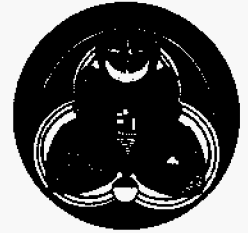
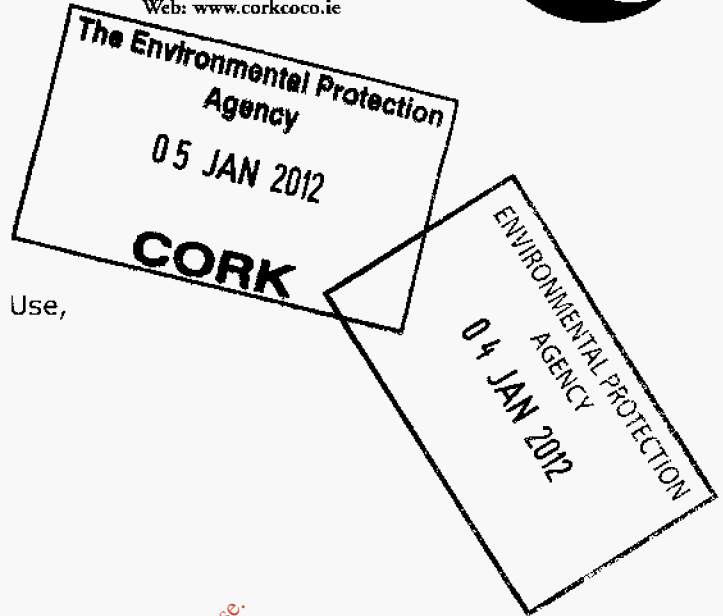


Comhairle Contae Chorcaí Cork County Council

Halla an Chontae,
Corcaigh, Éire.
Fón: (021) 4276891 • Faics: (021) 4276321
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Web: www.corkcoco.ie



Administration,
Environmental Licensing Programme,
Office of Climate, Licensing & Resource Use,
Environmental Protection Agency,
headquarters,
POBox3000,
Johnstown, Castle Estate,
County Wexford.
Your Ref.: D0429-01
Our Ref. : MS /RS/11



Sub.: Innishannon Agglomeration (Register No. D0429-01) Regulation 16 of the Waste Water Discharge (Authorisation) Regulations 2007

Dear Sir/Madam,

With reference to your letter of the 22 of September 2010, please find the following attached as requested:

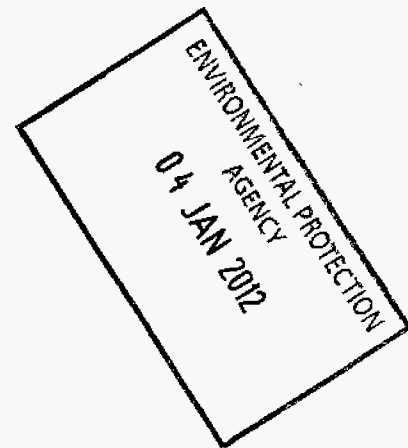
- 1 Original of the Innishannon Agglomeration (Register No. D0429 -01) Regulation 18(3)(b) Further Information Response & attachments,
- 1 Copy of the Kilbrittain Agglomeration (Register No. A0-D29-01) Regulation 18(3)(b) Further Information Response & attachments.
- 1 CDROM with the Further Information Response & attachments in PDF Format.

Yours faithfully,

Noel O'Keeffe,
County Engineer & Director of Water Services,
Cork County Council,
County Hall, Cork.
22/12/2011



Administration,
Environmental Licensing Programme,
Office of Climate, Licensing & Resource Use,
Environmental Protection Agency,
headquarters,
POBox3000,
Johnstown, Castle Estate,
County Wexford.
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Yours faithfully,

Noel O'Keeffe,
County Engineer & Director of Water Services,
Cork County Council,
County Hall, Cork.
22/12/2011

Innishannon 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)”.

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Wastewater Discharge Licence Application: D0429-01 Innishannon

Circular L8/08 2 September 2008

**Water Services Investment and Rural Water Programmes –
Protection of Natural Heritage and National Monuments**

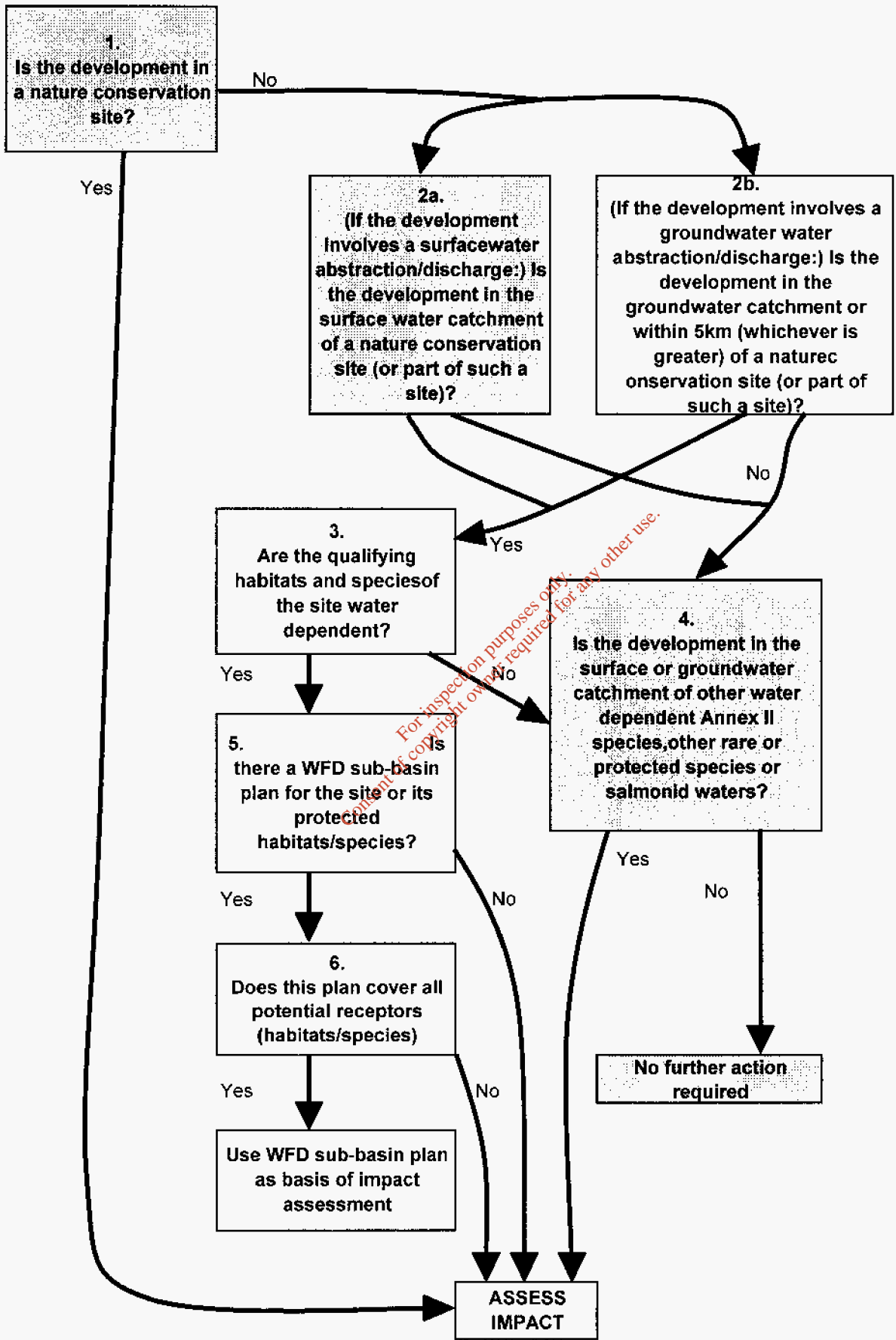
APPENDIX 1

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? pNHA 001740	Yes
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/species?	No
5. Is the development in the surface water or groundwater catchment of salmonid waters?	No
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

Flow Diagram for Innishannon Agglomeration



Conclusion: An assessment is required for Innishannon

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.

Inishannon is located approximately 16 kilometres west of Cork City and 6 kilometres east of Bandon. The National Secondary Road, the N71 runs through the main street in the village with three roads radiating northwards off this route as well as one cul-de-sac road heading in a southerly direction to the medieval church. The settlement is located on the North Bank of the River Bandon which is tidal to a point 0.5 km upstream of the village. Ground levels rise steeply from the river to the north of the village.

Until the 1960's raw sewage from Inishannon was discharged directly to the River Bandon. Two septic tanks were provided, one in the 1960's and the other in the 1970's. The total capacity of the tanks is 68m³. The design capacity of the septic tanks is 364PE. With the growth of the village however the inadequacies of the Treatment System became apparent by the mid 1990's.

Access to the final effluent sampling point of the treatment plant is provided via private property. The only access to this property is by means of a locked gate. Cork County Council does not have a key to this gate and must gain entry through a gap at the bottom of the gate. Cork County Council is currently considering alternative access routes to this sampling point.

Currently, influent flows for a PE of approximately 887 are entering the plant for treatment, the system is completely over loaded and therefore waste water is not receiving appropriate treatment.

The upstream and downstream sampling results for 2009 at SW01 and SW02 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 ambient sample results incorporated in the following tables are those laid out in the ambient column of the Revised Table E. However many of these results are at the limit of detection, or are based on averages that include assumed figures. Therefore an additional ambient table, which incorporates 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 column in the Revised Table E.

UPSTREAM COMPARISON TABLE

<i>Physico-chemical conditions</i>	<i>Ecological quality ratio/standard</i>	<i>21/05/2009 upstream ambient sampling results at aSW01u</i>
	<i>Good boundary</i>	
	<i>Rivers (All Types)</i>	
<i>Oxygenation conditions Table 9</i>	<i>River water body</i>	<i>Ambient sampling results</i>
Biochemical Oxygen Demand (BOD) (mgO ₂ /l)	Good status ≤1.5 (mean) or ≤2.6(95%ile)	<1.0mg/L (mean) <1.0mg/L (95%ile)
<i>Acidification Status Table 9</i>	<i>River Water Body</i>	<i>Ambient sampling results</i>
pH (individual values)	Soft Water 4.5 < pH < 9.0 Hard Water 6.0 < pH < 9.0	7.6
<i>Nutrient conditions Table 9</i>	<i>River Water body</i>	<i>Ambient sampling results</i>
Total Ammonia (mg N/l)	NO STANDARD	<0.1
Molybdate Reactive Phosphorus (MRP) (mg P/l)	0 to 0.7%psu ≤0.060 median 35%psu ≤0.040 median	
<i>Specific pollutants Table 10</i>	<i>Inland surface waters AA-EQS</i>	<i>Ambient sampling results</i>
Phenol	8	7.702µg/L
Toulene	10	<0.28µg/L
Xylene	10	<1.0µg/L
Arsenic	20	<0.96µg/L
Total Chromium	NO LIMIT Cr+6 ONLY see notes	<20.0µg/L
Copper (depending on water hardness)	5	<20.0µg/L
Cyanide	10	<5.0µg/L
Flouride	1500	49 µg/L
Zinc	40	<20.0µg/L
<i>Priority Substances Table 11</i>	<i>Inland surface waters AA-EQS</i>	<i>Ambient sampling results</i>
Atrazine	0.6	<0.01µg/L
Dichloromethane	20	<1.0µg/L
Simazine	1	<0.01µg/L
Lead and its compounds	7.2	<20.0µg/L
Nickel and its compounds	20	<20.0µg/L
<i>Priority Hazardous Substances Table 12</i>	<i>Inland surface waters AA-EQS</i>	<i>Ambient sampling results</i>

Cadmium and its compounds (depending on water hardness)	≤0.2	<20µg/L
Mercury and its compounds	0.05	<0.2µg/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.
The Analysis for Chromium was for total Chromium

**UPSTREAM COMPARISON TABLE
(ANALYSIS BELOW THE LIMIT OF DETECTION)**

<i>Physico-chemical conditions</i>	<i>Ecological quality ratio/standard</i>	<i>21/05/2009 upstream ambient sampling results at aSW01u</i>
	<i>Good boundary</i>	
	<i>Rivers (All Types)</i>	
<i>Nutrient conditions Table 9</i>	<i>River Water body</i>	<i>Ambient sampling results</i>
Total Ammonia (mg N/l)	Good status ≤0.065(mean) or ≤0.140(95%ile)	0.041 based on one result only
Molybdate Reactive Phosphorus (MRP) (mg P/l)	Good status ≤0.035(mean) or ≤0.075(95%ile)	.012 based on one result only
<i>Specific pollutants Table 10</i>	<i>Inland surface waters AA-EQS</i>	<i>Ambient sampling results</i>
Total Chromium	8.1	<1.0µg/L
Copper (depending on water hardness)	5	<1.0µg/L
Zinc (depending on water hardness)	40	<1.0µg/L
<i>Priority Substances Table 11</i>	<i>Inland surface waters AA-EQS</i>	<i>Ambient sampling results</i>
Lead and its compounds	7.2	<1.0µg/L
Nickel and its compounds	20	<1.0µg/L
<i>Priority Hazardous Substances Table 12</i>	<i>Inland surface waters AA-EQS</i>	<i>Ambient sampling results</i>
Cadmium and its compounds (depending on water hardness)	≤0.08	<1.0µg/L

Note: Actual result for Cadmium in sample was zero but <1 is recorded for reporting purposes.

DOWNSTREAM COMPARISON TABLE

<i>Physico-chemical conditions</i>	<i>Ecological quality ratio/standard</i>	<i>2008 upstream ambient sampling results at aSW01u</i>
	<i>Good boundary</i>	
	<i>Rivers (All Types)</i>	
<i>Oxygenation conditions Table 9</i>	<i>River water body</i>	<i>Ambient sampling results</i>
Biochemical Oxygen Demand (BOD) (mgO ₂ /l)	Good status ≤1.5 (mean) or ≤2.6(95%ile)	<1.0mg/L (mean) <1.0mg/L (95%ile)
<i>Acidification Status Table 9</i>	<i>River Water Body</i>	<i>Ambient sampling results</i>
pH (individual values)	Soft Water 4.5<pH<9.0 Hard Water 6.0<pH<9.0	7.6
<i>Nutrient conditions Table 9</i>	<i>River Water body</i>	<i>Ambient sampling results</i>
Total Ammonia (mg N/l)	NO STANDARD	<0.1 based on one result only
Molybdate Reactive Phosphorus (MRP) (mg P/l)	0 to 17%psu ≤0.060 median 35%psu ≤0.040 median	.025 based on one result only
<i>Specific pollutants Table 10</i>	<i>Inland surface waters AA-EQS</i>	<i>Ambient sampling results</i>
Phenol	8	<0.1µg/L
Toulene	10	<1.0µg/L
Xylene	10	<1.0µg/L
Arsenic	20	<0.96µg/L
Total Chromium	NO LIMIT Cr+6 ONLY See note	<20.0µg/L
Copper (depending on water hardness)	5	<20.0µg/L
Cyanide	10	<5.0µg/L
Flouride	1500	21.0µg/L
Zinc	40	<20.0µg/L
<i>Priority Substances Table 11</i>	<i>Inland surface waters AA-EQS</i>	<i>Ambient sampling results</i>
Atrazine	0.6	<0.01µg/L
Dichloromethane	20	<1.0µg/L
Simazine	1	<0.01µg/L
Lead and its compounds	7.2	<20.0µg/L
Nickel and its compounds	20	<20.0µg/L
<i>Priority Hazardous Substances Table 12</i>	<i>Inland surface waters AA-EQS</i>	<i>Ambient sampling results</i>

Cadmium and its compounds (depending on water hardness)	≤0.2	<20µg/L
Mercury and its compounds	0.05	<0.2µg/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.
The Analysis for Chromium was for total Chromium

**DOWNSTREAM COMPARISON TABLE
(ANALYSIS BELOW THE LIMIT OF DETECTION)**

<i>Physico-chemical conditions</i>	<i>Ecological quality ratio/standard</i>	<i>2008 upstream ambient sampling results at aSW01u</i>
	<i>Good boundary</i>	
	<i>Rivers (All Types)</i>	
<i>Nutrient conditions Table 9</i>	<i>River Water body</i>	<i>Ambient sampling results</i>
Total Ammonia (mg N/l)	Good status ≤0.065 (mean) or ≤0.140 (95%ile)	0.027 based on one result only
Molybdate Reactive Phosphorus (MRP) (mg P/l)	Good status ≤0.035 (mean) or ≤0.075 (95%ile)	0.015 based on one result only
<i>Specific pollutants Table 10</i>	<i>Inland surface waters AA-EQS</i>	<i>Ambient sampling results</i>
Total Chromium	8.1	<1.0µg/L
Copper (depending on water hardness)	5	<1.0µg/L
Zinc (depending on water hardness)	50	<1.0µg/L
<i>Priority Substances Table 11</i>	<i>Inland surface waters AA-EQS</i>	<i>Ambient sampling results</i>
Lead and its compounds	7.2	3.002µg/L
Nickel and its compounds	20	<1.0µg/L
<i>Priority Hazardous Substances Table 12</i>	<i>Inland surface waters AA-EQS</i>	<i>Ambient sampling results</i>
Cadmium and its compounds (depending on water hardness)	≤0.08	<1.0µg/L

Note the following:

Actual result for Cadmium in sample was zero but <1 is recorded for reporting purposes.

Below
LOD

GT499

0.019

<1
<1

7.81
2.15
6.88

<1
<1

56.4

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Existing Environment & Impact of Discharges

The River Bandon (20B02) is contained within Hydrometric Area 20 and is located entirely in County Cork. The River Bandon rises near Barrboy Mountain and generally flows eastwards towards Inishannon. The river changes direction at Inishannon and flows in a south-easterly direction and discharges into Kinsale Harbour. There is no recent water quality management plan or catchment management plan in place for the River Bandon.

The River Bandon is not designated as salmonid water under the European Communities (Quality of Salmonid Waters Regulations, 1988 (S.I. No. 293/1988)) however it contains good stocks of salmon and sea trout. Upstream of the location near Dunmanway an SAC has been designated, Site Code 002171 Bandon River. This SAC was designated for the Annex I habitat – Floating River Vegetation. The Annex II animal species Otter, Salmon (*Salmo salar*), Brook Lamprey (*Lampetra planeri*) and Freshwater Pearl Mussel (*Margaritifera*) occur. The Kingfisher, listed under Annex I of the E.U. Birds Directive, breeds along the river.

The 1998 Phosphorus Regulations set targets for phosphorus levels and biological quality (Q-values) for rivers and lakes. Where water quality is satisfactory it must be maintained and where water quality is unsatisfactory it must be improved. For levels of phosphorus the baseline Q-value determines the median molybdate-reactive phosphorus (MRP) to be achieved.

Water quality in the River Bandon is monitored by the EPA, there are 33 EPA monitoring stations within the catchment. EPA monitoring station 0900 is located at Inishannon Bridge, approximately 700m up-stream of Inishannon WWTP primary discharge point. Water quality at this station has been satisfactory since 1994 with a base Q-value of 4. The monitoring results are shown in **Table F1.1**.

Biological Quality Ratings (Q Values)											
Station	1971	1976	1978	1982	1986	1989	1994	1997	2000	2003	2006
0900	5	4-5	4	4	4	3-4	4	4	4	4	4

Table F1.1.

Station 0800 is located 300m down-stream of Bandon WWTP primary discharge point and approximately 6km up-stream of Inishannon WWTP primary discharge point. Results of the operational monitoring as part of the Water Framework Directive at station 0800 found elevated MRP at the three sampling events in 2007 and nitrate was elevated for one of the three sampling events. All other parameters sampled were within specified limits.

A Biological Quality Rating of Q4 represents satisfactory water quality. Eutrophication is unlikely to occur in water bodies with a biological quality rating of Q4 or higher. **Table F1.2** shows the Q-values for the stations upstream of Inishannon. There is no monitoring station down-stream of Inishannon discharge point as the river becomes tidal down-stream of Inishannon.

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AGENCY

River	Station	Location	Target value	2004-2006 Q value
Bandon	0800	1.5km downstream of Bandon Bridge	3-4	4
	0900	Inishannon Bridge	4	4

Table F1.2.

Water quality down-stream in the Upper Bandon Estuary has been classified as Eutrophic by the EPA and is classified as sensitive waters under the Urban Waste Water Treatment Regulations. The River Bandon has been classified as 'at risk' of not achieving 'good' status by 2015 under the Water Framework Directive Article 5 Characterisation (2004). The EPA has recently released Draft Classifications of river waterbody status in which the Bandon Catchment has been classified as being of 'moderate' status.

The Dry Weather Flow at hydrometric station 20011, upstream of the discharge point, is recorded as $0.10\text{m}^3/\text{s}$ and the 95%ile flow is $0.13\text{m}^3/\text{s}$. The estimated median flow received from the South Western River Basin District is $1.74674\text{m}^3/\text{s}$.

- o Provide a statement as to whether or not emissions of main polluting substances (as defined in the *Dangerous Substances Regulations S.I. No. 12 of 2001*) to water are likely to impair the environment.

Dangerous Substances Directive 2006/11/EC

Cork County Council has monitored the main polluting substances as defined in the Dangerous Substances Regulations S.I. No. 12 of 2001. The results are presented in Table D and F.

In addition Cork County Council conducted a screening assessment for Dangerous Substances in 2002 as part of the Measures Report under the Water Quality (Dangerous Substances) Regulations, 2001. The River Bandon at Inishannon Bridge was screened as part of the assessment and the baseline quality was found to be satisfactory for all parameters screened.

- o In circumstances where water abstraction points exist downstream of any discharge describe measures to be undertaken to ensure that discharges from the waste water works will not have a significant effect on faecal coliform, salmonella and protozoan pathogen numbers, e.g., Cryptosporidium and Giardia, in the receiving water environment.

Drinking Water Directives 80/778/EEC

Water is abstracted up-stream of the WWTP at Inishannon. The location of the abstraction point is approximately 1.5km up-stream of the outfall. The grid reference is 153484E, 057535N. The volume abstracted per day is approximately $9,800\text{m}^3/\text{day}$.

Specific measures are not taken to ensure that discharges from the wastewater works will not have a significant effect on faecal coliforms, salmonella and protozoan pathogen numbers as the discharge point is down-stream of the abstraction point. The water treatment plant at Inishannon treats water for the Inishannon Water Supply

Scheme which consists of coagulation, upward flow clarification, rapid gravity sand filtration, fluoridation and chlorination.

Water quality is monitored at the waterworks intake for the Cork County Council drinking water plant by Cork County Council on a quarterly programme as part of the Abstraction Directive. The intake location is also monitored currently on a weekly basis by Cork County Council for both *Cryptosporidium* and *Giardia* and the results are acceptable.

- o Indicate whether or not emissions from the agglomeration or any plant, methods, processes, operating procedures or other factors which affect such emissions are likely to have a significant effect on –
 - (a) a site (until the adoption, in respect of the site, of a decision by the European Commission under Article 21 of Council Directive 92/43/EEC for the purposes of the third paragraph of Article 4(2) of that Directive) –
 - (i) notified for the purposes of Regulation 4 of the Natural Habitats Regulations, subject to any amendments made to it by virtue of Regulation 5 of those Regulations,
 - (ii) details of which have been transmitted to the Commission in accordance with Regulation 5(4) of the Natural Habitats Regulations, or
 - (iii) added by virtue of Regulation 6 of the Natural Habitats Regulations to the list transmitted to the Commission in accordance with Regulation 5(4) of those Regulations,
 - (b) a site adopted by the European Commission as a site of Community importance for the purposes of Article 4(2) of Council Directive 92/43/EEC¹ in accordance with the procedures laid down in Article 21 of that Directive,
 - (c) a special area of conservation within the meaning of the Natural Habitats Regulations, or
 - (d) an area classified pursuant to Article 4(1) or 4(2) of Council Directive 79/409/EEC²;

¹Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (OJ No. L 206, 22.07.1992)

²Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds (OJ No. L 103, 25.4.1979)

There are two proposed Natural Heritage Areas (pNHAs) located in the vicinity of the Inishannon wastewater discharge point; one located up-stream of the discharge point and the other located down-stream of the discharge point. The discharge point from Inishannon septic tank discharges directly to pNHA Bandon Valley Above Inishannon (Site Code: 001740). The main qualifying interests of this pNHA are oak woodland on steep valley sides and unmodified river bed. Otters have been recorded from the Bandon Valley and cormorants and herons fish throughout the river. There is also a

pNHA downstream of Inishannon, the Bandon Valley Below Inishannon (Site Code: 001515).

Water Framework Directive 2000/60/EC

The objectives of the Water Framework Directive (WFD) are to protect all high status waters, prevent further deterioration of all waters and to restore degraded surface and ground water status by 2015. Cork County Council monitors the inlet and outlet flows from Inishannon septic tank to ensure compliance with the relevant standards. Up-stream and down-stream locations are also monitored.

Birds Directive 79/409/EEC

The directive aims to conserve and manage populations of wild birds throughout Europe partly through the designation of Special Protection Areas (SPA) for birds and their habitats. The discharge point is not located within an SPA.

Groundwater Directives 80/68/EEC and 2006/118/EC

Not applicable as there are no emissions to groundwater.

Urban Waste Water Treatment Directive 91/271/EEC

The Urban Waste Water Treatment Regulations, (S.I. 254 of 2001) gives effect to provisions of the Urban Wastewater Treatment Directive (91/271/EEC). The 2001 Irish Regulations in relation to the collection and treatment of urban wastewater.

Article 7 (a) states that 'Member States shall ensure that, by 31 December 2005, urban waste water entering collecting systems shall before discharge be subject to appropriate treatment as defined in Article 2 (9) in the following cases:

- for discharges to fresh-water and estuaries from agglomerations of less than 2 000 p.e.
- for discharges to coastal waters from agglomerations of less than 10,000 p.e'.

Appropriate treatment is described as that which will allow compliance with other relevant Directives. The most pertinent of these is the freshwater Fish Directive and Quality of Salmonid Waters Regulations. The Urban Wastewater Directive specifies that the point of discharge of the treated wastewater shall be chosen so as to minimise the effects on receiving waters.

The Directive specifies a number of obligations regarding the design of wastewater treatment plants as follows:

- (a) Such plants shall be designed, constructed, operated and maintained to ensure sufficient performance under all normal local climatic conditions.
- (b) When designing the plants, seasonal variations of the load shall be taken into account.
- (c) Waste water treatment plants shall be designed or modified so that representative samples of the incoming waste water and of treated effluent can be obtained before discharge to receiving waters.

- (d) The point of discharge of urban wastewater shall be chosen, as far as possible, so as to minimise the effects on receiving waters.

Habitats Directive 92/43/EEC

There are no Special Areas of Conservation (SACs) or Special Protection Areas (SPAs) under the Habitats Directive in the vicinity of the waste water discharge.

Bathing Water Directive 76/160/EEC

There are no designated bathing waters in the vicinity of the discharge.

Shellfish Waters Directive (79/923/EEC)

There are no waters designated for shellfish in the vicinity of the discharge.

- Describe, where appropriate, measures for minimising pollution over long distances or in the territory of other states.

Not applicable

- This section should also contain full details of any modelling of discharges from the agglomeration.

There was no modelling study conducted for the discharges from Inishannon septic tank.

F.1 (I) Waste Assimilative Capacity of Receiving Waters

Assimilative Capacity

Receiving waters should have a capacity to assimilate effluent discharges without showing signs of pollution. It is desirable that any effluent discharge to the Kiltha River should not

- increase the BOD₅ level in the water by more than 1mg/l;
- increase the overall BOD₅ in the water to more than 4mg/l (ideally 3mg/l);
- increase the Ortho Phosphate level in the water to more than 0.03mg/l;

Assimilative Capacity of the Receiving Water

Mass Balance Equation for Orthophosphates:

Station number 20011, at Downdaniel Bridge

Median flow of River (station 20011) = $9.44\text{m}^3/\text{sec}$
Median $\text{oPO}_4\text{-P}$ in River (upstream) = 0.05mg/l

Average volume of discharge = $0.004\text{ m}^3/\text{sec}$
Median value for $\text{oPO}_4\text{-P}$ in discharge = 1.26mg/l

$$C_{\text{final}} = \frac{(9.44 \times 0.05) + (0.004 \times 1.26)}{(9.44 + 0.004)}$$

$$C_{\text{final}} = 0.051 \text{ mg/l } \text{oPO}_4\text{-P}$$

The increase in Orthophosphate due to the discharge of Inishannon Septic tanks is 0.001 mg/l .

Mass Balance Equation for BOD:

Station number 20011, at Downdaniel Bridge

Flow of River (95% ile) = $0.94\text{m}^3/\text{sec}$
Median BOD in River (upstream) = 3.0mg/l

Average volume of discharge = $0.004\text{ m}^3/\text{sec}$
Median value for BOD in discharge = 49mg/l

$$C_{\text{final}} = \frac{(0.94 \times 3.0) + (0.004 \times 49)}{(0.94 + 0.004)}$$

$$C_{\text{final}} = 3.19\text{mg/l BOD}$$

The increase in BOD due to the discharge of Inishannon Septic tanks is 0.19 mg/l .

Mass Balance Equation for Suspended Solids:

Station number 20011, at Downdaniel Bridge

Flow of River (95% ile) = $0.94\text{m}^3/\text{sec}$
Median SS in River (upstream) = 5.75mg/l

Average volume of discharge = $0.004\text{ m}^3/\text{sec}$

Median value for SS in discharge = 44mg/l

$$C_{\text{final}} = \frac{(0.94 \times 5.75) + (0.004 \times 44)}{(0.94 + 0.004)}$$

$C_{\text{final}} = 5.91\text{mg/l}$ Suspended Solids

The increase in Suspended Solids due to the discharge of Inishannon Septic tanks is 0.16mg/l.

Mass Balance Equation for Total Phosphates:

Station number 20011, at Downdaniel Bridge

Median Flow of River (station no. 20011) = $9.44\text{m}^3/\text{sec}$
Median $\text{TPO}_4\text{-P}$ in River (upstream) = 0.066mg/l

Average volume of discharge = $0.004\text{m}^3/\text{sec}$
Median value for $\text{TPO}_4\text{-P}$ in discharge = 2.15mg/l

$$C_{\text{final}} = \frac{(9.44 \times 0.066) + (0.004 \times 2.15)}{(9.44 + 0.004)}$$

$C_{\text{final}} = 0.067\text{ mg/l}$ Total Phosphates

The increase in Total Phosphates due to the discharge of Inishannon Septic tanks is 0.007g/l.

Mass Balance Equation for Total Nitrogen:

Station number 20011, at Downdaniel Bridge

Flow of River (95% ile) = $0.94\text{m}^3/\text{sec}$
Median Total Nitrogen in River (upstream) = 2.65mg/l

Average volume of discharge = $0.004\text{m}^3/\text{sec}$
Median value for Total Nitrogen in discharge = 18.85mg/l

$$C_{\text{final}} = \frac{(0.94 \times 2.65) + (0.004 \times 18.85)}{(0.94 + 0.004)}$$

$C_{\text{final}} = 2.72\text{ mg/l}$ Total Nitrogen

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The increase in Total Nitrogen due to the discharge of Inishannon Septic tanks is 0.07mg/l.

Mass Balance Equation for Sulphates:

Station number 20011, at Downdaniel Bridge

Flow of River (95% ile) = 0.94m³/sec

Median Sulphates in River (upstream) = 30.0mg/l

Average volume of discharge = 0.004 m³/sec

Median value for Sulphates in discharge = 30.6mg/l

$$C_{\text{final}} = (0.94 \times 30.0) + (0.004 \times 30.6)$$

$$\frac{\quad}{(0.94 + 0.004)}$$

$$C_{\text{final}} = 30.00\text{mg/l Sulphates}$$

The increase in Sulphates due to the discharge of Inishannon Septic tanks 0.00mg/l.

Mass Balance Equation for Ammonia - N:

Station number 20011, at Downdaniel Bridge

Flow of River (95% ile) = 0.94m³/sec

Median Ammonia in River (upstream) = 0.1mg/l

Average volume of discharge = 0.004 m³/sec

Median value for Ammonia in discharge = 12.6mg/l

$$C_{\text{final}} = (0.94 \times 0.1) + (0.004 \times 12.6)$$

$$\frac{\quad}{(0.94 + 0.004)}$$

$$C_{\text{final}} = 0.153 \text{ mg/l Total Ammonia}$$

The increase in Ammonia due to the discharge of Inishannon Septic tanks is 0.053 mg/l.

Proposed Assimilative Capacity of the Receiving Water

Mass Balance Equation for BOD:

Station number 20011, at Downdaniel Bridge

Flow of River (95% ile) = $0.94\text{m}^3/\text{sec}$
Median BOD in River (upstream) = 3.0mg/l

Average volume of discharge = $0.004\text{ m}^3/\text{sec}$
Median value for BOD in discharge = 25mg/l

$$C_{\text{final}} = \frac{(0.94 \times 3.0) + (0.004 \times 25)}{(0.94 + 0.004)}$$

$$C_{\text{final}} = 3.09 \text{ mg/l BOD}$$

The increase in BOD due to the discharge of Inishannon septic tank is 0.09 mg/l .

Mass Balance Equation for Suspended Solids:

Station number 20011, at Downdaniel Bridge

Flow of River (95% ile) = $0.94\text{m}^3/\text{sec}$
Median SS in River (upstream) = 9.0mg/l

Average volume of discharge = $0.004\text{ m}^3/\text{sec}$
Median value for SS in discharge = 35mg/l

$$C_{\text{final}} = \frac{(0.94 \times 9.0) + (0.004 \times 35)}{(0.94 + 0.004)}$$

$$C_{\text{final}} = 9.11 \text{ mg/l Suspended Solids}$$

The increase in Suspended Solids due to the discharge of Inishannon septic tank is 0.11 mg/l

Mass Balance Equation for Total Phosphates:

Station number 20011, at Downdaniel Bridge

Median Flow of River (station no. 20011) = $9.44\text{m}^3/\text{sec}$
Median TPO₄-P in River (upstream) = 0.066mg/l

Average volume of discharge = 0.004 m³/sec
Median value for TPO₄-P in discharge = 1mg/l

$$C_{\text{final}} = \frac{(9.44 \times 0.066) + (0.004 \times 1.0)}{(9.44 + 0.004)}$$

$C_{\text{final}} = 0.664\text{mg/l}$ Total Phosphates

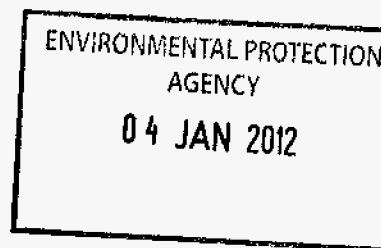
The increase in Total Phosphates due to the discharge of Inishannon septic tank is 0.004 mg/l.

The figure for the 50%ile and 95%ile flow were taken from data supplied by the EPA flow statistics.

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General

Data contained in document	physico-chemical data
Data collected from	Co Cork
Data collected by	Environmental Protection Agency
Data collected for the purpose of	Operational Monitoring
Document created	07-Oct-10
Time span of data in document	19/01/2009-23/09/2009



Spreadsheets

Stations

location information.

Columns explained:

Station_No	Station Number
latitude	Latitude
longitude	Longitude
Location	Location distription

Argideen estuary
Bandon estuary
Kinsale harbour
Blackwater estuary
Ilen estuary
Lee (Cork) estuary
Roaring Water Bay
Loch Mahon
Cork Harbour
North Channel
Owenacurra Estuary

physico-chemical data
physico-chemical data
physico-chemical data
physico-chemical data
physico-chemical data
physico-chemical data
physico-chemical data
physico-chemical data
physico-chemical data
physico-chemical data

Columns explained (Argideen -Owenacurra):

Sample_ID	Record identification number
Station_No	Station number
Sample_Label	Sample Label
Survey Date	Date of data collection
Time Clock	Time of data collection
Depth Bed	Depth of bed where sample was collected

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Depth Sample	Depth sampled
Salinity S ‰	Salinity (‰)
Temp °C	Temperature (°C)
pH	ph
Secchi	
DO_Saturation	Dissolved oxygen percent saturation
DO mg/l	Dissolved oxygen (mg/l)
B.O.D. mg/l O2	Biological Oxygen demand (mg/l O2)
TON mg/l N	Total oxidised nitrogen (mg/l N)
NH3 mg/l N	mg/l N
PO4 µg/l P	µg/l P
Chlorophyll a mg/m 	Chlorophyll a (mg/m3)
Si_est	(µg/l SiO2)
DIN mg/l N	(TON+NH3)
Free NH3	mg/l N
WB_Name	Waterbody name

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physico-chemical data
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B.O.D. mg/l O2	Biological Oxygen demand (mg/l O2)
TON mg/l N	Total oxidised nitrogen (mg/l N)
NH3 mg/l N	mg/l N
PO4 µg/l P	µg/l P
Chlorophyll a mg/m³	Chlorophyll a (mg/m ³)
Si_est	(µg/l SiO ₂)
DIN mg/l N	(TON+NH ₃)
Free NH3	mg/l N
WB_Name	Waterbody name

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Station No	latitude	longitude	Location	type
BN010	51° 45' 10.532" N	8° 38' 24.153" W	Kilpadder	Transitional water
BN020	51° 44' 44.805" N	8° 37' 55.122" W	Knockroe	Transitional water
BN030	51° 44' 14.019" N	8° 38' 4.073" W	Rockhouse	Transitional water
BN040	51° 43' 44.183" N	8° 37' 46.983" W	Kilmacsimon (d/s Quay)	Transitional water
BN050	51° 43' 22.664" N	8° 36' 46.252" W	Ballydawley	Transitional water
BN060	51° 42' 24.325" N	8° 36' 2.760" W	Black Quay	Transitional water
BN070	51° 41' 43.573" N	8° 34' 48.965" W	Roughwood / Currahoo	Transitional water
BN080	51° 42' 6.100" N	8° 33' 6.514" W	Whitecastle Creek	Transitional water
BN090	51° 41' 34.071" N	8° 31' 55.841" W	Kinsale Bridge	Transitional water
BN100	51° 42' 8.331" N	8° 30' 51.152" W	James' Fort	Transitional water
BN110	51° 41' 29.060" N	8° 30' 4.374" W	NE Money Point	Transitional water
BN120	51° 40' 25.212" N	8° 30' 29.637" W	East of Sandycove	Coastal water
BN130	51° 39' 59.280" N	8° 30' 40.586" W	Outer Kinsale Harbour: Courlaparleen	Coastal water
BN140	51° 39' 25.058" N	8° 30' 23.294" W	Outer Kinsale Harbour: E Hake Head	Coastal water

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2009 harbour data (Data Source Harbour Monitoring by EPA) Transitional Waters Upper Bandon Est. for 2 Lo

Sample ID	Station No	Sample Lab	Date Surveye	BOD	TON	NH3	PO4	chl_a	Si_est	DIN	Free NH3	WB_Name
92283	BN010	BN010B	29/06/2009	3.8	2.07	0.139	24	15.4	784	2.209	0.00304	Bandon Es
92400	BN010	BN010S	29/06/2009	2.3	2.65	0.101	31	35.3	1310	2.751	0.00156	Bandon Es
101303	BN010	BN010S	14/09/2009	0.49999	3.34	0.19	24	0.249999	3990	3.53	0.00181	Bandon Es
999	BN010	BN010C	20/01/2009		2.52	0.246	31	0.8	2010	2.766	0.00057	Bandon Es
999	BN010	BN010C	20/01/2009		2.52	0.246	31	0.8	2010	2.766	0.00057	Bandon Es
92441	BN020	BN020B	29/06/2009		1.59	0.142	15	48.8	328	1.732	0.0049	Bandon Es
101300	BN020	BN020B	14/09/2009	1.4	2.64	0.218	24	3.8	3280	2.858	0.00168	Bandon Es
92278	BN020	BN020S	29/06/2009		2.55	0.114	27	15	1110	2.664	0.00268	Bandon Es
101299	BN020	BN020S	14/09/2009		3.02	0.198	27	1.7	4180	3.218	0.00165	Bandon Es
985	BN020	BN020C	20/01/2009		2.42	0.181	29	0.249999	1940	2.601	0.00044	Bandon Es
985	BN020	BN020C	20/01/2009		2.42	0.181	29	0.249999	1940	2.601	0.00044	Bandon Es

Mean value

95% percentile

3.575

Median value

compliance with regul YES

EQS Standard

≤4.0

27

≤40

35.3

1.7

YES for Median value

No- failed on 90% value**

5.0(Med)&
10(90%)

** Note - high results for Chlorophyll recorded in Jur

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Locations Downstream of Innishannon

Stuary Upper
Stuary Upper
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1e 2009 Samples

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2009 harbour data (Data Source Harbour Monitoring by EPA) Transitional Waters Upper Bandon Est. for 2 Lo

Sample_ID	Station_No	Sample_Label	Date_Surveye	BOD	TON	NH3	PO4	chl_a	Si_est	DIN	Free_NH3	WB_Name
92283	BN010	BN010B	29/06/2009	3.8	2.07	0.139	24	0	784	2.209	0.00304	Bandon Es
52	BN010	BN010B	14-Sep-10	2	1.29	0.207	41	12.5		1.497		Bandon Es
70	BN010	BN010B	17-Aug-10	2	2.21	0.05	28	35.5		2.26		Bandon Es
395	BN010	BN010B	08-Feb-10		3.2	0.03	23	0.8		3.23		Bandon Es
999	BN010	BN010C	20/01/2009		2.52	0.246	31	0.8	2010	2.766	0.00057	Bandon Es
999	BN010	BN010C	20/01/2009		2.52	0.246	31	0.8	2010	2.766	0.00057	Bandon Es
92400	BN010	BN010S	29/06/2009	2.3	2.65	0.101	31	35.3	1310	2.751	0.00156	Bandon Es
101303	BN010	BN010S	14/09/2009	0.49999	3.34	0.19	24	0.24999	3990	3.53	0.00181	Bandon Es
53	BN010	BN010S	14-Sep-10	2	1.56	0.162	39	13		1.722		Bandon Es
72	BN010	BN010S	17-Aug-10	2	2.28	0.033	27	33.5		2.313		Bandon Es
164	BN010	BN010S	08-Feb-10	<2	3	0.03	24			3.03		Bandon Es
92441	BN020	BN020B	29/06/2009		1.59	0.142	15	48.8	328	1.732	0.0049	Bandon Es
101300	BN020	BN020B	14/09/2009	1.4	2.64	0.218	24	3.8	3280	2.858	0.00168	Bandon Es
337	BN020	BN020B	14-Sep-10		0.94	0.198	34	12.1		1.138		Bandon Es
363	BN020	BN020B	17-Aug-10		1.69	0.051	27	37		1.741		Bandon Es
43	BN020	BN020B	23-Jun-10	2	2.65	0.094	54			2.744		Bandon Es
371	BN020	BN020B	08-Feb-10		3.1	0.03	25	1.9		3.13		Bandon Es
306	BN020	BN020BR	14-Sep-10		1.8	0.166	47	16		1.966		Bandon Es
985	BN020	BN020C	20/01/2009		2.42	0.181	29	0.24999	1940	2.601	0.00044	Bandon Es
985	BN020	BN020C	20/01/2009		2.42	0.181	29	0.24999	1940	2.601	0.00044	Bandon Es
92278	BN020	BN020S	29/06/2009		2.55	0.114	27	15	1110	2.664	0.00268	Bandon Es
101299	BN020	BN020S	14/09/2009		3.02	0.198	27	1.7	4180	3.218	0.00165	Bandon Es
318	BN020	BN020S	14-Sep-10		1.52	0.173	41	17.7		1.693		Bandon Es
385	BN020	BN020S	17-Aug-10		2.11	0.025	24	29		2.135		Bandon Es
45	BN020	BN020S	23-Jun-10	2	2.82	0.06	49			2.88		Bandon Es
372	BN020	BN020S	08-Feb-10		3.1	0.03	25	1.7		3.13		Bandon Es
309	BN020	BN020SR	14-Sep-10		2.43	0.099	45	13.5		2.529		Bandon Es

Mean value	1.999999	2.34963	0.125704	31.2963	14.43958	2080.182	2.475333	0.001758
95% percentile	3.125				35.4			
Median value				28	12.3			
compliance with regul	YES			YES	No for Median value			
					No- failed on 90% value**			
EQS Standard	≤4.0			≤40	5.0(Med)& 10(90%)			

**** Note - high results for Chlorophyll recorded in Jur**

Locations Downstream of Innishannon

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ID	Station No	Sample Label	Date Surveyed	Salinity	Temperature	DO mg/L	DO Saturation	pH	NH3	TON	DIN
52	BN010	BN010B	14-Sep-10	12.59	16.83	6.8	75.8	7.6	0.207	1.29	1.497
70	BN010	BN010B	17-Aug-10	12.09	16.46	8.8	97.1	8.0	0.05	2.21	2.26
395	BN010	BN010B	08-Feb-10	0.08	6.75	11.9	97.7	7.4	0.03	3.2	3.23
53	BN010	BN010S	14-Sep-10	9.39	16.08	7.4	79.2	7.4	0.162	1.56	1.722
72	BN010	BN010S	17-Aug-10	10.01	16.4	9.7	105.8	7.9	0.033	2.28	2.313
164	BN010	BN010S	08-Feb-10	0.08	6.74	11.9	97.7	7.4	0.03	3	3.03
337	BN020	BN020B	14-Sep-10	17.93	16.79	6.5	74.9	7.7	0.198	0.94	1.138
363	BN020	BN020B	17-Aug-10	14.45	16.34	8.9	99.5	8.0	0.051	1.69	1.741
43	BN020	BN020B	23-Jun-10	7.71	19.57	9	102.6	7.9	0.094	2.65	2.744
371	BN020	BN020B	08-Feb-10	0.08	6.77	11.8	96.5	7.5	0.03	3.1	3.13
306	BN020	BN020BR	14-Sep-10	11.82	16.83	6.1	67.2	7.7	0.166	1.8	1.966
318	BN020	BN020S	14-Sep-10	9.58	16.38	7.4	79.8	7.6	0.173	1.52	1.693
385	BN020	BN020S	17-Aug-10	11.63	16.41	9.8	107.8	8.1	0.025	2.11	2.135
45	BN020	BN020S	23-Jun-10	1.49	18.99	9.4	102.2	7.8	0.06	2.82	2.88
372	BN020	BN020S	08-Feb-10	0.08	6.76	11.8	96.6	7.5	0.03	3.1	3.13
309	BN020	BN020SR	14-Sep-10	1.58	16.83	8.2	85.1	7.9	0.099	2.43	2.529

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ENVIRONMENTAL PROTECTION
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04 JAN 2012

PO4	BOD	Chl a
41	2	12.5
28	2	35.5
23		0.8
39	2	13
27	2	33.5
24	<2	
34		12.1
27		37
54	2	
25		1.9
47		16
41		17.7
24		29
49	2	
25		1.7
45		13.5

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Register Number D0429-01 Revised E4 Inishannon collated data

Sample Date	21/04/2009	21/05/2009	21/04/2009	Below LOD	21/05/2009	Below LOD	#####	Below LOD	21/05/2009	Below LOD	21/04/2009	Below LOD	21/05/2009	Below LOD	21/04/2009
Sample	Influent	Influent	Effluent**		Effluent		upstream		upstream		downstream		downstream		Inishannon River u/s of where river meets Bandon river
Sample Code	GT497	GT760	GT500	GT500	GT761	GT761	GT504	GT504	GT759	GT759	GT498	GT498	GT762	GT762	GT499
Flow M ³ /Day	*	*	*		*		*		*		*		*		
pH	7.2	7.0	7.0		7.0		8.3		7.6		7.9		7.6		7.6
Temperature °C	*	*	*		*		*		*		*		*		
Cond 20°C	459	367	350		359		181		172		193		127		229
SS mg/L	76	65	48		40		<2.5		9		1.25		8		<2.5
NH ₃ mg/L	19.1	16.8	10.1		15.1		<0.1	0.076	<0.1	0.041	<0.1	0.054	<0.1	0.027	<0.1
BOD mg/L	57	44	48		50		<1		3		1		0.5		<1.0
COD mg/L	125	123	95		113		<21		31		10.5		21		<21
TN mg/L	23.5	28.5	13.3		24.4		3.11		2.18		3.21		2.18		6.08
Nitrite mg/L	*	0.693	*		0.607		*		<0.10		*		<0.10		*
Nitrate mg/L	*	1.737	*		<0.50		*		1.27		*		1.3		*
TP mg/L	*	3.52	*		2.15		*		0.066		*		0.062		*
O-PO4-P mg/L	2.61	2.58	1.18		1.34		<0.05	0.033	<0.05	0.012	0.07		0.025	0.015	0.07
SO4 mg/L	39.7	31.8	<30		31.2		<30		<30		<30		<30		<30
Phenols µg/L	*	3.464	*		<0.10		*		7.702		*		<0.10		*
Atrazine µg/L	*	<0.01	*		<0.01		*		<0.01		*		<0.01		*
Dichloromethane µg/L	*	<1	*		<1		*		<1		*		<1		*
Simazine µg/L	*	<0.01	*		<0.01		*		<0.01		*		<0.01		*
Toluene µg/L	*	<0.28	*		6.67		*		<0.28		*		<0.28		*
Tributyltin µg/L	*	*	*		*		*		*		*		*		*
Xylenes µg/L	*	<1	*		<1		*		<1		*		<1		*
Arsenic µg/L	*	<0.96	*		<0.96		*		<0.96		*		<0.96		*
Chromium ug/L	<20	<20	<20	<1	<20	<1	<20	<1	<20	<1	<20	<1	<20	<1	<20
Copper ug/L	<20	<20	<20	3.62	<20	<1	<20	<1	<20	<1	<20	<1	<20	<1	<20
Cyanide µg/L	*	<5	*		<5		*		<5		*		<5		*
Fluoride µg/L	*	228	*		207		*		49		*		<100		*
Lead ug/L	<20	<20	<20	4.59	<20	2.8	<20	2.37	<20	3.57	<20	2.47	<20	3.002	<20
Nickel ug/L	<20	<20	<20	2.22	<20	<1	<20	<1	<20	<1	<20	<1	<20	<1	<20
Zinc ug/L	36.5	42.4	27.4	n/a	<20	<1	<20	<1	<20	<1	<20	<1	<20	<1	<20
Boron ug/L	39	<20	52.8		<20	<1	<20	<1	<20	<1	<20	<1	<20	<1	<20
Cadmium ug/L	<20	<20	<20	<1	<20	<1	<20	<1	<20	<1	<20	<1	<20	<1	<20
Mercury µg/L	*	<0.2	*		<0.2		*		<0.2		*		0.5		*
Selenium µg/L	*	2.5	*		1.8		*		1.3		*		1.6		*
Barium ug/L	<20	<20	<20	13.3	<20	<1	41.6		<20	<1	48.4	48.4	30.06	30.06	56.4

Effluent** sample collected from junction of river and septic tank discharge