quality?</b>	No.

## Section 6. Certification and Sign Off

**Table 6.1 - Summary of AER Contents**

Does the AER include an executive summary?	Yes
Does the AER include an assessment of the performance of the Waste Water Works (i.e. have the results of assessments been interpreted against WWDL requirements and or Environmental Quality Standards)?	Yes
Is there a need to advise the EPA for consideration of a technical amendment / review of the licence?	No
List reason e.g. additional SWO identified <i>(insert lines as required)</i>	N/A
Is there a need to request/advise the EPA of any modifications to the existing WWDL? Refer to Condition 1.7 (changes to works/discharges) & Condition 4 (changes to monitoring location, frequency etc.)	No
List reason e.g. failure to complete specified works within dates specified in the licence, changes to monitoring requirements <i>(insert lines as required)</i>	N/A
Have these processes commenced? (i.e. Request for Technical Amendment / Licence Review / Change Request)	N/A
Are all outstanding reports and assessments from previous AERs included as an appendix to this AER?	N/A
List outstanding reports <i>(insert lines as required)</i>	N/A

### Declaration by Irish Water

The AER contains the following;

- Introduction and background to 2014 AER
- Monitoring reports summary.
- Operational reports summary.
- Infrastructural Assessment and Programme of Improvements.
- Licence specific reports.
- Certification and Sign Off
- Appendices

I certify that to the best of my knowledge the information given in this Annual Environmental Report is truthful, accurate and complete:

Signed:



Date: 26/02/2015

**Gerry Galvin**  
**Chief Technical Advisor**



## Section 7. Appendix

In the appendix include all the detailed or site specific reports that are relevant to the AER. Reports omitted from previous AERs should also be appended here.

Appendix 7.1 - Annual Statement of Measures

Appendix 7.2 - Ambient monitoring summary

Appendix 7.6 – Sewer integrity tool output

Appendix 7.7 - Priority substances assessment

Appendix 7.1.

Statement of Measures- Littleton

### **Appendix 7.1. – Statement of Measures Littleton WWTP**

On 29 July 2014 the primary discharge pipe was extended to the main channel of the Breagh River at Grid Reference E217577 N154254. This fulfilled one of the items specified under Schedule C: Specified Improvement Programme and Condition 5.4.

No other additional measures have been taken in 2014 in relation to prevention of environmental damage. The need for measures to prevent environmental damage will be reviewed on an annual basis.

Littleton is currently not on the Irish Water Capital Investment Plan.

## Appendix 7.2.

### Ambient Monitoring - Littleton

Appendix 7.2. Littleton WWTP Ambient Monitoring 2014

**Table 2.3.1: Ambient Monitoring upstream and downstream of Littleton WWTP during 2014.**

	Upstream	Downstream
	27/11/2014	27/11/2014
Parameter and units		
Ammonia as N (mg/l as N)	0.11	0.08
Ammonia NH <sub>4</sub> (mg/l NH <sub>4</sub> )	0.142	0.103
BOD (mg/l O <sub>2</sub> )	1.6	1.4
Chemical Oxygen Demand (mg/l O <sub>2</sub> )	35	25
Chloride (mg/l Cl)	17.48	17.54
Conductivity @ 20°C (uS/cm)	434	429
Dissolved Oxygen % Saturation	84	79.8
Dissolved Oxygen (measurement) mg/l O <sub>2</sub>	9.9	9.64
Nitrates (mg/l NO <sub>3</sub> as N)	1.45	1.53
Nitrites (mg/l NO <sub>2</sub> as N)	0.024	0.024
O-Phos (mg/l PO <sub>4</sub> as P)	0.027	0.029
O-Phos (mg/l PO <sub>4</sub> )	0.083	0.089
pH (pH units)	7.84	7.74
Sulphate (mg/l SO <sub>4</sub> )	25.3	25.06
Suspended Solids (mg/l)	25.2	4.4
Temperature (oC)	7.3	7.4
Total Oxidised Nitrogen (mg/l TON as N)	1.47	1.55
Total Phosphorus (mg/l as P)	0.07	0.05

**Table 2.3.3. Ecological Status of River Breagagh (upstream and downstream of Littleton WWTP)**

Parameter	Upstream	Status	Overall Status for Upstream	Downstream	Status	Overall Status for Downstream
BOD	2.15(mean)	Less than Good	Less than Good	2.05 (mean)	Less than Good	Less than good
Total Ammonia (as N)	0.072(mean)	Less than Good		0.059(mean)	Good	
Orthophosphate (as P)	0.037(mean)	Less than Good		0.047(mean)	Less than Good	

**Table 2.3.3. Schedule 5 of the European Communities Environmental Objectives (Surface Waters) Regulations 2009**

Parameter	Value	Status
BOD	<1.3 (mean) or <2.2 (95%ile)	High
BOD	<1.5(mean) or <2.6(95%ile)	Good
Total Ammonia as N	<0.040 (mean) or <0.090 (95%ile)	High
Total Ammonia as N	<0.065 (mean) or <0.140 (95%ile)	Good
MRP as P	<0.025(mean) or <0.045 (95%ile)	High
MRP as P	<0.035 (mean) or <0.075 (95%ile)	Good

Appendix 7.6.

Sewer Integrity Report- Littleton

Section 1.1 Agglomeration Details						
Name		Littleton				
Licence Number		D0480-01				
Insert Name of Catchment if the Risk Assessment is for part of an agglomeration (only divide agglomeration where p.e. >5,000p.e. and where such division is warranted)		Littleton				
Date Licence Issued		31/07/2014				
Current Date		22/02/2015				
		Year	Year	Year	Year	
Waste Water Works - Wastewater Treatment Plant Details		Unit	2015	2016	2017	2018
1.1	Is there an existing WWTP in operation?		Yes	Yes	Yes	Yes
Section 1.2 BOD Loading & Population Equivalent						
1.2	Average Daily Influent Flow or Average Total Flow in system (If no measured data exists, insert estimated figure)	l/day, measured	372,603			
1.3	Average Daily Influent BOD or Average BOD Load from area served (If no measured data exists, insert estimated figure)	mg/l, measured	112			
1.4	Total BOD Load	kg/day	41.731536			
1.5	Average Population Equivalent (@0.06kg/person/day)	p.e.	696			
1.6	Estimated (existing) Non-Domestic Load	p.e.				
1.7	Estimated Domestic Load	p.e.	696			
1.8	Occupancy Rate for the Agglomeration	pop/house	2.92			
1.9	Estimated Number of Connected Properties	houses	238			
1.10	Number of properties within the agglomeration when compared with CSO Data or An Post Geodirectory	houses	unknown			
Section 1.3 Hydraulic Details						
1.11	Average Dry Weather Flow arriving at WWTP OR Total Average DWF in system (If no measured data exists insert estimated figure)	l/s, measured	0.76			
1.12	Estimated 3DWF	l/sec	2.28			
1.13	Annual Average Peak Flow to WWTP or discharging from whole system if there is no existing WWTP	l/s, measured	3.05			
1.14	This Annual Average Peak as Multiples of Dry Weather Flow (Peaking Factor)	Nr	4.01			
1.15	Highest Peak Flow Recorded (Insert UNKNOWN if no records exist)	l/s	9.49			
1.16	Does this Peak Flow (multiple of DWF) cause hydraulic capacity problems within the network ?	---	No			
1.17	Total Rainfall for Previous Year	mm	1003.6			
1.18	Comparison - Mean Annual Rainfall for the agglomeration	mm	948.2			
1.18.1	Define the Weather Station Used		Gurteen			
1.19	If Storm Water Storage is available at the Wastewater Treatment plant, what is the volume of the storm tank ?	m <sup>3</sup>	n/a			
1.20	Is the capacity of the storm tank sufficient to capture and retain all overflows to the tank ?	---				
1.21	Total monthly average volume of Storm Water Stored or Returned for Treatment within the Waste Water Treatment Plant	m <sup>3</sup> per month	n/a			
1.22	If the answer to 1.20 above is No, What is the estimated frequency of Overflows from the Storm Tank ? (N/A if no overflow)		N/A			
Waste Water Works - Sewer Network Details		Unit	2015	2016	2017	2018
Section 1.4 Waste Water Works - Gravity Sewer Details						
1.23	What database is used to maintain records of the sewer network	Hard Copy Drawings only				
1.23.1	If other or combination of the above please describe	Describe				
1.24	Total length of sewers (use drop down menus to define whether these figures are estimated or measured)	km Estimated	#VALUE!	0.00	0.00	0.00
1.24.1	Total length of sewers > 450mm Diameter	km Estimated	unknown			
1.24.2	Total length of sewers > 300mm but ≤ 450mm in Diameter	km Estimated	unknown			
1.24.3	Total length of sewers > 225mm but ≤ 300mm in Diameter	km Measured	unknown			
1.24.4	Total length of sewers ≤ 225mm in Diameter	km Estimated	unknown			
1.24.5	Other	km Estimated	Unknown			
1.25	Pipeline Material					



1.25.1	What portion of the sewer network consists of Concrete Pipes	% Estimated	Unknown			
1.25.2	What portion of the sewer network consists of Plastic Pipes	% Estimated	Unknown			
1.25.3	What portion of the sewer network consists of Clay materials	% Estimated	Unknown			
1.25.4	What portion of the sewer network consists of Brick Type Sewers	% Estimated	Unknown			
1.25.5	What portion of the sewer network consists of Other Materials	% Estimated	Unknown			
1.26	Total number of Storm Water Overflows (Enter '1' if none and state under Item 1.27 that there are no SWOs in the network; <b>do not leave blank</b> )	Nr	1			
1.27	What Screening or other mechanical devices are employed at the storm water overflows					
	SWO No. _ located at _____	Works at Littleton W	None			
1.28	Water Quality at the receiving waters					
1.28.1	Where the receiving water is a river - indicate the EPA Biological Rating of the Receiving Water for each SWO below (Particularly if there is more than one receiving water within the agglomeration)					
	SWO No. _ located at _____	Describe	Q4			
1.28.2	Where the receiving water is a coastal water indicate the Status of the Receiving Water for each SWO below (Particularly if there is more than one receiving water within the agglomeration)					
	SWO No. _ located at _____	Describe	N/A			
1.28.3	With reference to the SWO's detailed above define if the receiving waters are sensitive in accordance with the Urban Wastewater Treatment Regulations as amended.					
	SWO No. _ located at _____	Describe	Not Listed			
1.28.4	With reference to the SWO's detailed above define are the receiving waters Protected Areas (designated or awaiting designation)					
	SWO No. _ located at _____	Designation	n/a			
1.28.5	With reference to the SWO's detailed above define do the receiving waters have any other designations.					
	SWO No. _ located at _____	Designation	Not Listed			
<b>Section 1.5 Waste Water Works - Pumping Stations</b>						
1.29	Number of Pumping Stations (operated by the Local Authority)	Nr	1			
1.30	Total Length of Rising Mains (operated by the Local Authority)	km	unknown			
1.31	Rising Main Material					
1.31.1	What portion of the rising mains consists of ductile iron pipes	% Measured	unknown			
1.31.2	What portion of the rising mains consists of plastic pipes	% Measured	unknown			
1.31.3	What portion of the rising mains consists of other materials	% Estimated	unknown			
1.32	Discharge Capacity of the Pump Set (s) at normal duty point					
	At Pump Station __ at _____					
1.33	What percentage of the pumping stations have recorded flow data (i.e. if all pumping stations have flow meters on the rising mains then this would read 100%)	%	0.00%			
1.34	Available Storage Capacity at Pump Stations					
	At Pump Station __ at _____	m <sup>3</sup>	unknown			
1.35	Total Number of " <b>Licensed Secondary Discharge Points and Stormwater Overflows</b> " at pumping stations	Nr	0			

1.36	Total Number of <b>"Emergency Overflow Points"</b> at pumping stations	Nr	0			
1.37	What Screening or other mechanical devices are employed at the secondary discharge points or emergency overflows ?					
	At Pump Station ___ at _____	Describe	n/a			
1.38	Water Quality at the receiving waters at each pumping station location					
1.38.1	Where the receiving water is a river - indicate the EPA Biological Rating of the Receiving Water for each secondary discharge point or emergency overflow at each pumping station (Particularly if there is more than one receiving water within the agglomeration)					
	At Pump Station ___ at _____	Describe	N/A			
1.38.2	Where the receiving water is a coastal water indicate the Status of the Receiving Water for each secondary discharge point or emergency overflow at each pumping station (Particularly if there is more than one receiving water within the agglomeration)					
	At Pump Station ___ at _____	Describe	N/A			
1.38.3	With reference to the pumping stations, for each secondary discharge point or emergency overflow detailed above, define if the receiving waters are sensitive in accordance with the Urban Wastewater Treatment Regulations as amended.					
	At Pump Station ___ at _____		Not Listed			
1.38.4	With reference to the pumping stations, for each secondary discharge point or emergency overflow detailed above, are the receiving waters Protected Areas (designated or awaiting designation) .					
	At Pump Station ___ at _____	Designation	None			
1.38.5	With reference to the pumping stations, for each secondary discharge point or emergency overflow detailed above, do the receiving waters have any other designations.					
	At Pump Station 1	Designation	Not Listed			
1.39	Estimated Number of Private Pumping Stations within the agglomeration (not operated by the Local Authority)	Nr	0			
<b>Section 1.6 Reporting</b>						
<b>Section 1.6.1 Reported Number of Sewer Related Complaints</b>						
1.40	Number of Reported Complaints	Nr	0			
1.41	Number of Reported Complaints which have been rectified	Nr	0			
<b>Section 1.6.2 Reported/Recorded/Estimated Number of Secondary Discharges</b>						
1.42	Number of Reported Secondary Discharges	Nr	0			
1.43	Number of Recorded Secondary Discharges	Nr	0			
1.44	Estimated Total Number of Secondary Discharges	Nr	0			
<b>Section 1.6.3 Reported/Recorded/Estimated Number of Emergency Overflow Discharges from Pumping Stations</b>						
1.45	Number of Reported Emergency Overflow Discharges	Nr	0			
1.46	Number of Recorded Emergency Overflow Discharges	Nr	0			
1.47	Estimated Total Number of Emergency Overflow Discharges	Nr	0			
<b>Section 1.7 Operational Staff</b>						
1.48	In the four boxes below, describe the extent of operation staff employed by the Local Authority to maintain and operate the sewer network and pumping stations					

1.48.1	1 Nr. Part-time Caretaker (with basis H&S training) to operate & maintain the sewer network.					
1.48.2						
1.48.3						
1.48.4						
<b>Waste Water Works - Investment Details</b>		<b>Unit</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>
<b>Section 1.8 Capital Investment works carried out since most recent report (including works not included on WSIP Programme or not WSIP funded)</b>						
1.49	Sewers Upgraded or Replaced	m	0			
1.50	Sewers Rehabilitated	m	0			
1.51	Manholes Rehabilitated	Nr	0			
1.52	Local Repairs	Nr	0			
1.53	Total Length of sewers Upgraded, Replaced or Rehabilitated	m	0			
1.54	Pumping Stations Operated by Local Authority Upgraded or Repaired	Nr	0			
1.55	WWTW operated by Local Authority Upgraded or Replaced	Nr	0			
1.56	In the following two cells describe the actual Capital Investment undertaken in the reporting period.					
1.56.1	For example : Sewer Rehabilitation Contract Works being undertaken under the WSIP					
1.56.2						
<b>Section 1.9 Licence Specified Improvements Works</b>						
1.57	<i>The Local Authority is required to report on the extent of Improvement Works which have been specified under the Licence as issued by the EPA. Reference which AER contains this information</i>					
<b>Section 1.10 Other Updates Since Last Report</b>						
1.58	<i>For example : 50% of the sewer network is currently being upgraded under the WSIP with an investment of € 1.5m in 2010.</i>					
1.59	<i>For example : 2% of the sewer network is currently being replaced under the Local Authorities Annual Maintenance Fund</i>					
1.60						
1.61						
1.62						

Appendix 7.7.

Priority Substances Report- Littleton

# Priority Substances Assessment

<b>Agglomeration Name:</b>	<b>Littleton</b>
<b>Licence Register No.</b>	<b>D0480-01</b>



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## **1 Introduction**

This report has been prepared for D0480-01, Littleton, in County Tipperary in accordance with the requirements of Condition 4 of the wastewater discharge licence for the agglomeration.

This desk top study has been undertaken to determine the necessity, if any, for analysis of the discharge to comply with the condition in the wastewater discharge licence based on the *Guidance on the Screening for Priority Substances for Waste Water Discharge Licences*, issued by the EPA. Relevant inputs to the waste water works and estimates of emissions from the discharge point have been taken into account in the preparation of this report. Relevant inputs to the waste water works, any relevant measurements / calculations / estimates of emissions from the discharge point and any relevant measurements undertaken at representative downstream monitoring locations have been taken into account in the preparation of this report.

Details of the emissions concentration for the primary discharge and impact on the receiving water are included in Appendix 1.

## **2 Desktop Study**

### **2.1 Assessment of Analysis Required**

#### **A. Review of all industrial inputs into WWTP**

A desktop review of all inputs into the WWTP was undertaken using Geo-directory, records of activities licensed under the Environmental Protection Agency Act, 1992 (IPPC licensed activities with discharges to sewer), records of activities licensed under Section 16 of the Water Pollution Act 1977 and review of licence related documents.

The desktop review has indicated that there are no industrial type discharges, leachate discharges or other imports to the treatment plant. Other discharges within the agglomeration with a likelihood of priority substances include the petrol service station.

The wastewater discharged to the wastewater treatment plant is domestic in nature.

#### **B. Discharge monitoring**

An effluent grab sample was taken from the Littleton WWTP on 23<sup>rd</sup> September 2014 and analysed for a number of priority substances. This analysis data is included in Appendix 1 with details of the sample data and/or source of the data.

#### **C. Downstream monitoring location's participation in relevant monitoring programme**

A receiving water grab sample was taken from the Breagagh River upstream and downstream of the Littleton WWTP primary discharge point (217514E 153993N and 217411E 154249N) on 23<sup>rd</sup> September 2014. Analysis data for these monitoring locations for the relevant parameters is included in Appendix 3 with details of the sample data and/or source of the data.

#### **D. Participation in PRTR reporting**

As of the 2012 AER reporting year, it is not a requirement for licence holders for waste water treatment plants with a population equivalent less than 2,000P.E. to report on PRTR. The Littleton

WWTP has a design population equivalent of 1,000 P.E. with an estimated loading of 600 (2012 figure).

The Emissions of specific organic compounds and metals (priority substances), which have not been analysed for in the effluent grab sample taken on 23<sup>rd</sup> September 2014, have been estimated utilising the EPA's urban WWTP calculation tool for PRTR reporting (Version 5).

It is noted from the EPA's report, *An Inventory of Emissions to Waters in Ireland*, that extensive assessment of emission factors was undertaken during 2011 / 2012 that focussed on the evaluation of inputs / output concentrations and removal efficiency using a variety of different sized plants and wastewater treatment options. This has led to the significant refinement of the electronic templates toolkit used for WWTP assessment using the PRTR tool.

All parameters listed in Appendix 1 have emissions data available for the discharge from the PRTR tool. The Total Halogenated Organic Compound Value from the PRTR reporting has been used to give a conservative estimate for Trichloromethane.

The emission concentration from the PRTR has been included in the table in Appendix 1 where analysis data is not available.

## **2.2 Review outcome of Desktop study**

Following the desktop study, all parameters in Appendix 1 have been assessed to establish any potential impact on the receiving waters. Due to the domestic nature of the wastewater in the catchment it is considered that the PRTR tool provides full characterisation of the wastewater and the potential impact on the receiving waters. A review of the national monitoring programme for priority substances in wastewater is proposed to be undertaken by Irish Water in 2015 in consultation with the EPA. It is proposed that this review, in consultation with the EPA, will recommend parameters to be monitored and frequency of monitoring at Irish Water WWTP's.

## **3 Assessment of Significance and Recommendations**

The assessment carried out above indicates that data is available for all parameters based on either analysis or the PRTR toolkit. The level of dilution is based on 95 percentile flows and the EQS is based on Annual Average concentration requirements. As such the results of the analysis undertaken are conservative.

One parameter, Barium, has been identified as potentially being higher than the required EQS, at 95 percentile flows. Barium concentrations both upstream and downstream of the WWTP discharge exceed the EQS value, and downstream concentrations do not appear to be elevated due to WWTP inputs to the environment. This assessment is based on one grab sample however, further analysis is necessary to determine impact.

There is a potential for some impact on the receiving waters based on the assessment carried out. Further analysis is considered necessary to establish the impact, if any, on the receiving waters. A sampling and monitoring programme will be developed by Irish Water in 2015 to assess parameters which may exceed the EQS and require further sampling and analysis.



The EPA have prepared a report on priority substances, *An Inventory of Emissions to Waters in Ireland*. This document states that Ireland appears to have relatively few problems associated with the presence of Priority / Priority Hazardous substances in its surface waters. It identifies that wastewater discharges are a potential source of metals in receiving waters with lead being the main metal identified as associated with wastewater discharges. However, metals exceedences, in particular those for cadmium, lead, and nickel are primarily associated with areas of historic mining activity. Similarly PAH's have been identified in stormwater overflows but the most significant source is considered to be rainfall.

A consultation process with the EPA is proposed to be undertaken by Irish Water in 2015 to establish appropriate levels of monitoring for priority and dangerous substances, taking into account the particular requirements of the Water Framework Directive. This will allow a targeted monitoring programme to be undertaken in areas where priority substances have been identified or industrial discharges or imports provide a potential source, and where there is a shortfall of existing monitoring data.

<b>Does the assessment use the Desk Top Study Method or Screening Analysis to determine if the discharge contains the parameters in Appendix 1 of the EPA guidance</b>	Desk Top Study <i>and</i> Screening Analysis
<b>Does the assessment include a review of Trade inputs to the works?</b>	Yes
<b>Does the assessment include a review of other inputs to the works?</b>	Yes
<b>Does the report include an assessment of the significance of the results where a listed material is present in the discharge? (e.g. impact on the relevant EQS standard for the receiving water)</b>	Yes
<b>Does the assessment identify that priority substances may be impacting the receiving water?</b>	Yes
<b>Does the Improvement Programme for the agglomeration include the elimination / reduction of all priority substances identified as having an impact on receiving water quality?</b>	No

## Appendix 1 – Screening of Parameters for Priority Substances

Parameters to be Screened for in Waste Water Discharges

Note where the concentration in the effluent is less than the limit of detection (LOD), and for the purposes of assessing against the EQS values, the concentration is taken to be 0.

AA: average annual

EQS: environmental quality standards

Dilution factor in receiving water: 5.8 (Source: EPA Inspectors report July 2014)

No.	Compound	Group of compounds	AA-EQS Inland SW (µg/l)	AA-EQS Other SW (µg/l)	Measured /Estimated Conc. (µg/l) <sup>1</sup>	Data Source [Sample / PRTR / Other (state)]	Sample Date (if applicable)	Effluent Concentration above AA concentration (Yes/No)	Effluent Concentration above AA concentration after dilution (Yes/No)
1	Benzene	VOCs	10	8	0.017	PRTR		No	No
2	Carbon tetrachloride	VOCs	12	12	0.000	PRTR		No	No
3	1,2-Dichloroethane	VOCs	10	10	0.000	PRTR		No	No
4	Dichloromethane	VOCs	20	20	<5	Sample	23/09/2014	No	No
5	Tetrachloroethylene	VOCs	10	10	0.059	PRTR		No	No
6	Trichloroethylene	VOCs	10	10	0.000	PRTR		No	No
7	Trichlorobenzenes	VOCs	0.4	0.4	0.000	PRTR		No	No
8	Trichloromethane	VOCs	2.5	2.5	#N/A	PRTR		#N/A	#N/A
9	Xylenes	VOCs	10	10	<1	Sample	23/09/2014	No	No
10	Ethyl Benzene	VOCs	10	10	0.017	PRTR		No	No
11	Toluene	VOCs	10	10	<0.5	Sample	23/09/2014	No	No
12	Naphthalene	PAHs	2.4	1.2	0.004	PRTR		No	No
13	Flouranthene	PAHs	0.1	0.1	0.002	PRTR		No	No
14	Benzo[k]fluoranthene	PAHs	0.03	0.03	0.002	PRTR		No	No
15	Benzo[ghi]perylene	PAHs	0.002	0.002	0.002	PRTR		No	No

No.	Compound	Group of compounds	AA-EQS Inland SW (µg/l)	AA-EQS Other SW (µg/l)	Measured /Estimated Conc. (µg/l) <sup>1</sup>	Data Source [Sample / PRTR / Other (state)]	Sample Date (if applicable)	Effluent Concentration above AA concentration (Yes/No)	Effluent Concentration above AA concentration after dilution (Yes/No)
16	Indeno[1,2,3-c,d]pyrene	PAHs	0.002	0.002	0.002	PRTR		yes	No
17	Benzo[b]fluoranthene	PAHs	0.03	0.03	0.002	PRTR		No	No
18	Benzo[a]pyrene	PAHs	0.05	0.05	0.002	PRTR		No	No
19	Di(2-ethylhexyl)phthalate	Plasticiser	1.3	1.3	0.917	PRTR		No	No
20	Isodrin	Pesticides	0.01	0.005	0.000	PRTR		No	No
21	Dieldrin	Pesticides	0.01	0.005	0.000	PRTR		No	No
22	Diuron	Pesticides	0.2	0.2	0.026	PRTR		No	No
23	Isoproturon	Pesticides	0.3	0.3	0.008	PRTR		No	No
24	Atrazine	Pesticides	0.6	0.6	<0.05	Sample	23/09/2014	No	No
25	Simazine	Pesticides	1	1	<0.05	Sample	23/09/2014	No	No
26	Glyphosate	Pesticides	60	-	1.533	PRTR		No	No
27	Mecoprop	Pesticides	0.02	0.02	0.107	PRTR		yes	No
28	2,4-D	Pesticides	n/a	n/a	0.051	PRTR		N/A	N/A
29	MCPA	Pesticides	n/a	n/a	0.089	PRTR		N/A	N/A
30	Linuron	Pesticides	0.7	0.7	0.000	PRTR		No	No
31	Dichlobenil	Pesticides	n/a	n/a	0.004	PRTR		N/A	N/A
32	2,6-Dichlorobenzamide	Pesticides	n/a	n/a	0.080	PRTR		N/A	N/A
33	Polychlorinated biphenyls	PCBs	0.1	0.1	0.000	PRTR		No	No
34	Phenols (as Total C)	Phenols	8	8	0.910	PRTR		No	No
35	Lead	Metals	7.2	7.2	<0.9	Sample	23/09/2014	No	No
36	Arsenic	Metals	25	20	<1	Sample	23/09/2014	No	No
37	Copper	Metals	30	5	13.000	Sample	23/09/2014	No	No
38	Zinc	Metals	100	40	35.100	Sample	23/09/2014	No	No
39	Cadmium	Metals	0.08	0.2	0.600	Sample	23/09/2014	yes	No

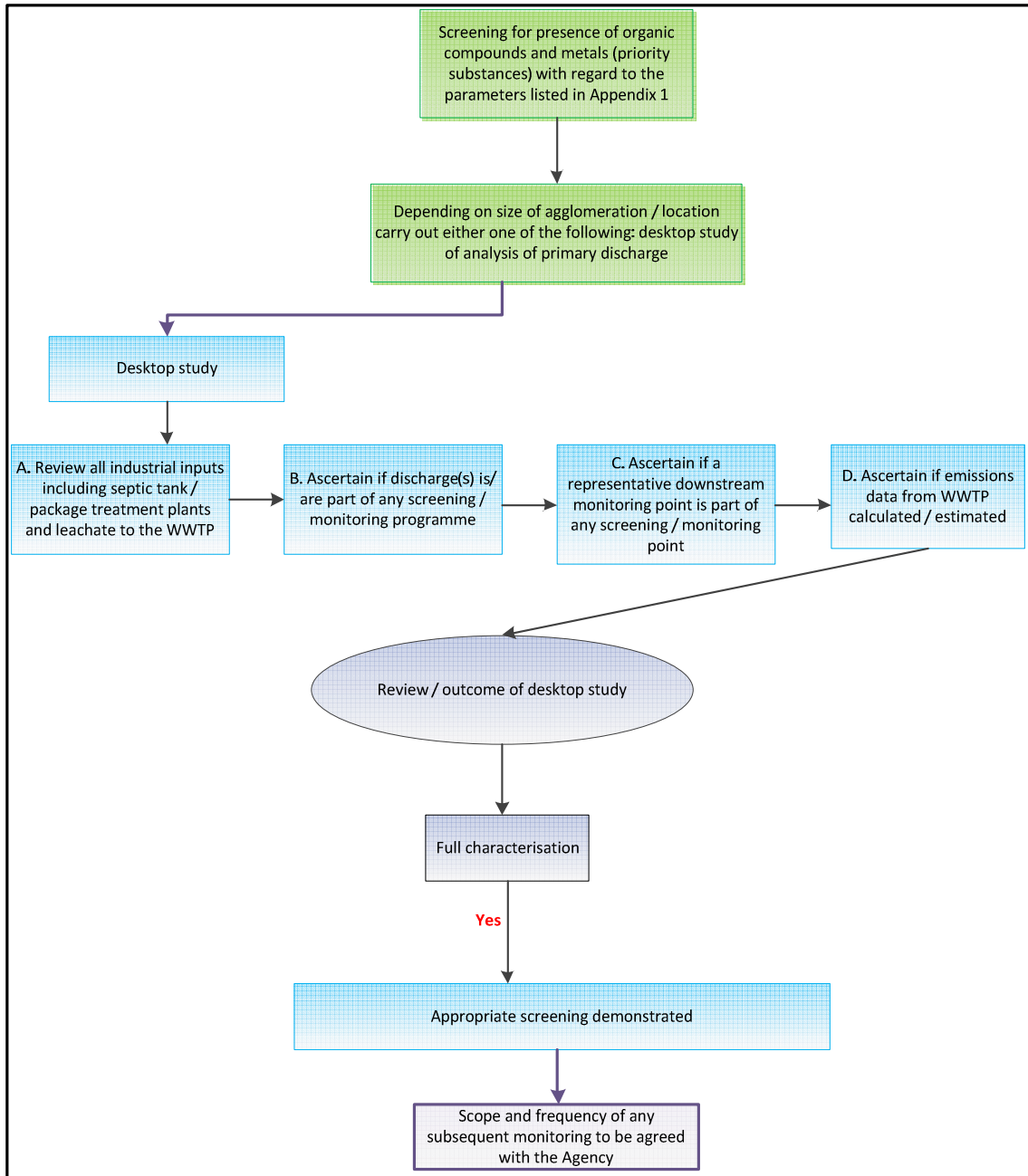
No.	Compound	Group of compounds	AA-EQS Inland SW (µg/l)	AA-EQS Other SW (µg/l)	Measured /Estimated Conc. (µg/l) <sup>1</sup>	Data Source [Sample / PRTR / Other (state)]	Sample Date (if applicable)	Effluent Concentration above AA concentration (Yes/No)	Effluent Concentration above AA concentration after dilution (Yes/No)
40	Mercury	Metals	0.05	0.05	<0.06	Sample	23/09/2014	No	No
41	Chromium	Metals	3.4	0.6	<3	Sample	23/09/2014	No	No
42	Selenium	Metals	5.3	5.3	<3	Sample	23/09/2014	No	No
43	Antimony	Metals	0.4	0.4	0.155	PRTR		No	No
44	Molybdenum	Metals	4.3	4.3	0.000	PRTR		No	No
45	Tin	Metals	0.2	0.2	0.144	PRTR		No	No
46	Barium	Metals	1	1	117.100	Sample	23/09/2014	yes	<b>yes</b>
47	Boron	Metals	6.5	6.5	<500	Sample	23/09/2014	No	No
48	Cobalt	Metals	0.2	0.2	0.176	PRTR		No	No
49	Vanadium	Metals	0.9	0.9	2.727	PRTR		yes	No
50	Nickel	Metals	20	20	1.800	Sample	23/09/2014	No	No
51	Fluoride	General	500	500	<100	Sample	23/09/2014	No	No
52	Chloride	General	250000	250000	0.110	Sample	23/09/2014	No	No
53	Total organic carbon	General	n/a	n/a	9219.773	PRTR		N/A	N/A
54	Cyanide	General	10	10	<6	Sample	23/09/2014	No	No
0	Conductivity	General	n/a	n/a	1022	Sample	23/09/2014	N/A	N/A
0	Hardness (mg/l CaCO <sub>3</sub> )	General	n/a	n/a	351	Sample	23/09/2014	N/A	N/A
0	pH	General	n/a	n/a	8.01	Sample	23/09/2014	N/A	N/A

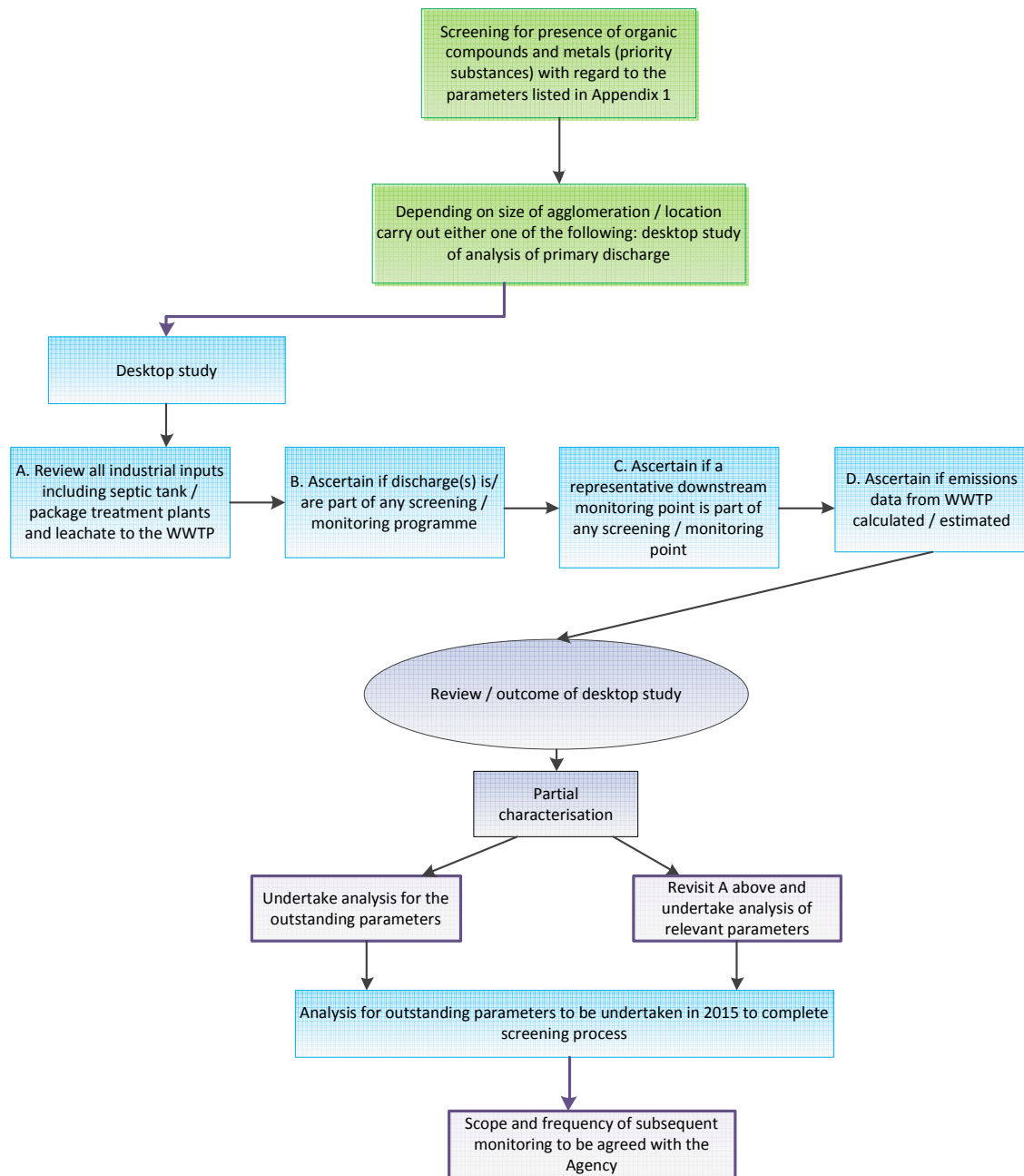
Notes:

1. Where measured values are available these should be used instead of estimated values from PRTR tool.
2. In the case of Copper the value 5 applies where the water hardness measured in mg/l CaCO<sub>3</sub> is less than or equal to 100; the value 30 applies where the water hardness exceeds 100 mg/l CaCO<sub>3</sub>. Estimated CaCO<sub>3</sub> value > 100 where no sampling data available (based on PRTR tool)
3. In the case of Zinc, the standard shall be 8 µg/l for water hardness with annual average values less than or equal to 10 mg/l CaCO<sub>3</sub>, 50 µg/l for water hardness greater than 10 mg/l CaCO<sub>3</sub> and less than or equal to 100 mg/l CaCO<sub>3</sub> and 100 µg/l elsewhere. Estimated CaCO<sub>3</sub> value > 100 where no sampling data available

## Appendix 2 – Priority Substance Screening Flowchart

A flow chart for the screening of the presence of organic compounds and metals (Priority Substances) from WWTP is included below. This flowchart shows that appropriate screening has been demonstrated in line with the assessment undertaken in this report.





### Appendix 3 – Receiving Waters Priority Substance Data

No.	Compound	Group of compounds	AA-EQS Inland SW (µg/l)	AA-EQS Other SW (µg/l)	Measured Upstream Conc. (µg/l)	Measured Downstream Conc. (µg/l)
1	Benzene	VOCs	10	8		
2	Carbon tetrachloride	VOCs	12	12		
3	1,2-Dichloroethane	VOCs	10	10		
4	Dichloromethane	VOCs	20	20	<1	<1
5	Tetrachloroethylene	VOCs	10	10		
6	Trichloroethylene	VOCs	10	10		
7	Trichlorobenzenes	VOCs	0.4	0.4		
8	Trichloromethane	VOCs	2.5	2.5		
9	Xylenes (all isomers)	VOCs	10	10	<1	<1
10	Ethyl Benzene	VOCs	10	10		
11	Toluene	VOCs	10	10	<0.5	<0.5
12	Naphthlene	PAHs	2.4	1.2		
13	Fluoranthene	PAHs	0.1	0.1		
14	Benzo[k]fluoranthene	PAHs	0.03	0.03		
15	Benzo[ghi]perylene	PAHs	0.002	0.002		
16	Indeno[1,2,3-c,d]pyrene	PAHs	0.002	0.002		
17	Benzo[b]fluoranthene	PAHs	0.03	0.03		
18	Benzo[a]pyrene	PAHs	0.05	0.05		
19	Di(2-ethylhexyl)phthalate (DEHP)	Plasticiser	1.3	1.3		
20	Isodrin	Pesticides	0.01	0.005		
21	Dieldrin	Pesticides	0.01	0.005		
22	Diuron	Pesticides	0.2	0.2		
23	Isoproturon	Pesticides	0.3	0.3		
24	Atrazine	Pesticides	0.6	0.6	<0.01	<0.01
25	Simazine	Pesticides	1	1	<0.01	<0.01
26	Glyphosate	Pesticides	60	-		
27	Mecoprop	Pesticides	0.02	0.02		
28	2,4-D	Pesticides	n/a	n/a		
29	MCPA	Pesticides	n/a	n/a		
30	Linuron	Pesticides	0.7	0.7		
31	Dichlobenil	Pesticides	n/a	n/a		
32	2,6-Dichlorobenzamide	Pesticides	n/a	n/a		
33	PCBs	PCBs	0.1	0.1		
34	Phenols (as Total C)	Phenols	8	8	<150	<150
35	Lead	Metals	7.2	7.2	<0.3	<0.3
36	Arsenic	Metals	25	20	4.1	4
37	Copper	Metals	5 or 100 <sup>2</sup>	5	7	5
38	Zinc	Metals	8 or 50 or 100 <sup>3</sup>	40	5.4	4.5

No.	Compound	Group of compounds	AA-EQS Inland SW (µg/l)	AA-EQS Other SW (µg/l)	Measured Upstream Conc. (µg/l)	Measured Downstream Conc. (µg/l)
39	Cadmium	Metals	0.08	0.2	0.1	0.1
40	Mercury	Metals	0.05	0.05	<0.02	<0.02
41	Chromium	Metals	3.4	0.6	<1	<1
42	Selenium	Metals	5.3	5.3	1.8	2
43	Antimony	Metals	0.4	0.4		
44	Molybdenum	Metals	4.3	4.3		
45	Tin	Metals	0.2	0.2		
46	Barium	Metals	1	1	<b>176.5</b>	<b>179.3</b>
47	Boron	Metals	6.5	6.5	<20	<20
48	Cobalt	Metals	0.2	0.2		
49	Vanadium	Metals	0.9	0.9		
50	Nickel	Metals	20	20	1.2	1.2
51	Fluoride	General	500	500	<100	<100
52	Chloride	General	250000	250000	28270	29300
53	TOC	General	n/a	n/a		
54	Cyanide	General	10	10	<1.2	1.2
	Conductivity	General	n/a	n/a	514	515
	Hardness (mg/l CaCO <sub>3</sub> )	General	n/a	n/a	253	260
	pH	General	n/a	n/a	7.98	7.99