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Cork County Council

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Administration,
Environmental Licencing programme,
Office of Climate,Licencing & Resource Use,
Environmental Protection Agency,
Regional Inspectorate,
Inniscarra,
County Cork.

October 18th 2010

D0126-01

Re: Notice in accordance with Regulation 18(3)(b) of the Waste Water Discharge (Authorisation) Regulations 2007

Dear Mr Huskisson,

With reference to the notice received for the Macroom Waste Water Discharge Licence Application on 20th of August last and Cork County Council's response by email seeking a revised submission date of the 12th of October 2010, please find our response attached.

Yours Faithfully

Patricia Power
Director of Services,
Area Operations South,
Floor 5,
County Hall,
Cork

Wastewater Discharge Licence Application: D0126-01Macroom

Circular L8/08 2 September 2008
Water Services Investment and Rural Water Programmes – Protection of Natural Heritage and National Monuments

APPENDIX 1
Water Services Schemes - Natural Heritage Checklist for Local Authorities

What projects must be screened?

For new projects and significant changes to any existing operations, if the answer is 'yes' to any of the following, the project (i.e. construction, operation and maintenance) must be screened for its impacts:	
1. Is the development in or on the boundary of a nature conservation site NHA/SAC/SPA?	No
2. Will nationally protected species be directly impacted? Wildlife Acts (1976 and 2000), Flora Protection order (S.I. 94 of 1999)?	No
3. Is the development a surface water discharge or abstraction in the surface water catchment, or immediately downstream of a nature conservation site with water dependant qualifying habitats/ species?	no
4. Is the development a groundwater discharge or abstraction in the ground water catchment or within 5 km of a nature conservation site with water-dependant qualifying habitats/species2?	No
5. Is the development in the surface water or groundwater catchment of salmonid waters?	yes
6. Is the treatment plant in an active or former floodplain or flood zone of a river, lake, etc?	yes
7. Is the development a surface discharge or abstraction to or from marine waters and within 3km of a marine nature conservation site?	No
8. Will the project in combination with other projects (existing and proposed) or changes to such projects affect the hydrology or water levels of sites of nature conservation interest or the habitats of protected species?	No

Macroom Regulation 18 Further Information Response

Question 1 **Assess the likelihood of significant effect of the waste water discharges from the above agglomerations on the relevant European sites by referring to Circular L8/08 "Water Services Investment and Rural Water Programmes – Protection of Natural Heritage and National Monuments" issued by the Department of Heritage and Local Government. In particular, the flow diagram in Appendix 1 should be completed and the results of each section recorded. Provide details of the results of this assessment within one month of the date of this notice and provide a reasoned response for the decision. If significant effects are likely then and appropriate assessment must be carried out and a report of this assessment forwarded to the Agency by the date specified below.**
You are advised to provide the requested information in accordance with the "Note on Appropriate Assessments for the purposes of the Waste Water Discharge (Authorisation) Regulations, 2007 (S.I. 684 of 2007)".

Habitats Directive Assessment (Screening Report) in respect of Application by Cork County Council to the EPA for Wastewater Discharge License for Macroom Agglomeration.

October 2010

1 Introduction

1.1 Macroom town is situated approx. 40km North West of Cork city on the N22 National primary route. The town has a population of approx. 3,500 and is currently served by a WWTP located in Sleveen East, to the east of the town on the southern bank of the River Sullane. The treatment plant is at a very low elevation and its boundary is only 5m from the river (See Attachment A.1. Map 1). Treated effluent from the plant is discharged into the river. Storm overflow from the treatment plant discharges to the treated effluent outfall. The plant comprises an extended aeration activated sludge plant with preliminary treatment and sludge thickening and dewatering.
The Macroom WWTP was designed for a Population Equivalent (PE) of approximately 5,230PE. The maximum hydraulic capacity of the treatment plant is 47m^3/hour.
The existing treatment plant was constructed in 1975 and comprises a inlet channel with high level storm overflow prior to the automated inlet screen which removes the inorganic matter from the influent. Post removal the screened waste is washed and compacted for disposal.
The secondary treatment stage is an activated sludge system comprising a single oxidation ditch with a secondary settlement tank and a return sludge system.
The WWTP is monitored by Cork County Council as per the guidelines set down by the Urban Wastewater Treatment Regulations. The quality of effluent discharged meets the standards set.
Due to the nature of some light industries in the Macroom agglomeration the WWTP is currently treating a load of nearly 10,000 pe (based on BOD samples) The treatment plant is overloaded and proposals are underway to upgrade and expand the system to cater for future development.It was envisaged at the time the licence application was submitted that a new WWTP would be operational in Macroom by 2013.

However the scheme does not appear on the new 2010- 2012 Assessment of needs programme even under the schemes at planning stage. Therefore it is unlikely that this deadline will be met.

It is not clear at this point in time if a new WWTP will be built Macroom over the lifetime of this Licence. Therefore we are carrying out the assessment here based on the assumption that the existing system will be the only form of treatment available. If this changes over the lifetime of the licence the Agency will be informed immediately.

1.3 This document brings together all of the information necessary to make determination as to whether there are likely to be significant impacts arising from the Macroom discharge on the designated sites within the catchment area.

These are :-

SAC – St Gobnets Wood - approx 14km upstream of discharge location where the qualifying habitat is not water dependent

SPA - Mullaghanish to Musheramore – protected species Hen Harrier – Not water dependent. Stream in site joins the Foherish River which in turn joins the Sullane 4km upstream of discharge location.

SAC – Mullaghanish – Musheramore – Same as above

SAC/SPA – The Gearagh – Located on River Lee approx 2km upstream of where Sullane meets Lee. The Sullane meets the Lee approx. 1km downstream of the Macroom discharge location.

Based on the preliminary flow chart already carried out, the need for an assessment is to assess whether the Macroom discharge has an impact on the salmonoid waters of the Lee. The WWTP discharges into the Sullane River which is in the Upper Lee Catchment Area. The Sullane meets the Lee approx 1km downstream of the discharge location.

2 Appropriate Assessment Screening Matrix

2.1 Description of project	
Location	Macroom WWTP. See Location map – part A original application.
Description of the key components of the project	Macroom WWTP serves a population equivalent of approx 10,000. (based on BOD)It was designed to treat half of this when originally constructed. It discharges directly into the Sullane river.
Distance from designated sites in potential impact zone	1km from Salmonoid river (River Lee), See above for Natura sites in the vicinity.

2.2 Description of the Natura 2000 sites within the potential impact zone[1]	
Name	**None within impact zone**. Designated sites within the area are : St Gobnets Wood SAC is located approx 14km upstream of the discharge location and the qualifying habitats and species are not water dependent. Mullaghanish- Musheramore SAC/SPA – The qualifying habitats and species are not water dependent. A stream runs through the area which joins the Foherish river. The Foherish is a tributary to the Sullane and its confluence is approx 4km upstream of Macroom WWTP. The Gearagh SAC/SPA is located on the River Lee approx 2km upstream of the Sullane/Lee confluence. The confluence occurs approx 1km downstream of the discharge location.
Site Code	N/A

[1] Natura 2000 sites within the potential impact zone of the proposed development have been identified in accordance with guidance provided in the NPWS circular L8/08.

2.3 Assessment Criteria	
Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the Salmonoid River.	**Discharge from Macroom WWTP** *Treated effluent is discharged into the Sullane river.Though the WWTP is overloaded the standard of effluent is generally good.* **Other Discharges in the vicinity:** Clondrohid – Two septic tanks discharging to the Foherish tributary of the Sullane. The Foherish/Sullane confluence occurs approx. 4km upstream of Macroom *Coolcower septic tank (approx.pe 100) discharges directly into the River Lee downstream of the Lee/Sullane confluence.*
Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the Salmonoid river taking into account the following: o Size and scale o Land-take o Distance from the Natura 2000 site or key features of the site: o Resource requirements (water abstraction etc.) o Emissions (disposal to land, water or air) o Excavation Requirements o Transportation Requirements o Duration of construction, operation, decommissioning o Other.	Untreated discharges could give rise to elevated nutrients entering the River Lee. Increased nutrients could have a negative impact on the fish life in the river.

Describe any likely changes to the site arising as a result of: o Reduction in habitat area o Disturbance to key species o Habitat or species fragmentation o Reduction in species density o Changes in key indicators of conservation value (water quality etc) o Climate Change	**Reduction in habitat area:** N/A **Disturbance to key species:** *Increased nutrients in the Sullane river and the river Lee downstream of the discharge location could have a negative effect on fish numbers in the Lee. However there is no evidence to support this.* **Habitat or species fragmentation:** *No water dependent species in the surrounding SAC's SPA's.* **Reduction in species density:** *N/A.* **Changes in key indicators of conservation value eg water quality:** *The South Western River Basin District have carried out a Water Management Unit Report on the Upper lee Catchment. This includes all the tributaries to the Lee upstream of Macroom. The Sullane is classified as having good water quality as is the upper Lee. The intention of the SWRBD is to preserve this good quality.* *The EPA water monitoring sites in the vicinity give a consistent Q rating of 4-5 upstream of the discharge location. Downstream of the discharge location has a Q rating of 4* *(last available data 2008)* *As part of the Application process Cork County Council carried out limited sampling of water immediately upstream and downstream of the discharge point (depending on safe access)* *There is no evidence of deterioration of water quality associated with these results.*
Describe from the above those elements of the project of plan, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known.	

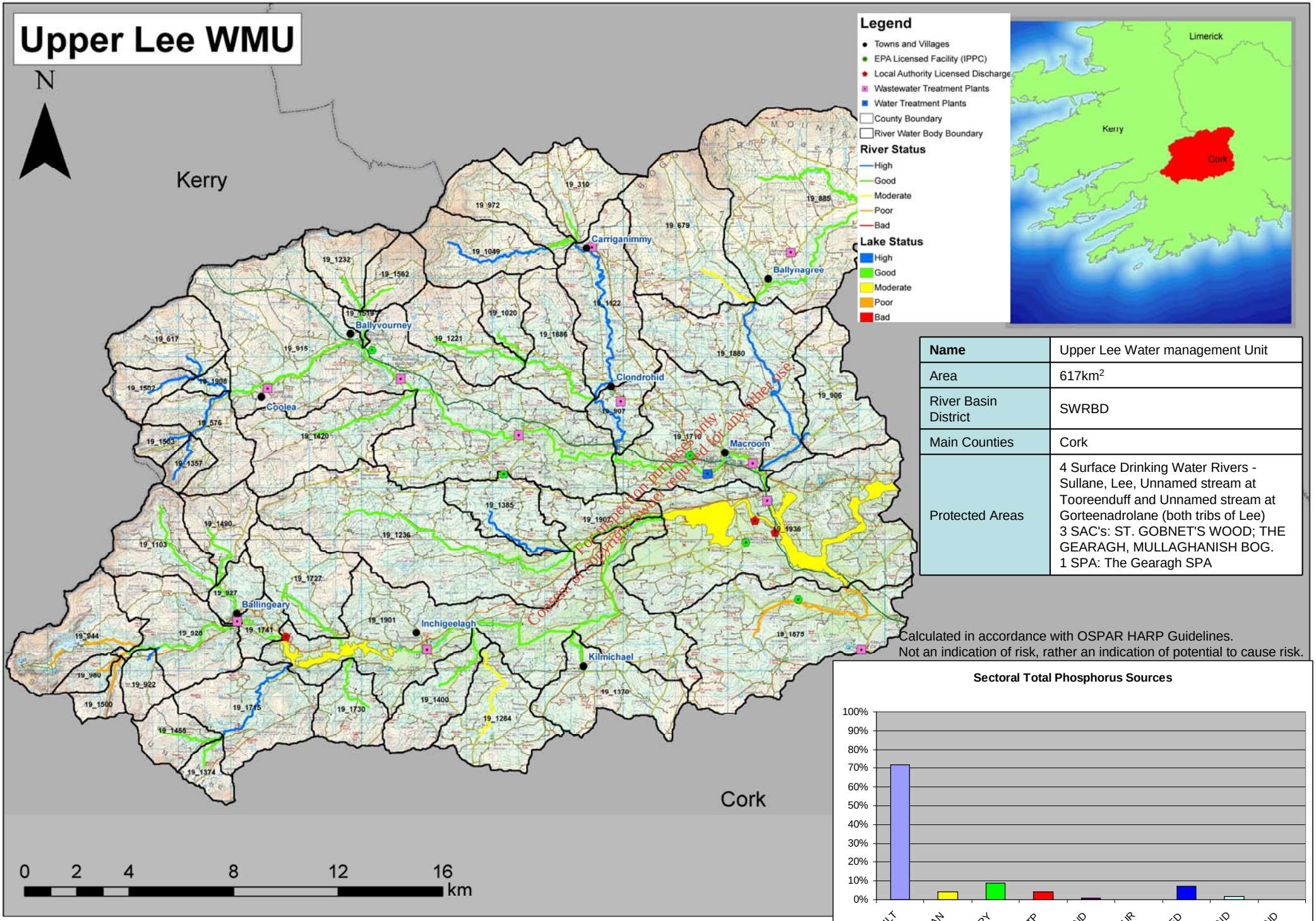
3. Finding of No Significant Effects Report Matrix

3.1 Project Description	
Name of project or plan	Macroom WWTP
Name of salmonoid River	River Lee
Description of the project or plan	Macroom WWTP serves the domestic population of the town (Approx. 3500) plus also some commercial premises and light industries. Due to the nature of the industries the population equivalent treated by the WWTP is approx 10,000.
Is the project or plan directly connected with or necessary to the management of the site (provide details)?	No

3.2 The assessment of significance of effects	
Describe how the project or plan (alone or in combination) is likely to affect the river	The discharge location for Macroom WWTP is located approx 1km upstream of the Sullane/Lee confluence.If untreated effluent was to be discharged into the Sullane in low flow situation then the available dilutions may not exist in the Sullane to prevent wastewater high in nutrients entering the Salmonoid river.
Explain why these effects are not considered significant.	Available water quality data downstream of discharge is consistently Q4 which means the river Sullane is not eutrophic and thus poses no threat to the Lee. Available monitoring data from the WWTP show that despite being overloaded the WWTP is working well and meets the UWWT regulations. (2010 data attached)

Data collected to carry out the assessment			
Who carried out the assessment	**Sources of data**	**Level of assessment completed**	**Where can the full results of the assessment be accessed and viewed**
Madeleine Healy y, Cork County Council	Cork Co Council EPA water quality monitoring data	Desktop review of cited data.	This report.

Upper Lee WMU



Legend

- Towns and Villages
- EPA Licensed Facility (IPPC)
- Local Authority Licensed Discharge
- Wastewater Treatment Plants
- Water Treatment Plants
- County Boundary
- River Water Body Boundary

River Status

- High
- Good
- Moderate
- Poor
- Bad

Lake Status

- High
- Good
- Moderate
- Poor
- Bad

Name	Upper Lee Water management Unit
Area	617km^2
River Basin District	SWRBD
Main Counties	Cork
Protected Areas	4 Surface Drinking Water Rivers - Sullane, Lee, Unnamed stream at Tooreenduff and Unnamed stream at Gorteenadrolane (both tribs of Lee) 3 SAC's: ST. GOBNET'S WOOD; THE GEARAGH, MULLAGHANISH BOG. 1 SPA: The Gearagh SPA

Calculated in accordance with OSPAR HARP Guidelines.
Not an indication of risk, rather an indication of potential to cause risk.

Upper Lee Water Management Unit Action Plan

STATUS/IMPACTS	
Overall status	There are 47 water bodies in this WMU. They are mostly High Status (14) with 27 Good Status, 2 Moderate status and 4 Poor status.
Status elements	Fish and hydromorphology dictates status of the poor waterbodies. Physchem is good or high, where monitored. High and Good water bodies are generally dictated by Q scores.
Possible Impacts - EPA Water Quality	LEE (CORK): SW_19_944; SW_19_928; SW_19_1901 2002 - EPA noted the protected pearl mussel has apparently become scarce in the river in the past two decades. 2005 - there was major disruption to fauna at first location, upstream of Gouganebarra Lake (0010), where salmonid parr and other age classes had been killed. The pH of the water was 10.66 on the day, outside the limit of tolerance for these fish, which resulted from concreting work on a small bridge upstream of the sampling site. 2008 - the site was assigned Q score 4-5 (high) - RECOVERY SW_19_944 Status of WB 2009: Moderate Status dictated by hydromorph SW_19_1901 Status of WB 2009: Good Status dictated by Q status SW_19_928 Status of WB 2009: Good Status dictated by Q status CUMMER SW_19_1875 2002 - The top and middle section of the river was polluted after having being high status in previous years. 2005 and 2008 - the water quality started to improve. The bottom section has remained at a good/high quality since records began. In 2002 and 2005 pollution was detected at the top section (site 0800). However the latest EPA data, collected in 2008, assigned site 0800 a Q score 4 (good). Status of WB 2009: Poor Status dictated by fishery status TOON: SW_19_1236; SW_19_1907 2002 - EPA found Toon river to be satisfactory throughout, for the first time since sampling began in 1990, when examined after flooding in September 2002. The pearl mussel still lives in part of the upper reaches. The lower reach, including the final location (0800), is hydromorphologically different than upstream following channelisation in the past 2005 - continuing satisfactory. SW_19_1236 Status of WB 2009: Good Status dictated by Q status SW_19_1907 Status of WB 2009: Good Status dictated by Q status LANEY: SW_19_885; SW_19_1800 2008 - Continuing satisfactory with high ecological quality at three of the site (0200, 0400, 0500) and good status a one site (0100). The top two sites surveyed (0100 and 0200) were assigned Q score 4 (good) whilst the bottom two sites were assigned Q score 4-5 (high). The protected pearl mussel lives in some stretches of the river. SW_19_885 Status of WB 2009: Good Status dictated by Q status SW_19_1800 Status of WB 2009: High Status dictated by Q status

STATUS/IMPACTS	
Possible Impacts - EPA Water Quality (CONTINUED)	SULLANE – SW_19_915; SW_19_1710 2002 - EPA noted the protected pearl mussel inhabits parts of the river. 2005 - EPA found the Sullane to be continuing satisfactory. A polluted stream enters the river, from right-hand side, downstream of Ballyvourney (0170). 2008 - All sites were assigned good status, except site 0300 which was classified Q score 4-5 (high). SW_19_915 Status of WB 2009: Good Status dictated by Q status, good fishery status and physchem status**** SW_19_1710 Status of WB 2009: Good Status dictated by Q score FOHERISH:SW_19_1049 ; SW_19_972;SW_19_1122; SW_19_907 All sites continue to be assigned Q score 4-5 (high). SW_19_1049 Status of WB: High Status dictated by Q status SW_19_972 Status of WB: High Status dictated by Q status SW_19_1122 Status of WB: High Status dictated by Q status SW_19_907 Status of WB: High Status dictated by Q status AWBOY - SW_19_679 Since records began the site has been assigned either good status or above. Status of WB 2009: Good Status dictated by Q score KEEL SW_19_310 Continuing satisfactory with good quality again recorded at the only location sampled on this tributary of the Foherish. Status of WB 2009: Good Status dictated by Q status DOUGLAS (SULLANE) - SW_19_1420 The Douglas (Sullane) has consistently attained good/high status. The lower site (0200) continuously has been assigned Q score 4, whilst the upper site (0700) has continuously been assigned Q score 4-5. Status of WB 2009: Good Status dictated by Q status GARRANE (LEE) SW_19_972 Since records began this site has been assigned Q score of 4 or 4-5 (good or high). Status of WB: High Status dictated by Q status CUSLOURA – SW_19_679 Consistently assigned Q score 4 (good) except in 2005 when it was assigned moderate status. This was due to the river becoming overgrown with emergent vegetation in July 2005. In 2008 EPA recorded a reverse in the quality and it was assigned Q score 4 again. Status of WB 2009: Good Status dictated by Q status

Upper Lee Water Management Unit Action Plan

PRESSURES/RISKS	
Nutrient sources	Most TP is diffuse (92%) of which 72% comes from agriculture, 9% from forestry and 7% from unsewered properties. 8% of TP comes from Urban and WWTP.
Point pressures	11 WWTP: - Ballinagree, Ballingeary, Ballymakera, Carranimmy, Clondrohid, Coolcower, Coolea, Inchigeela, Kilmurry, Kilnamartyra, Macroom U.D.C); 1 WTP (Macroom Pws); 4 Section 4 2 contaminated sites (Palfab Limited, Adhmaid Cill Na Martra Teoranta). 4 IPPC
Wastewater Treatment Plants (WWTP) and Industrial Discharges	Ballingeary - Insufficient existing capacity, evidence of impact, not a protected area Ballingeary - Insufficient existing assimilative capacity (BOD), evidence of impact, not a protected area Ballymakera WWTP - Insufficient existing capacity, evidence of impact, not a protected area Ballymakera WWTP - Insufficient existing assimilative capacity (BOD), evidence of impact, not a protected area Kilmurry - Insufficient future (2015) assimilative capacity (BOD), discharge not to a protected area Macroom U.D.C. WWTP - Insufficient existing capacity, non-compliant effluent standard Macroom U.D.C. WWTP - Insufficient existing capacity of treatment plant, no evidence of impact, not a protected area Macroom U.D.C. WWTP - Insufficient future (2015) assimilative capacity (BOD), discharge not to a protected area Inchigeela - Insufficient existing capacity, evidence of impact, not a protected area Inchigeela - Insufficient existing assimilative capacity (BOD), evidence of impact, not a protected area
Quarries, Mines & Landfills	3 quarries and 1 landfill. None at risk.
Agriculture	1 WB at risk - SW_19_1875 -Cummer and Buingea Rivers
On-site systems	There are 4499 septic tanks in this WMU. 1518 of these are located in areas of very high or extreme risk.
Forestry	10 WB at risk from acidification - SW_19_1400, SW_19_617, SW_19_1357, SW_19_1503, SW_19_576, SW_19_1374, SW_19_1049, SW_19_1500, SW_19_1730, SW_19_1727.
Dangerous substances	None at Risk
Morphology	1 WB at risk - SW_19_1936 - Water Regulation and Impoundments - Carrigdrohid Reservoir, which is designated as HMWB
Abstractions	None at risk
Other	

Future Pressures and Developments

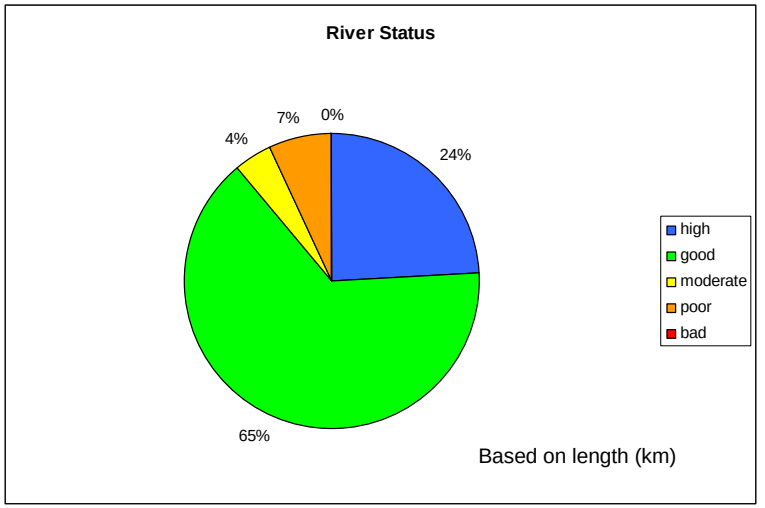
Throughout the river basin management cycle future pressures and developments will need to be managed to ensure compliance with the objectives of the Water Framework Directive and the Programme of Measures will need to be developed to ensure issues associated with these new pressures are addressed.

Upper Lee Water Management Unit Action Plan

SELECTED ACTION PROGRAMME *NB All relevant basic measures and general supplementary measures/surveys apply*	
Point Sources	Refer to point source table below for WWTP action programme Section 4s & IPPCs- Review Discharge Licenses
Diffuse Sources	AGRICULTURE - Good Agricultural Practice Regulations and Enforcement FORESTRY - Measures to address acidification apply to the 10 water bodies at risk in the WMU. These are generally located to the west and south west of the WMU. Septic Tanks: At Risk septic tanks are to be prioritised for inspections. Subsequent upgrade or connection to municipal systems depends on inspection and economic tests.
Other	Protection of drinking water, abstraction control and future licensing. MORPHOLOGY – Impassable barriers investigation.

Discharge		Measures							Waterbody	
Point Source Discharge	County	Plants Requiring Capital Works	Agglomerations Requiring Further Investigation Prior to Capital Works	Plants Required to Commence Implementation of Pollution Reduction Programmes for Shellfish Waters	Plants Requiring the Implementation of an Appropriate Performance Management System	Plants Requiring the Investigation of CSO's	Plants Required to Ensure Capacity of Treatment Plant is not Exceeded	Extended Timescale for Measure Implementation	Waterbody Code	Extended Deadline to Achieve Waterbody Objective
Ballingeary	Cork South	Yes						Yes	SW_19_927	No
Ballymakera WWTP	Cork South	Yes						Yes	SW_19_915	No
Inchigeela	Cork West	Yes						Yes	SW_19_1901	No
Kilmurry	Cork South						Yes	No	SW_19_1875	No
Macroom U.D.C. WWTP	Cork South	Yes					Yes	Yes	SW_19_1710	No

OBJECTIVES	
Good status 2015	Protect 41 waterbodies. Restore 3 waterbodies – by 2015
Alternative Objectives	Restore 1 waterbody by 2021 (SW_19_1875) – extended deadline for nitrogen losses to surface waters via groundwaters. Restore 1 waterbody by 2021 (SW_19_980) to allow recovery from poor/bad status Restore 1 waterbody (SW_19_1500) by 2027 for forestry.



Transitional Status – Refer to separate transitional waters action programme
Groundwater Status – Refer to separate groundwater action programme

Upper Lee Water Management Unit Action Plan - Rivers

IE_SW_UpperLee																		
			Biological Elements				Supporting Elements						Protected Areas					
Member State Code	Monitored Y (Extrapolated N)	Donor Waterbody	Macroinvertebrates (Q)	FreshWater Pearl Mussel	Fish	Phytobenthos (Diatoms)	Morphology	Specific Polutants	Physio-chemical	Ecological Status	Chemical Status	Special Area of Conservation	Special Protection Area	Nutrient Sensitive Waters	Drinking Water	Objective	Date objective to be achieved
SW_19_1020	N	SW_19_1221								G			Y			GES	2009
SW_19_1049	Y		H							H			Y			HES	2009
SW_19_1103	N	SW_19_1420								G						GES	2009
SW_19_1122	Y		H							H			Y			HES	2009
SW_19_1221	Y		G							G			Y			GES	2009
SW_19_1232	N	SW_19_915								G		Y	Y			GES	2009
SW_19_1236	Y		G				G			G						GES	2009
SW_19_1284	N	SW_20_250								M						GES	2015
SW_19_1357	N	SW_21_4731								H						HES	2009
SW_19_1370	N	SW_19_1710								G						GES	2009
SW_19_1374	N	SW_19_928								G						GES	2009
SW_19_1385	N	SW_19_907								H						HES	2009
SW_19_1400	N	SW_19_1236								G						GES	2009
SW_19_1420	Y		G							G						GES	2009
SW_19_1455	N	SW_19_928								G						GES	2009
SW_19_1490	N	SW_19_1420								G						GES	2009
SW_19_1500	N	SW_19_944								P						GES	2027
SW_19_1502	N	SW_21_4731								H						HES	2009
SW_19_1503	N	SW_21_4731								H						HES	2009
SW_19_1519	N	SW_19_915								G			Y			GES	2009
SW_19_1562	N	SW_19_915								G		Y	Y			GES	2009
SW_19_1710	Y		G				H		H	G					Y	GES	2009
SW_19_1715	N	SW_21_7068								H						HES	2009
SW_19_1727	N	SW_19_1420								G						GES	2009
SW_19_1730	N	SW_20_1491								G						GES	2009
SW_19_1741	N	SW_19_1420								G						GES	2009
SW_19_1875	Y		G		P				H	P						GES	2021

Upper Lee Water Management Unit Action Plan - Rivers

IE_SW_UpperLee																		
			Biological Elements				Supporting Elements						Protected Areas					
Member State Code	Monitored Y (Extrapolated N)	Donor Waterbody	Macroinvertebrates (Q)	FreshWater Pearl Mussel	Fish	Phytobenthos (Diatoms)	Morphology	Specific Polutants	Physio-chemical	Ecological Status	Chemical Status	Special Area of Conservation	Special Protection Area	Nutrient Sensitive Waters	Drinking Water	Objective	Date objective to be achieved
SW_19_1880	Y		H							H			Y			HES	2009
SW_19_1886	Y		G							G			Y			GES	2009
SW_19_1901	Y		G						H	G		Y	Y			GES	2009
SW_19_1907	Y		G							G		Y	Y			GES	2009
SW_19_1908	N	SW_21_4731								H						HES	2009
SW_19_1936	Y								G	G		Y	Y			GES	2009
SW_19_310	Y		G							G			Y			GES	2009
SW_19_576	N	SW_21_4731								H						HES	2009
SW_19_617	N	SW_21_4731								H						HES	2009
SW_19_679	Y		M							M			Y			GES	2015
SW_19_885	Y		G							G			Y			GES	2009
SW_19_906	N	SW_19_1880								H						HES	2009
SW_19_907	Y		H							H						HES	2009
SW_19_915	Y		G		G				G	G		Y	Y			GES	2009
SW_19_922	N	SW_21_7068								H						HES	2009
SW_19_927	N	SW_19_1420								G						GES	2009
SW_19_928	Y		G						H	G						GES	2009
SW_19_944	Y		P				G			P						GES	2015
SW_19_972	Y		G							G			Y			GES	2009
SW_19_980	N	SW_19_944								P						GES	2021

Upper Lee Water Management Unit Action Plan - Lakes

IE_SW_UpperLee																		
			Biological Elements			Supporting Elements						Protected Areas						
Member State Code	Name	Monitored Y (Extrapolated N)	Macrophytes	Chlorophyll	Fish	Morphology	Nutrient Enrichment	Physico Chemical	Ecological Status	Chemical Status	Special Area of Conservation	Special Protection Area	Nutrient Sensitive Waters	Bathing Water	Drinking Water	Objective	Date objective to be achieved
SW_19_139	Carrigdrohid Reservoir	Y	M	G			G	G	M		Y	Y				GEP	2015
SW_19_4	Allua (Lough)	Y	M	M	M		G	G	M							GES	2015

Non Technical Summary (Revised October 2010)

INTRODUCTION:

This application is in relation to the discharge from the Macroom Town Waste Water Treatment Plant, which serves the agglomeration of Macroom and includes Macroom Town and its Environs. This plant is under the administrative control of Macroom Urban District Council (Town Council) which also operates the plant.
The plant is located at the eastern end of the town on the southern bank of the river Sullane. A pumping station at Masseytown serves the region to the west of the town; this pumping station is equipped with 2 No. Duty/Standby pumps and high level overflows to the River Sullane when necessary during heavy rainfall.
Macroom Town has developed along an East–West Axis, with development constrained to the south of the town by the topography, and to north by the River Sullane. The existing sewerage network comprises of approximately 19km of pipe-work. Flows from the east of the catchment gravitate directly to the WWTP while flows from the west gravitate to Masseytown where they are pumped east to a point where they can gravitate to the WWTP. There are three small pumping stations on the network servicing residential developments, none of which have emergency or storm overflows. The majority of the town consists of combined sewer with the exception of new developments which have recently been constructed in the last five years. The majority of the existing combined, foul and storm sewers are a mix between 150mm to 550mm pipes.

A DESCRIPTION OF THE WASTE WATER WORKS AND THE ACTIVITIES CARRIED OUT THEREIN: (SEE ATTACHMENT A.1 DRAWING 1 FOR DETAILS OF THE LAYOUT)

Located in Sleveen East, to the east of the town on the southern bank of the River Sullane, the treatment plant is at a very low elevation and its boundary is only 5m from the river (See Attachment A.1. Map 1). Treated effluent from the plant is discharged into the river. Storm overflow from the treatment plant discharges to the treated effluent outfall. The treatment plant occupies only a portion of a 2 acre site owned by the Town Council. The plant comprises an extended aeration activated sludge plant with preliminary treatment and sludge thickening and dewatering.
The Macroom WWTP was designed for a Population Equivalent (PE) of approximately 5,230PE. The maximum hydraulic capacity of the treatment plant is 47m3/hour.
The existing treatment plant was constructed in 1975 and comprises a inlet channel with high level storm overflow prior to the automated inlet screen which has recently been replaced (2007) including a washing and compacting facility.
Flows are then measured in the open channel venturi flume before gravitating into the activated sludge system comprising a single oxidation ditch with a secondary settlement tank and a return sludge system. The sludge thickening

and dewatering facilities as well as a Phosphorus removal system were added in the late 1980's. Wastewater-flow through the treatment process is by gravity with no inter-stage pumping required. The treatment plant is currently near its design capacity and a Preliminary Report is currently being undertaken to assess the upgrading of the sewerage network and WWTP to cater for future predicted flows.
There are three buildings at the WWTP. These include a small control building (which also serves as an office) and a separate sludge dewatering building (which also houses the ferric and polymer dosing systems) and a shed used by Macroom Town Council for storage of their equipment.

Pre-Treatment

The aim of the pre-treatment is to remove as much inorganic load, and floating and suspended objects as possible before primary treatment. There are no facilities on site for the storage of storm water and in the event of storm conditions incoming storm flows overflow via a two-sided weir channel into the River Sullane. The storm water overflow is positioned upstream of the newly installed screening facility. There is no facility on site for measuring the flow rate of storm water discharge to the river. All flows which go forward to full treatment are screened to 6mm.

Secondary Treatment

The secondary treatment stage is an activated sludge system comprising a single oxidation ditch with a secondary settlement tank and a return sludge system.
The oxidation ditch is fitted with two horizontal shaft surface aerators which are mounted on floating supports due to the regular flooding of the site and the submergence of the oxidation ditch.
Flow from the oxidation ditch gravitates to a 15.2m diameter radial flow settlement tank fitted with a rotating half bridge scraper mechanism. Settled sludge from this tank gravitates to a nearby sludge chamber. A lifting wheel in the sludge chamber returns the activated sludge to the oxidation ditch.
Treated effluent which overflows from the secondary settlement tank combines with the storm water overflow and gravitates via an outfall pipe to the River Sullane. 24 hour composite samples are collected for analysis up to 12 times per year from this chamber by Cork County Staff which are then analysed at the laboratory in Inniscarra. There is no facility on site for measuring the flow rate of treated effluent to the river.
A phosphorus removal facility, comprising a GRP ferric sulphate storage tank and dosing system, was installed in the late 1980's. However, this has not been operated for a number of years.

Sludge Management

Surplus sludge is pumped to a gravity sludge thickening tank. The sludge thickener is a flat bottomed fabricated steel tank, in which a submersible mixer is installed.
Thickened sludge is pumped to a double belt dewatering press. The press

produces a dewatered cake at 17 % dry solids. This is stored in a skip until it is taken off–site. The press is generally operated for approximately 7 hours per day and five days per week. Currently one skip containing approximately 7 tonnes of sludge cake is transported off site to McGill Environmental System's site at Castletownroche, Co. Cork for composting.

Operation of the WWTP

The Macroom WWTP is currently operated by Macroom Town Council. The plant is manned during the week from 8.30am – 5.00pm (Monday – Friday) by a plant operator and a plant manager. Weekend cover is provided on both Saturday and Sunday for an hour's duration each day. There is no SCADA system or remote monitoring of the plant in place. Inflow is measured and recorded automatically.

Upgrading of Sewer Network and Treatment Plant

In 2006 Cork County Council advertised for the services of a Consulting Engineer to compile a Preliminary Report to assess the current waste water infrastructure
in Macroom. In 2007, J.B. Barry & Partners, Consulting Engineers, commenced work on the Preliminary Report. The objective of this report is to establish how best to improve the existing system and make recommendations to Cork County
Council. The eventual upgrading of the system (which is expected to be completed and operational by 2013) will improve the discharges from the treatment plant to the river by:

- Provision of additional storm storage and screen at Masseytown Pump Station;
- Removing the discharge of unscreened storm flows into the River Sullane at the WWTP and provide storm storage;
- Increasing capacity at the WWTP to cope with the predicted future increases in population;
- Protection of assets from flooding events;
- Provision of standby sludge dewatering facilities.

The proposed upgrade of the WWTP will not be completed by 2013. The current 2010-2012 Assessment of need programme does not include Macroom WWTP even in the projects at planning stage.

(Inserted October 2010)

SOURCES OF EMISSIONS FROM THE WASTE WATER TREATMENT WORKS

The pollution load for the Macroom agglomeration arises from the following areas:

- The local population
- Local industries
- Cork Marts Macroom

The domestic population of Macroom has grown over the last three censuses owing to it development as a town within the Cork Metropolitan area. The population of Macroom has increased by approx. 4.4% per annum for the last 10 years. The most recent Census (2006) figures show that Macroom Town and its environs now have a domestic population in excess of 3550.
Other sources of influent that contribute to the sewage scheme would be:

- Commercial premises
- Schools
- Tourism
- Infiltration

The overall population equivalent of the town, commercial and domestic, has been calculated as 6,616.

NATURE AND QUANTITIES OF FORESEEABLE EMISSIONS FROM THE WASTEWATER WORKS INTO THE RECEIVING AQUEOUS ENVIRONMENT AS WELL AS IDENTIFICATION OF SIGNIFICANT EFFECTS OF THE EMISSIONS ON THE ENVIRONMENT:

The effluent discharged from the treatment plant to the receiving waters contains BOD, COD, Suspended Solids, Phosphorus, Ammonia and Nitrates. The use of poly-electrolye, for sludge dewatering purposes, and Ferric Sulphate (if Phosphorus reduction is in operation) are also potential loadings from the treatment plant to the receiving waters. The treatment process employed in Macroom greatly reduces the levels of these parameters entering the aquatic environment and the levels are below those indicated in the Urban Waste Water Directive. The treated effluent from the Macroom WWTP meets the required parameters.

Parameter	Concentration limit	Concentration as discharged (WWTP 2007)
BOD	25mg/l O_2	20.8mg/l O_2
COD	125mg/l O_2	26.1mg/l O_2
TSS	35mg/l O_2	34.8mg/l O_2

Table A.1 Emission Limit Values for Discharges to non-Sensitive Waters Receiving water

The final effluent discharge and stormwater overflow from the WWTP and Masseytown PS discharge into the River Sullane. The Sullane rises in the Derrynasaggart Mountains just past Coolea. It flows in a North-Easterly direction towards Ballyvourney on the main Cork / Killarney Road. From Ballyvourney it follows close to the main road all the way to Macroom. As it reaches the Western outskirts of Macroom it becomes wider. The Sullane is joined by the Laney which flows from the North of Macroom just before it meets the Lee at the Two Mile Bridge.

The River Sullane is an important fishery and although it is not a designated salmonid river and there is no legislative requirement for the Sullane to comply with Salmonid Water Regulations, achievement of these standards is desirable to support existing fishing activities.
The 2005 EPA Water Quality Report indicated that the water quality in the River Sullane has remained satisfactory over the period of the last report. The Q-value upstream of Macroom Town at Linnamilla Bridge is 5; downstream of the town at the confluence with the River Laney the Q-value is 4 which denotes unpolluted conditions.

Drinking Water

The Sullane River is a tributary of the River Lee and drinking water is abstracted downstream of the outfall site at Inniscarra by Cork County Council. Council Directive 75/440/EEC 1975 and the associated EC (Quality of Surface Water Intended for the Abstraction of Drinking Water) Regulations 1989 (SI No 294 of 1989) are applicable. Therefore, the treated effluent should not impact on the ability of the receiving water to reach the above standards. The aim of this legislation is to reduce and prevent pollution of surface water intended for the abstraction of drinking water. Surface water intended for abstraction of drinking water is divided into three categories (A1, A2 & A3 waters) and different levels of water treatment are specified depending on the classification of the water body. The regulations set the following minimum quality requirements to be met by surface fresh water:
- parameters defining the physical, chemical and microbiological characteristics;

- limit values for these parameters;
- the minimum frequency of sampling and analysis; and
- common non-mandatory reference methods for measuring the parameters.

The following are some of the water quality standards are set out these regulations:

Table A.2 Surface Water Quality Standards

Parameter	A1	A2	A3
BOD mg/l	5	5	7
Total Sus. Solids (mg/l)	50	50	50
Total Ammonia (mg/l)	0.2	1.5	4.0
Nitrates (mg/l)	50	50	50
Phosphates (mg/l)	0.5	0.5	0.7

Inniscarra Water Treatment Plant has a full treatment process which includes sedimentation, filtration and disinfection which in accordance to Annex 1 of the Surface Water Directives that gives definitions of the method of treatment from surface water into drinking water the category is A2 – Normal physical treatment. Therefore the above parameters for category A2 apply to Macroom WWTP.

PROPOSED TECHNOLOGY AND OTHER TECHNIQUES FOR PREVENTING OR, WHERE THIS IS NOT POSSIBLE, REDUCING EMISSIONS FROM THE WASTE WATER WORKS:

The WWTP at Macroom floods on a regular basis due to its proximity to the Sullane River. The forthcoming Preliminary Report will make recommendations on the introduction of flood protection measures to ensure that the plant remains operational during high river flows.
The Preliminary Report will consider the following measures among others: -

- Installation of a storm water storage system;
- Raising the height/walls of the existing structures;
- Provision of standby diesel generators or generator sockets in control panels;
- Installation of final effluent Pumping Station to pump final effluent and storm flows into the river at high levels;
- Construction of additional process units to cope with the predicted future load.

These measures would be implemented to prevent untreated emissions from entering the receiving aqueous environment.
The Preliminary Report currently being undertaken on behalf of Cork County Council by J.B. Barry & Partners is to assess the various options available for the upgrading of the current treatment plant and sewerage network due to increased demand for wastewater infrastructure in Macroom in recent years. The report is to be completed by September 2008.

FURTHER MEASURES PLANNED TO COMPLY WITH THE GENERAL PRINCIPLE OF THE BASIC OBLIGATIONS OF THE OPERATOR, I.E., THAT NO SIGNIFICANT POLLUTION IS CAUSED:

Prevention of Pollution
Any alteration/upgrading of the existing infrastructure undertaken by Cork County Council shall not increase the potential to cause pollution in the environment. In particular any alterations to the wastewater treatment plant will be designed to enable any operator of the facility to prevent pollution of the environment by the following potential contaminants:

- Surface water run-off
- Spillages
- Solid Waste
- Toxic Substances

Cork County Council shall insure that any modifications or alterations to the plant do not increase the impact by any toxic substances. All chemical and dangerous substances must be stored safely at all times and all appropriate safety measures must be taken to ensure against leakage and spillage in accordance with the relevant Health & Safety Legislation.

MEASURES PLANNED TO MONITOR EMISSIONS INTO THE ENVIRONMENT:
Macroom Town Council, as current operator has not developed procedures and processes for the sampling and analysis at the various stages of the processes.
Laboratory analysis is not carried out on site, samples are collected 6 – 12 times per year by Cork County Council staff and analysed at Cork County Council's laboratory at Inniscarra.
Cork County Council has water quality data from samples taken in the Sullane at Linnimella Bridge (Station No. 0480) which is upstream of Macroom Town (results date from 17/01/2007 to 07/08/2007). The results of this sampling indicate levels of Molydbate Reactive Phosphorus ranging between <0.006 and 0.024 mg/l. The mean level recorded over this period was 0.01mg/l P.
The Environmental Protection Agency (EPA) also has a water quality monitoring point here. The most recent EPA monitoring records in 2005 confirm a Q rating of 5 at this point. The last period for which chemical data is available is 1995-1997.
At the treatment plant Cork County Council undertakes sampling of the final effluent and also has monitoring and sampling points upstream and downstream of the discharge point. The upstream monitoring point is just upstream of the discharge point whereas the downstream sampling point is at Coachford Bridge.
Analysis results from these points for 2006 indicate a slight deterioration in water quality downstream of the discharge. The mean Total Phosphorus result for the upstream point was <0.2 mg/l P and downstream was <0.318 mg/l P.
The mean upstream BOD was 1.686 mg/l BOD and downstream this figure was 2.064 mg/l BOD.

CONCLUSION

The Waste Water Treatment Plant at Macroom provides treatment for the wastewater generated by the Macroom agglomeration. Cork County Council has engaged the services of a firm of Consulting Engineers to prepare a Preliminary Report on the upgrading of the Macroom Sewerage Network. The measures recommended by this report will ensure that the sewerage network and treatment plant in Macroom continue to meets the requirements of the Urban Waste Water Directive when the upgrade is completed (expected 2013) and other applicable directives and reduce the incidents and severity of stormwater overflows into the River Sullane.

Upgrade will not be completed by 2013. – See note above in section on upgrading network and WWTP. – Inserted October 2010.

CONTRACTS AT CONSTRUCTION

Scheme Name	Contract Name	W/S	Estimated Cost €
Cork County			
Ballincollig Sewerage Scheme (G)	· Emergency Treatment Plant Upgrade	S	1,500,000
	· Network (Green Route)	S	2,500,000
Bantry Interim Water Supply Scheme	· Civil Works	W	3,411,000
	· M&E Works	W	1,678,000
Bantry Sewerage Scheme	· Network (Civil Works)	S	5,694,000
	· Network (M&E Works)	S	3,378,000
Blarney Water Supply Scheme Phase 1 (SLI)	· Network (Extension to Station Road)	W	216,000
Cloughduv Sewerage Scheme	· Contract 1 (Civil Works)	S	1,480,000
Cloughduv Water Supply Scheme	· Contract 1 (Civil Works)	W	1,650,000
Cobh/Midleton/Carrigtwohill Water Supply Scheme	· Contract 3 (Network)	W	3,144,000
Dripsey/Coachford Water Supply Scheme	· Contract 1 (Civil Works)	W	3,252,000
Innishannon Water Supply Scheme	· Civil Works	W	6,490,000
	· M&E Works	W	1,160,000
Killeagh Sewerage Scheme	· Contract 1 (Treatment Plant Upgrade)	S	462,000
Kinsale Sewerage Scheme	· Contract 3 (Network)	S	7,654,000
	· Contract 4 (Network)	S	2,260,000
	· Wastewater Treatment Plant - DBO	S	10,289,000
Schull Sewerage Scheme	· Network (Civil Works)	S	2,424,000
	· Network (M&E Works)	S	506,000
Water Conservation Stages 1 & 2 Works	· Water Conservation Stages 1 & 2 Works	W	18,364,000
Watergrasshill Water Supply Scheme	· Contract 1 (Civil Works)	W	3,770,000
Kerry			
Kilcummin/Barraduff Sewerage Scheme	· Barraduff Wastewater Treatment Plant - DBO	S	2,599,000
NSS Hub Cluster Sewerage Scheme	· Firies Wastewater Treatment Plant - DBO	S	2,787,000
NSS Hub Cluster Sewerage Scheme	· Milltown Wastewater Treatment Plant - DBO	S	3,496,000
Water Conservation Stages 1 & 2 Works	· Water Conservation Stages 1 & 2 Works	W	2,882,000
TOTAL			**93,046,000**

CONTRACTS TO START 2010 - 2012

Scheme Name	Contract Name	W/S	Estimated Cost €
Cork City			
Cork City Water Supply Scheme (G)	· Lee Road Water Treatment Plant Upgrade	W	17,500,000
	· Network (Shanakiel Rising Main)	W	1,900,000
	· Network (Wilton Lee Road Trunk Main)	W	2,900,000
Docklands Water Supply Scheme (G)	· Contract 1 (Network)	W	5,600,000
Water Conservation Stage 3 Works (G)	· Watermains Rehabilitation Project Phase 1	W	12,200,000
Cork County			
Ballincollig Sewerage Scheme (G)	· Wastewater Treatment Plant Upgrade (Advance Works)	S	5,000,000
Baltimore Sewerage Scheme	· Network	S	750,000
Bandon Sewerage Scheme Phase 2	· Network	S	12,000,000
	· Wastewater Treatment Plant Upgrade	S	1,000,000
Bantry Water Supply Scheme Phase 2	· Network	W	1,897,000
Blarney Tower Sewerage Scheme (G)	· Network (Cloghroe)	S	600,000
	· Network (Overflows)	S	5,000,000
Carrigtwohill Sewerage Scheme (SLI)	· Wastewater Treatment Plant Upgrade	S	14,000,000
Castletownbere Regional Water Supply Scheme Phase 1	· Water Treatment Plant, Reservoir & Network	W	6,000,000
Clonakilty Sewerage Scheme	· Wastewater Treatment Plant Upgrade	S	5,000,000
Coachford Sewerage Scheme (SLI)	· Network	S	1,447,000
Conna Regional Water Supply Scheme Phase 1	· Reservoir	W	1,000,000
Courtmacsherry/Timoleague Sewerage Scheme	· Treatment & Network	S	5,000,000
Crookstown Sewerage Scheme (SLI)	· Network	S	1,000,000
	· Wastewater Treatment Plant Upgrade	S	1,400,000
Dunmanway Regional Water Supply Scheme Phase 1	· Water Treatment Plant Upgrade	W	1,000,000
Dunmanway Regional Water Supply Scheme Phase 2	· Treatment & Network	W	6,760,000
Dunmanway Sewerage Scheme	· Network	S	400,000
Inniscarra Water Treatment Plant (G)	· Sludge Treatment Upgrade	W	5,570,000
Innishannon Sewerage Scheme (SLI)	· Wastewater Treatment Plant Upgrade	S	2,000,000
Kinsale Sewerage Scheme	· Storm Tank	S	1,000,000
Leap/Baltimore Water Supply Scheme Phase 1	· Contract 1 (Network)	W	2,200,000
Little Island Sewerage Scheme	· Network	S	600,000
Mallow Sewerage Scheme (H)	· Network	S	5,000,000
	· Wastewater Treatment Plant (Nutrient Reduction)	S	1,000,000
Mallow/Ballyviniter Regional Water Supply Scheme Phase 1 (H)	· Network (Box Cross)	W	4,000,000

Midleton Sewerage Scheme (SLI)	·	Wastewater Treatment Plant Upgrade	S	2,288,000
Riverstick Sewerage Scheme	·	Wastewater Treatment Plant Upgrade	S	1,200,000
Schull Water Supply Scheme Phase 1	·	Treatment Plant & Network	W	5,600,000
Skibbereen Regional Water Supply Scheme Phase 4	·	Treatment & Storage	W	2,500,000
Water Conservation Stage 3 Works	·	Watermains Rehabilitation Project Phase 1	W	23,213,000
West Cork Grouped DBO Scheme[1]	·	Wastewater Treatment Plant - DBO	S	6,950,000
Youghal Sewerage Scheme	·	Network	S	8,000,000
	·	Wastewater Treatment Plant - DBO	S	10,000,000
Kerry				
Central Regional Water Supply Scheme (H)	·	Scart Reservoir	W	5,070,000
	·	Water Treatment Plant - DBO	W	22,730,000
Kenmare Sewerage Scheme	·	Wastewater Treatment Plant Upgrade	S	9,800,000
Kenmare Water Supply Scheme	·	Water Treatment Plant - DBO	W	6,000,000
Water Conservation Stage 3 Works	·	Watermains Rehabilitation Project Phase 1	W	18,790,000
Waterville Water & Sewerage Scheme	·	Water & Waste Treatment Plants - DBO	S	10,500,000
Waterford County				
Lismore Sewerage Scheme (SLI)	·	Wastewater Treatment Plant Upgrade	S	1,140,000
West Waterford Water Supply Scheme Phase 1	·	Contract 1 (River Finisk Borehole)	W	525,000
TOTAL				**265,030,000**

[1]Skibbereen, Schull, Baltimore & Dunmanway

SCHEMES AT PLANNING STAGES 2010 - 2012

Scheme Name	W/S
Cork City	
Carrigrennan Wastewater Treatment Plant Upgrade (G)	S
Cork City Water Supply Scheme (Storage Mt Elma, Ballincollig & Chetwynd) (G)	W
Cork City Water Supply Scheme (Storage at Low Intermediate Level) (G)	W
Docklands Sewerage Scheme (G)	S
Water Conservation Stage 3 Works	W
Cork County	
Ballincollig Sewerage Scheme (G)	S
Ballyvourney/Ballymakeera Sewerage Scheme (Treatment Plant)	S
Banteer/Dromahane Regional Water Supply Scheme	W
Bantry Sewerage Scheme	S
Bantry Water Supply Scheme	W

Castletownbere Sewerage Scheme	S
Conna Regional Water Supply Scheme	W
Cork City Sewerage Scheme (Tramore River Valley - Study)	S
Cork Lower Harbour Sewerage Scheme	S
Cork North East Water Supply Scheme	W
Cork Sludge Management Scheme (G)	S
Drimoleague Sewerage Scheme	S
Dripsey Sewerage Scheme	S
Dunmanway Regional Water Supply Scheme	W
Fermoy Sewerage Scheme	S
Garrettstown/Ballinspittle Sewerage Scheme	S
Glanmire/Riverstown/Little Island Stormwater Separation Study	S
Leap/Baltimore Water Supply Scheme	W
Mallow/Ballyviniter Regional Water Supply Scheme (H)	W
Millstreet Sewerage Scheme	S
Mitchelstown/North Galtees Water Supply Scheme	W
Mitchelstown Sewerage Scheme	S
Monard New Town - Water Services Study	W/S
Rosscarbery/Owenahincha Sewerage Scheme	S
Saleen Sewerage Scheme	S
Schull Water Supply Scheme	W
Shanagarry/Garryvoe/Ballycotton Sewerage Scheme	S
Shannonvale Sewerage Scheme	S
Skibbereen Regional Water Supply Scheme	W
Whitegate/Aghada Sewerage Scheme	S
Youghal Water Supply Scheme	W
Water Conservation Stage 3 Works	W

Kerry

Castlemaine Sewerage Scheme	S
Glenbeigh Sewerage Scheme	S
Kilcummin Sewerage Scheme	S
Water Conservation Stage 3 Works	W

Notes:

H refers to a Hub as designated in the National Spatial Strategy

G refers to a Gateway as designated in the National Spatial Strategy (Towns in the Dublin local authorities and in Counties Meath, Kildare and Wicklow all fall within the Greater Dublin Area as designated in the National Spatial Strategy)

S refers to wastewater infrastructure

SLI refers only to contracts appproved to commence in the period 2010-2012 under the Serviced Land Initiative, largely arising from contractual commitments, as this initiative is otherwise discontinued.

W refers to water supply or water conservation

MacroomTreated Effluent Discharge 2010

Sample Date	21/01/2010	04/02/2010	04/03/2010	08/04/2010	05/05/2010
Sample	Effluent	Effluent	Effluent	Effluent	Effluent
Sample Code	GU016	GU068	GU152	GU208	GU307
Flow M^3/Day	*	*	*	*	*
pH	*	*	*	*	*
Temperature °C	*	*	*	*	*
Conductivity uS/cm 20°C	*	*	*	*	*
Suspended Solids mg/L	<2.5	24	11	27	14
Ammonia-N mg/L	*	*	*	*	*
BOD mg/L	1	19	6	27	13
COD mg/L	<21	100	45	91	<21
TN-N mg/L	*	*	*	*	*

03/06/2010	08/07/2010	12/08/2010	09/09/2010		MEAN VALUE
Effluent	Effluent	Effluent	Effluent	Effluent	
GU380	GU495	GU584	GU671		
*	*	*	*		
*	*	*	*		
*	*	*	*		
*	*	*	*		
8	19	50	9		**20.25**
*	*	*	*		
5	6	18	4.5		**11.06**
44	40	97	39		**65**
*	*	*	*		

Question 2 **Review the assessment of the impact of the discharge in relation to the requirements of the Environmental Quality Objectives regulations (S.I. No. 272 of 2009) and resubmit and update where relevant**

The River Sullane into which the WWTP discharges has a “good status”. Therefore the “good” standard contained in the Surface Water Regulations (2009) was used for comparison purposes.

The upstream and downstream sampling results for 2008 at aSW01u and aSW01d were compared to the relevant EQR/S from the surface water regulations in the following tables. The sample results and the EQR/S were included only if there were values for both, to allow comparison.

The upstream and downstream sample results incorporated in the following tables are those laid out in the upstream and downstream sheets of the Revised Table E. However many of these results are at the limit of detection, or are results based on averages that include assumed figures. Therefore additional upstream and downstream tables which incorporate actual results for analysis below the Limit of Detection have been included. This “Analysis below the Limit of Detection” is laid out on a separate sheet in the Revised Table E.

UPSTREAM COMPARISON TABLE

Physico-chemical conditions	***Ecological quality ratio/standard***	***2008 upstream ambient sampling results at aSW-1u***
	Good boundary	
	Rivers (All Types)	
Oxygenation conditions Table 9	***River water body***	***Ambient sampling results***
Biochemical Oxygen Demand (BOD) (mgO_2/l)	Good status≤1.5 (mean) or ≤2.6(95%ile)	1.0mg/L (mean) 2.0mg/L (95%ile)
Acidification Status Table 9	***River Water Body***	***Ambient sampling results***
pH (individual values)	Soft Water 4.5<pH<9.0 Hard Water 6.0<pH<9.0	7.2-7.6
Nutrient conditions Table 9	***River Water body***	***Ambient sampling results***
Total Ammonia (mg N/l)	Good status≤0.065(mean) or ≤0.140(95%ile)	0.05mg/L (mean) 0.05mg/L (95%ile)
Molybdate Reactive Phosphorus (MRP) (mg P/l)	Good status≤0.035(mean) or ≤0.075(95%ile)	0.025mg/L (mean) 0.025mg/L (95%ile)
Specific pollutants Table 10	***Inland surface waters AA-EQS***	***Ambient sampling results***
Phenol	8	<0.1µg/L
Toulene	10	<1.0µg/L
Xylene	10	<1.0µg/L
Arsenic	25	<0.96µg/L
Total Chromium	8.6	<20µg/L
Copper (depending on water hardness)	5	<20µg/L
Cyanide	10	7
Flouride	500	60
Zinc (depending on water hardness)	50	<20µg/L
Priority Substances Table 11	***Inland surface waters AA-EQS***	***Ambient sampling results***
Atrazine	0.6	<0.01µg/L
Dichloromethane	20	<1.0µg/L
Simazine	1	<0.01µg/L
Lead and its compounds	7.2	<20µg/L
Nickel and its compounds	20	<20µg/L
Priority Hazardous Substances Table 12	***Inland surface waters AA-EQS***	***Ambient sampling results***
Cadmium and its compounds (depending on water hardness)	0.25	<20µg/L
Mercury and its compounds	0.05	0.4µg/L

Note the following:

The black results are within the EQR/S.
The red results break the EQR/S.
The blue results may break the EQR/S.
The results highlighted grey are at the limit of detection.
Water hardness in the Sullane River is 36mg$CaCO_3$/L

UPSTREAM COMPARISON TABLE
(ANALYSIS BELOW THE LIMIT OF DETECTION)

Physico-chemical conditions	***Ecological quality ratio/standard*** ***Good boundary*** ***Rivers (All Types)***	***2007-2008 upstream ambient sampling results at aSW-1u***
Nutrient conditions Table 9	***River Water body***	***Ambient sampling results***
Total Ammonia (mg N/l)	Good status≤0.065(mean) or ≤0.140(95%ile)	0.144mg/L (mean) 0.672mg/L (95%ile)
Molybdate Reactive Phosphorus (MRP) (mg P/l)	Good status≤0.035(mean) or ≤0.075(95%ile)	0.014mg/L (mean) 0.0275mg/L (95%ile)
Specific pollutants Table 10	***Inland surface waters AA-EQS***	***Ambient sampling results***
Total Chromium	8.1	0.5µg/L
Copper (depending on water hardness)	5	<1.0µg/L
Zinc (depending on water hardness)	50	0.715µg/L
Priority Substances Table 11	***Inland surface waters AA-EQS***	***Ambient sampling results***
Lead and its compounds	7.2	3.69µg/L
Nickel and its compounds	20	0.508µg/L
Priority Hazardous Substances Table 12	***Inland surface waters AA-EQS***	***Ambient sampling results***
Cadmium and its compounds (depending on water hardness)	0.25	<1.0µg/L

DOWNSTREAM COMPARISON TABLE

Physico-chemical conditions	***Ecological quality ratio/standard*** ***Good boundary*** ***Rivers (All Types)***	***2008 downstream ambient sampling results at aSW-1d***
Oxygenation conditions Table 9	***River water body***	***Ambient sampling results***
Biochemical Oxygen Demand (BOD) (mgO_2/l)	Good status≤1.5 (mean) or ≤2.6(95%ile)	0.5mg/L (mean) 0.5mg/L (95%ile)
Acidification Status Table 9	***River Water Body***	***Ambient sampling results***
pH (individual values)	Soft Water 4.5<pH<9.0 Hard Water 6.0<pH<9.0	7.2-7.8
Nutrient conditions Table 9	***River Water body***	***Ambient sampling results***
Total Ammonia (mg N/l)	Good status≤0.065(mean) or ≤0.140(95%ile)	0.05mg/L (mean) 0.05mg/L (95%ile)
Molybdate Reactive Phosphorus (MRP) (mg P/l)	Good status≤0.035(mean) or ≤0.075(95%ile)	0.025mg/L (mean) 0.025mg/L (95%ile)
Specific pollutants Table 10	***Inland surface waters AA-EQS***	***Ambient sampling results***
Phenol	8	21.29µg/L
Toulene	10	<1.0µg/L
Xylene	10	<1.0µg/L
Arsenic	25	<0.96µg/L
Total Chromium	8.6	13.71µg/L
Copper (depending on water hardness)	5	<20µg/L
Cyanide	10	7µg/L
Flouride	500	40µg/L
Zinc (depending on water hardness)	50	<20µg/L
Priority Substances Table 11	***Inland surface waters AA-EQS***	***Ambient sampling results***
Atrazine	0.6	<0.01µg/L
Dichloromethane	20	<1.0µg/L
Simazine	1	<0.01µg/L
Lead and its compounds	7.2	0.012µg/L
Nickel and its compounds	20	<20µg/L
Priority Hazardous Substances Table 12	***Inland surface waters AA-EQS***	***Ambient sampling results***
Cadmium and its compounds (depending on water hardness)	0.25	<20µg/L
Mercury and its compounds	0.05	0.5µg/L

Note the following:

The black results are within the EQR/S.
The red results break the EQR/S.
The blue results may break the EQR/S.
The results highlighted grey are at the limit of detection.
Water hardness in the Sullane River is 36mgCaCO3/L

DOWNSTREAM COMPARISON TABLE
(ANALYSIS BELOW THE LIMIT OF DETECTION)

Physico-chemical conditions	***Ecological quality ratio/standard*** ***Good boundary*** ***Rivers (All Types)***	***2007-2008 downstream ambient sampling results at aSW-1d***
Nutrient conditions Table 9	***River Water body***	***Ambient sampling results***
Total Ammonia (mg N/l)	Good status≤0.065(mean) or ≤0.140(95%ile)	0.072mg/L (mean) 0.29mg/L (95%ile)
Molybdate Reactive Phosphorus (MRP) (mg P/l)	Good status≤0.035(mean) or ≤0.075(95%ile)	0.020mg/L (mean) 0.0282mg/L (95%ile)
Specific pollutants Table 10	***Inland surface waters AA-EQS***	***Ambient sampling results***
Total Chromium	8.1	3.23µg/L
Copper (depending on water hardness)	5	1.0µg/L
Zinc (depending on water hardness)	50	1.98µg/L
Priority Substances Table 11	***Inland surface waters AA-EQS***	***Ambient sampling results***
Lead and its compounds	7.2	6.0µg/L
Nickel and its compounds	20	0.57µg/L
Priority Hazardous Substances Table 12	***Inland surface waters AA-EQS***	***Ambient sampling results***
Cadmium and its compounds (depending on water hardness)	0.25	<1.0µg/L

PREDICTED IMPACTS

MASS BALANCE EQUATIONS FOR BOD:

Worst Case Scenario:

Maximum Discharge, Low Flow in the River, Maximum BOD in Discharge.

Flow of River (95%ile) = 0.34m^3/sec
Mean BOD in River (upstream) = 1.0mg/L
Max volume of discharge = 0.026m^3/sec
Max value for BOD in discharge = 25mg/L (Max from Online Tables)

$$C_{final} = \frac{(0.34 \times 1.0) + (0.026 \times 25)}{(0.34 + 0.026)}$$

C_{final} = 2.7mg/l BOD

This is in breach of the 1.5 mg/L Mean and 2.6mg/L 95%ile EQS for BOD.

Normal Scenario:

Normal Discharge, Median Flow in the River, Mean BOD in Discharge.

Flow of River (Median) = 4.955m^3/sec
Mean BOD in River (upstream) = 1.0mg/L
Normal volume of discharge = 0.013m^3/sec
Mean value for BOD in discharge = 15.79mg/L (2008 Mean from Outlet Table E4)

$$C_{final} = \frac{(4.955 \times 1.0) + (0.013 \times 15.79)}{(4.955 + 0.013)}$$

C_{final} = 1.04mg/l BOD

This is within the 1.5 mg/L Mean and 2.6mg/L 95%ile EQS for BOD.

MASS BALANCE EQUATIONS FOR AMMONIA:

Worst Case Scenario:

Maximum Discharge, Low Flow in the River, Maximum Ammonia in Discharge.

Flow of River (95%ile) = 0.34m^3/sec
Mean Ammonia in River (upstream) = 0.05mg/L
Max volume of discharge = 0.026m^3/sec
Max value for Ammonia in discharge = 1.0mg/L (2008 Max from Outlet Table E4)

$$C_{final} = \frac{(0.34 \times 0.05) + (0.026 \times 1.0)}{(0.34 + 0.026)}$$

C_{final} = 0.12mg/l Ammonia

This is in breach of the 0.065mg/L mean EQS for Ammonia. However this is within the 0.14mg/L 95%ile EQS for Ammonia.

Normal Scenario:

Normal Discharge, Median Flow in the River, Mean Ammonia in Discharge.

Flow of River (Median) = 4.955m^3/sec
Mean Ammonia in River (upstream) = 0.05mg/L
Normal volume of discharge = 0.013m^3/sec
Mean value for Ammonia in discharge = 0.1mg/L (2008 Mean from Outlet Table E4)

$$C_{final} = \frac{(4.955 \times 0.05) + (0.013 \times 0.1)}{(4.955 + 0.013)}$$

C_{final} = 0.050mg/l Ammonia

This meets the 0.065mg/L mean and 0.14mg/L 95%ile EQS for Ammonia.

MASS BALANCE EQUATIONS FOR ORTHOPHOSPHATE:

Worst Case Scenario:

Maximum Discharge, Low Flow in the River, Maximum Orthophosphate in Discharge.

Flow of River (95%ile) = 0.34m^3/sec
Mean Orthophosphate in River (upstream) = 0.025mg/L
Max volume of discharge = 0.026m^3/sec
Max value for Orthophosphate in discharge = 4.5mg/L (Max from Online Tables)

$$C_{final} = \frac{(0.34 \times 0.025) + (0.026 \times 4.5)}{(0.34 + 0.026)}$$

C_{final} = 0.34mg/l Orthophosphate

This is in breach of the 0.035mg/L Mean and 0.075mg/L 95%ile EQS for Orthophosphate

Normal Scenario:

Normal Discharge, Median Flow in the River, Mean Orthophosphate in Discharge.

Flow of River (Median) = 4.955m^3/sec
Mean Orthophosphate in River (upstream) = 0.025mg/L
Normal volume of discharge = 0.013m^3/sec
Mean value for Orthophosphate in discharge = 1.77mg/L (2008 Mean from Outlet Table E4)

$$C_{final} = \frac{(4.955 \times 0.025) + (0.013 \times 1.77)}{(4.955 + 0.013)}$$

C_{final} = 0.03mg/l Orthophosphate

This meets the 0.035mg/L mean and 0.075mg/L 95%ile EQS for Orthophosphate.

D0126-01 Attachment E4- Macroom Inlet

Sample Date	20/06/2007	04/10/2007	07/02/2008	06/03/2008	03/04/2008	19/06/2008	10/07/2008	17/07/2008	21/08/2008	Average
Sample	influent	influent	Influent	Influent	Influent	Influent	Influent	Influent	Influent	
Flow M^3/Day	*	*	*	*	*	*	*	*	*	*
pH	*	*	*	*	*	*	*	7.4	*	7.4
Temperature °C	*	*	*	*	*	*	*	*	*	*
Cond 20°C	*	*	*	*	898	*	685	821	*	801.33333
SS mg/L	*	*	*	267	*	5257	*	644	*	2056
NH_3 mg/L	*	104.2	23.9	*	*	16.4	*	58.5	*	50.75
BOD mg/L	*	*	*	*	*	*	*	566	*	566
COD mg/L	299	1242	493	977	1029	3105	*	1150	433	1091
TN mg/L	9.64	*	41	*	*	*	*	128	*	59.546667
Nitrite mg/L	*	*	*	*	*	*	*	0.0036	*	0.0036
Nitrate mg/L	*	*	*	*	*	*	*	<0.405	*	<0.405
TP mg/L	*	20.15	5.08	5.2	15.15	*	*	2.2	*	9.556
O-PO4-P mg/L	*	13.85	2.62	5.99	7.23	0.17	*	9.22	*	6.5133333
SO4 mg/L	*	40.2	41.2	*	*	*	*	44	*	41.8
Phenols µg/L	*	*	*	*	*	*	*	<0.1	*	<0.1
Atrazine µg/L	*	*	*	*	*	*	*	<0.01	*	<0.01
Dichloromethane µg/L	*	*	*	*	*	*	*	<1.0	*	<1.0
Simazine µg/L	*	*	*	*	*	*	*	<0.01	*	<0.01
Toluene µg/L	*	*	*	*	*	*	*	<1.0	*	<1.0
Tributyltin µg/L	*	*	*	*	*	*	*	not required	*	not required
Xylenes µg/L	*	*	*	*	*	*	*	<1.0	*	<1.0
Arsenic µg/L	*	*	*	*	*	*	*	1	*	1
Chromium ug/L		<20	<20	*	*	*	<20	*	*	<20
Copper ug/L		156	39	*	*	*	10	*	*	68.333333
Cyanide µg/L	*	*	*	*	*	*	*	4	*	4
Fluoride ug/l	*	*	*	*	*	*	*	70	*	70
Lead ug/L		56	10	*	*	*	10	*	*	25.333333
Nickel ug/L		<20	<20	*	*	*	<20	*	*	<20
Zinc ug/L		262	74	*	*	*	<20	*	*	168
Boron ug/L		10	65	*	*	*	*	*	*	37.5
Cadmium ug/L		<20	<20	*	*	*	<20	*	*	<20
Mercury µg/L	*	*	*	*	*	*	*	<0.2	*	<0.2
Selenium µg/L	*	*	*	*	*	*	*	1	*	1
Barium ug/L		73	37	*	*	*	10	*	*	40

value at half of LOD for statistical purposes

D0126-01 Attachment E4- Macroom Effluent Outlet

Sample Date	07/02/2008	06/03/2008	03/04/2008	19/06/2008	10/07/2008	17/07/2008	21/08/2008	24/09/2008	09/10/2008	30/10/2008	02/12/2008	18/12/2008	Average	Average	Average	17/01/2007	07/03/2007	08/03/2007	20/06/2007	03/10/2007	04/10/2007	14/11/2007	15/11/2007	23/11/2007	05/12/2007	12/12/2007	13/12/2007	Average
Sample	effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	2008	Kg/day*	Kg/yr*	Effluent	effluent	effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	2007
Flow M^3/Day	2597	917	1119	569	870	788	*	*	*	*	*	*	1143.33333	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
pH	7.1	7.2	*	7.1	*	6.8	6.9	*	*	*	6.8	*	6.98333333	*	*	7.4	7.5	7.3	6.9	7.3	8	7.5	7.4	*	7.5	7.4	7.5	7.42727273
Temperature °C	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Cond 20°C	*	560	459	272	378	490		*	*	*	*	*	431.8	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
SS mg/L	7	20	9	226.2	9	21	4	6	3	28	96	5	36.1833333	41.37	15099.45	22	73	165	33	23	46	11	3	18	9	12	<2.5	37.7272727
NH_3 mg/L	0.2	0.05	0.05	0.05	0.2	0.05	*	*	*	*	*	*	0.1	0.1143	41.73	*	*	*	*	24.3	21.1	0.2	0.2	0.1	0.05	*	*	7.65833333
BOD mg/L	4.26	3	3.82	37.8	2.55	7.64	3.02	3.4	1.1	7.8	111.4	3.65	15.7866667	18.06	6593.4	*	57	85	7.3	16	22	3.78	4.58	5.1	3.54	3.99	<1	20.829
COD mg/L	10.5	34	10.5	243	34	42	24	26	24	30	301	26	67.0833333	76.7	27994.04	42	128	284	48	51	87	36	10.5	36	10.5	25	24	65.1666667
TN mg/L	8.4	28.45	22.6	0.6	17.6	24.9	*	*	*	*	*	*	17.0916667	19.541	7132..4	15	14	*	10.7	20.7	23.2	15.4	13.8	*	9.6	14.3	11.3	14.8
Nitrite mg/L	*	*	*	*	*	0.226	*	*	*	*	*	*	0.226	0.258	94.31	*	*	*	*	*	*	*	*	*	*	*	*	*
Nitrate mg/L	*	*	*	*	*	20.41	*	*	*	*	*	*	20.41	23.33	8517.18	*	*	*	*	*	*	*	*	*	*	*	*	*
TP mg/L	0.3	0.3	1.59	0.1	0.93	4.38	2.3	*	*	*	*	*	1.41428571	1.617	590.19	0.47	2.43	3.45	1.64	2.41	1.38	0.33	0.28	0.33	0.1	0.23	0.1	1.09583333
O-PO4-P mg/L	0.14	0.16	*	1.77	2.52	4.27	*	*	*	*	*	*	1.772	2.026	739.46	*	*	*	*	1.29	0.62	0.15	0.17	0.05	0.025	*	*	0.38416667
SO4 mg/L	15	*	*	*	*	36	*	*	*	*	*	*	25.5	29.15	10639.75	*	*	*	*	38	38.3	38.7	38.2	41.3	15	*	15	32.0714286
Phenols µg/L	*	*	*	*	*	<0.1	*	*	*	*	*	*	<0.1	<0.000114	<0.0417	*	*	*	*	*	*	*	*	*	*	*	*	*
Atrazine µg/L	*	*	*	*	*	<0.01	*	*	*	*	*	*	<0.01	<0.0000114	<0.0042	*	*	*	*	*	*	*	*	*	*	*	*	*
Dichloromethane	*	*	*	*	*	<1.0	*	*	*	*	*	*	<1.0	<0.00114	<0.4173	*	*	*	*	*	*	*	*	*	*	*	*	*
Simazine µg/L	*	*	*	*	*	<0.01	*	*	*	*	*	*	<0.01	<0.0000114	<0.0042	*	*	*	*	*	*	*	*	*	*	*	*	*
Toluene µg/L	*	*	*	*	*	<1.0	*	*	*	*	*	*	<1.0	<0.00114	<0.4173	*	*	*	*	*	*	*	*	*	*	*	*	*
Tributyltin µg/L	*	*	*	*	*	not required	*	*	*	*	*	*	not required	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Xylenes µg/L	*	*	*	*	*	<1.0	*	*	*	*	*	*	<1.0	<0.00114	<0.4173	*	*	*	*	*	*	*	*	*	*	*	*	*
Arsenic µg/L	*	*	*	*	*	<0.96	*	*	*	*	*	*	<0.96			*	*	*	*	*	*	*	*	*	*	*	*	*
Chromium ug/L	<20	*	*	<20	<20	<20	<20	*	*	*	*	*	<20	<0.0223	<8.35			<20	<20	<20	<20	<20	<20	<20	<20	<20		<20	<20
Copper ug/L	<20	*	*	<20	<20	<20	<20	*	*	*	*	*	<20	<0.0223	<8.35			<20	<20	<20	<20	<20	<20	<20	<20	<20		<20	<20
Cyanide µg/L	*	*	*	*	*	2	*	*	*	*	*	*	2	0.0023	0.835	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Fluoride ug/l	*	*	*	*	*	130	*	*	*	*	*	*	130	0.149	54.25	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Lead ug/L	<20	*	*	<20	<20	<20	<20	*	*	*	*	*	<20	<0.0223	<8.35			<20	<20	<20	<20	<20	<20	<20	<20	*	<20	<20
Nickel ug/L	<20	*	*	<20	<20	<20	<20	*	*	*	*	*	<20	<0.0223	<8.35			<20	<20	<20	<20	<20	<20	<20	<20	*	<20	<20
Zinc ug/L	27	*	*	10	21	10	21	*	*	*	*	*	17.8	0.0204	7.428			22	10	10	10	10	10	26	26	*	*	15.5
Boron ug/L	49	*	*	10	91	10	59	*	*	*	*	*	43.8	0.0501	18.276			*	*	*	*	133	210	125	*	*	*	156
Cadmium ug/L	<20	*	*	<20	<20	<20	<20	*	*	*	*	*	<20	<0.0223	<8.35			<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Mercury µg/L	*	*	*	*	*	0.5	*	*	*	*	*	*	0.5	0.00057	0.209	*	*	*	*	*	*	*	*	*	*	*	*	*
Selenium µg/L	*	*	*	*	*	1	*	*	*	*	*	*	1	0.00114	0.4173	*	*	*	*	*	*	*	*	*	*	*	*	*
Barium ug/L	10	*	*	34	10	10	10	*	*	*	*	*	14.8	0.0169	6.176			<20	<20	<20	<20	<20	<20	<20	<20		<20	<20

value at half of LOD for statistical purposes

* using average flow of 1145 m3/day

D0126-01 Attachment E4- Macroom Upstream

Sample Date	07/02/2008	06/03/2008	03/04/2008	19/06/2008	10/07/2008	17/07/2008	21/08/2008	Average	95%ile	Range	17/01/2007	08/03/2007	20/06/2007	04/10/2007	14/11/2007	15/11/2007	23/11/2007	05/12/2007	Average
Sample	river	River	River	river	River	River	River	2008	2008	2008	river	river	river	river	river	river	river	river	2007
Flow M^3/Day	*	*	*	*	*	*	*	*			*	*	*	*	*	*	*	*	
pH	7.2	7.6	*	7.6	*	7.6	7.4	7.48		7.2-7.6	7.5	7.2	*	7.4	7.5	7.4	*	*	7.4
Temperature °C	*	*	*	*	*	*	*	*			*	*	*	*	*	*	*	*	
Cond 20°C	*	129	144	*	109.2	138	*	130.05			*	*	*	*	*	*	*	*	
SS mg/L	<2.5	<2.5	<25	<2.5	<2.5	<2.5	8	8			17	1.25	5	3	1.25	1.25	1.25	22	6.5
NH_3 mg/L	0.05	0.05	0.05	0.05	*	0.05	*	0.05	0.05		0.05	0.05	0.05	1.6	0.05	0.05	0.05	0.05	0.24375
BOD mg/L	1.16	0.5	1.06	2.28	*	0.5	0.5	1.00	2.00		<1	<1	2.2	7.28	1.1	1.2	1.55	1.71	2.5066667
COD mg/L	<21	*	*	*	*	<21	*	*			*	53	*	26	10.5	10.5	*	*	25
TN mg/L	1.7	2.48	1.1	*	0.8	2.1	*	1.636			1.7	3.7	2.28	7.2	0.5	2	1.4	8.1	3.36
Nitrite mg/L	*	*	*	*	*	0.0125	*	0.0125			*	*	*	*	*	*	*	*	
Nitrate mg/L	*	*	*	*	*	1.5	*	1.5			*	*	*	*	*	*	*	*	
TP mg/L	<0.2	<0.2	<0.20	<0.2	<0.2	<0.2	<0.20	<0.20			<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
O-PO4-P mg/L	0.025	0.025	0.025	0.025	0.025	0.025	*	0.025	0.025		*	*	*	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
SO4 mg/L	<30	*	*	*	*	<30	*	<30			*	*	*	<30	<30	<30	<30	<30	<30
Phenols µg/L	*	*	*	*	*	<0.1	*	<0.1			*	*	*	*	*	*	*	*	*
Atrazine µg/L	*	*	*	*	*	<0.01	*	<0.01			*	*	*	*	*	*	*	*	*
Dichloromethane	*	*	*	*	*	<1.0	*	<1.0			*	*	*	*	*	*	*	*	*
Simazine µg/L	*	*	*	*	*	<0.01	*	<0.01			*	*	*	*	*	*	*	*	*
Toluene µg/L	*	*	*	*	*	<1	*	<1			*	*	*	*	*	*	*	*	*
Tributyltin µg/L	*	*	*	*	*	not required	*	not required			*	*	*	*	*	*	*	*	*
Xylenes µg/L	*	*	*	*	*	<1	*	<1			*	*	*	*	*	*	*	*	*
Arsenic µg/L	*	*	*	*	*	<0.96	*	<0.96			*	*	*	*	*	*	*	*	*
Chromium ug/L	<20	<20	<20	<20	<20	<20	<20	<20					<20	<20	<20	<20	<20	<20	<20
Copper ug/L	<20	<20	<20	<20	<20	<20	<20	<20					<20	<20	<20	<20	<20	<20	<20
Cyanide µg/L	*	*	*	*	*	7	*	7			*	*	*	*	*	*	*	*	
Fluoride ug/l	*	*	*	*	*	60	*	60			*	*	*	*	*	*	*	*	
Lead ug/L	<20	<20	<20	<20	<20	<20	<20	<20					<20	<20	<20	<20	<20	<20	<20
Nickel ug/L	<20	<20	<20	<20	<20	<20	<20	<20					<20	<20	<20	<20	<20	<20	<20
Zinc ug/L	<20	<20	<20	<20	<20	<20	<20	<20					<20	<20	<20	<20	<20	<20	<20
Boron ug/L	*	*	*	*	*	<20	*	<20					*	*	*	<20	<20	<20	<20
Cadmium ug/L	<20	<20	<20	<20	<20	<20	<20	<20					<20	<20	<20	<20	<20	<20	<20
Mercury µg/L	*	*	*	*	*	0.4	*	0.4			*	*	*	*	*	*	*	*	
Selenium µg/L	*	*	*	*	*	1	*	1			*	*	*	*	*	*	*	*	
Barium ug/L	*	10	*	44	*	39	46	34.75					<20	<20	<20	<20	<20	<20	<20

value at half of LOD for statistical purposes

D0126-01 Attachment E4 tabulation of monitoring results for compliance purposes against SI 272 of 2009 for comparison purposes where results are below LOD for analytical method

Sample Date	17/01/2007	08/03/2007	20/06/2007	04/10/2007	14/11/2007	15/11/2007	23/11/2007	05/12/2007	07/02/2008	06/03/2008	03/04/2008	19/06/2008	10/07/2008	17/07/2008	21/08/2008	Average	95% percentile
Sample	Upstream River	Upstream River	Upstream River	Upstream River	Upstream River	Upstream River	Upstream River	Upstream River	Upstream River	Upstream River	Upstream River	Upstream River	Upstream River	Upstream River	Upstream River		
Sample Code	GR010	GR222	GR529	GR951	GR1107	GR1111	GR1151	GR1168	GS057	GS176	GS219	GS572	GS629	GS659	GS783		
NH_3 mg/L	0.032	0.031	0.008	1.6	0.021	0.024	0.04	0.012	0.022	0.009	0.008	0.054	*	0.016	*	0.144384615	0.6724
O-PO4-P mg/L	*	*	*	0.017	0.006	0.006	0.009	0.021	0.014	0.004	0.033	0.009	0.019	0.022	*	0.014545455	0.0275
Chromium ug/L	*	*	1.0	<1	1.0	1.0	1.0	1.0	<1	<1	1.5	<1	<1	<1	<1	0.50*	n/a
Copper ug/L	*	*	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	n/a
Lead ug/L	*	*	<1	<1	3.0	4.0	<1	6.0	5.0	5.5	6.5	8.5	1.0	2.0	6.5	3.69*	n/a
Nickel ug/L	*	*	<1	1.0	<1	1.0	<1	1.0	1.0	1.3	<1	<1	<1	<1	1.3	0.508*	n/a
Zinc ug/L	*	*	<1	8.30	<1	<1	<1	<1	<1	<1	<1	1.0	<1	<1	<1	0.715*	n/a
Boron ug/L	*	*	no result	no result	<1	<1	<1	no result	<1	<1	<1	<1	12.0	6.3	<1	1.83*	n/a
Cadmium ug/L	*	*	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	n/a
Barium ug/L	*	*	7.5	5.0	10.5	11	9.0	9.5	10.5	12	13.5	36.5	44.0	38.5	46	19.5	n/a

Sample Date	17/01/2007	08/03/2007	20/06/2007	04/10/2007	14/11/2007	15/11/2007	23/11/2007	05/12/2007	07/02/2008	06/03/2008	03/04/2008	19/06/2008	10/07/2008	17/07/2008	21/08/2008	Average	95% percentile
Sample	Downstream River	Downstream River	Downstream River	Downstream River	Downstream River	Downstream River	Downstream River	Downstream River	Downstream River	Downstream River	Downstream River	Downstream River	Downstream River	Downstream River	Downstream River		
Sample Code	GR011	GR221	GR530	GR950	GR1108	GR1110	GR1153	GR1167	GS058	GS175	GS220	GS573	GS630	GS660	GS784		
NH_3 mg/L	0.083	0.6	0.007	0.026	0.026	0.034	0.04	0.0025	0.021	0.032	0.0155	0.036	*	0.017	*	0.072307692	0.2898
O-PO4-P mg/L	*	*	*	0.019	0.009	0.026	*	0.023	0.016	0.012	0.03	0.017	0.019	0.024	*	0.0195	0.0282
Chromium ug/L	*	*	<1	<1	1.0	1.0	1.0	2.0	<1	<1	35.5	<1	<1	<1	1.5	3.23*	n/a
Copper ug/L	*	*	<1	<1	<1	<1	<1	6.0	<1	<1	7.0	<1	<1	<1	<1	1.00*	n/a
Lead ug/L	*	*	<1	<1	1	<1	1.0	34	4.5	10.5	4.5	6.0	5.5	2	9	6.00*	n/a
Nickel ug/L	*	*	<1	<1	<1	<1	1.3	<1	1.0	1.7	1.7	<1	<1	<1	1.7	0.57*	n/a
Zinc ug/L	*	*	<1	10.0	<1	<1	<1	9.7	<1	<1	<1	6.0	<1	<1	<1	1.977*	n/a
Boron ug/L	*	*	no result	no result	<1	<1	<1	<1	<1	<1	32	<1	4.3	6	2	4.03*	n/a
Cadmium ug/L	*	*	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	n/a
Barium ug/L	*	*	7.0	6.0	10.5	10.5	9.0	15.5	9.5	11.0	10.5	33.5	41	30	39	17.923077	n/a

<1 Note values of 0ug/l recorded as <1ug/l

D0126-01 Attachment E4- Macroom Downstream-

Sample Date	07/02/2008	06/03/2008	03/04/2008	19/06/2008	10/07/2008	17/07/2008	21/08/2008	Average	95%ile	Range	17/01/2007	08/03/2007	20/06/2007	04/10/2007	14/11/2007	15/11/2007	23/11/2007	05/12/2007	Average
Sample	river	River	River	River	River	River	River	2008	2008	2008	river	river	river	river	river	river	river	river	2007
Flow M^3/Day	*	*	*	*	*	*	*	*			*	*	*	*	*	*	*	*	*
pH	7.2	7.5	*	7.7	*	7.7	7.8	7.58		7.2-7.8	7.3	7.1	*	7.4	7.6	7.5	*	7.2	7.35
Temperature °C	*	*	*	*	*	*	*	*			*	*	*	*	*	*	*	*	*
Cond 20°C	*	144	145	*	112.3	138	*	134.825			*	*	*	*	*	*	*	*	*
SS mg/L	1.25	1.25	3	1.25	1.25	1.25	1.25	1.5			*	*	*	*	1.25	1.25	*	21	7.83333333
NH_3 mg/L	0.05	0.05	*	0.05	*	0.05	*	0.05	0.05		<0.1	0.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.6
BOD mg/L	0.5	0.5	0.5	*	*	0.5	0.5	0.5	0.5		1.1	4.5	1.7	1.44	1.37	1.2	1.2	2.4	1.86375
COD mg/L	<21	*	*	*	*	<21	*	<21			*	10.5	*	21	*	10.5	*	*	14
TN mg/L	<0.5	2.83	1.9	0.7	2.1	1.8	*	1.866			3.6	5.4	1	2.7	3.1	1.1	1.4	11	3.6625
Nitrite mg/L	*	*	*	*	*	0.0053	*	0.0053			*	*	*	*	*	*	*	*	*
Nitrate mg/L	*	*	*	*	*	1.77	*	1.77			*	*	*	*	*	*	*	*	*
TP mg/L	<0.2	<0.2	0.35	<0.2	<0.2	<0.2	<0.20	0.35			0.64	0.1	0.1	0.6	0.1	0.1	0.1	0.28	0.2525
O-PO4-P mg/L	0.025	0.025	0.025	0.025	0.025	0.025	*	0.025	0.025		*	*	*	<0.05	<0.05	<0.05	*	<0.05	<0.05
SO4 mg/L	<30	*	*	*	*	<30	*	<30			*	*	*	<30	<30	<30	<30	<30	<30
Phenols µg/L	*	*	*	*	*	21.288	*	21.288			*	*	*	*	*	*	*	*	*
Atrazine µg/L	*	*	*	*	*	<0.01	*	<0.01			*	*	*	*	*	*	*	*	*
Dichloromethane	*	*	*	*	*	<1.0	*	<1.0			*	*	*	*	*	*	*	*	*
Simazine µg/L	*	*	*	*	*	<0.01	*	<0.01			*	*	*	*	*	*	*	*	*
Toluene µg/L	*	*	*	*	*	<1	*	<1			*	*	*	*	*	*	*	*	*
Tributyltin µg/L	*	*	*	*	*	not required	*	not required			*	*	*	*	*	*	*	*	*
Xylenes µg/L	*	*	*	*	*	<1	*	<1			*	*	*	*	*	*	*	*	*
Arsenic µg/L	*	*	*	*	*	<0.96	*	<0.96			*	*	*	*	*	*	*	*	*
Chromium ug/L	10	10	36	10	10	10	10	13.71428571			*	*	<20	<20	<20	<20	<20	<20	<20
Copper ug/L	<20	<20	<20	<20	<20	<20	<20	<20			*	*	<20	<20	<20	<20	<20	<20	<20
Cyanide µg/L	*	*	*	*	*	7	*	7			*	*	*	*	*	*	*	*	*
Fluoride ug/l	*	*	*	*	*	40	*	40			*	*	*	*	*	*	*	*	*
Lead ug/L	0.01	0.024	0.01	0.01	0.01	0.01	0.01	0.012			*	*	10	10	10	10	10	35	14.1666667
Nickel ug/L	<20	<20	<20	<20	<20	<20	<20	<20			*	*	<20	<20	<20	<20	<20	<20	<20
Zinc ug/L	<20	<20	<20	<20	<20	<20	<20	<20			*	*	<20	<20	<20	<20	<20	<20	<20
Boron ug/L	<20	<20	<20	<20	*	<20	<20	<20			*	*	*	*	*	*	*	*	*
Cadmium ug/L	<20	<20	<20	<20	<20	<20	<20	<20			*	*	<20	<20	<20	<20	<20	<20	<20
Mercury µg/L	*	*	*	*	*	0.5	*	0.5			*	*	*	*	*	*	*	*	*
Selenium µg/L	*	*	*	*	*	1	*	1			*	*	*	*	*	*	*	*	*
Barium ug/L	10	10	10	34	42	30	39	25			*	*	<20	<20	<20	<20	<20	<20	<20

value at half of LOD for statistical purposes