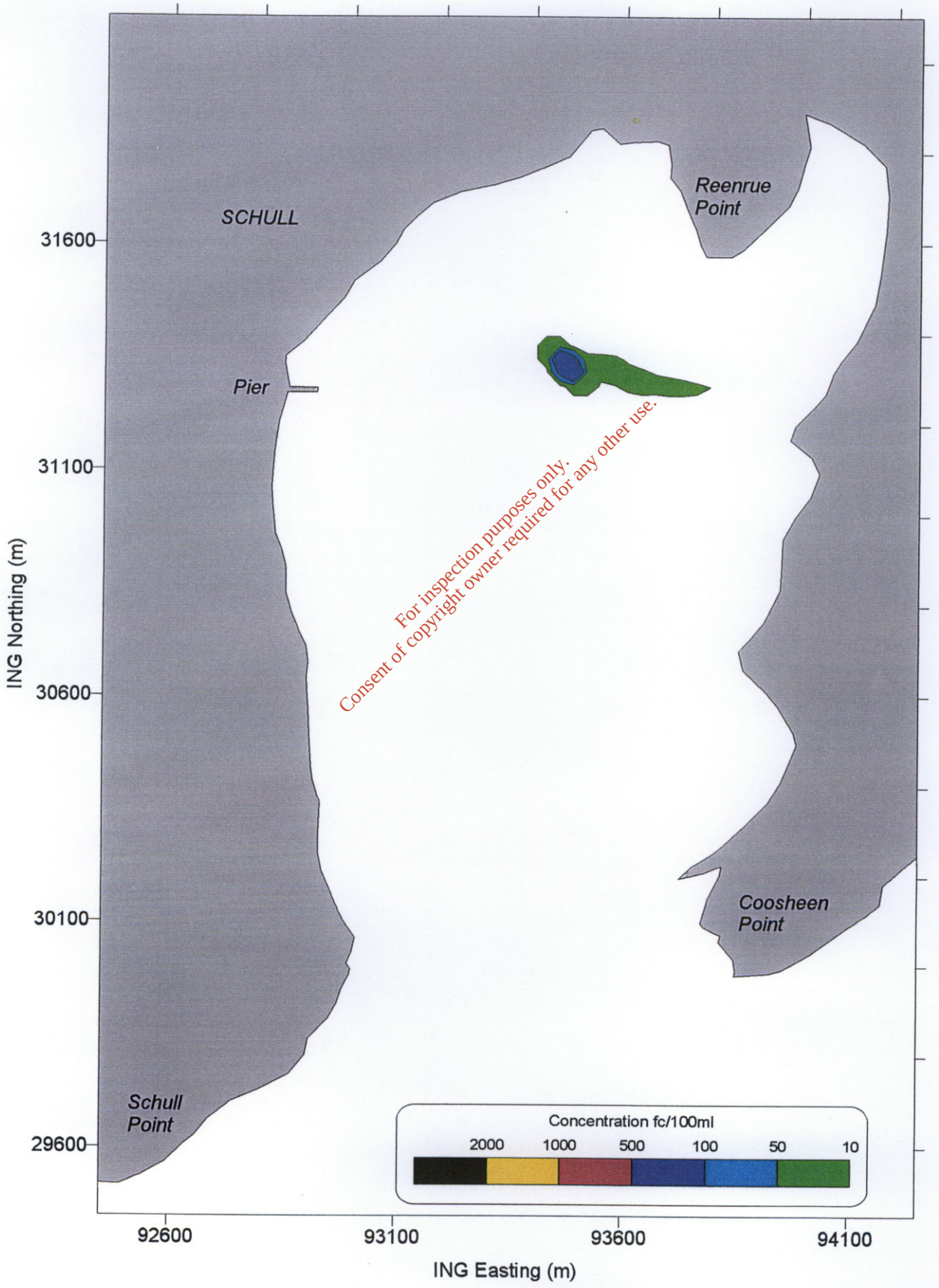
Appendix E - Mid-Bay Outfall, Neap Tide, Westerly Wind

SCHULL OUTFALL STUDY 2001

Neap Tide Simulation - Mid-Bay Outfall Westerly Wind (F2)

Effluent Source: 48 litres/second
Bacterial Concentration: 1 x 10E4

Predicted Coliform Concentration at :
Low Water

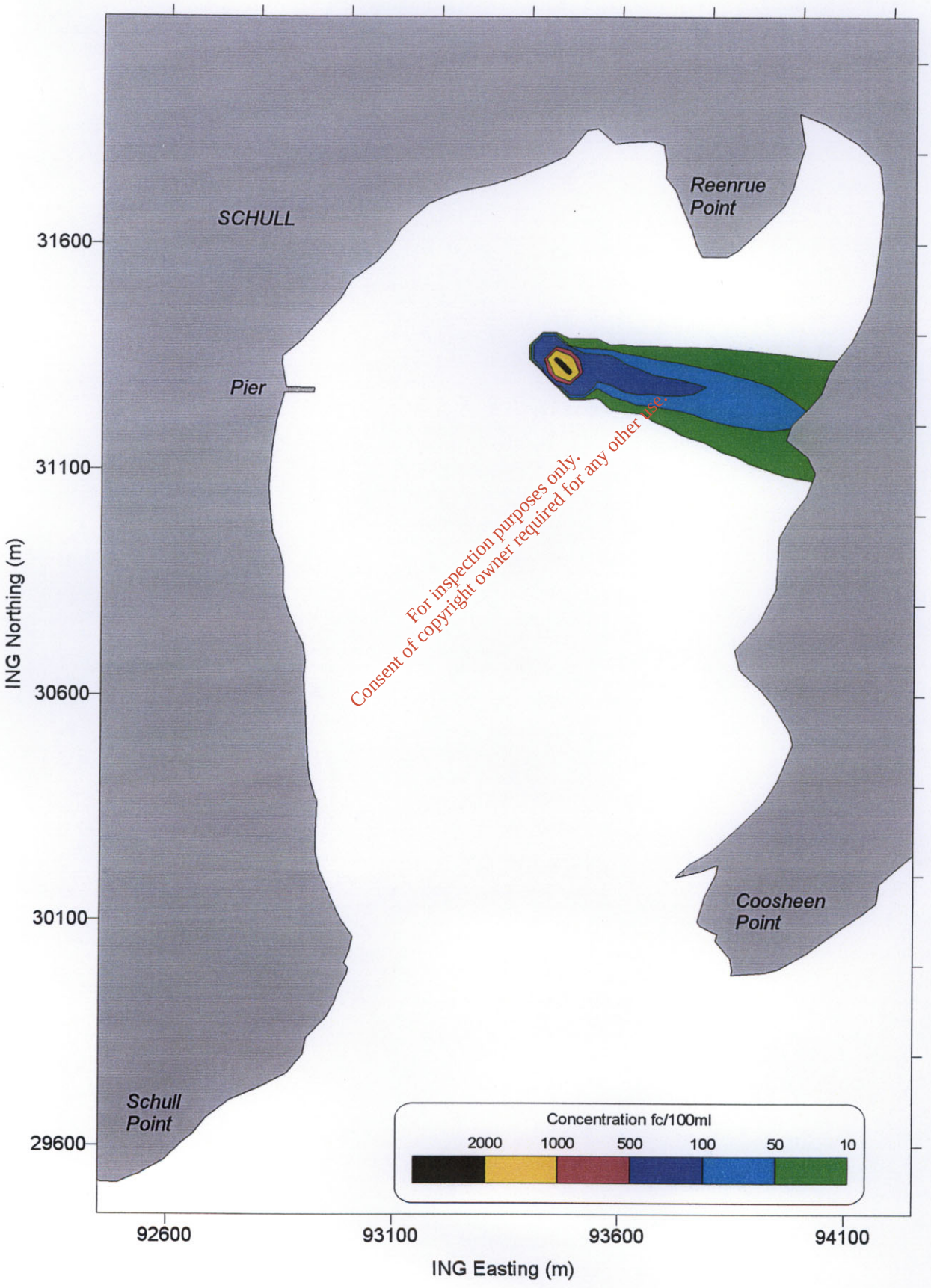


SCHULL OUTFALL STUDY 2001

Neap Tide Simulation - Mid-Bay Outfall Westerly Wind (F2)

Effluent Source: 48 litres/second
Bacterial Concentration: 1 x 10E5

Predicted Coliform Concentration at :
Low Water

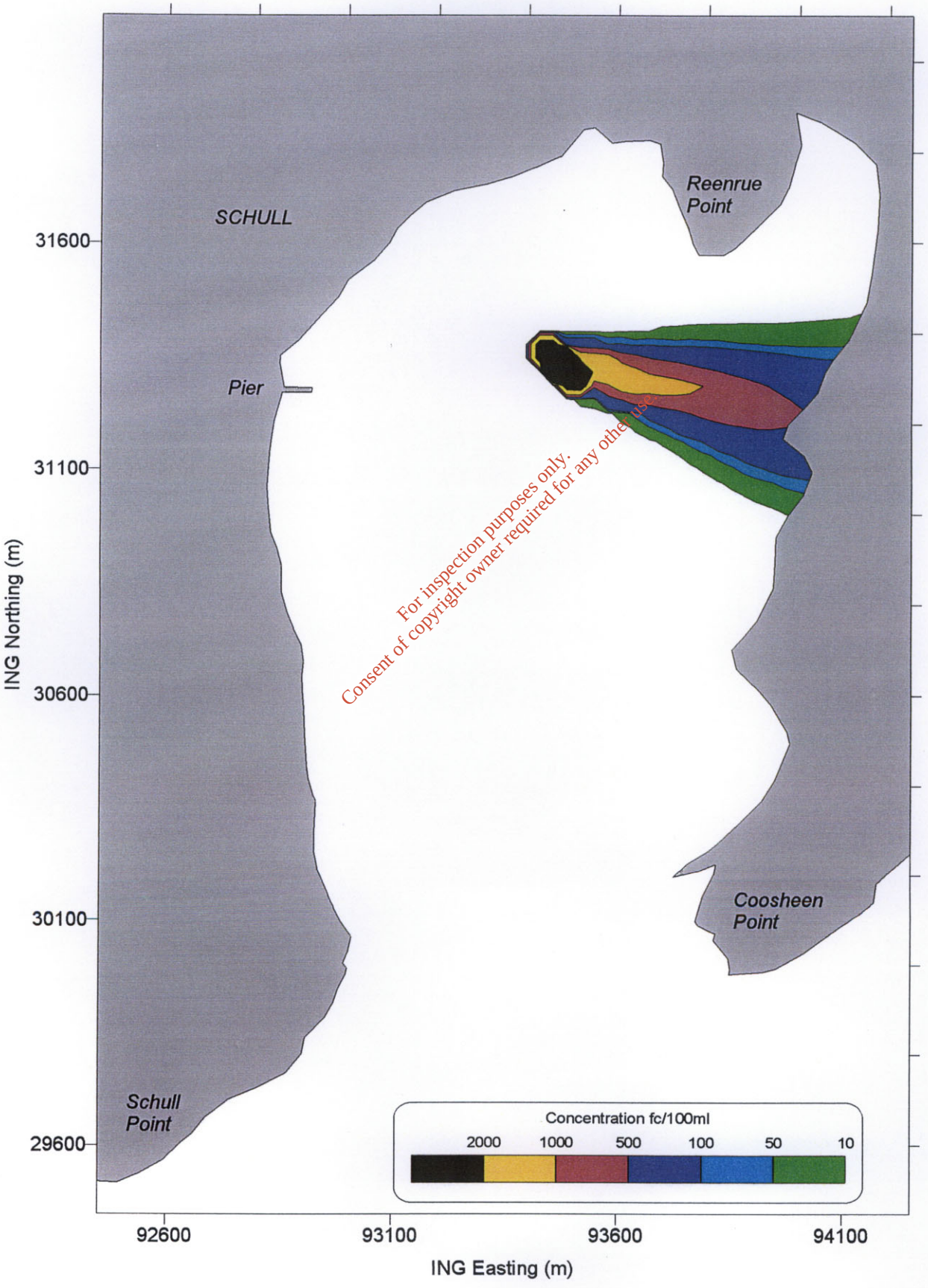


SCHULL OUTFALL STUDY 2001

Neap Tide Simulation - Mid-Bay Outfall Westerly Wind (F2)

Effluent Source: 48 litres/second
Bacterial Concentration: 1 x 10E6

Predicted Coliform Concentration at :
Low Water



Appendix F - Mid-Bay Outfall, Neap Tide, Simulated Easterly Wind

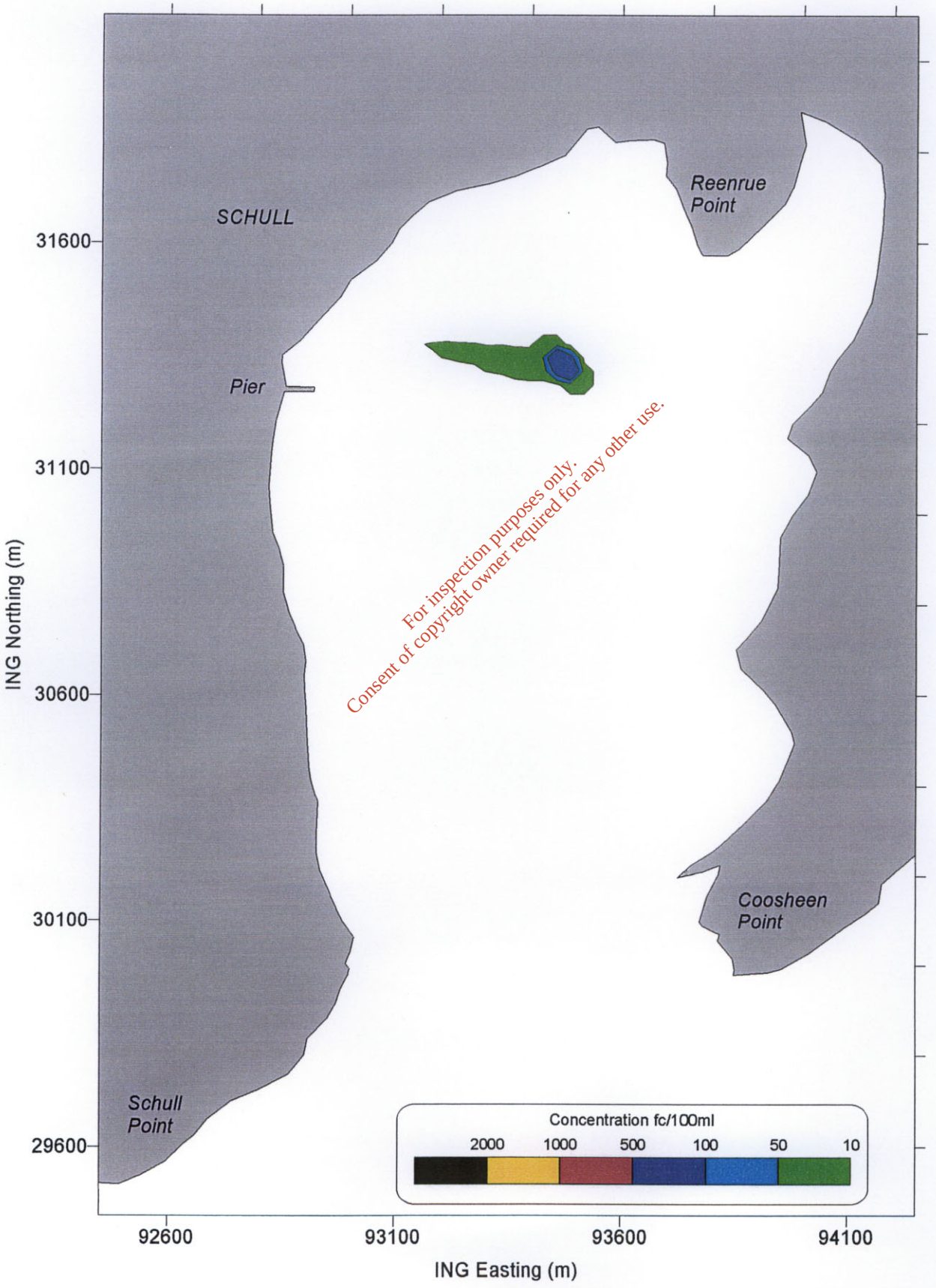
SCHULL OUTFALL STUDY 2001

Neap Tide Simulation - Mid-Bay Outfall

Simulated Easterly Wind (F3-4)

Effluent Source: 48 litres/second
Bacterial Concentration: 1 x 10E4

Predicted Coliform Concentration at :
Mid Tide



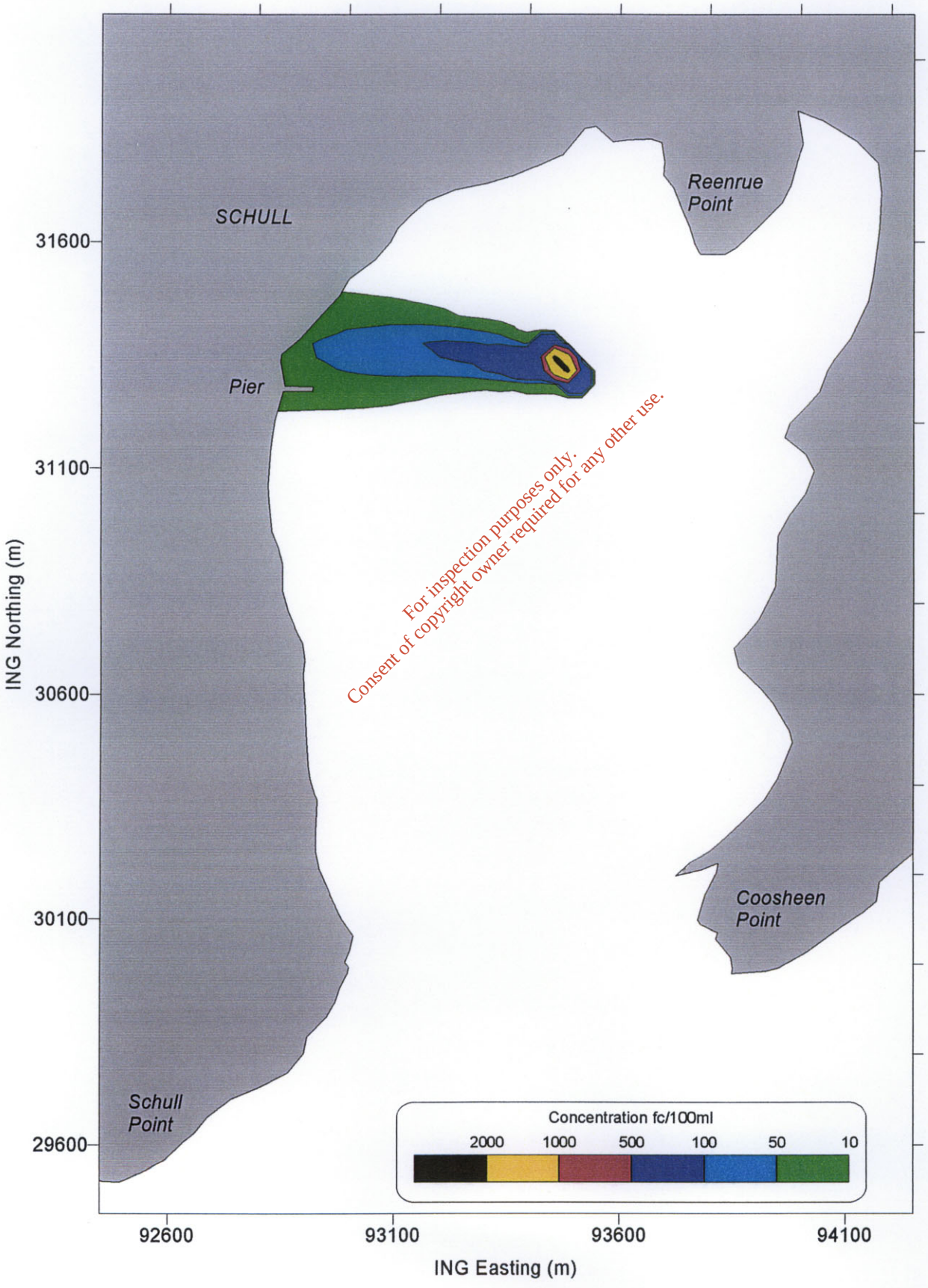
SCHULL OUTFALL STUDY 2001

Neap Tide Simulation - Mid-Bay Outfall

Simulated Easterly Wind (F3-4)

Effluent Source: 48 litres/second
Bacterial Concentration: 1 x 10E5

Predicted Coliform Concentration at :
Mid Tide



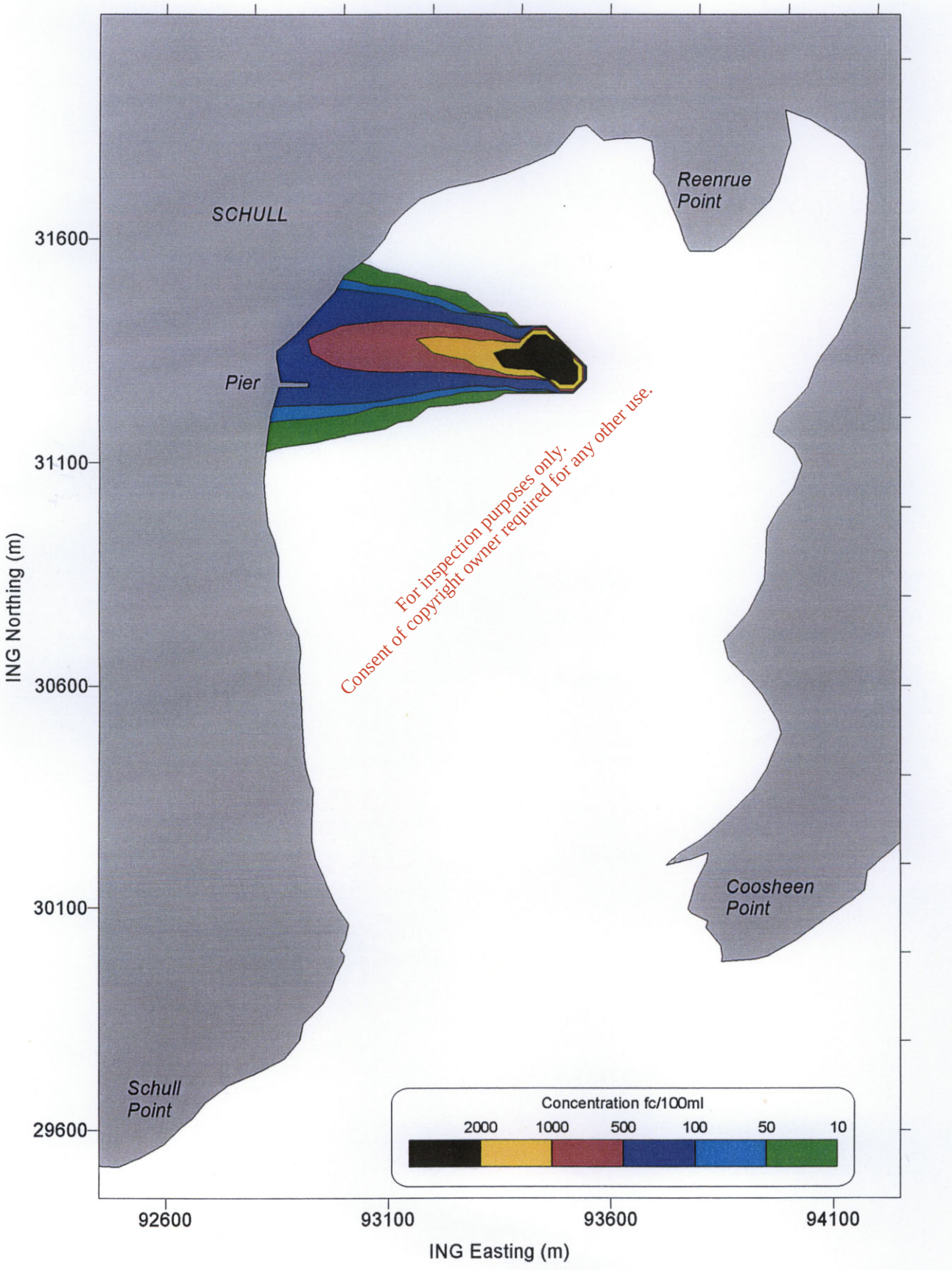
SCHULL OUTFALL STUDY 2001

Neap Tide Simulation - Mid-Bay Outfall

Simulated Easterly Wind (F3-4)

Effluent Source: 48 litres/second
Bacterial Concentration: 1 x 10E6

Predicted Coliform Concentration at :
Mid Tide



Attachment E.2

Attachment E.2

- Monitoring Programme

Attachment E.2 - Schull Waste Water Discharge Licence Application – Monitoring and Sampling Points

Grab samples have been collected recently of the effluent from the primary and secondary discharges as well as receiving waters and the results are included in Attachments E.4 and F.1 of this application.

Upstream and downstream samples are not relevant in this case as the discharge is below low tide water level. Sampling of receiving waters was carried out at the south-eastern side of Harbour at Coosheen Point.

There is no drinking water abstraction point downstream of the plant and therefore the Abstraction Directive is not applicable. Neither is there Shellfish Waters in the Harbour.

The recent sample analysis has been carried out by the Laboratory of Cork County Council which is accredited for a number of analytical tests under the Irish National Accreditation Board (INAB) under the ISO 17025 international standard. It is currently accredited for the following parameters under that standard system:

- pH
- Biochemical Oxygen Demand
- Chemical Oxygen Demand
- Suspended Solids
- Ammonia
- Ortho Phosphate
- Total Phosphate
- Chloride
- Sulphate

It is proposed to sample the influent and effluent from septic tanks where accessible and receiving waters once a year in the future for the following parameters at the Cork County Council Laboratory in Skibbereen:

- pH
- Biochemical Oxygen Demand
- Chemical Oxygen Demand
- Suspended Solids
- Ammonia
- Ortho Phosphate
- Total Nitrogen

When the proposed WWTP for Schull is constructed it will be operated under a Design, Build & Operate contract. A comprehensive monitoring and sampling programme will be undertaken by the contractor in accordance with the relevant standards and frequencies as set out by Cork County Council.

Attachment E.4

Attachment E.4

- Sampling Data

Attachment E4 Schull Discharge Outlet Table E4

Sample Date	07/06/2006	18/07/2006	05/09/2006	12/04/2007	13/06/2007	11/10/2007	22/05/2008	19/06/2008	03/09/2008	24/09/2008	30/10/2008	18/12/2008			
Sample	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Average	Kg/Day	Kg/year
Sample Code							GS456	GS583	GS839	GS969	GS1167	GS1395			
Flow M^3/Day	*	*	*	*	*	*	*	*	*	*	*	*			
pH	6.9	6.5	6.8	7.6	7.4	7	7	6.9	5.7	*	7.3	*	6.91	*	*
Temperature ℃	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Cond 20℃	*	*	*	*	*	*	410	683	584	*	357	*	508.5	*	*
SS mg/L	153	117	65	242	145	79	68	939	46	49	37	54	166.1666667	213.86	78054.5
NH_3 mg/L	*	*	*	*	*	29.1	6.5	26.2	23.8	*	*	11.9	19.5	25.097	9160.2
BOD mg/L	268	349	168	247	198	136	123.3	539	441	139	56.6	98.4	230.275	296.36	108172.8
COD mg/L	320	674	337	509	449	288	266	1487	699	281	94	190	466.1666667	599.95	218984.1
TN mg/L	22	80	13	*	44	29.8	59	*	36	*	6	*	36.225	46.62	17016.9
Nitrite mg/L	*	*	*	*	*	*	*	*	*	*	0.951	*	0.951	1.224	446.74
Nitrate mg/L	*	*	*	*	*	*	*	*	*	*	1.52	*	1.52	1.956	714.03
TP mg/L	2.47	9.5	3.95	6.63	5.48	5.35	2.27	10.23	*	*	2	*	5.32	6.847	2499.1
O-PO4-P mg/L	*	*	*	*	*	2.81	0.66	4.49	4.78	*	0.49	1.36	2.431666667	3.127	1141.5
SO4 mg/L	*	*	*	*	*	31.7	*	*	*	*	<30.0	*	<30.0	<38.61	<14092.7
Phenols µg/L	*	*	*	*	*	*	*	*	*	*	38	*	38	0.0489	17.851
Atrazine µg/L	*	*	*	*	*	*	*		*	*	<0.02	*	<0.02	<0.000026	<0.009395
Dichloromethane	*	*	*	*	*	*	*		*	*	<5.0	*	<5.0	<0.00644	<2.349
Simazine µg/L	*	*	*	*	*	*	*	*	*	*	<0.02	*	<0.02	<0.000026	<0.009395
Toluene µg/L	*	*	*	*	*	*	*	*	*	*	<0.1	*	<0.1	<0.0001287	<0.04698
Tributyltin µg/L	*	*	*	*	*	*	*	*	*	*	<0.02	*	<0.02	<0.000026	<0.009395
Xylenes µg/L	*	*	*	*	*	*	*	*	*	*	<0.2	*	<0.2	<0.00026	<0.09395
Arsenic µg/L	*	*	*	*	*	*	*	*	*	*	0.7	*	0.7	0.0009	0.3288
Chromium mg/L	*	*	*	*	*	*	*	0.02	<0.02	*	<0.02	<0.02	0.0125	0.0161	5.87
Copper mg/L	*	*	*	*	*	*	*	0.463	0.021	*	<0.02	<0.02	0.1733	0.0257	9.395
Cyanide µg/L	*	*	*	*	*	*	*	*	*	*	5	*	5	0.00644	2.349
Fluoride µg/L	*	*	*	*	*	*	*	*	*	*	80	*	80	0.103	37.58
Lead mg/L	*	*	*	*	*	*	*	0.047	<0.02	*	<0.02	<0.02	0.01925	0.0248	9.043
Nickel mg/L	*	*	*	*	*	*	*	<0.02	<0.02	*	<0.02	<0.02	<0.02	<0.0257	<9.395
Zinc mg/L	*	*	*	*	*	*	*	0.665	<0.02	*	<0.02	<0.02	0.1963	0.253	92.213
Boron mg/L	*	*	*	*	*	*	*	0.031	0.054	*	0.076	<0.02	0.04275	0.055	20.082
Cadmium mg/L	*	*	*	*	*	*	*	<0.02	<0.02	*	<0.02	<0.02	<0.02	<0.0257	<9.395
Mercury µg/L	*	*	*	*	*	*	*	*	*	*	<0.02	*	<0.02	<0.000026	<0.009395
Selenium µg/L	*	*	*	*	*	*	*	*	*	*	1	*	1	0.001287	0.4698
Barium mg/L	*	*	*	*	*	*	*	0.197	0.048	*	0.023	0.029	0.07425	0.0956	34.88

values recorded as 1/2 the LOD for statistical purposes in average column

NOTE: Maximum Voume per day is 1287 m3/day

* Matrix interference from Suspended solids in test

Attachment E4 Schull Secondary Discharge Outlet Table E4

Sample Date	30/10/2008						
Sample	Effluent	Average	Kg/Day	Kg/year			
Sample Code	GS1168						
Flow M^3/Day	*						
pH	7.3	7.3	*	*			
Temperature ℃	*	*	*	*			
Cond 20℃	706	706	*	*			
SS mg/L	87	87	0.1218	44.46			
NH_3 mg/L	19.9	19.9	0.0279	10.169			
BOD mg/L	297.5	297.5	0.416	152.02			
COD mg/L	540	540	0.756	275.94			
TN mg/L	37	37	0.0518	18.91			
Nitrite mg/L	0.052	0.052	0.000073	0.02657			
Nitrate mg/L	<0.405	<0.405	<0.000567	<0.2069			
TP mg/L	9.8	9.8	0.0137	5.0078			
O-PO4-P mg/L	9.24	9.24	0.01294	4.722			
SO4 mg/L	42.5	42.5	0.0595	21.72			
Phenols µg/L	<5	<5	<0.000007	<0.00255			
Atrazine µg/L	<0.02	<0.02	<0.000000028	<0.00001022			
Dichloromethane	<5.0	<5.0	<0.000007	<0.00255			
Simazine µg/L	<0.02	<0.02	<0.000000028	<0.00001022			
Toluene µg/L	<0.1	<0.1	<0.00000014	<0.0000511			
Tributyltin µg/L	<0.02	<0.02	<0.000000028	<0.00001022			
Xylenes µg/L	<0.2	<0.2	<0.00000028	<0.0001022			
Arsenic µg/L	15	15	0.000021	0.00767			
Chromium mg/L	<0.02	<0.02	<0.000028	<0.01022			
Copper mg/L	0.067	0.067	0.000094	0.0342			
Cyanide µg/L	37	37	0.0000518	0.0189			
Fluoride µg/L	80	80	0.000112	0.0409			
Lead mg/L	<0.02	<0.02	<0.000028	<0.01022			
Nickel mg/L	<0.02	<0.02	<0.000028	<0.01022			
Zinc mg/L	0.114	0.114	0.00016	0.0583			
Boron mg/L	0.055	0.055	0.000077	0.0281			
Cadmium mg/L	<0.02	<0.02	<0.000028	<0.01022			
Mercury µg/L	<0.02	<0.02	<0.000000028	<0.00001022			
Selenium µg/L	1	1	0.0000014	0.00051			
Barium mg/L	<0.02	<0.02	<0.000028	<0.01022			

Attachment E4 Schull Secondary Discharge Outlet Table E4

Sample Date	30/10/2008						
Sample	Effluent	Average	Kg/Day	Kg/year			
Sample Code	GS1168						
Flow M^3/Day	*						
pH	7.3	7.3	*	*			
Temperature ℃	*	*	*	*			
Cond 20℃	706	706	*	*			
SS mg/L	87	87	0.1218	44.46			
NH_3 mg/L	19.9	19.9	0.0279	10.169			
BOD mg/L	297.5	297.5	0.416	152.02			
COD mg/L	540	540	0.756	275.94			
TN mg/L	37	37	0.0518	18.91			
Nitrite mg/L	0.052	0.052	0.000073	0.02657			
Nitrate mg/L	<0.405	<0.405	<0.000567	<0.2069			
TP mg/L	9.8	9.8	0.0137	5.0078			
O-PO4-P mg/L	9.24	9.24	0.01294	4.722			
SO4 mg/L	42.5	42.5	0.0595	21.72			
Phenols µg/L	<5	<5	<0.000007	<0.00255			
Atrazine µg/L	<0.02	<0.02	<0.000000028	<0.00001022			
Dichloromethane	<5.0	<5.0	<0.000007	<0.00255			
Simazine µg/L	<0.02	<0.02	<0.000000028	<0.00001022			
Toluene µg/L	<0.1	<0.1	<0.00000014	<0.0000511			
Tributyltin µg/L	<0.02	<0.02	<0.000000028	<0.00001022			
Xylenes µg/L	<0.2	<0.2	<0.00000028	<0.0001022			
Arsenic µg/L	15	15	0.000021	0.00767			
Chromium mg/L	<0.02	<0.02	<0.000028	<0.01022			
Copper mg/L	0.067	0.067	0.000094	0.0342			
Cyanide µg/L	37	37	0.0000518	0.0189			
Fluoride µg/L	80	80	0.000112	0.0409			
Lead mg/L	<0.02	<0.02	<0.000028	<0.01022			
Nickel mg/L	<0.02	<0.02	<0.000028	<0.01022			
Zinc mg/L	0.114	0.114	0.00016	0.0583			
Boron mg/L	0.055	0.055	0.000077	0.0281			
Cadmium mg/L	<0.02	<0.02	<0.000028	<0.01022			
Mercury µg/L	<0.02	<0.02	<0.000000028	<0.00001022			
Selenium µg/L	1	1	0.0000014	0.00051			
Barium mg/L	<0.02	<0.02	<0.000028	<0.01022			

Attachment F.1

Attachment F.1

- Assessment of the Ecological Impacts of Providing an Upgraded Wastewater Treatment System at Schull, Co. Cork.
- Additional information on the Ecological Impacts of Providing an Upgraded Wastewater Treatment System at Schull, Co. Cork.

Dixon .Brosnan

environmental consultants

Project title	Assessment of the ecological impacts of providing an upgraded wastewater treatment system at Schull, Co. Cork.
Client	T.J. O' Connor & Associates
Client ref.	-
D.B ref.	DB500
Revision	2nd Revision
Date	
approved by	Carl Dixon B. Sc. (Applied Ecology)
on behalf of Dixon.Brosnan	

Dixon.Brosnan, Tellengana Lodge,
Blackrock Road, Cork, Ireland.
Tel: (021) 4968 600
Fax: (021) 4968 210
Email: dixonbrosnan@eircom.net

CONTENTS

1. INTRODUCTION

1.1 Dixon.Brosnan environmental consultants were asked by T.J O Connor & Associates to carry out an ecological impact assessment in respect of an upgraded wastewater treatment plant to be constructed at Schull, Co. Cork. The following ecological assessments were requested by the Heritage section of the Department of Environment (Duchas):

- *Biological communities over which the activity will impact including an inventory of flora and fauna (in fauna, epifauna and marine animals).*

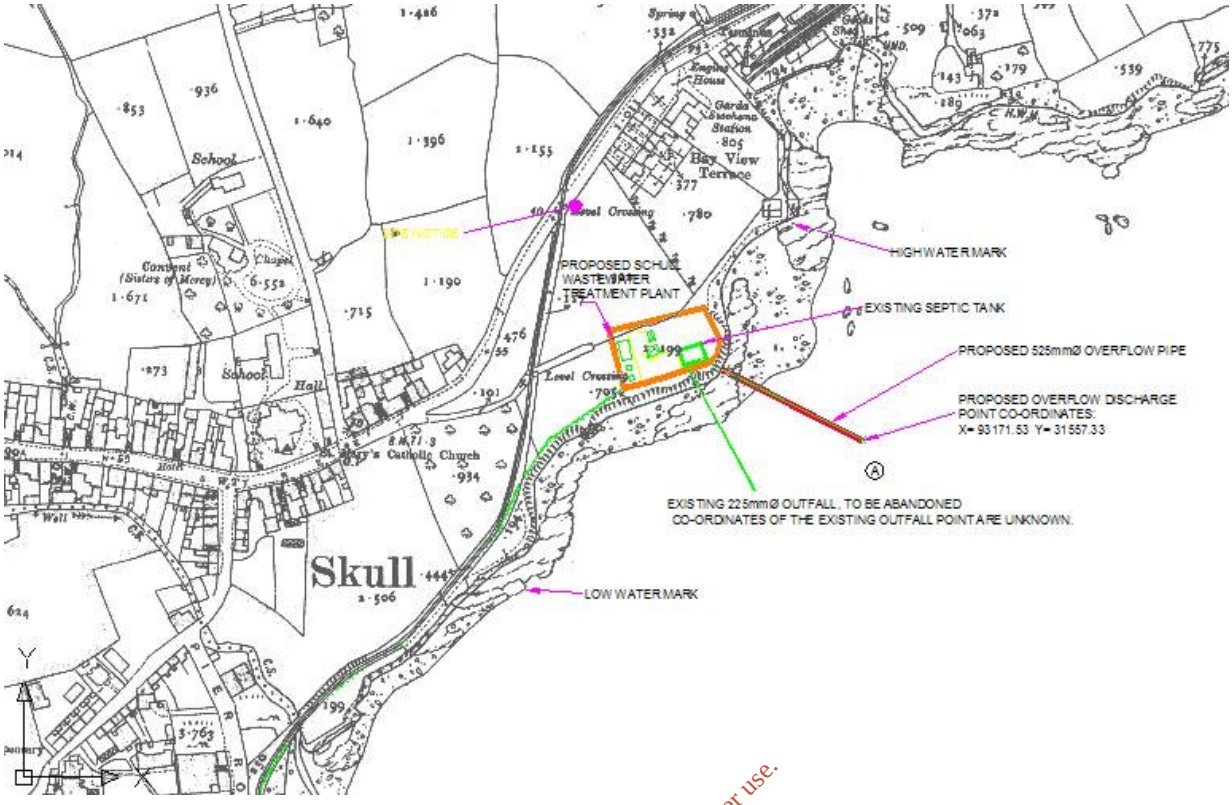
- *If the development requires a foreshore licence the biological communities or habitats likely to be impacted must be described.*

- *Construction activities that may impact upon resident and/or transient bird and mammal populations.*

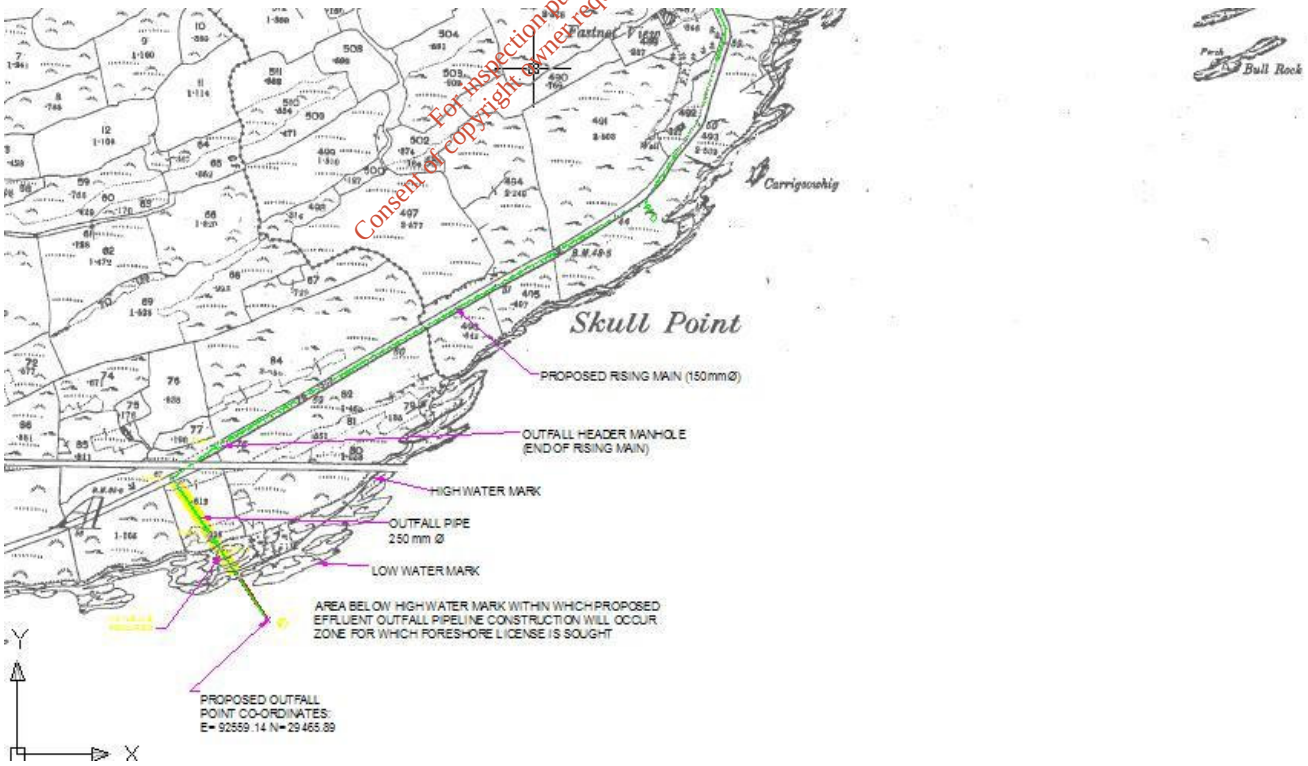
- *Will construction activities result in noise/visual disturbance to marine mammals?*

1.2 The proposed development is below the threshold at which an Environmental Impact Assessment is required under the European Communities (Environmental Impact Assessment) Regulations, 1989 (S.I. No. 349 of 1989), and accordingly this report does not purport to be an Environmental Impact Statement. However, the Environmental Protection Agency document *Advice notes on current practice in the preparation of Environmental Impact Statements* (2000) was consulted during the preparation of the report.

1.3 The locations of the existing and proposed outfalls, wastewater treatment plant and associated pipework is shown on Map 1 & 2 overleaf.



Map 1-Showing location of existing septic tank, proposed treatment plant and existing outfall.



Map 2- showing location of proposed outfall pipe.

2. EXISTING TREATMENT

2.1 Wastewater from Schull and its environs is collected via the existing collection system. The collection system discharges wastewater into a septic tank at the shoreline to the north of the pier. The septic tank provides primary treatment for the sewage. The treated effluent discharges via a 225 mm outfall to below the LWM. During periods of high flow the septic tank is bypassed by the excess flows.

2.2 At present the sewage outfall discharges to an enclosed bay and where movement of water is limited. Limited dispersal of effluent would be expected, especially during low tides. It is probable that this is having a negative ecological impact in the immediate area of the discharge.

2.3 The current population of Schull is 1,068 (Ref. 2002 Census Table 6). The future summertime wastewater loadings in Schull are expected to rise to 3,250 p.e. Sewage is currently treated via a septic tank and thus it can be assumed that primary treatment occurs prior to discharge. The Environmental Protection Agency Document '*Treatment Systems for Small Communities, Business, leisure centres and Hotels*' (EPA 1999) details wastewater inflow characteristics for domestic and commercial sources. These figures are shown in Table 1 below.

Table 1-Inflow wastewater characteristics

Parameters	*Units*	*Domestic sources*	*Treatment systems serving hotels/restaurants*
SS	mg/l	163	293
BOD	mg/l	168	470
COD	mg/l	389	888
0-PO4	mg/l	7.1	8.21
Total N	mg/l	40.6	55
pH		7.5	7.37
Total -coli	CFU/100ml	1×10^8	1×10^8
E-coli	CFU/100ml	4×10^7	4×10^7

2.5 In reality the discharge from Schull will contain a mixture of wastewater from domestic and commercial sources. The BOD loading rate is an important parameter in the design of all biological wastewater treatment systems. For comparison purposes in the context of this report it will be assumed that the all the wastewater is derived from domestic sources. Based a current population equivalent of 1,068 and a discharge volume of 180l/person/day the total BOD reaching the treatment plant is estimated at 32.29 kg/day.

Based on a predicted summer population of 3,250p.e, the total BOD reaching the treatment plant could be as high as 98.28 kg/day.

2.6 Based on the same population equivalents the amount of suspended solids reaching the treatment plant is estimated at 31.34kg/day at present and could be as high as 95.36kg/day in summer assuming the population increases as predicted.

2.7 At present wastewater from Schull is treated via a septic tank. The main function of a septic tank is to act as a primary settlement tank removing some of the BOD and the majority of the suspended solids. The EPA publication '*Primary, secondary and tertiary treatment*' (EPA 1997) estimates that typically 50-70% of suspended solids are removed in primary settlement tanks; BOD is reduced by 20-50% and the bacterial count by 25-75%. Assuming that the septic tank at Schull is currently working at average efficiency the approximate reductions are estimated as 60% for suspended solids and 35% for BOD. The reduction in bacterial count is estimated at 50%

2.8 This would result in a BOD discharge to the bay of 20.99 kg/day based on current population figures and could reach 63.88 kg/day in summer (3,250 predicted p.e.). The volume of suspended solids reaching the bay is estimated at 12.54 kg/day at present and could reach a maximum value 38.14 kg/day in summer based on predicted increases in population. These figures assume that all waste is domestic in origin.

2.9 Based on the above, the current discharge of sewage would be expected to cause deteriorations in water quality in respect of nutrients and bacterial levels.

3. PROPOSED TREATMENT

3.1 Treatment Plant

3.1.1 Due to the increasing load on the septic tank it is proposed to construct a modern treatment plant to cater for existing and increased loadings in the future. This plant is to be located alongside the existing septic tank. Standby power generation will be available on site in case of power failure. The new plant will consist of preliminary and secondary treatment or their equivalent to achieve the standards as proposed in the table below to the standard given below throughout the entire year. The existing septic tank is to be used as a storm water storage tank to reduce the frequency of overflows events. The existing outfall from the septic tank (225 mm diameter), to be used as an overflow, may have to be replaced with a 525 mm pipe of similar length. The overflowed effluent shall receive screening to 6 mm, and shall be heavily diluted with large amounts of surface runoff prior to discharge. These proposed treatment standards, which are shown in Table 2, are in line with those specified by the Urban Wastewater Treatment Regulations, 2001 for non-sensitive waters.

Table 2: Proposed treatment standards.

Parameter	*Value*	*Unit*
Design Capacity	3,250	p.e.
BOD	25	mg/l
SS	35	mg/l
COD	125	mg/l

3.1.2 For ease of comparison between the current and proposed treatment the discharge per person is again estimated at 180 l/day and the current population is left unchanged at 1,068 p.e. Using these figures the estimated loading of BOD discharged to Roaringwater Bay from the upgraded treatment plant is 4.81 kg/day based on the current population and an upgraded treatment plant. Using a predicted maximum summer population of 3,250 p.e the maximum summer discharge is estimated at 14.63 kg/day. Using the same figures the amount of suspended solids discharging to the bay is estimated at 6.73 kg/day based on the current population and the maximum summer discharge is estimated at 20.48 kg/day.

Table 3 – A comparison of treatment efficiencies for SS and BOD

	Assuming primary treatment via existing septic tank Current population of 1,068 Maximum predicted summer population 3,250 180l/person/day BOD removal 35% approx. SS removal 60% approx.	*New treatment plant. Current population of 1,068 Maximum predicted summer population 3,250 180l/person/day BOD 25mg/l SS 35 mg/l*	*% reduction*
BOD kg/day (current population)	20.99	4.81	77.10%
BOD kg/day (max. future population)	63.88	14.63	77.10%
SS kg/day (current population)	12.54	6.73	46.33%
SS kg/day (max. future population)	38.14	20.48	46.33%

3.2 Bacteria

3.2.1 Irish Hydrodata were commissioned by M.C. O Sullivan & Co. to investigate the bacterial impact on the marine environment of treated wastewater discharges from the proposed outfall. Field studies including drogue and dye tracking, current metering and depth profiling were conducted at Schull point approximately 600m east of the final position of the proposed outfall. Field measurements indicate that the ebb tide is stronger (average 0.3 mm/s) and longer in duration than the flood tide (average 0.08 mm/s). Model simulations of the discharge show that bacterial concentrations will rapidly decrease away from the outfall and will be within statutory requirements where they reach the coastline. It is not intended therefore to provide disinfection with the new treatment plant.

Table 4 – A comparison of treatment efficiencies for bacteria.

	Assuming primary treatment via existing septic tank Assumes removal rate of 50%	*New treatment plant*
F. Coliforms	2 X 10^7 CFU/100ml	1 X 10^5 - 1 X 10^6 CFU/100ml

3.2.2 As detailed above the proposed works will substantially improve the quality of the effluent discharged to Roaringwater Bay. In the absence of an upgraded treatment plant and given the predicted rise in population the amount of nutrients and bacteria reaching the harbour will significantly increase in the future.

3.3 Pumping Station and rising main

3.3.1 A pumping station is to be constructed alongside the existing septic tank. The treated effluent is to be pumped from the treatment plant to Schull Point for discharge outside of the harbour. A rising main pipeline is to be laid from the proposed Schull Wastewater Treatment Plant at the village green Schull, out along the Colla Road and to Schull Point.

3.4 Outfall

3.4.1 An outfall pipeline will be laid from Schull Point to Colla where the pipe will be laid across the foreshore and into Long Island Channel below the low water mark. The treated effluent is to be discharged via the proposed outfall. The outfall will consist of a 250 mm diameter pipeline and duck-bill valve, laid to 50 m beyond the high water mark. Repairs to the shoreline, pipe bedding and concrete surround to protect the pipe will be undertaken as associated site works. The recommended 2 m minimum depth of water at low tide will be available at all stages of the tide.

4. SITE DESIGNATION

4.1 Roaringwater bay into which the treatment plant will discharge is a candidate Special Area of Conservation (cSAC). As detailed in the site synopsis included in Appendix 1, three marine habitats listed under the EU Habitats Directive, i.e. large shallow inlets and bays, marine caves and reefs are found within the bay.

4.2 The shallow intertidal reefs are diverse in places with kelp forest and diverse communities of sponges and ascidians. Species of particular ecological interest include the sponge *Tethyspira spinosa,* the red alga *Phyllophora sicula* and the scarce hydroid *Tamarisca tamarisca.*

4.3 The sedimentary communities in Roaringwater Bay are of particular interest and species of note include the calcareous free-living red alga *Lithophyllum dentatum* and the rare filamentous red alga *Spyridia filimentosa.*

4. 4 Three terrestrial habitats listed under the EU Habitats Directive, i.e. dry heath, sea cliffs and lowland hay meadows are found within Roaringwater Bay. In addition to typical heath species a number of more uncommon species occur within this habitat including Hairy Birdsfoot Trefoil (*Lotus subbiflorus*), the Common Birdsfoot (*Ornithopus perpusillus*), Spotted Rockrose (*Tuberaria guttata*), Pale Heath Violet (*Viola lactea*) and Lanceolate Spleenwort (*Asplenium billotii*) and Deptford Pink (*Dianthus armeria*).

4. 5 Seashore vegetation includes typical species such as Sea Pink (*Armeria maritima*) and Plantains (*Plantago maritima*, *P. coronopus*). Of particular note are two Red Data Book plants, Little Robin (*Geranium purpureum*) and Sea Pea (*Lathyrus japonicus*) which occur rarely on shingle beaches.

4. 6 Otter and Grey seal, two mammal species listed on Annex II of the EU Habitats Directive, occur within the site and there are Arctic/Common Terns which are listed on Annex I of the EU Bird's Directive on Carrigviglash Rock. Choughs another species listed on Annex I of the Bird's Directive also occur within the site.

5. TOPOGRAPHY

5.1 The new wastewater treatment plant will be located adjacent to the existing septic tank north of the pier in Schull. The area in which the plant will be located is built-up with new apartments nearby. A path runs between the current treatment plant and the seashore and is used by walkers. The upper margin of the shore has been stabilised with concrete and there is a narrow band of shingle and rock between the upper edge of the shore and the high tide mark. At the lower limit of the littoral zone the grounds drops away relatively sharply. This results in a narrow intertidal zone composed of coarse shingle and rock outcrops.

5.2 The outflow from the current septic plant discharges into the western edge of Schull Harbour. From the shore adjacent to the existing outfall a plume was observed at the mouth of the outfall pipe. Sanitary products were noted on the upper shore suggesting that a certain times treatment is not adequate with the existing system. Schull Harbour itself is a u-shaped bay, which is slightly narrower at the mouth. It provides mooring for a number of commercial and pleasure craft. Long Island, which is located close to the mouth of the harbour, provides a degree of shelter from south and southwesterly winds. The area, into which the existing outfall discharges, is sheltered to moderately exposed.

5.3 It is proposed to discharge treated wastewater via a new outflow pipe, which will be, located approximately 1.5km south of the town close to Schull point. This location is considerable more exposed than the current location particularly to the southwest. The outflow will discharge to Long Island Channel, which is situated between the mainland and Long Island.

6. MARINE ECOLOGY

6.1 A number of different habitat types are located at or close to the site of the proposed and existing discharge pipes. Samples were taken from rocky habitats in the tidal zones and an inventory of the species noted is attached in Appendix 2. The classification of these habitats follows the scheme outlined in the Heritage Council publication A *Guide to Habitats in Ireland* (Fossit, 2000). This classification scheme provides for two classifications namely:

- 1-Marine Littoral (Intertidal)
- 2-Marine Sublittoral (Subtidal)

6.2 Marine Littoral (Intertidal).

This category is further divided into two main habitat types namely:

- Littoral sediment
- Littoral rock

6.3 Marine Sublittoral (Subtidal)

This category is further divided into two main habitat types namely:

- Sublittoral rock
- Sublittoral sediment

6.4 Existing discharge to Schull Harbour

6.4.1 Existing discharge to Schull Harbour - Littoral sediment

A stony beach is situated adjacent to wastewater treatment plant and existing discharge pipe. This habitat is classified as "*Shingle and gravel shores LS1*". This section of beach consists of cobbles and stones and is characterised by low biodiversity.

6.4.2 Existing discharge to Schull Harbour - Littoral rock

The lower shore at the discharge point is characterised by a mixture of rock outcrops and large boulders. It is classified as *Moderately exposed rocky shore LR2*.To the west of the discharge pipe there are shallow rock pools within the rock outcrops and area of larger stones and cobbles. The splash zone is narrow; a reflection of the relatively sheltered conditions and concrete structures which restricts the upper limit of the tidal zone. Some typical lichen species are present but pools are absent. Typical species noted were *Xanthoria sp*. and *Verrucaria maura.* Barnacles and limpets dominate the mid and upper shores with small numbers of mussels confined to crevices. Periwinkle species are common. Seaweed growth is limited although the fucoid species channel wrack and serrated wracks are present. Sea lettuce and red algae are present in small amounts in shallow pools some of which are covered with encrusting pink species. The rock outcrops and boulders on the lower shore give way sharply to deeper water. On the lower shore seaweed species are limited in extent with barnacles dominant. Although a number of animals were noted such as common prawn, beadlet anemone, common periwinkle, small periwinkle, shanny, painted topshell and shore crab the diversity of species is limited by the absence of seaweed cover and larger pools which might contain a greater variety of species.

6.4.3 Existing discharge to Schull Harbour - sublittoral rock

A diver surveyed sublittoral habitats although visibility was poor. The rock in the tidal zone continues into the subtidal zone and extends to the mouth of the outflow pipe. Finer sediments were largely absent from the area in proximity to the discharge pipe.

The subtidal rock is classified as *Moderately Exposed infralittoral rock SR2.* Kelp was present but not dominant. Other species noted include tubeworm, barnacles and common starfish.

6.4.4 Existing discharge to Schull Harbour - Sublittoral sediment

This classification includes habitats of the seabed where the substratum consists of unconsolidated material in a range of sizes. In this instance the sublittoral sediment was a continuation of the shingle beach. This habitat is classified as *infralittoral mixed sediment SS4* and is characterised by various mixtures of coarse sediments with shells and large stones. Biodiversity was low with tubeworm the only species noted. Further into the bay the large sized shingle and stone gives way to mud.

6.5 Proposed outfall at Colla

6.5.1 Proposed outfall - Littoral rock & Sublittoral rock

The shoreline at the proposed outlet consists of exposed rock dropping sharply into deeper water. The habitat is classified as *Exposed Rock Shore LR1* and is characterised by species typical of this type of habitat. At the extreme upper edge of the tidal zone the terrestrial vegetation consists of thrift, kidney vetch, red fescue and goat willow. Some seepages of freshwater reach the upper shore from the land. The splash zone is characterised by typical lichen species including *Caloplaca marina*, *Xanthoria* sp. and *Verrucaria maura*. Rock pools in the upper shore contain species such a *Cladophora* sp. and *Enteromorpha* sp. The snail species *Melarhaphe neritoides* was also noted. The middle and lower shores are dominated by barnacles, which completely coat the rock ridges on the lower shore in particular. Other species noted include common periwinkle, mussel which is common on the lower shore and limpet. Seaweed species are largely absent with the exception of small amounts of serrated wrack.

6.5.2 Local information indicates that the Long Island Sound is fished for shrimps and velvet crab; this species are also fished within the harbour itself. Scallops do occur however their distribution is patchy and they only occur in conjunction with mud and/or sand substratum. Based on the habitats available species such as wrasse, pollack, mackerel and possibly bass may be present in the area close to the proposed outfall.

7. TERRESTRIAL ECOLOGY

7.1 Existing septic tank

The proposed treatment plant will be located alongside the existing treatment plant. This is located within a build up area at the eastern edge of the town.

A dense hedge of yuccas surrounds the existing the treatment plant and other habitats noted include semi-intensive grassland and small areas of scrub.

A path runs along the top of a eroding bank situated between the shoreline and the existing septic tank. To the east of the septic tankis an apartment complex.

7.2 Proposed outfall

At the extreme upper edge of the tidal zone the terrestrial vegetation consists of thrift, kidney vetch, red fescue, rush and goat willow. Exotic species such as yucca, fuchsia, montbresia and conifers have also been planted by adjoining landowners and the invasive species winter heliotrope is common.

7.3 None of the three terrestrial habitats listed under the EU Habitats Directive, i.e. dry heath, sea cliffs and lowland hay meadows, which are found within Roaringwater Bay, will be affected by the development

7.2 None of the uncommon species noted in the site synopsis (Hairy Birdsfoot, Common Birdsfoot, Spotted Rockrose, Pale Heath Violet, Lanceolate Spleenwort, Deptford Pink) were noted at any of the areas to be affected. Similarly, neither of the Red Data book species mentioned in the site synopsis (Little Robin and Sea Pea), which occur on shingle beaches were noted or are likely to occur in the areas which will be affected

7.3 Although some typical coastline species such as thrift were noted none of the habitats likely to be affected are of any particular conservation value. No rare or endangered species were noted in any of the habitats surveyed.

8. MAMMALS

8.1 Otters

Otters are found throughout Roaringwater Bay and a survey of otter populations was conducted in 1990. The results of this survey were published as *Bulletin of Sherkin Island No. 12-"Otter survey of Roaringwater Bay; South West Cork* by Jeremy D. Wickens. The results from a more recent survey have not yet been published.

8.1.2 Signs of Otter Activity

The following were considered to be indicators of otter activity:

1-Spraints and anal glands

2-Footprints and sign heaps

3-Runs or paths

4- Feeding sites and prey item remains

8.1.3 Mainland Survey

Although parts of the mainland were surveyed in 1990 the area in which the proposed development will be located was not included in the survey. In the 4.8km surveyed on the mainland a total of 28 sites of otter activity were noted. These included 6 holts, with the remainder consisting of spraint sites. The report concludes that otters are relatively common within Roaringwater Bay.

8.1.4 Site survey – existing septic tank

A survey of the coastline in proximity to the site did not find any evidence of otter activity. The area where it is proposed to locate the treatment plant is close to the town and is subject to disturbance by recreational users including walking of dogs. The pier is located to the southwest of the existing outflow and there are a number of commercial and recreational moored boats to the south of it. It was noted in the report on the 1990 survey that where land- and sea-based activity coincides the number of sites of otter activity decreases. It is considered likely that the level of human disturbance at the site prevents otters from breeding and significant use of this site by this species is considered unlikely.

8.1.5 *Site survey – proposed outfall*

The site of the proposed outfall is more exposed and less developed; however a number of houses and gardens are located in proximity the site. In some instances the gardens run down to private slips and the shoreline is steep and rocky with little cover available for otters. Although it is possible that otters visit this area on occasions significant impacts on this species is considered unlikely.

8.2 Cetaceans

Three cetaceans species bottlenose dolphin (*Tursiops truncatus)*, harbour porpoise (*Phocoena phocoena)* and common dolphin (*Delphinus delphis*) are likely to occur within Roaringwater Bay. Bottlenose dolphin is an occasional summer visitor and harbour porpoise is most likely of these cetacean species to occur close to shore. There is no available information, which suggests that any of these species are particularly common at the location of the proposed outfall. The effect of sewage discharges on cetaceans may include effects from chemical compounds and effects from bacterial contamination.

Raw sewage may contain a variety of substances including bacterial, viral and protozoan pathogens, organotins and heavy metals and a variety of organic and inorganic wastes. In particular bacteria are present in large concentrations in raw sewage and bacteria associated with water contaminated by human pathogens have been documented in marine mammals. (UK Marine SAC Project). Given that the proposed treatment plant will significantly reduce the numbers of bacteria reaching the bay the upgrade of the treatment system should have positive benefits in respect of cetaceans.

8.3 Seals

8.3.1 Harbour seals (*Phoca vitulina*) are listed in Annex II of the Habitats Directive. The latest information on distribution of this species comes from an aerial census carried out in August 2003. Harbour seals moult during this time and therefore most of the seals would be ashore during this period. Seals are ashore for extended periods during this time and are vulnerable to disturbance. Approximately 50 seals were recorded from Roaringwater Bay at a number of locations. These are located close to the Balldehob Bay and Ringarogy Island, which are more than 10km from the position of the proposed outfall. (Source Michelle Cronin; Coastal Resource Management Unit pers. com.). Exact information on breeding sites is not available however it is probable that this species do breed in the bay. However given the proximity of houses to the proposed outfall it is considered unlikely that this species will breed at, or in proximity to this location.

8.3.2 Grey seals (*Halichoerus grypus*) are widely distributed around the Irish coast although breeding is thought to take place predominantly on offshore island and remote mainland sites between the months of September and November (Kiely, O *et al*, 1998). This species is also listed under Annex II of the Habitats Directive. Approximately 50 grey seals were recorded during the August 2003 aerial survey although it is noted that this survey was not designed to record this species. (Source Michelle Cronin; Coastal Resource Management Unit pers. com.).Grey seals prefer more exposed sites than harbour seals and were recorded from sites at Hare and Calf islands. It is believed that grey seals breed in these areas and no impact on breeding populations is likely to occur due to the upgrading of the treatment plant at Schull.

9. BIRDS

9.1 As noted earlier in this report the site of the new treatment plant consists of a mixture of rocky shore and shingle habitats. These types of habitats do not attract the large numbers of migrant waders more commonly associated with mudflats where there are high macroinvertebrate numbers. Typical species noted include oystercatcher, gulls and cormorant. All of the species noted are common inhabitants of these types of habitats.

9.2 The site of the proposed outfall consists of steep rock with no sediment. This type of habitat does not support significant numbers of waders and no such species were noted.

9.3 I-WeBS Data

9.3.1 Information was received from Birdwatch Ireland detailing I-WeBS counts for areas within Roaringwater Bay. (Table 5).

Sub-Site Code	Site	Sub-site	S-s Grid Ref	1997/ 98	1998/ 99	1999/ 00	2000/ 01	2001/ 02
0L463	Ilen Estuary	Deelish	W100335	3			2	
0L471	Ilen Estuary	Killeena	W070304		4	1	1	
0L472	Ilen Estuary	Abbeystrowry	W100340	2	3	3	1	
0L473	Ilen Estuary	Oldcourt Bridge/Creagh	W084318	4	1	2		
0L474	Ilen Estuary	Rathmore	W060283	5	6	3	4	1
0L410	Toormore Bay	Toormore Bay	V855300	4	6			
0L411	Cockle Strand (Crookhaven)	Cockle Strand (Crookhaven)	V815265	4	2			
0L412	Lissagriffin Lake	Lissagriffin Lake	V770263	4	2			3
0L461	Rosbrin Cove	Rosbrin Cove	V980315	6	6			4
0L475	Ballydehob Estuary	Ballydehob Estuary	V990350	6	6			4
0L921	Croagh Bay	Croagh Bay	V900290	5	6	4	6	5

9.3.2 The closest locations to Schull are Rosbrin Cove and Croagh Bay. Croagh Bay is located approximately 3km west of the proposed outfall. Rosbrin Bay is located approximately 5km east of the proposed outfall. Both of these bays are sheltered with shallow beaches and sedimentary mud and gravels, which support high numbers of invertebrates. These in turn will support high numbers of feeding birds. This type of habitat does not occur at the proposed outfall location and is limited in extent within Schull Bay. A summary report was received in respect of the closest of the two locations namely Croagh Bay, see Appendix 4. A total of 28 species were recorded however none of the species were recorded in nationally or internationally important numbers. Based on the type of habitat to be affected and the significant dispersion expected in the Long Island Channel no significant, negative impacts on birds are expected to occur.

9.4 Three bird species (common tern, artic tern and chough) included in Annex I of the Bird Directive are found within Roaringwater Bay. The artic/common tern colony is located on Carrigviglash Rock which is situated approximately 10km east of the proposed outfall and no direct impact is therefore likely.

9.5 None of the terrestrial habitats noted including small areas of managed grassland, scrub and planted exotics are likely to support rare birds species. Choughs, which are listed on Annex I of the habitats directive, will not be affected by the construction of the new treatment plant or outfall.

10. POSSIBLE IMPACTS

10.1. Noise Impacts

Noise impacts are likely to significant during the construction phase, which will involve the dredging of a trench approximately 50m into the bay. As noted earlier in this report the area in which the plant is located has significant amounts of sea traffic and other human disturbance. The noise levels should therefore be considered in the context of relatively high background noise levels. The location of the proposed outfall is more isolated and less exposed to noise. A degree of localised disruption may occur due to works at this location.

10.1.1 Impacts on Mammals

Although there is no evidence to suggest that cetaceans, seals or otters breed in proximity to the proposed site these species may feed in the area. Some adaptation to increased noise levels is likely for any species, which habitually occur in this area, and in this context the increase in noise levels is unlikely to have a significant impact in the inner harbour. Seals and otters are highly mobile and can move quickly away from external disturbance and provided that no blasting takes place significant impacts at the outfall location are considered unlikely.

10.1.2 Impacts on Birds

There is evidence to suggest that noise does have an impact on certain bird species by affecting the ability of birds to effectively communicate and by direct disturbance. There is very little information available on the effects of noise on waterfowl, and it is particularly sparse with regard to port and harbour operations. A British Trust for Ornithology (BTO) review reports that evidence of noise disturbance during construction operations has been found for certain wildfowl and wader species (BTO 1990). However evidence suggest that in general, wildlife, including birds, adjust to noise levels, even sudden noises, as indicated by the existence of SPAs near to 24 hour container terminals in the UK which have been there for years. However, the ability of waterfowl species to habituate to certain forms of disturbance and their ability to compensate for lost feeding time due to disturbance is poorly understood (BTO 1990). However as noted earlier in this report neither of the sites to be affected support high numbers of sensitive birds.

10.2 Dredging will increase silt levels in the water column and may have impacts on sedentary benthic communities. More mobile species such as fish will be able to avoid the increased silt levels and the strong currents in the Long Island sound should ensure rapid dispersion of sediment. Although some benthic species will be affected by dredging many of these species may be able to recolonise the area following the completion of works.

11. SUMMARY OF IMPACTS

Table 7: Summary of impacts

Habitat/Species	*Habitat Value*	*Potential impacts without mitigation*	*Comments*
Littoral and sublittoral sediment at existing discharge point Photo 1	Low conservation value	Low	Any works on the existing outflow may affect a limited amount of shingle and mud. Biodiversity low.
Littoral and sublittoral rock at existing discharge point Photos 2	Moderate conservation value	Moderate	Rocky outcrops on the upper to lower shore affected by any works to the existing outflow. Low to moderate diversity; this type of habitat is common within the bay.
Littoral and sublittoral rock at proposed outfall Photos 3 & 4	Moderate conservation value	Moderate	Rocky outcrops on the upper to lower shore will be affected. The exposed nature of the shore is such that encrusting species are most common. These species can recolonise hard substrates including concrete.
Otters	High conservation value	Low	No evidence of breeding or feeding otters. If otters do feed in this area the disruption will be relatively short in duration.
Seals	High conservation value	Low	No evidence of breeding seals in proximity to the site. Localised disruption of feeding may occur.
Cetaceans	High conservation value	Low	The area into which the outfall pipe will discharge is not of particular value for cetaceans. Minimal impact expected.
Birds	Moderate to high conservation value	Low	Some disruption to species associated with rocky shores. Waders feed on more sheltered shores and direct disturbance and loss of feeding time is unlikely to be significant. Minimal loss of habitat for terrestrial species.

12. RESIDUAL IMPACTS

12.1 After construction, benthic communities should recolonise disturbed areas, with an accompanying re-establishment of fish in these areas. However concrete surfaces may lack the structural complexity of natural rock and certain niches may no longer be available.

12.2 The location of the proposed outflow pipe is such that effective dispersal of effluent will occur.

12.3 Overall the reduction in suspended solids, nutrients and bacterial loadings should have a beneficial impact on the ecology and water quality of Roaringwater Bay.

13. MITIGATION MEASURES

13.1 Where possible the original sediments from both the littoral and sublittoral zones should be reused as backfill where possible. This will encourage recolonisation by the communities disturbed by dredging. Prior to reuse or disposal of sediment chemical testing should be conducted to determine if the waste has hazardous properties. Following testing a suitable use/disposal solution can be determined.

13.2 To prevent damage to benthic species such as scallops disruption to the seabed should be kept to the minimum. Any incidental damage to neighbouring habitats should be avoided.

13.3 Although it is not envisaged that blasting will be required any such work should not be carried out prior to consultation and agreement with Duchas and the development of specific protocols to prevent impacts on mammals and birds.

13.4 It is considered unlikely that seals or cetaceans will be at risk from the construction works; however these species could occur in proximity to the works on occasions. These species are sufficiently mobile to move away from the works if environmental conditions deteriorate, however, as a precaution, it is recommended that the local representative of the National Parks and Wildlife Service be informed if these species are noted in proximity to the works.

14. CONCLUSIONS

14.1 Roaringwater Bay into which the upgraded treatment plant discharges is a cSAC.

14.2 Marine habitats will be affected by the construction of the pipeline. These include littoral and sublittoral rock and sediment. Although a variety of floral and fauna species were detected during surveys, the habitats noted are locally common and no rare or endangered species were noted.

14.3 None of the terrestrial habitats and species noted are of particular conservation value and no significant impact is expected to occur.

14.4 Although otters are common in the bay no evidence of their presence was detected at the site or in the immediate environs. The level of human disturbance may be preventing this species from breeding on or close to the site of the treatment plant or proposed outfall.

14.5 Seals do not breed in proximity to the site, however they may occur in proximity to the site on occasions. Given the limited duration of the works (4-8 weeks) no significant impact is likely to occur.

14.6 Harbour porpoise, common dolphin and bottlenose dolphin may all occur in the bay, however it is considered unlikely that these species will regularly occur in proximity to the site. Given the limited duration of the dredging works (4-8 weeks approximately) no significant impact is likely to occur.

14.7 Birds may be affected by noise and disturbance, however the species noted in proximity to the site are expected to be relatively tolerant of this type of disturbance. Waders, which may be more susceptible to lost feeding time are more likely to occur at more sheltered locations such as Croagh Bay which is situated approximately 3km from the proposed outfall and will therefore not be affected.

15. PHOTOGRAPHS

Photo 1 showing shingle beach and fence surrounding the existing treatment plant. A public walkway runs between the fence and the shoreline.

Photo 2 adjacent to the existing outfall. Shows narrow splash zone and encrusting barnacles on lower shore.

Photo 3 at proposed outfall. Shows zonation with wide splash zone indicative of exposed conditions. Shallow pools noticeable on the middle shore. Dense barnacle/mussel growth on lower shore.

Photo 4 close to proposed outfall showing a sudden graduation to deeper water and strong water movement.

APPENDIX 1: SITE SYNOPSIS

SITE NAME: ROARINGWATER BAY AND ISLANDS

SITE CODE: 000101

Roaringwater Bay, Co. Cork, is a wide shallow bay located on the southwest coast. The site includes the immediate coastline on the mainland from Long Island to Baltimore together with the whole bay and most of the islands. Bedrock is composed of a series of Devonian Old Red Sandstone reefs that run parallel to troughs of Devonian Carboniferous marine clastics in a north east/south west direction. These reefs emerge to form the islands on the south side of the bay and within the bay. Generally the coast is low-lying but the southern edge rises, in line with the hills behind Baltimore, to culminate in a summit of 160m on Cape Clear.

The bay itself has a wide variety of reef and sediment habitats, subject to a range of wave exposures and tidal currents, and has been selected for three marine habitats listed under the EU Habitats Directive, i.e. large shallow inlets and bays, marine caves and reefs. The shores of the bay range from the exposed, rocky shores of South Sherkin Island, to the sheltered rock, sand and mud communities of the Inner Bay and estuarine communities where the rivers enter the bay. The shallow subtidal reefs have good examples of kelp forest community grazed by the sea urchin *Echinus esculentus.* The animal dominated reefs includes the feather star *Antedon bifida* community, the hydroid *Sertularia argentia* and *Hydralmania falcata* community, and sponge and ascidian communities some of which are species rich and in which two rare species occur, the sponge *Tethyspira spinosa* and the rare red alga *Phyllophora sicula*. The scarce hydroid *Tamarisca tamarisca* occurs at a number of sites within the bay. These communities are typical of very sheltered areas with some current present. The cave community on Sherkin Island is home to the rare filamentous red alga, *Pterosiphonia pennata*. The sedimentary communities in Roaringwater Bay are exceptional. Of particular interest is the extensive bed of the calcareous free living red alga *Lithophyllum dentatum*, (generally termed maerl but may be locally know as 'coral') which is the largest in the country for this species. This bed typically contains specimens that are very large and uniquely flattened in form with the rare filamentous red alga *Spyridia filimentosa.* *Lithophyllum dentatum* is only known from 2 other sites. There are also other maerl communities and several seagrass beds (*Zostera marina*) which may co-occur with a particularly good example in Horseshoe Bay, Sherkin Island.

The terrestrial habitats are also of conservation interest and include three habitats listed under the EU Habitats Directive, i.e. dry heath, sea cliffs and lowland hay meadows. The coastal heath vegetation is typified by an abundance of Autumn Gorse (*Ulex gallii*), Heather (*Calluna vulgaris*) and Bell Heather (*Erica cinerea*). This is regularly burnt in most places so that there are clearings where grasses and herbs such as Wood Sage (*Teucrium scorodonia*), Common Violet (*Viola riviniana*) and Tormentil (*Potentilla erecta*) have a temporary rise to prominence before the shrubs grow again. Outcrops of rock bring variety into the heath and are the sites of the more interesting species. These include many southern plants, for example the rare Red Data Book species Hairy Birdsfoot Trefoil (*Lotus subbiflorus*), the Common Birdsfoot itself (*Ornithopus perpusillus*), Spotted Rockrose (*Tuberaria guttata*), Pale Heath Violet (*Viola lactea*) and Lanceolate Spleenwort (*Asplenium billotii*). In addition there is a small amount of Deptford Pink (*Dianthus armeria*), the only place it grows in Ireland though it was likely to have been introduced. Flushes and damp places through this vegetation support some interesting liverworts as well as Birdsfoot Clover (*Trifolium ornithopodioides*) and the special annual plants of the south-west, Chaffweed (*Anagallis minima*), Yellow Centaury (*Cicendia filiformis*) and Allseed (*Radiola linoides*). Chamomile (*Chamaemelum nobile*) is also common with Yellow Bartsia (*Parentucellia viscosa*) somewhat less so.

Close to the sea the vegetation responds with Sea Pink (*Armeria maritima*) and Plantains (*Plantago maritima*, *P. coronopus*) and, locally, with Dotted Sedge (*Carex punctata*) and the Slender Spikerush (*Eleocharis uniglumis*). Two other Red Data Book plants, Little Robin (*Geranium purpureum*) and Sea Pea (*Lathyrus japonicus*) occur rarely on shingle beaches while Ray's Knotgrass (*Polygonum raii*) is more widespread. Several streams have been ponded by such beaches to create marshes of Reed (*Phragmites australis*) where Marsh Pennywort (*Hydrocotyle vulgaris*), Marsh Cinquefoil (*Potentilla palustris*) and Marsh Orchids (*Dactylorhiza majalis*, *D. incarnata*) are frequent together with some Creeping Willow (*Salix repens*) and Gypsywort (*Lycopus europaeus*). On Cape Clear a similar marsh has developed into a bog with abundant bog mosses (*Sphagnum* spp.), Bogbean (*Menyanthes trifoliata*) and St John's Wort (*Hypericum elodes*). Sand is a notable feature of Sherkin Island and occurs to a small extent elsewhere. Wild Radish (*Raphanus raphanistrum*), Crested Hairgrass (*Koeleria macrantha*) and Sea Storksbill (*Erodium maritimum*) grow in this habitat with a little Haresfoot Clover (*Trifolium arvense*), Knotted Clover (*T. striatum*) and the Red Data Book Lesser Centaury (*Centaurium pulchellum*).

Otter and Grey seal, two mammal species listed on Annex II of the EU Habitats Directive, occur within the site. Large seabird populations breed on some of the islands in the bay. These include Arctic/Common Terns (122 pairs in 1984) on Carrigviglash Rock. Terns are listed on Annex I of the EU Bird's Directive. On Cape Clear and the Calf and Goat Islands the 1990 totals were Fulmar (472 pairs), Cormorant (51 pairs), Shag (67 pairs), Black Guillemot (99 pairs), Lesser Black-backed Gull (252 pairs), Great Black-backed Gull 67 (pairs) and Herring Gull (185 pairs). There are also significant numbers of Choughs (18 pairs in 1992), another species listed on Annex I of the Bird's Directive. An important bird observatory is located on Cape Clear Island.

In conclusion, Roaringwater Bay and Islands is a site of exceptional conservation importance, supporting diverse marine and terrestrial habitats, six of which are listed under the EU Habitats Directive. The site is also notable for the presence of Otter and Grey Seal plus a number of rare species and also supports important sea bird colonies.

APPENDIX 2: SPECIES LISTS-MARINE

Species from rocky shore - littoral and sublittoral zones

Flora

Pelvetia canaliculta (Channeled wrack)
Fucus serratus (serrated wrack)
Laminaria digitata (kelp)
Chondus crispus (Carragheen moss)
Mastocarpus stellatus
Palmaria palmata
Ulva lactuca
Cladophora sp.
Osmundea pinnatifida
Enteromorpha sp.
Corallina officinalis.
Ramalina spp, *(Lichen)*
Xanthoria sp. *(Lichen)*
Verrucaria maura (Lichen)
Caloplaca marina (Lichen)

Fauna

Calliostoma zizyphinum (Painted topshell)
Littorina littorea (Common periwinkle)
Littorina saxatilis (rough periwinkle)
Melarhaphe neritoides (Small Periwinkle)
Chthamalus stellatus (barnacle)
Semibalanus balanoides (barnacle)
Pomotocerous lamarki. (Tube Worm).
Carcinus maenus (common shore crab)
Cancer pagurus (edible crab)
Asterias rubens (common starfish)
Mytilus edulis (mussel)
Patella vulgata (common limpet)
Gammurus duebeni (freshwater shrimp)
Leander serratus (common prawn)
Actinia equina (beadlet anemone)
Blennius pholis (shanny)

APPENDIX 3: REFERENCES

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APPENDIX 4: I-WeBS COUNTS

Croagh Bay

Species name	1% national	1% International	1997/98	1998/99	1999/00	2000/01	2001/02	Mean	Peak
Little Grebe	30					1		0	1
Cormorant	105	1,200	2	1	1	2		1	2
Grey Heron	105	4,500	1	2	2	2	1	2	2
Little Egret		600	1	1	1	1	2	1	2
Mute Swan	100	2,400	3	10	2	1	3	4	10
Shelduck	125	3,000	3		2		7	2	7
Wigeon	1,000	12,500	3					1	3
Teal	500	4,000	7	13	50	23	34	25	50
Mallard	500	20,000		6			2	2	6
Long-tailed Duck	20	20,000				1		0	1
Red-breasted Merganser	25	1,250	7	3	4	12	4	6	12
Oystercatcher	700	9,000	11	17	4	34	13	16	34
Ringed Plover	100	500	35	30	15	13	8	20	35
Lapwing	2,000	20,000	50	32	18	20	14	29	50
Dunlin	1,200	14,000	20		40	11	14	17	40
Jack-Snipe					1			0	1
Snipe		10,000	10	9	9	20	5	10	20
Whimbrel		6,500		7				1	7
Curlew	1,000	3,500	31	43	35	60	60	46	60
Redshank	250	1,500	9	23	40	47	32	30	47
Greenshank	20	3,000	1	2	7	8	5	5	8
Turnstone	100	700		5	21	12	13	10	21
Black-headed Gull		20,000	30	17	4	14	35	20	35
Common Gull		16,000		1				0	1
Lesser Black-backed Gull		4,500				5	25	6	25
Herring Gull		13,000	7	7	4	20	30	14	30
Great Black-backed Gull		6,800	5	11	30	5	6	11	30
Kingfisher					1	1	1	1	1

Dixon .Brosnan

environmental consultants

Project title	Additional information on the ecological impacts of providing an upgraded wastewater treatment system at Schull, Co. Cork.
Client	T.J. O' Connor & Associates
Client ref.	-
D.B ref.	-
Revision	-
Date	
approved by	Carl Dixon B. Sc. (Applied Ecology)
on behalf of Dixon.Brosnan	

Dixon.Brosnan, Tellengana Lodge,
Blackrock Road, Cork, Ireland.
Tel: (021) 4968 600
Fax: (021) 4968 210
Email: dixonbrosnan@eircom.net

1. INTRODUCTION

Dixon.Brosnan environmental consultants were asked by T.J O Connor & Associates to carry out an ecological impact assessment in respect of an upgraded wastewater treatment plant to be constructed at Schull, Co. Cork. Following submission of the results of this survey, further information on sublittoral habitats was requested by Duchas. A dive survey was therefore conducted in July 2004 and the details of this survey are given in Appendix 1.

2. CONCLUSIONS

The dive surveys did not indicate that the habitats likely to be affected by the laying of the pipeline are of particular ecological significance. The habitats encountered in the 100m covered by the dive were relatively uniform and it is considered likely that large amounts of similar habitat are present along this section of shoreline.

Although it is acknowledged that visibility was poor during the dive, no rare or uncommon species were noted and given the nature of the habitats encountered this area is unlikely to be of particular significance for such species.

The density of scallops varied throughout the area surveyed. The highest average density of scallops occurred to the west of the proposed pipeline route. The other commercial species noted was velvet crab, which are also fished commercially in the area.

Laying of the pipeline will require a trench of minimum width of 2m and 1.5m deep. A length of approximately 20m of the seabed would be affected.

Ideally the pipe will be laid from the shore, which would significantly reduce the amount of dredging and the generation of silt. Dredged material should be used to backfill the trench which will result in a similar sediment profile. Laying of the pipeline from the shore will disturb rocky shore habitats however following completion of the project it is expected that recolonisation of hard surfaces will occur.

Overall laying of the pipeline will affect a small proportion of the total amount of similar habitat located within this section of Roaringwater Bay. Following construction of the pipeline, it is expected that rock/concrete and sublittoral sediments will be recolonised by similar species.

Given the limited amount of substratum which will be affected, no significant impact on commercial species such as scallop and velvet crab is expected to occur.

APPENDIX 1

Description of sublittoral flora and fauna biotopes and sediment type from diver survey in Schull.

Date: 27/07/04

For: Dixon Brosnan and Associates
By: Shore Explorers marine research services

1 Materials and methods

The aim of the survey was to provide descriptions of the sublittoral habitats. Habitat was classified in area of 100m around the location of proposed pipeline. Dive 1 covered the route of the proposed pipleline and the area 50m to the east of it. Dive 2 covered the route of the proposed pipeline and the area stretching 50m to the west of it. Habitat classification was following the classification of Connor et al. (2004). On Sunday 25/7/04, two dives were carried out using SCUBA equipment from a dory boat. Each dive covered a 40m transect recording details of underwater flora and fauna. For each dive, a description was made of habitats within the site. The relative abundance of all conspicuous species present was recorded and classified as rare, occasional, frequent, common, abundant or super abundant using the scales in Hiscock (1990). Although photographs were taken visibility was poor and the photographs were indistinct. Samples were taken for later identification of specimens.

Inspection of admiralty chart showed topography and tidal currents in the area.

Sediment samples were taken by diver using cores and sieved through a set of sand sieves. Sediments were classified according to the wentworth scale (Wentworth 1922).

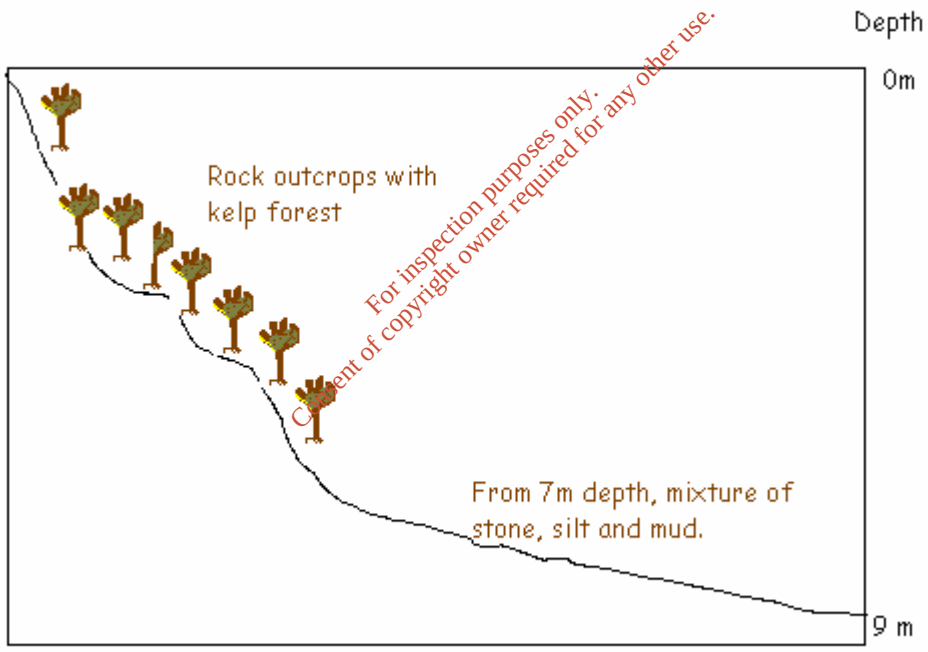
2 Results

Dive survey 1: Flora and Fauna, habitat classification

Dive 1 was at 5pm on 25/7/04. Low water was at 17.20 (1.0m above chart datum). Maximum depth of dive was 9m. Figure 2.1 shows the depth profile of the dive. To 7m, habitat was kelp forest with predominantly *Laminaria hyperborea.* There were associated epiphytes on the *L. hyperborea.* These included *Lomentaria articulata. Laminaria sacchirina* was also present. Fauna included edible urchin *Echinus esculantus* and cotton spinner *Holothuria forskali.* Pollack and ballan wrasse *Labrus bergylta* were seen during the dive. Crustaceans seen in the kelp forest were edible brown crab *Cancer pagarus* and velvet swimming crab *Macropipus puber.*

From 7m, the bottom opened to a mixture of stone, silt and mud. A scallop bed (*Pecten maximus)* with an average density of 0.2/m² was noted at the western boundary of the dive. There were also queen scallops (*Aequipecten opercularis)* with an average density of 0.3/m² . Epifauna of calcareous tubeworms were present on many scallop shells. Other bivalves included *Tapes rhomboides* and *Tapes aureus.* There were also starfish (*Asterias rubens),* buried anemones (unidentified) and feather stars *Ophiura sp.* The fauna of this stone, silt and mud bottom included sea lettuce *Ulva lactuca* and specimens of the red seaweed *Delesseria sanguinea.* There were strands of *Chorda filum.* Fish seen included grey gurnard *Eutrigla gurnaradus* and numerous juvenile flatfish. There were territories of velvet swimming crab *Macropipus puber.*

Figure 2.1: Profile and distribution of habitats per depth on dive 1 on 25/7/04.

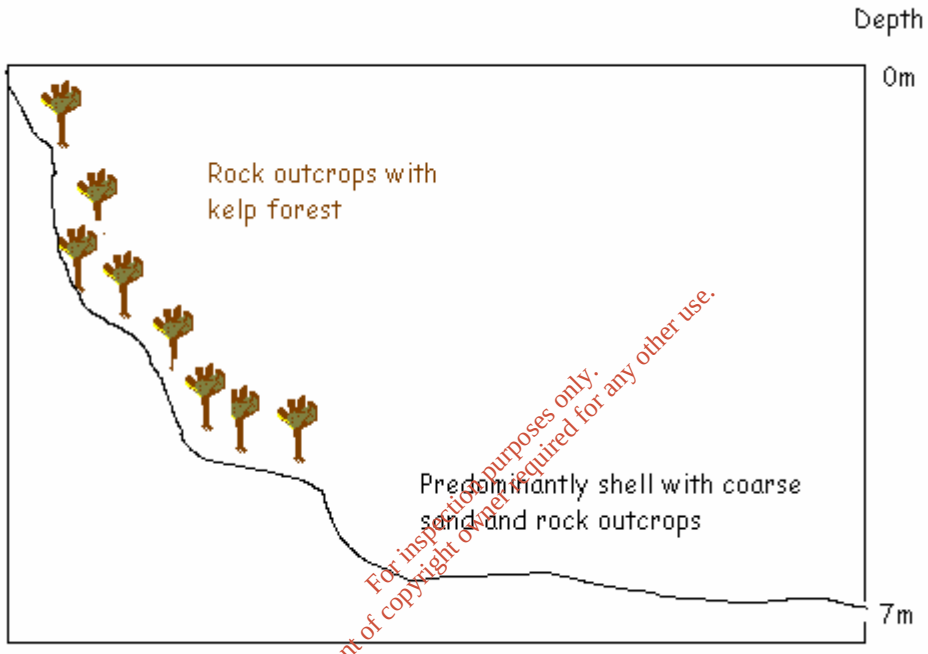


Dive survey 2

Flora and Fauna, habitat classification, geology.

Dive 2 was at 5.40pm on 25/7/04. Low water was at 17.20 with a depth of 1.0m. Maximum dive depth was 7m. Figure 2.2 shows the depth profile of the dive. To 7m, habitat was kelp forest with predominantly *Laminaria hyperborea.* There were associated epiphytes on the *L. hyperborean.* These included *Lomentaria articulata. Laminaria sacchirina* was also present. Fauna included edible urchin *Echinus esculantus* and cotton spinner *Holothuria forskali.*
From 7m, the bottom opened to mixed sediment of a heterogenous mixture of coarse, medium and fine sand, mud with shell. Scallops (*Pecten maximus)* were present at densities of 0.01/m^2. Starfish *(Asterias rubens)* were present. Pollack and many small flatfish were seen. Infauna in sediments included Brittlestars (*Ophiocomina nigra* and *Ophiura texturata)* and tubificid worms.

Figure 2.2: Profile and distribution of flora and fauna on dive 2.



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Attachment G.1

Attachment G.1

- Costs and Likely Timeframe completion
- Details of approved funding.

1. Summary of Costs –
(Source : Addendum to Preliminary Report Nov.2003, by RPS MCOS Consulting Engineers)

The cost of the proposed programme of works has been estimated as follows:

Contract Phase One (Collection System) : €1,201,800
Contract Phase Two (Proposed WWTP) : €1,931,195

Total Costs : €3,132,994

2. Likely Timeframe for completion of Works

1. Start Construction, Phase 1 2008
2. Completion of Works, Phase 1 2009.

3. Start Construction, Phase 2 2009.
4. Completion of Works, Phase 2 2010.

3.0 Details of Funding

The WSIP approved funding was €3.523 million. Please see WSIP approved funding overleaf.

Cork County

Water Services Investment Programme 2007 - 2009

Schemes at Construction	W/S	Est. Cost
Cork North		
Mitchelstown Sewerage Scheme (Nutrient Removal)	S	221,000
Cork South		
Ballyvourney/ Ballymakeery Sewerage Scheme	S	3,049,000
Cobh/ Midleton/ Carrigtwohill Water Supply Scheme	W	10,135,000
Cork Lower Harbour Sewerage Scheme (Crosshaven SS) (G)	S	4,850,000
Cork Water Strategy Study (G)	W	941,000
Kinsale Sewerage Scheme	S	20,000,000
Midleton Sewerage Scheme (Infiltration Reduction) (G)	S	2,078,000
		41,274,000
Schemes to start 2007		
Cork North		
North Cork Grouped DBO Wastewater Treatment Plant (Buttevant, Doneraile & Kilbrin)	S	5,150,000
Cork West		
Skibbereen Sewerage Scheme	S	20,000,000
		25,150,000
Schemes to start 2008		
Cork North		
Mallow/ Ballyviniter Regional Water Supply Scheme (H)	W	8,632,000
Mallow Sewerage Scheme (H)	S	6,408,000
Cork South		
Ballincollig Sewerage Scheme (Nutrient Removal) (G)	S	948,000
Ballingeary Sewerage Scheme	S	1,296,000
Bandon Sewerage Scheme Stage 2	S	14,729,000
City Environs (CASP) Strategic Study (G)	S	153,000
Cloghroe Sewerage Scheme (Upgrade)	S	683,000
Coachford Water Supply Scheme	W	1,318,000
Garrettstown Sewerage Scheme	S	2,153,000
Inniscarra Water Treatment Plant Extension Phase 1	W	2,678,000
Little Island Sewerage Scheme (G)	S	2,200,000
Cork West		
Bantry Sewerage Scheme	S	7,148,000
Dunmanway Sewerage Scheme	S	2,153,000
Leap/ Baltimore Water Supply Scheme	W	6,365,000
Schull Water Supply Scheme	W	5,253,000
		61,137,000
Schemes to start 2009		
Cork North		
Banteer/Dromahane Regional Water Supply Scheme	W	1,576,000
Conna Regional Water Supply Scheme Extension	W	2,627,000
Cork NE Water Supply Scheme	W	4,326,000
Cork NW Regional Water Supply Scheme	W	6,046,000
Millstreet Wastewater Treatment Plant (Upgrade)	S	1,628,000

	W/S	Est. Cost
Cork South		
Ballincollig Sewerage Scheme (Upgrade) (G)	S	22,248,000
Cork Lower Harbour Sewerage Scheme (excl. Crosshaven SS)	S	73,542,000
Shannagarry/ Garryvoe/ Ballycotton Sewerage Scheme	S	3,780,000
Youghal Sewerage Scheme	S	14,420,000
Cork West		
Ballydehob Sewerage Scheme	S	683,000
Bantry Water Supply Scheme	W	14,935,000
Clonakilty Sewerage Scheme (Plant Capacity Increase)	S	3,677,000
Courtmacsherry/ Timoleague Sewerage Scheme	S	2,472,000
Dunmanway Regional Water Supply Scheme Stage 1	W	12,669,000
		164,629,000
Serviced Land Initiative		
Cork North		
Ballyclough Water Supply Scheme	W	139,000
Ballyhooley Improvement Scheme	W/S	139,000
Broghill- Rathgoggin Sewerage Scheme	S	406,000
Bweeng Water Supply Scheme	W	115,000
Churchtown Sewerage Scheme (incl. Water)	W/S	543,000
Clondulane Sewage Treatment Plant	S	417,000
Freemount Sewerage Scheme	S	150,000
Pike Road Sewerage Scheme (incl. Water)	W/S	2,080,000
Rathcormac Sewerage Scheme (incl. Water)	W/S	555,000
Spa Glen Sewerage Scheme	S	736,000
Uplands Fermoy Sewerage Scheme (incl. Water)	W/S	1,174,000
Watergrasshill Water Supply Scheme (incl. Sewerage) (G)	W/S	4,151,000
Cork South		
Ballincollig Sewerage Scheme (Barry's Rd Foul and Storm Drainage) (G)	S	1,164,000
Belgooley, Water Supply Scheme (incl. Sewerage)	W/S	2,913,000
Blarney Water Supply Scheme (Ext. to Station Rd) (G)	W	416,000
Carrigtwohill Sewerage Scheme (Treatment and Storm Drain) (G)	S	7,632,000
Castlematyr Wastewater Treatment Plant Extension	S	1,200,000
Crookstown Sewerage Scheme (incl. Water)	W/S	1,200,000
Dripsey Water Supply Scheme (incl. Sewerage)	W/S	1,112,000
Glounthane Sewerage Scheme (G)	S	1,576,000
Innishannon Sewerage Scheme	S	277,000
Innishannon Wastewater Treatment Plant	S	694,000
Kerrypike Sewerage Scheme	S	832,000
Kerrypike Water Supply Scheme	W	416,000
Killeagh Wastewater Treatment Plant Extension	S	1,200,000
Killeagh Water Supply Scheme (includes Sewerage)	W/S	485,000
Killeens Sewerage Scheme	S	420,000
Kilnagleary Sewerage Scheme	S	694,000
Midleton Wastewater Treatment Plant Extension	S	4,050,000

Cork County contd.

Water Services Investment Programme 2007 - 2009

	W/S	Est. Cost
Mogeely, Castlemartyr & Ladysbridge Water Supply Scheme	W	2,566,000
North Cobh Sewerage Scheme (G)	S	3,193,000
Riverstick Water Supply Scheme (incl. Sewerage)	W/S	525,000
Rochestown Water Supply Scheme	W	2,700,000
Saleen Sewerage Scheme	S	1,051,000
Youghal Water Supply Scheme	W	2,300,000
Cork West		
Castletownshend Sewerage Scheme	S	1,576,000
		50,797,000
Rural Towns & Villages Initiative		
Cork North		
Buttevant Sewerage Scheme (Collection System)	S	2,446,000
Doneraile Sewerage Scheme (Collection System)	S	1,738,000
Cork South		
Innishannon (Ballinadee/ Ballinspittle/ Garrettstown) Water Supply Scheme	W	6,726,000
Cork West		
Ballylicky Sewerage Scheme	S	2,153,000
Baltimore Sewerage Scheme	S	3,162,000
Castletownbere Sewerage Scheme	S	5,402,000
Schull Sewerage Scheme	S	3,523,000
		24,950,000
Schemes to Advance through Planning		
Cork North		
Mitchelstown North Galtees Water Supply Scheme	W	3,152,000
Mitchelstown Sewerage Scheme	S	3,000,000
Newmarket Sewerage Scheme	S	3,152,000

	W/S	Est. Cost
Cork South		
Carrigtwohill Sewerage Scheme (G)	S	20,000,000
Cork Sludge Management (G)	S	14,420,000
Cork Water Supply Scheme (Storage - Mount Emla, Ballincollig & Chetwind) (G)	W	8,500,000
Inniscarra Water Treatment Plant (Sludge Treatment)(G)	W	5,356,000
Macroom Sewerage Scheme	S	5,150,000
Minane Bridge Water Supply Scheme	W	1,421,000
Cork West		
Bantry Regional Water Supply Scheme (Distribution)	W	9,455,000
Cape Clear Water Supply Scheme	W	1,679,000
Castletownbere Regional Water Supply Scheme	W	8,405,000
Glengarriff Sewerage Scheme	S	2,500,000
Roscarberry/Owenahincha Sewerage Scheme	S	1,576,000
Skibbereen Regional Water Supply Scheme Stage 4	W	7,880,000
		95,646,000
Water Conservation Allocation		**12,206,000**
Asset Management Study		**300,000**
South Western River Basin District (WFD) Project[1]		**9,400,000**
Programme Total		**485,489,000**

[1] This project is being led by Cork County Council on behalf of other authorities in the River Basin District

(H) Refers to a Hub as designated in the National Spatial Strategy

(G) Refers to a Gateway as designated in the National Spatial Strategy

Attachment G.2

Attachment G.2

- Costs and Likely Timeframe completion
- Details of approved funding.

1. Summary of Costs –
(Source : Addendum to Preliminary Report Nov.2003, by RPS MCOS Consulting Engineers)

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2. Likely Timeframe for completion of Works

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2. Completion of Works, Phase 1 2009.

3. Start Construction, Phase 2 2009.
4. Completion of Works, Phase 2 2010.

3.0 Details of Funding

The WSIP approved funding was €3.523 million. Please see WSIP approved funding overleaf.

Cork County

Water Services Investment Programme 2007 - 2009

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Cork North		
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Cork South		
Ballyvourney/ Ballymakeery Sewerage Scheme	S	3,049,000
Cobh/ Midleton/ Carrigtwohill Water Supply Scheme	W	10,135,000
Cork Lower Harbour Sewerage Scheme (Crosshaven SS) (G)	S	4,850,000
Cork Water Strategy Study (G)	W	941,000
Kinsale Sewerage Scheme	S	20,000,000
Midleton Sewerage Scheme (Infiltration Reduction) (G)	S	2,078,000
		41,274,000
Schemes to start 2007		
Cork North		
North Cork Grouped DBO Wastewater Treatment Plant (Buttevant, Doneraile & Kilbrin)	S	5,150,000
Cork West		
Skibbereen Sewerage Scheme	S	20,000,000
		25,150,000
Schemes to start 2008		
Cork North		
Mallow/ Ballyviniter Regional Water Supply Scheme (H)	W	8,632,000
Mallow Sewerage Scheme (H)	S	6,408,000
Cork South		
Ballincollig Sewerage Scheme (Nutrient Removal) (G)	S	948,000
Ballingeary Sewerage Scheme	S	1,296,000
Bandon Sewerage Scheme Stage 2	S	14,729,000
City Environs (CASP) Strategic Study (G)	S	153,000
Cloghroe Sewerage Scheme (Upgrade)	S	683,000
Coachford Water Supply Scheme	W	1,318,000
Garrettstown Sewerage Scheme	S	2,153,000
Inniscarra Water Treatment Plant Extension Phase 1	W	2,678,000
Little Island Sewerage Scheme (G)	S	2,200,000
Cork West		
Bantry Sewerage Scheme	S	7,148,000
Dunmanway Sewerage Scheme	S	2,153,000
Leap/ Baltimore Water Supply Scheme	W	6,365,000
Schull Water Supply Scheme	W	5,253,000
		61,137,000
Schemes to start 2009		
Cork North		
Banteer/Dromahane Regional Water Supply Scheme	W	1,576,000
Conna Regional Water Supply Scheme Extension	W	2,627,000
Cork NE Water Supply Scheme	W	4,326,000
Cork NW Regional Water Supply Scheme	W	6,046,000
Millstreet Wastewater Treatment Plant (Upgrade)	S	1,628,000

	W/S	Est. Cost
Cork South		
Ballincollig Sewerage Scheme (Upgrade) (G)	S	22,248,000
Cork Lower Harbour Sewerage Scheme (excl. Crosshaven SS)	S	73,542,000
Shannagarry/ Garryvoe/ Ballycotton Sewerage Scheme	S	3,780,000
Youghal Sewerage Scheme	S	14,420,000
Cork West		
Ballydehob Sewerage Scheme	S	683,000
Bantry Water Supply Scheme	W	14,935,000
Clonakilty Sewerage Scheme (Plant Capacity Increase)	S	3,677,000
Courtmacsherry/ Timoleague Sewerage Scheme	S	2,472,000
Dunmanway Regional Water Supply Scheme Stage 1	W	12,669,000
		164,629,000
Serviced Land Initiative		
Cork North		
Ballyclough Water Supply Scheme	W	139,000
Ballyhooley Improvement Scheme	W/S	139,000
Broghill- Rathgoggin Sewerage Scheme	S	406,000
Bweeng Water Supply Scheme	W	115,000
Churchtown Sewerage Scheme (incl. Water)	W/S	543,000
Clondulane Sewage Treatment Plant	S	417,000
Freemount Sewerage Scheme	S	150,000
Pike Road Sewerage Scheme (incl. Water)	W/S	2,080,000
Rathcormac Sewerage Scheme (incl. Water)	W/S	555,000
Spa Glen Sewerage Scheme	S	736,000
Uplands Fermoy Sewerage Scheme (incl. Water)	W/S	1,174,000
Watergrasshill Water Supply Scheme (incl. Sewerage) (G)	W/S	4,151,000
Cork South		
Ballincollig Sewerage Scheme (Barry's Rd Foul and Storm Drainage) (G)	S	1,164,000
Belgooley, Water Supply Scheme (incl. Sewerage)	W/S	2,913,000
Blarney Water Supply Scheme (Ext. to Station Rd) (G)	W	416,000
Carrigtwohill Sewerage Scheme (Treatment and Storm Drain) (G)	S	7,632,000
Castlematyr Wastewater Treatment Plant Extension	S	1,200,000
Crookstown Sewerage Scheme (incl. Water)	W/S	1,200,000
Dripsey Water Supply Scheme (incl. Sewerage)	W/S	1,112,000
Glounthane Sewerage Scheme (G)	S	1,576,000
Innishannon Sewerage Scheme	S	277,000
Innishannon Wastewater Treatment Plant	S	694,000
Kerrypike Sewerage Scheme	S	832,000
Kerrypike Water Supply Scheme	W	416,000
Killeagh Wastewater Treatment Plant Extension	S	1,200,000
Killeagh Water Supply Scheme (includes Sewerage)	W/S	485,000
Killeens Sewerage Scheme	S	420,000
Kilnagleary Sewerage Scheme	S	694,000
Midleton Wastewater Treatment Plant Extension	S	4,050,000

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	W/S	Est. Cost
Mogeely, Castlemartyr & Ladysbridge Water Supply Scheme	W	2,566,000
North Cobh Sewerage Scheme (G)	S	3,193,000
Riverstick Water Supply Scheme (incl. Sewerage)	W/S	525,000
Rochestown Water Supply Scheme	W	2,700,000
Saleen Sewerage Scheme	S	1,051,000
Youghal Water Supply Scheme	W	2,300,000
Cork West		
Castletownshend Sewerage Scheme	S	1,576,000
		50,797,000
Rural Towns & Villages Initiative		
Cork North		
Buttevant Sewerage Scheme (Collection System)	S	2,446,000
Doneraile Sewerage Scheme (Collection System)	S	1,738,000
Cork South		
Innishannon (Ballinadee/ Ballinspittle/ Garrettstown) Water Supply Scheme	W	6,726,000
Cork West		
Ballylicky Sewerage Scheme	S	2,153,000
Baltimore Sewerage Scheme	S	3,162,000
Castletownbere Sewerage Scheme	S	5,402,000
Schull Sewerage Scheme	S	3,523,000
		24,950,000
Schemes to Advance through Planning		
Cork North		
Mitchelstown North Galtees Water Supply Scheme	W	3,152,000
Mitchelstown Sewerage Scheme	S	3,000,000
Newmarket Sewerage Scheme	S	3,152,000

	W/S	Est. Cost
Cork South		
Carrigtwohill Sewerage Scheme (G)	S	20,000,000
Cork Sludge Management (G)	S	14,420,000
Cork Water Supply Scheme (Storage - Mount Emla, Ballincollig & Chetwind) (G)	W	8,500,000
Inniscarra Water Treatment Plant (Sludge Treatment)(G)	W	5,356,000
Macroom Sewerage Scheme	S	5,150,000
Minane Bridge Water Supply Scheme	W	1,421,000
Cork West		
Bantry Regional Water Supply Scheme (Distribution)	W	9,455,000
Cape Clear Water Supply Scheme	W	1,679,000
Castletownbere Regional Water Supply Scheme	W	8,405,000
Glengarriff Sewerage Scheme	S	2,500,000
Roscarberry/Owenahincha Sewerage Scheme	S	1,576,000
Skibbereen Regional Water Supply Scheme Stage 4	W	7,880,000
		95,646,000
Water Conservation Allocation		**12,206,000**
Asset Management Study		**300,000**
South Western River Basin District (WFD) Project[1]		**9,400,000**
Programme Total		**485,489,000**

[1] This project is being led by Cork County Council on behalf of other authorities in the River Basin District

(H) Refers to a Hub as designated in the National Spatial Strategy

(G) Refers to a Gateway as designated in the National Spatial Strategy

Attachment G.3

Attachment G.3

- Costs and Likely Timeframe completion
- Details of approved funding.

1. Summary of Costs –
(Source : Addendum to Preliminary Report Nov.2003, by RPS MCOS Consulting Engineers)

The cost of the proposed programme of works has been estimated as follows:

Contract Phase One (Collection System) : €1,201,800
Contract Phase Two (Proposed WWTP) : €1,931,195

Total Costs : €3,132,994

2. Likely Timeframe for completion of Works

1. Start Construction, Phase 1 2008
2. Completion of Works, Phase 1 2009.

3. Start Construction, Phase 2 2009.
4. Completion of Works, Phase 2 2010.

3.0 Details of Funding

The WSIP approved funding was €3.523 million. Please see WSIP approved funding overleaf.

Cork County

Water Services Investment Programme 2007 - 2009

Schemes at Construction	W/S	Est. Cost
Cork North		
Mitchelstown Sewerage Scheme (Nutrient Removal)	S	221,000
Cork South		
Ballyvourney/ Ballymakeery Sewerage Scheme	S	3,049,000
Cobh/ Midleton/ Carrigtwohill Water Supply Scheme	W	10,135,000
Cork Lower Harbour Sewerage Scheme (Crosshaven SS) (G)	S	4,850,000
Cork Water Strategy Study (G)	W	941,000
Kinsale Sewerage Scheme	S	20,000,000
Midleton Sewerage Scheme (Infiltration Reduction) (G)	S	2,078,000
		41,274,000
Schemes to start 2007		
Cork North		
North Cork Grouped DBO Wastewater Treatment Plant (Buttevant, Doneraile & Kilbrin)	S	5,150,000
Cork West		
Skibbereen Sewerage Scheme	S	20,000,000
		25,150,000
Schemes to start 2008		
Cork North		
Mallow/ Ballyviniter Regional Water Supply Scheme (H)	W	8,632,000
Mallow Sewerage Scheme (H)	S	6,408,000
Cork South		
Ballincollig Sewerage Scheme (Nutrient Removal) (G)	S	948,000
Ballingeary Sewerage Scheme	S	1,296,000
Bandon Sewerage Scheme Stage 2	S	14,729,000
City Environs (CASP) Strategic Study (G)	S	153,000
Cloghroe Sewerage Scheme (Upgrade)	S	683,000
Coachford Water Supply Scheme	W	1,318,000
Garrettstown Sewerage Scheme	S	2,153,000
Inniscarra Water Treatment Plant Extension Phase 1	W	2,678,000
Little Island Sewerage Scheme (G)	S	2,200,000
Cork West		
Bantry Sewerage Scheme	S	7,148,000
Dunmanway Sewerage Scheme	S	2,153,000
Leap/ Baltimore Water Supply Scheme	W	6,365,000
Schull Water Supply Scheme	W	5,253,000
		61,137,000
Schemes to start 2009		
Cork North		
Banteer/Dromahane Regional Water Supply Scheme	W	1,576,000
Conna Regional Water Supply Scheme Extension	W	2,627,000
Cork NE Water Supply Scheme	W	4,326,000
Cork NW Regional Water Supply Scheme	W	6,046,000
Millstreet Wastewater Treatment Plant (Upgrade)	S	1,628,000

	W/S	Est. Cost
Cork South		
Ballincollig Sewerage Scheme (Upgrade) (G)	S	22,248,000
Cork Lower Harbour Sewerage Scheme (excl. Crosshaven SS)	S	73,542,000
Shannagarry/ Garryvoe/ Ballycotton Sewerage Scheme	S	3,780,000
Youghal Sewerage Scheme	S	14,420,000
Cork West		
Ballydehob Sewerage Scheme	S	683,000
Bantry Water Supply Scheme	W	14,935,000
Clonakilty Sewerage Scheme (Plant Capacity Increase)	S	3,677,000
Courtmacsherry/ Timoleague Sewerage Scheme	S	2,472,000
Dunmanway Regional Water Supply Scheme Stage 1	W	12,669,000
		164,629,000
Serviced Land Initiative		
Cork North		
Ballyclough Water Supply Scheme	W	139,000
Ballyhooley Improvement Scheme	W/S	139,000
Broghill- Rathgoggin Sewerage Scheme	S	406,000
Bweeng Water Supply Scheme	W	115,000
Churchtown Sewerage Scheme (incl. Water)	W/S	543,000
Clondulane Sewage Treatment Plant	S	417,000
Freemount Sewerage Scheme	S	150,000
Pike Road Sewerage Scheme (incl. Water)	W/S	2,080,000
Rathcormac Sewerage Scheme (incl. Water)	W/S	555,000
Spa Glen Sewerage Scheme	S	736,000
Uplands Fermoy Sewerage Scheme (incl. Water)	W/S	1,174,000
Watergrasshill Water Supply Scheme (incl. Sewerage) (G)	W/S	4,151,000
Cork South		
Ballincollig Sewerage Scheme (Barry's Rd Foul and Storm Drainage) (G)	S	1,164,000
Belgooley, Water Supply Scheme (incl. Sewerage)	W/S	2,913,000
Blarney Water Supply Scheme (Ext. to Station Rd) (G)	W	416,000
Carrigtwohill Sewerage Scheme (Treatment and Storm Drain) (G)	S	7,632,000
Castlematyr Wastewater Treatment Plant Extension	S	1,200,000
Crookstown Sewerage Scheme (incl. Water)	W/S	1,200,000
Dripsey Water Supply Scheme (incl. Sewerage)	W/S	1,112,000
Glounthane Sewerage Scheme (G)	S	1,576,000
Innishannon Sewerage Scheme	S	277,000
Innishannon Wastewater Treatment Plant	S	694,000
Kerrypike Sewerage Scheme	S	832,000
Kerrypike Water Supply Scheme	W	416,000
Killeagh Wastewater Treatment Plant Extension	S	1,200,000
Killeagh Water Supply Scheme (includes Sewerage)	W/S	485,000
Killeens Sewerage Scheme	S	420,000
Kilnagleary Sewerage Scheme	S	694,000
Midleton Wastewater Treatment Plant Extension	S	4,050,000

Cork County contd.

Water Services Investment Programme 2007 - 2009

	W/S	Est. Cost
Mogeely, Castlemartyr & Ladysbridge Water Supply Scheme	W	2,566,000
North Cobh Sewerage Scheme (G)	S	3,193,000
Riverstick Water Supply Scheme (incl. Sewerage)	W/S	525,000
Rochestown Water Supply Scheme	W	2,700,000
Saleen Sewerage Scheme	S	1,051,000
Youghal Water Supply Scheme	W	2,300,000
Cork West		
Castletownshend Sewerage Scheme	S	1,576,000
		50,797,000
Rural Towns & Villages Initiative		
Cork North		
Buttevant Sewerage Scheme (Collection System)	S	2,446,000
Doneraile Sewerage Scheme (Collection System)	S	1,738,000
Cork South		
Innishannon (Ballinadee/ Ballinspittle/ Garrettstown) Water Supply Scheme	W	6,726,000
Cork West		
Ballylicky Sewerage Scheme	S	2,153,000
Baltimore Sewerage Scheme	S	3,162,000
Castletownbere Sewerage Scheme	S	5,402,000
Schull Sewerage Scheme	S	3,523,000
		24,950,000
Schemes to Advance through Planning		
Cork North		
Mitchelstown North Galtees Water Supply Scheme	W	3,152,000
Mitchelstown Sewerage Scheme	S	3,000,000
Newmarket Sewerage Scheme	S	3,152,000

	W/S	Est. Cost
Cork South		
Carrigtwohill Sewerage Scheme (G)	S	20,000,000
Cork Sludge Management (G)	S	14,420,000
Cork Water Supply Scheme (Storage - Mount Emla, Ballincollig & Chetwind) (G)	W	8,500,000
Inniscarra Water Treatment Plant (Sludge Treatment)(G)	W	5,356,000
Macroom Sewerage Scheme	S	5,150,000
Minane Bridge Water Supply Scheme	W	1,421,000
Cork West		
Bantry Regional Water Supply Scheme (Distribution)	W	9,455,000
Cape Clear Water Supply Scheme	W	1,679,000
Castletownbere Regional Water Supply Scheme	W	8,405,000
Glengarriff Sewerage Scheme	S	2,500,000
Roscarberry/Owenahincha Sewerage Scheme	S	1,576,000
Skibbereen Regional Water Supply Scheme Stage 4	W	7,880,000
		95,646,000
Water Conservation Allocation		**12,206,000**
Asset Management Study		**300,000**
South Western River Basin District (WFD) Project[1]		**9,400,000**
Programme Total		**485,489,000**

[1] This project is being led by Cork County Council on behalf of other authorities in the River Basin District

(H) Refers to a Hub as designated in the National Spatial Strategy

(G) Refers to a Gateway as designated in the National Spatial Strategy

Agglomeration details

Leading Local Authority	Cork County Council
Co-Applicants	
Agglomeration	Schull
Population Equivalent	1950
Level of Treatment	Primary
Treatment plant address	Schull WWTP, Meenvane, Schull, Co.Cork.
Grid Ref (12 digits, 6E, 6N)	093074 / 031607
EPA Reference No:	

Contact details

Contact Name:	Declan Groarke
Contact Address:	Water Services West, Cork County Council, Courthouse, Skibbereen, Co. Cork.
Contact Number:	02821299
Contact Fax:	02821295
Contact Email:	declan.groarke@corkcoco.ie

Table D.1(i)(a): EMISSIONS TO SURFACE/GROUND WATERS (Primary Discharge Point)

Discharge Point Code: SW-1

Local Authority Ref No:	SW01-Schull	
Source of Emission:	Open Pipe	
Location:	Meenvane	
Grid Ref (12 digits, 6E, 6N)	093171 / 031557	
Name of Receiving waters:	Schull Harbour	
Water Body:	Coastal Water Body	
River Basin District	South Western RBD	
Designation of Receiving Waters:	SAC, pNHA	
Flow Rate in Receiving Waters:	0	$m^3.sec^{-1}$ Dry Weather Flow
	0	$m^3.sec^{-1}$ 95% Weather Flow
Additional Comments (e.g. commentary on zero flow or other information deemed of value)	Where Zero flow indicated flow rate not applicable as receiving waters tidal	

Emission Details:

(i) Volume emitted			
Normal/day	429 m^3	Maximum/day	1287 m^3
Maximum rate/hour	54 m^3	Period of emission (avg)	60 min/hr 24 hr/day 365 day/yr
Dry Weather Flow	0.01 m^3/sec		

Table D.1(i)(b): EMISSIONS TO SURFACE/GROUND WATERS - Characteristics of The Emission (Primary Discharge Point)

Discharge Point Code: SW-1

Substance	As discharged			
	Unit of Measurement	Sampling Method	Max Daily Avg.	kg/day
pH	pH	Grab	= 9	
Temperature	°C	Grab	= 25	
Electrical Conductivity (@ 25°C)	µS/cm	Grab	= 0	
Suspended Solids	mg/l	Grab	= 250	107.25
Ammonia (as N)	mg/l	Grab	= 25	10.73
Biochemical Oxygen Demand	mg/l	Grab	= 210	27.42
Chemical Oxygen Demand	mg/l	Grab	= 460	197.34
Total Nitrogen (as N)	mg/l	Grab	= 50	21.45
Nitrite (as N)	mg/l	Grab	= 0	0
Nitrate (as N)	mg/l	Grab	= 0	0
Total Phosphorous (as P)	mg/l	Grab	= 12	5.15
OrthoPhosphate (as P)	mg/l	Grab	= 10	4.29
Sulphate (SO_4)	mg/l	Grab	= 0	0
Phenols (Sum)	µg/l	Grab	= 0	0

For Orthophosphate: this monitoring should be undertaken on a sample filtered on 0.45µm filter paper
For Phenols: USEPA Method 604, AWWA Standard Method 6240, or equivalent.

Table D.1(i)(c): DANGEROUS SUBSTANCE EMISSIONS TO SURFACE/GROUND WATERS - Characteristics of The Emission (Primary Discharge Point)

Discharge Point Code: SW-1

Substance	As discharged			
	Unit of Measurement	Sampling Method	Max Daily Avg.	kg/day
Atrazine	µg/l	Grab	= 0	0
Dichloromethane	µg/l	Grab	= 0	0
Simazine	µg/l	Grab	= 0	0
Toluene	µg/l	Grab	= 0	0
Tributyltin	µg/l	Grab	= 0	0
Xylenes	µg/l	Grab	= 0	0
Arsenic	µg/l	Grab	= 0	0
Chromium	µg/l	Grab	= 0	0
Copper	µg/l	Grab	= 0	0
Cyanide	µg/l	Grab	= 0	0
Flouride	µg/l	Grab	= 0	0
Lead	µg/l	Grab	= 0	0
Nickel	µg/l	Grab	= 0	0
Zinc	µg/l	Grab	= 0	0
Boron	µg/l	Grab	= 0	0
Cadmium	µg/l	Grab	= 0	0
Mercury	µg/l	Grab	= 0	0
Selenium	µg/l	Grab	= 0	0
Barium	µg/l	Grab	= 0	0

For Orthophosphate: this monitoring should be undertaken on a sample filtered on 0.45µm filter paper
For Phenols: USEPA Method 604, AWWA Standard Method 6240, or equivalent.

Table D.1(ii)(a): EMISSIONS TO SURFACE/GROUND WATERS (Secondary Discharge Point)

Discharge Point Code: SW-2

Local Authority Ref No:	SW02-Schull	
Source of Emission:	Open Pipe	
Location:	Skull	
Grid Ref (12 digits, 6E, 6N)	092892 / 031221	
Name of Receiving waters:	Schull Harbour	
Water Body:	Coastal Water Body	
River Basin District	South Western RBD	
Designation of Receiving Waters:	SAC, pNHA	
Flow Rate in Receiving Waters:	0	$m^3.sec^{-1}$ Dry Weather Flow
	0	$m^3.sec^{-1}$ 95% Weather Flow
Additional Comments (e.g. commentary on zero flow or other information deemed of value)	Where zero flow indicated flow rate not applicable as receiving waters tidal	

Emission Details:

(i) Volume emitted			
Normal/day	0.46 m^3	Maximum/day	1.4 m^3
Maximum rate/hour	0.11 m^3	Period of emission (avg)	60 min/hr 60 hr/day 365 day/yr
Dry Weather Flow	0.0001 m^3/sec		

Table D.1(ii)(b): EMISSIONS TO SURFACE/GROUND WATERS - Characteristics of The Emission (Secondary Discharge Point)

Discharge Point Code: SW-2

Substance	As discharged			
	Unit of Measurement	Sampling Method	Max Daily Avg.	kg/day
pH	pH	Grab	= 9	
Temperature	°C	Grab	= 25	
Electrical Conductivity (@ 25°C)	µS/cm	Grab	= 0	
Suspended Solids	mg/l	Grab	= 500	0.23
Ammonia (as N)	mg/l	Grab	= 0	0
Biochemical Oxygen Demand	mg/l	Grab	= 300	0.138
Chemical Oxygen Demand	mg/l	Grab	= 600	0.276
Total Nitrogen (as N)	mg/l	Grab	= 50	0.023
Nitrite (as N)	mg/l	Grab	= 0	0
Nitrate (as N)	mg/l	Grab	= 0	0
Total Phosphorous (as P)	mg/l	Grab	= 12	0.006
OrthoPhosphate (as P)	mg/l	Grab	= 10	0.005
Sulphate (SO_4)	mg/l	Grab	= 0	0
Phenols (Sum)	µg/l	Grab	= 0	0

For Orthophosphate: this monitoring should be undertaken on a sample filtered on 0.45µm filter paper
For Phenols: USEPA Method 604, AWWA Standard Method 6240, or equivalent.

Table D.1(ii)(c): DANGEROUS SUBSTANCE EMISSIONS TO SURFACE/GROUND WATERS - Characteristics of The Emission (Secondary Discharge Point)

Discharge Point Code: SW-2

Substance	As discharged			
	Unit of Measurement	Sampling Method	Max Daily Avg.	kg/day
Atrazine	µg/l	Grab	= 0	0
Dichloromethane	µg/l	Grab	= 0	0
Simazine	µg/l	Grab	= 0	0
Toluene	µg/l	Grab	= 0	0
Tributyltin	µg/l	Grab	= 0	0
Xylenes	µg/l	Grab	= 0	0
Arsenic	µg/l	Grab	= 0	0
Chromium	µg/l	Grab	= 0	0
Copper	µg/l	Grab	= 0	0
Cyanide	µg/l	Grab	= 0	0
Flouride	µg/l	Grab	= 0	0
Lead	µg/l	Grab	= 0	0
Nickel	µg/l	Grab	= 0	0
Zinc	µg/l	Grab	= 0	0
Boron	µg/l	Grab	= 0	0
Cadmium	µg/l	Grab	= 0	0
Mercury	µg/l	Grab	= 0	0
Selenium	µg/l	Grab	= 0	0
Barium	µg/l	Grab	= 0	0

For Orthophosphate: this monitoring should be undertaken on a sample filtered on 0.45µm filter paper
For Phenols: USEPA Method 604, AWWA Standard Method 6240, or equivalent.

Table D.1(iii)(a): EMISSIONS TO SURFACE/GROUND WATERS (Storm Overflow)

Discharge Point Code: SW-3

Local Authority Ref No:	SW03 Schull	
Source of Emission:	Open Pipe	
Location:	Meenvane	
Grid Ref (12 digits, 6E, 6N)	093171 / 031557	
Name of Receiving waters:	Schull Harbour	
Water Body:	Coastal Water Body	
River Basin District	South Western RBD	
Designation of Receiving Waters:	SAC, pNHA	
Flow Rate in Receiving Waters:	0	$m^3.sec^{-1}$ Dry Weather Flow
	0	$m^3.sec^{-1}$ 95% Weather Flow
Additional Comments (e.g. commentary on zero flow or other information deemed of value)	Where zero flow indicated flow rate not applicable as receiving waters tidal. Otherwise, where zero indicated information not available.	

Emission Details:

(i) Volume emitted			
Normal/day	0 m^3	Maximum/day	0 m^3
Maximum rate/hour	0 m^3	Period of emission (avg)	0 min/hr 0 hr/day 0 day/yr
Dry Weather Flow	0 m^3/sec		

Table D.1(iii)(a): EMISSIONS TO SURFACE/GROUND WATERS (Storm Overflow)

Discharge Point Code: SW-4

Local Authority Ref No:	SW04 Schull	
Source of Emission:	Overflow Pipe	
Location:	Skull	
Grid Ref (12 digits, 6E, 6N)	092813 / 031436	
Name of Receiving waters:	Schull Harbour	
Water Body:	River Water Body	
River Basin District	South Western RBD	
Designation of Receiving Waters:	SAC, pNHA	
Flow Rate in Receiving Waters:	0	$m^3.sec^{-1}$ Dry Weather Flow
	0	$m^3.sec^{-1}$ 95% Weather Flow
Additional Comments (e.g. commentary on zero flow or other information deemed of value)	Where zero flow indicated flow rate not applicable as receiving waters tidal. Otherwise, where zero indicated information not available.	

Emission Details:

(i) Volume emitted			
Normal/day	0 m^3	Maximum/day	0 m^3
Maximum rate/hour	0 m^3	Period of emission (avg)	0 min/hr 0 hr/day 0 day/yr
Dry Weather Flow	0 m^3/sec		

TABLE E.1(i): WASTE WATER FREQUENCY AND QUANTITY OF DISCHARGE – Primary and Secondary Discharge Points

Identification Code for Discharge point	Frequency of discharge (days/annum)	Quantity of Waste Water Discharged (m^3/annum)
SW-1	365	156585
SW-2	365	167.9

TABLE E.1(ii): WASTE WATER FREQUENCY AND QUANTITY OF DISCHARGE – Storm Water Overflows

Identification Code for Discharge point	Frequency of discharge (days/annum)	Quantity of Waste Water Discharged (m^3/annum)	Complies with Definition of Storm Water Overflow
SW-3	0	0	Yes
SW-4	0	0	Yes

TABLE F.1(i)(a): SURFACE/GROUND WATER MONITORING

Primary Discharge Point

Discharge Point Code:	SW-1
MONITORING POINT CODE:	aSW-1d
Grid Ref (12 digits, 6E, 6N)	093979 / 031186

Parameter	Results (mg/l)				Sampling method	Limit of Quantitation	Analysis method / technique
	30/10/08	01/01/09					
pH	= 8.1				Grab	2	Electrochemical
Temperature		= 0			Grab	0	Electrochemical
Electrical Conductivity (@ 25°C)	= 49				Grab	0.5	Electrochemical
Suspended Solids	= 10				Grab	0.5	Gravimetric
Ammonia (as N)	< 0.6				Grab	0.02	Colorimetric
Biochemical Oxygen Demand	< 1				Grab	0.06	Electrochemical
Chemical Oxygen Demand	= 41				Grab	8	Digestion & Colorimetric
Dissolved Oxygen		= 0			Grab	0	ISE
Hardness (as $CaCO_3$)		= 0			Grab	0	Titrimetric
Total Nitrogen (as N)	< 1				Grab	0.5	Digestion & Colorimetric
Nitrite (as N)		= 0			Grab	0	Colorimetric
Nitrate (as N)		= 0			Grab	0.5	Colorimetric
Total Phosphorous (as P)	< 0.3				Grab	0.2	Digestion & Colorimetric
OrthoPhosphate (as P)	< 0.05				Grab	0.02	Colorimetric
Sulphate (SO_4)	= 2641				Grab	30	Turbidimetric
Phenols (Sum)	< 0.005				Grab	0.1	GC-MS 2

For Orthophosphate: this monitoring should be undertaken on a sample filtered on 0.45µm filter paper
For Phenols: USEPA Method 604, AWWA Standard Method 6240, or equivalent.

Additional Comments:	

TABLE F.1(i)(b): SURFACE/GROUND WATER MONITORING (Dangerous Substances)

Primary Discharge Point

Discharge Point Code:	SW-1
MONITORING POINT CODE:	aSW-1d
Grid Ref (12 digits, 6E, 6N)	093979 / 031186

Parameter	Results (µg/l)				Sampling method	Limit of Quantitation	Analysis method / technique
	30/10/08						
Atrazine	< 0.01				Grab	0.96	HPLC
Dichloromethane	< 5				Grab	1	GC-MS1
Simazine	< 0.01				Grab	0.01	HPLC
Toluene	< 0.1				Grab	0.02	GC-MS1
Tributyltin	< 0.02				Grab	0.02	GC-MS1
Xylenes	< 0.2				Grab	1	GC-MS1
Arsenic	< 0.2				Grab	0.96	ICP-MS
Chromium	< 20				Grab	20	ICP-OES
Copper	< 20				Grab	20	ICP-OES
Cyanide	< 5				Grab	5	Colorimetric
Flouride	= 0.8				Grab	100	ISE
Lead	< 20				Grab	20	ICP-OES
Nickel	< 20				Grab	20	ICP-OES
Zinc	< 20				Grab	20	ICP-OES
Boron	< 20				Grab	20	ICP-OES
Cadmium	< 20				Grab	20	ICP-OES
Mercury	< 0.02				Grab	0.2	ICP-MS
Selenium	= 59.3				Grab	0.74	ICP-MS
Barium	< 20				Grab	20	ICP-OES

Additional Comments:	TBT value is 0.02ug/l as Sn

TABLE F.1(ii)(a): SURFACE/GROUND WATER MONITORING

Secondary Discharge Point

Discharge Point Code:	SW-2
MONITORING POINT CODE:	aSW-2d
Grid Ref (12 digits, 6E, 6N)	093979 / 031186

Parameter	Results (mg/l)				Sampling method	Limit of Quantitation	Analysis method / technique
	30/10/08	01/01/09					
pH	= 8.1				Grab	2	Electrochemical
Temperature		= 0			Grab	0	Electrochemical
Electrical Conductivity (@ 25°C)	= 49				Grab	0.5	Electrochemical
Suspended Solids	= 10				Grab	0.5	Gravimetric
Ammonia (as N)	< 0.6				Grab	0.02	Colorimetric
Biochemical Oxygen Demand	< 1				Grab	0.06	Electrochemical
Chemical Oxygen Demand	= 41				Grab	8	Digestion & Colorimetric
Dissolved Oxygen		= 0			Grab	0	ISE
Hardness (as $CaCO_3$)		= 0			Grab	0	Titrimetric
Total Nitrogen (as N)	< 1				Grab	0.5	Digestion & Colorimetric
Nitrite (as N)		= 0			Grab	0	Colorimetric
Nitrate (as N)		= 0			Grab	0.5	Colorimetric
Total Phosphorous (as P)	< 0.3				Grab	0.2	Digestion & Colorimetric
OrthoPhosphate (as P)	< 0.05				Grab	0.02	Colorimetric
Sulphate (SO_4)	= 2641				Grab	30	Turbidimetric
Phenols (Sum)	< 0.005				Grab	0.1	GC-MS 2

For Orthophosphate: this monitoring should be undertaken on a sample filtered on 0.45µm filter paper
For Phenols: USEPA Method 604, AWWA Standard Method 6240, or equivalent.

Additional Comments:	

TABLE F.1(ii)(b): SURFACE/GROUND WATER MONITORING (Dangerous Substances)

Secondary Discharge Point

Discharge Point Code:	SW-2
MONITORING POINT CODE:	aSW-2d
Grid Ref (12 digits, 6E, 6N)	093979 / 031186

Parameter	Results (µg/l)				Sampling method	Limit of Quantitation	Analysis method / technique
	30/10/08						
Atrazine	< 0.01				Grab	0.96	HPLC
Dichloromethane	< 5				Grab	1	GC-MS1
Simazine	< 0.01				Grab	0.01	HPLC
Toluene	< 0.1				Grab	0.02	GC-MS1
Tributyltin	< 0.02				Grab	0.02	GC-MS1
Xylenes	< 0.2				Grab	1	GC-MS1
Arsenic	< 0.2				Grab	0.96	ICP-MS
Chromium	< 20				Grab	20	ICP-OES
Copper	< 20				Grab	20	ICP-OES
Cyanide	< 5				Grab	5	Colorimetric
Flouride	= 0.8				Grab	100	ISE
Lead	< 20				Grab	20	ICP-OES
Nickel	< 20				Grab	20	ICP-OES
Zinc	< 20				Grab	20	ICP-OES
Boron	< 20				Grab	20	ICP-OES
Cadmium	< 20				Grab	20	ICP-OES
Mercury	< 0.02				Grab	0.2	ICP-MS
Selenium	= 59.3				Grab	0.74	ICP-MS
Barium	< 20				Grab	20	ICP-OES

Additional Comments:	TBT value is 0.02ug/l as Sn

Annex 2: Check List For Regulation 16 Compliance

Regulation 16 of the waste water discharge (Authorisation) Regulations 2007 (S.I. No. 684 of 2007) sets out the information which must, in all cases, accompany a discharge licence application. In order to ensure that the application fully complies with the legal requirements of regulation 16 of the 2007 Regulations, all applicants should complete the following.

In each case, refer to the attachment number(s), of your application which contains(s) the information requested in the appropiate sub-article.

Regulation 16(1) **In the case of an application for a waste water discharge licence, the application shall -**		**Attachment Number**	**Checked by Applicant**
(a)	give the name, address, telefax number (if any) and telephone number of the applicant (and, if different, of the operator of any treatment plant concerned) and the address to which correspondence relating to the application should be sent and, if the operator is a body corporate, the address of its registered office or principal office,	B.1	Yes
(b)	give the name of the water services authority in whose functional area the relevant waste water discharge takes place or is to take place, if different from that of the applicant,	Not Applicable	Yes
(c)	give the location or postal address (including where appropriate, the name of the townland or townlands) and the National Grid reference of the location of the waste water treatment plant and/or the waste water discharge point or points to which the application relates,	B.2	Yes
(d)	state the population equivalent of the agglomeration to which the application relates,	B.9(i)	Yes
(e)	specify the content and extent of the waste water discharge, the level of treatment provided, if any, and the flow and type of discharge,	C,D	Yes
(f)	give details of the receiving water body, including its protected area status, if any, and details of any sensitive areas or protected areas or both in the vicinity of the discharge point or points likely to be affected by the discharge concerned, and for discharges to ground provide details of groundwater protection schemes in place for the receiving water body and all associated hydrogeological and geological assessments related to the receiving water environment in the vicinity of the discharge.	F.1	Yes
(g)	identify monitoring and sampling points and indicate proposed arrangements for the monitoring of discharges and, if Regulation 17 does not apply, provide details of the likely environmental consequences of any such discharges,	E.3	Yes
(h)	in the case of an existing waste water treatment plant, specify the sampling data pertaining to the discharge based on the samples taken in the 12 months preceding the making of the application,	E.4	Yes
(i)	describe the existing or proposed measures, including emergency procedures, to prevent unintended waste water discharges and to minimise the impact on the environment of any such discharges,	G.3	Yes
(j)	give particulars of the nearest downstream drinking water abstraction point or points to the discharge point or points,	Not Applicable	Yes
(k)	give details, and an assessment of the effects, of any existing or proposed emissions on the environment, including any environmental medium other than those into which the emissions are, or are to be made, and of proposed measures to prevent or eliminate or, where that is not practicable, to limit any pollution caused in such discharges,	F.1	Yes
(l)	give detail of compliance with relevant monitoring requirements and treatment standards contained in any applicable Council Directives of Regulations,	E.1,E.4	Yes
(m)	give details of any work necessary to meet relevant effluent discharge standards and a timeframe and schedule for such work.	G.1	Yes
(n)	Any other information as may be stipulated by the Agency.	Not Applicable	Yes
Regulation 16(3) **Without prejudice to Regulation 16 (1) and (2), an application for a licence shall be accompanied by -**		**Attachment Number**	**Checked by Applicant**
(a)	a copy of the notice of intention to make an application given pursuant to Regulation 9,	B.8	Yes
(b)	where appropriate, a copy of the notice given to a relevant water services authority under Regulation 13,	Not Applicable	Yes
(c)	Such other particulars, drawings, maps, reports and supporting documentation as are necessary to identify and describe, as appropriate -	B	Yes
(c) (i)	the point or points, including storm water overflows, from which a discharge or discharges take place or are to take place, and	B.3, B.4, B.5	Yes
(c) (ii)	the point or points at which monitoring and sampling are undertaken or are to be undertaken,	E.3	Yes
(d)	such fee as is appropriate having regard to the provisions of Regulations 38 and 39.	B.9(iii)	Yes

Regulation 16(4) An original application shall be accompanied by 2 copies of it and of all accompanying documents and particulars as required under Regulation 16(3) in hardcopy or in an electronic or other format as specified by the Agency.		Attachment Number	Checked by Applicant
1	An Original Application shall be accompanied by 2 copies of it and of all accompanying documents and particulars as required under regulation 16(3) in hardcopy or in electronic or other format as specified by the agancy.		Yes
Regulation 16(5) **For the purpose of paragraph (4), all or part of the 2 copies of the said application and associated documents and particulars may, with the agreement of the Agency, be submitted in an electronic or other format specified by the Agency.**		**Attachment Number**	**Checked by Applicant**
1	Signed original.		Yes
2	2 hardcopies of application provided or 2 CD versions of application (PDF files) provided.		Yes
3	1 CD of geo-referenced digital files provided.		Yes
Regulation 17 **Where a treatment plant associated with the relevant waste water works is or has been subject to the European Communities (Environmental Impact Assessment) Regulations 1989 to 2001, in addition to compliance with the requirements of Regulation 16, an application in respect of the relevant discharge shall be accompanied by a copy of an environmental impact statement and approval in accordance with the Act of 2000 in respect of the said development and may be submitted in an electronic or other format specified by the Agency**		**Attachment Number**	**Checked by Applicant**
1	EIA provided if applicable	F.1	Yes
2	2 hardcopies of EIS provided if applicable.	Not Applicable	Yes
3	2 CD versions of EIS, as PDF files, provided.	Not Applicable	Yes