Áras an Chontae,
Cnoc na Radharc, Gaillimh.
Áras an Chontae,
Prospect Hill, Galway.

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Comhairle Chontae na Gaillimhe
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(091) 509 301
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Register of Electors
(091) 509 310
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Water Services
(091) 476 401
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Community & Enterprise
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Planning
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Higher Education Grants
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Leabharlann
Library
(091) 562 471
info@galwaylibrary.ie

Environmental Protection Agency
PO Box 3000
Johnstown Castle Estate
Co. Wexford

13/03/2009

Re: EPA Reference No: D0198-01 - Clifden Waste Water Discharge Licence Application, Unsolicited Additional Information

Dear Sirs

Please find enclosed Unsolicited Additional Information pertaining to the application by Galway County Council for a Waste Water Discharge Licence for the Clifden Waste Water Works.

We wish to confirm that the content of the electronic files is a true copy of the Unsolicited Additional Information hardcopy submission.

Yours Sincerely,

Liam Gavin
A/Director of Services

Tá míle fáilte roimh chomhfhreagras i nGaeilge.

GALWAY COUNTY COUNCIL

CLIFDEN WASTE WATER DISCHARGE LICENCE APPLICATION

UNSOLICITED ADDITIONAL INFORMATION

March 2009

Client	**Galway County Council**
Project No.	**2040**
Project Title	**Clifden Waste Water Discharge Licence Application**
Report Title	**Unsolicited Additional Information**

Rev.	Status	Author(s)	Reviewed By	Approved By	Issue Date
1	Final	C. Malone	C. Claffey	M. Joyce	18.03.09

GALWAY COUNTY COUNCIL

CLIFDEN WASTE WATER DISCHARGE LICENCE APPLICATION
UNSOLICITED ADDITIONAL INFORMATION

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Attachments:

Attachments B.6: Part 8 Planning Report
Attachments B.12: Foreshore Licence Application

1. INTRODUCTION

This document relates to outstanding information which was not submitted at the time of the original Waste Water Discharge Licence Application for the Clifden Agglomeration in September 2008. This information which is detailed in Section 2 to Section 5 is now being submitted to the EPA as unsolicited additional information.

2. PART 8 PLANNING DETAILS STAGE 1

B.6 Planning Authority

Give the name of the planning authority, or authorities, in whose functional area the discharge or discharges take place or are proposed to take place.

Name:	Galway County Council
Address:	Planning Department
	County Hall
	Prospect Hill
	Galway
Tel:	091 509308
Fax:	091 509010
e-mail:	planning@galwaycoco.ie

Planning Permission relating to the waste water works which is the subject of this application:- (tick as appropriate)

has been obtained		***is being processed***	√
is not yet applied for		***is not required***	

Local Authority Planning File Reference Nº:	LA22/08

Attachment B.6 should contain ***the most recent*** planning permission, including a copy of ***all*** conditions, and where an EIS was required, copies of any such EIS and any certification associated with the EIS, should also be enclosed. Where planning permission is not required for the development, provide reasons, relevant correspondence, *etc.*

Attachment included	**Yes**	**No**
	√	

Response

Since the submission of the Waste Water Discharge Licence Application for the Clifden Agglomeration in September 2008, Galway County Council has received approval for advancement of the scheme from the DEHLG. The Part 8 Planning Documents were then prepared and lodged under the Part 8 Planning Process at the end of October 2008. The Part 8 Planning Report is included in Appendix I.

3. PENDING DEVELOPMENTS AND TREATMENT WORKS CAPACITY

Section B.7

Where planning permission has been granted for developments, but the said development has not been commenced or completed to date, within the boundary of the agglomeration and this development is being, or is to be, served by the waste water works provide the following;

- *Information on the calculated population equivalent (p.e.) to be contributed to the waste water works as a result of those planning permissions granted,*
- *The percentage of the projected p.e. to be contributed by the non-domestic activities, and*
- *The ability of the waste water works to accommodate this extra hydraulic and organic loading without posing an environmental risk to the receiving water habitat.*

Response

The population equivalent (P.E.) to be contributed to the waste water works as a result of developments that have not commenced or completed is **164.3 P.E.** The percentage of the projected P.E. to be contributed by the non-domestic activities is **8.2**%. For a more detailed breakdown of the projected P.E. figures, refer to Table 1 below.

An assessment of the ability of the waste water works to accommodate this extra hydraulic and organic loading has not been carried out. As stated in the non-technical summary, the EPA inspected the existing treatment works site in 2006 and have informed Galway County Council, in a letter dated 22nd September 2006, that in their opinion Galway County Council have failed to "perform in a satisfactory manner a statutory function of the Council in relation to environmental protection" under the Environmental Protection Agency Acts 1992 and 2003, namely:

- Failing to meet the Urban Waste Water Regulations 2001 effluent standards for Clifden Waste Water Treatment Plant
- Failing to provide secondary treatment at Clifden by 31st December 2005
- Failing to manage Clifden WWTP contrary to the provision of Article 8(1) which requires local authorities to ensure that treatment plants are properly operated and maintained
- Failing to manage and dispose of sewage sludge in accordance with the provisions of the Waste Management Act 1996-2003
- Failing to meet the EU Mandatory Bathing Water standard for faecal coliforms due to the lack of appropriate treatment of waste water.

A hydrographic marine survey of Clifden Bay was carried out in 2005 to establish the assimilative and dispersive ability of the marine environment in relation to the discharge of treated effluent from the proposed WWTW. A computer model was constructed and validated using data collated from bathymetric surveys, meteorological readings, tide gauge data, current meter data, dye studies, drogue studies and water quality studies carried out as part of the marine survey. Detailed analysis of the computer model for the inner and outer Clifden Bay for discharge of treated effluent from the proposed WWTW concluded:

- *The (proposed) outfall in the inner part of Clifden Bay can be used to dispose of appropriately treated effluent without compromising either the water quality at the bathing beach or the marine farms in the vicinity.*

- *The EU Bathing Water Regulations limit of less than 1,000 number / 100ml of faecal coliforms was not exceeded anywhere in the Bay. The values predicted by the model in the vicinity of the beach were min fact, several orders of magnitude lower and hence should have no impact on the quality of the bathing waters.*

- *The maximum allowable level of faecal coliforms permitted by national and international standards for shellfish waters was not exceeded in any location in the bay during the time of the model study. The actual concentrations observed were well below this limit and hence should not have any adverse effects on the quality of fish or shellfish being harvested.*

The conclusions of the above hydrographic marine survey indicates that the issues referred to in the proposed EPA direction will be adequately addressed by Stage 1 of Clifden Sewerage Scheme.

A detailed programme for the procurement, construction and commissioning of Stage 1 of Clifden Sewerage Scheme is included in Attachment B.10 of the original application.

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Table 1:

Calculated P.E. to be contributed to the waste water works and percentage of the projected P.E. to be contributed by the non-domestic activities

File No.	total	hse	aprt	ind	ret	other	commencement	P.E.	P.E	Comment
							yes/no	Dom	Non dom	
03-5879	33	0	31	1	0	1	yes	0	0	supermarket
05-2092	16	12	4	0	0	0	no	41.6	0	
02-1653	18	18	0	0	0	0	yes	0	0	
06-3144	17	5	12	0	0	0	no	38	0	
03-4346	16	0	16	0	0	0	yes	0	0	
03-5562	12	0	12	0	0	0	yes	0	0	
07-5344	10	0	10	0	0	0	yes	0	0	
03-6766	6	0	4	2	0	0	no	8	1	
07-236	4	4	0	0	0	0	yes	0	0	
06-4165	4	0	4	0	0	0	yes	8	0	
04-1159	4	4	0	0	0	0	yes	0	0	
03-2182	4	0	4	0	0	0	yes	0	0	
03-7059	3	3	0	0	0	0	yes	0	0	
08-537	1	1	0	0	0	0	no	2.8	0	
08-1657	2	0	0	1	0	1	yes	0	0	
08-917	1	0	0	0	1	0	no	0	0.5	Aldi Store
07-2839	1	0	0	0	1	0	no	0	0.5	
07-1029	1	0	0	0	1	0	yes	0	0	
07-3761	1	0	0	1	0	0	yes	0	0	
07-4497	1	0	0	0	0	0	N/A	0	0	
07-4075	1	1	0	0	0	0	no	2.8	0	
06-5865	1	1	0	0	0	0	no	2.8	0	
06-4967	1	1	0	0	0	0	no	2.8	0	
06-5312	1	0	0	0	0	1	yes	0	0	
06-4844	1	1	0	0	0	0	yes	0	0	
06-1402	1	1	0	0	0	0	yes	0	0	
06-947	1	1	0	0	0	0	no	2.8	0	
06-1180	1	1	0	0	0	0	no	2.8	0	
06-1288	1	0	0	1	0	0	yes	0	0	
06-2231	1	1	0	0	0	0	no	2.8	0	
06-2334	2	2	0	0	0	0	no	5.6	0	
06-2375	1	0	0	0	0	1	yes	0	0	
05-124	1	0	0	0	0	1	yes	0	0	
05-4318	1	1	0	0	0	0	no	2.8	0	
05-4320	1	1	0	0	0	0	no	2.8	0	
05-1633	1	0	0	0	1	0	yes	0	0	
05-8	1	1	0	0	0	0	no	2.8	0	
04-1452	1	1	0	0	0	0	no	2.8	0	
04-1908	2	2	0	0	0	0	N/A	0	0	
04-3576	1	1	0	0	0	0	N/A	0	0	
04-4626	2	2	0	0	0	0	no	5.6	0	
04-4613	1	1	0	0	0	0	N/A	0	0	
04-4694	1	0	0	0	0	1	yes	0	0	
04-4647	1	1	0	0	0	0	no	2.8	0	
04-4996	2	0	1	1	0	0	no	2	0.5	
08-1369	1	0	0	0	0	1	yes	0	5	Lidl

04-654	1	1	0	0	0	0	no	2.8	0	
04-5673	2	0	0	0	1	1	no	0	5.5	
04-5261	1	1	0	0	0	0	no	2.8	0	
03-3152	2	1	0	0	1	0	no	2.8	0.5	
03-4943	1	0	0	0	1	0	yes	0	0	
03-5298	2	0	1	1	0	0	yes	0	0	
03-5502	1	1	0	0	0	0	N/A	0	0	
03-5799	1	0	1	0	0	0	N/A	0	0	
03-6685	1	0	0	1	0	0	N/A	0	0	
03-721	1	1	0	0	0	0	yes	0	0	
02-3002	1	0	0	1	0	0	yes	0	0	
02-4054	1	0	0	0	0	1	yes	0	0	
Total Units	200						**Subtotals**	**150.8**	**13.5**	

Projected PE:	

P.E. of Developments to be Constructed & Connected to WWW	**164.30 P.E.**	
P.E. of Non-Dom Contribution of Developments Constructed & Connected to WWW	**13.50 P.E.**	**8.2%**

retail shop	0.5
dwelling	2.8
apartment	2
office	0.5
industrial unit	0.5
restaurant	5.0

4. FORESHORE LICENCE APPLICATION, STAGE 1

B.12 Foreshore Act Licences.

Provide a copy of the most recent Foreshore Act licence issued in relation to discharges from the waste water works issued under the Foreshore Act 1933.

Attachment B.12 should contain the most recent licence issued under the Foreshore Act 1933, including a copy of ***all*** conditions attached to the licence and any monitoring returns for the previous 12-month period, if applicable.

Attachment included	Yes	No
	√	

Response

Since the submission of the Waste Water Discharge Licence Application for the Clifden Agglomeration in September 2008, Galway County Council has received approval for advancement of the scheme from the DEHLG. The Foreshore Licence application was prepared and lodged with the Department of Agriculture, Fisheries and Food on the 10th October 2008 under the Foreshore Acts 1933 to 2003.

A copy of the Foreshore Licence Application is included in Appendix II excluding the Hydrographic Survey Report which was included in the original waste water discharge licence application under Attachment F.1.

5. SAMPLING RESULTS

A complete set of sampling results on the final effluent are now included in Table D.1(i)(b) and (c) and detailed in the following pages.

WWD Licence Application Annex I

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	24 hr composite	= 6.9	
Temperature	°C	Grab	= 17.1	
Electrical Conductivity (@ 25°C)	µS/cm	Grab	= 572	
Suspended Solids	mg/l	24 hr composite	= 182	303.58
Ammonia (as N)	mg/l	24 hr composite	= 23.4	39.03
Biochemical Oxygen Demand	mg/l	24 hr composite	= 268	447.02
Chemical Oxygen Demand	mg/l	24 hr composite	= 673	1122.56
Total Nitrogen (as N)	mg/l	Grab	= 21.42	35.73
Nitrite (as N)	mg/l	Grab	= 0.021	0.0350
Nitrate (as N)	mg/l	Grab	< 0.1	0.1668
Total Phosphorous (as P)	mg/l	Grab	= 3.436	5.73
Ortho Phosphate (as P)	mg/l	24 hr composite	= 6.5	10.84
Sulphate (SO4)	mg/l	Grab	= 37.58	62.68
Phenols (Sum)	µg/l	Grab	< 5.0	0.0083

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

WWD Licence Application Annex I

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	< 0.2	0.0003336
Dichloromethane	µg/l	Grab	= 1.6	0.0026688
Simazine	µg/l	Grab	< 0.2	0.0003336
Toluene	µg/l	Grab	= 20.3	0.0338604
Tributyltin	µg/l	Grab	< 0.1	0.0001668
Xylenes	µg/l	Grab	< 2.0	0.003336
Arsenic	µg/l	Grab	= 0.8	0.0013344
Chromium	µg/l	Grab	= 1.0	0.001668
Copper	µg/l	Grab	= 299	0.498732
Cyanide	µg/l	Grab	< 0.1	0.0001668
Flouride	µg/l	Grab	< 0.1	0.0001668
Lead	µg/l	Grab	= 5.0	0.00834
Nickel	µg/l	Grab	= 2.0	0.003336
Zinc	µg/l	Grab	= 80	0.13344
Boron	µg/l	Grab	= 86	0.143448
Cadmium	µg/l	Grab	= 0.5	0.000834
Mercury	µg/l	Grab	< 0.05	0.0000834
Selenium	µg/l	Grab	< 0.5	0.000834
Barium	µg/l	Grab	= 17	0.028356

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

GALWAY COUNTY COUNCIL

CLIFDEN WASTE WATER DISCHARGE LICENCE APPLICATION

Unsolicited Additional Information

Attachment B.6:

Part 8 Planning Application

RYAN HANLEY

March 2009

GALWAY COUNTY COUNCIL

CLIFDEN WASTE WATER DISCHARGE LICENCE APPLICATION

Unsolicited Additional Information

Attachment B.12:

Foreshore Licence Application

RYAN HANLEY

March 2009

GALWAY COUNTY COUNCIL

CLIFDEN WASTE WATER DISCHARGE LICENCE APPLICATION
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CLIFDEN WASTE WATER DISCHARGE LICENCE APPLICATION

Unsolicited Additional Information

Attachment B.6:

Part 8 Planning Application

RYAN HANLEY

March 2009

GALWAY COUNTY COUNCIL

CLIFDEN SEWERAGE SCHEME
STAGE 1

PLANNING AND DEVELOPMENT ACT, 2000

APPLICATION FOR PART 8 PLANNING

October 2008

Client	**Galway County Council**
Project No.	**1367**
Project Title	**Clifden Sewerage Scheme Stage 1**
Report Title	**Part 8 Planning Report**

Rev.	Status	Author(s)	Reviewed By	Approved By	Issue Date
1	For Client Review	A Slaney	C Lyons	T Shryane	25/9/08
2	For Client Review	A Slaney	T Shryane	T Shryane	2/10/08
3	Final	A Slaney	T Shryane	T Shryane	7/10/08
4	Final Revised	A Slaney	T Shryane	M Joyce	21/10/08

GALWAY COUNTY COUNCIL

CLIFDEN SEWERAGE SCHEME STAGE 1

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Appendices

Appendix I Archaeological Assessment
Appendix II Ecological Screening

Schedule of Drawings:

No.	Title
1	Location Map
2	Indicative Site Layout of Proposed Waste water Treatment Works
3	Layout Plan of Proposed Collection Network Stage 1
4	Designated Heritage Areas in Vicinity of Waste water Treatment Works

1. DESCRIPTION OF PROPOSED SCHEME

Clifden is currently serviced by a combined storm water/sewage drainage network and a waste water treatment plant that provides basic primary treatment before discharging primary treated waste water into Clifden Bay. As the existing sewerage infrastructure has insufficient capacity to cater for the current and projected Clifden populations, and the current level of treatment at the waste water treatment plant is inadequate, Galway County Council have proposed a two-stage upgrade to the Clifden sewerage scheme.

Stage 1 of the Clifden sewerage scheme upgrade will involve construction of a new waste water treatment plant to be constructed on the site of the existing plant to provide adequate treatment of the reduced sewage flow prior to discharge into inner Clifden Bay via a new outfall pipe. New surface water drains will also be constructed to divert surface water from the existing sewer network.

The proposed waste water treatment plant will be procured under a design/build/operate (DBO) contract. The plant will be designed by the contractor in order to meet effluent quality standards and noise and odour limits at the site boundary that will be set out in the DBO contract documents. At this stage because the contract has not been tendered, the layout and sizes of the various units within the plant have not been finalised and the attached layout plan (Figure 2) is indicative only.

The proposed waste water treatment plant, in the event that the Contractor chooses an extended aeration plant (typical for the mainly domestic sewage profile and scale of the proposed works) would likely comprise the following processes:

- Inlet pump station
- Screening and Grit Removal
- Stormwater Storage
- Extended Aeration
- Secondary Clarification
- Tertiary Filtration and/or UV disinfection
- Sludge Thickening and Dewatering
- Odour Control and abatement

The proposed waste water treatment plant and access road will extend beyond the boundaries of the existing waste water treatment plant site and additional land will be purchased by Galway County Council to accommodate the new site and access road.

Drawings showing the proposed Stage 1 works are included with this application and should be read in conjunction with this report.

The treated effluent will be discharged to Clifden Bay via a new outfall. Sludge will be transported off site for further treatment and disposal at a sludge satellite centre.

This planning application is for the Stage 1 works. Stage 2 Works are proposed to proceed 5 years after the Stage 1 Works and will be subject to a separate planning application. Stage 2 will involve extending the sewage and surface water collection networks and a modular expansion to the waste water treatment plant to cater for the increased population.

2. OBJECTIVES OF CLIFDEN SEWERAGE SCHEME STAGE 1 UPGRADE

The objectives of the Clifden Sewerage Scheme Stage 1 Upgrade are:

1. To relieve existing combined sewers by providing a separate surface water drainage system, thus reducing untreated overflows to the Owenglin River and the inner Clifden Bay during wet weather.

2. To avoid adverse effects on Clifden Bay water quality by replacing the existing overloaded waste water treatment plant with a new treatment plant and marine outfall. The treatment plant will produce treated effluent which will meet the requirements of the Urban Waste Water Treatment Directive, 2001.

3. SUMMARY OF PROPOSED STAGE 1 WORKS

The works to be carried out under Clifden Sewerage Scheme Stage 1 are summarised below.

a) Waste water Treatment Plant - Structures

- Inlet pump station
- Preliminary treatment units – screen chamber, grit chamber & storm overflow chamber
- Process tanks and equipment to be determined by the successful Design Build Operate Contractor based on the particular waste water treatment process chosen by him to treat effluent from Clifden. In the event that the Contractor chooses a typical extended aeration plant, the likely process tanks and equipment used would be:
  - Aeration tanks
  - Secondary settling tanks
  - Tertiary filtration tank
  - Return activated sludge pump chamber
- Final effluent measurement and sampling chamber
- Sludge thickening tank
- Supernatant return pump chamber
- Storm water storage tank
- Storm water pump chamber
- Odour control unit

b) Waste water Treatment Plant - Buildings

- Control building
- Blower building
- Sludge dewatering building

c) Waste water Treatment Plant - Siteworks

- New access road
- New overhead mains power supply from road
- Buried process pipework, manholes and outfall pipe
- Site drainage pipework
- Buried watermains and cable ducts
- Earthworks and landscaping

- Carpark and footpath surfacing and kerb and channels
- Miscellaneous chambers
- Site lighting and security fencing

d) New Surface Water Sewers

New surface water sewers are to be provided at the following locations:

- Main Street
- Market Street
- Bridge Street
- Westport Road
- Hulk Street
- Galway Road

The total length of proposed surface water sewers is approximately 2,400 m. The provision of the surface water sewers will relieve the existing combined sewers and prevent storm overflows.

e) Upgrade and Rehabilitation of Existing Sewers

Existing sewers will be upgraded or rehabilitated as required

4. VISUAL EFFECTS OF PROPOSED WASTE WATER TREATMENT PLANT

The proposed waste water treatment plant will be located on the site of the existing Clifden waste water treatment plant. The site is about 100m west of the Clifden/Ballyconneely road (Regional Road R341), beside the seashore at the bottom of wooded sloping terrain. A new access road will be constructed from the R341 to the waste water treatment plant. The land is zoned Agricultural.

An indicative layout plan is provided in the attached Drawings (Figure 2). Because the waste water treatment plant will be procured using a Design/Build/Operate contract, the precise layout and sizes of the process units is not known at this stage and so the layout plan is for indicative purposes only.

The site is on the southern shore of the Owenglin estuary which at low tide empties to tidal mudflats with a narrow estuary channel. The site is overlooked from town residences on the opposite shore, and from residences along Quay Road and Beach Road. A shelterbelt of evergreen trees will be constructed along the northern and western boundaries to screen the site from the estuary so that the treatment plant will not be visible from the estuary or the town.

It is expected that, due to tidal and meteorological constraints, part or all of the proposed treatment works site will be excavated to a minimum base level of between 3.0 to 4.0m OD. It is further expected that the likely minimum finished floor levels of proposed buildings will generally be within the range of 3.2 to 4.2m OD (Malin Head).

A control building, blower building and sludge dewatering building will be constructed on the site. The buildings will be designed to blend in with the surrounding rural environment. The control and blower buildings will be single storied buildings with a wall height of

approximately 3.0 metres and a gable height of 5.0 metres above ground level. The sludge dewatering building will have a wall height of approximately 4.0 metres maximum gable height of 6.0 metres above ground level.

The waste water treatment plant will consist of a series of open topped concrete tanks which will be largely buried beneath existing ground level. The tank walls are expected to protrude no more than 2.0 metres above the ground. Some of the tanks will have steel or aluminium walkways and and/or handrails mounted on the walls. In general, all interconnecting pipework will be buried.

During the Stage 2 upgrade the waste water treatment plant capacity will be increased by adding additional process tanks and associated mechanical equipment. It is expected that no additional buildings will be required.

5. NOISE AND ODOUR EFFECTS OF PROPOSED WASTE WATER TREATMENT PLANT

Odour emissions will be reduced by providing continual air extraction and odour treatment for high risk process units (sludge thickening, dewatering, inlet works). Extracted air will be passed through an odour removal process (eg biofilter). To ensure no odour nuisance to neighbours, maximum odour concentration levels at the site boundary will be specified in the DBO contract documents. Based on current international standards, it is proposed to apply a 98% non-exceedance of one-hour average concentration of 3.0 OU/m^3 at the nearest sensitive receptor.

Noise attenuation measures will be provided to avoid nuisance to neighbours. The blowers and sludge dewatering equipment will be housed in buildings, and landscaping will be designed to provide barriers to noise emissions.

To ensure no nuisance to neighbours, noise limits at specified locations will be written into the DBO contract documents. It is proposed that the following criteria be applied at the treatment plant during its operation:

Night (22.00 to 08.00): 45 d B L Aeq
Day: (08.00 to 22.00); 55 d B L Aeq

These are limit values for the noise from the proposed works measured at the nearest receptor.

6. ECOLOGICAL EFFECTS OF PROPOSED WASTE WATER TREATMENT PLANT

The proposed waste water treatment plant will be located on the site of the existing waste water treatment plant. The existing site boundaries will be extended into surrounding rural land to the west and east to accommodate the new waste water treatment plant and access road. The adjoining land that will be incorporated into the waste water treatment site is of rural nature and there are not expected to be any significant ecological impacts from the proposed works.

There are two designated areas in the vicinity of the site: The Owenglin River, 400 metres to the northeast of the site, which is part of the Twelve Bens/Garraun Complex Special Area of Conservation (SAC), and the Connemara Bog Complex SAC, 700 metres to the southeast of the site. Figure 5 of the attached Drawings shows the locations of the two designated areas in relation to the site. Due to the separation distances there will be no impact on either area as a result of the proposed works.

An ecological screening report is included in Appendix II of this report.

A new outfall pipe will be constructed from the treatment plant to the Owenglin River estuary channel as part of the Stage 1 works. A Foreshore Licence from the Department of Agriculture, Fisheries and Food for the new outfall has been applied for, under the Foreshore Acts 1933 to 2003. This application deals with the impacts of the proposed outfall pipe on the marine environment.

A Discharge Licence from the Environmental Protection Agency has been applied for under the Waste Water Discharge (Authorisation) Regulations, 2007. This application deals with the impacts of the discharge on the receiving environment.

7. ARCHEOLOGICAL EFFECTS OF PROPOSED WASTE WATER TREATMENT PLANT

An archaeological assessment of the waste water treatment plant site was undertaken in 2005 as part of the survey for the proposed new marine outfall (Aquafact, June 2005). An extract from the marine survey report covering the archaeological assessment is provided in Appendix 2 of this report.
The archaeological assessment concluded that while there are no visible archaeological features on the site it nevertheless has archaeological potential. This is illustrated by the presence of ships timbers protruding from the mud close to north-eastern edge of the site. The assessment concluded that in view of discoveries elsewhere in similar terrain, all construction work should be monitored.

As a result of the archaeological assessment, all earthworks (topsoil stripping/general excavation works) will be monitored by a suitably qualified archaeologist licensed to the Department of Environment, Heritage and Local Government. In the event of items of archaeological importance being discovered during the course of the monitoring, the Department of the Environment, Heritage and Local Government shall be informed immediately, and any requirements in relation to preservation, recording or excavation of the items discovered shall be complied with.

8. REFERENCES

Aqua-Fact International Services Ltd (June 2005). Hydrographic Survey of Clifden Bay for a Proposed Waste Water Treatment Plant

GALWAY COUNTY COUNCIL

Clifden Sewerage scheme Stage 1
Part 8 Planning Report

Appendix I:

Archaeological Assessment (from 2005 Marine Survey Report)

RYAN HANLEY

October 2008

2.10 Archaeological assessment

The proposed site for the new sewerage treatment plant on the inner tidal reaches of Clifden Bay was inspected by a suitably qualified archaeologist (Michael Gibbons), the results of the survey are described in this section. Today the site is partially covered in woodland and the remainder consists of intertidal mud that is uncovered twice a day.

There are a handful of known archaeological sites in the immediate vicinity of the site. Tidal peats are present in the eastern area of the site which may mark buried archaeological material and a number of boats' timbers protrude from the mud north-east of the site, while these are undated, this section of the inner bay seems to have been used in the 19th Century as a dumping area for redundant sailing vessels. Two 19th Century buildings are identified on the shore east and north of the proposed site. None are currently visible on the ground.

2.10.1 Archaeological background

West Connemara has a settlement history going back to the later Mesolithic, ca. 7,000 years ago, indicated by finds of 'Bann Flakes' at Streamstown near Clifden and at Oughterard. It is exceptionally rich in Neolithic and Bronze Age sites with lesser numbers of diagnostic Early Christian and Medieval Monuments.

The bulk of the Neolithic sites consist of a series of 40 Megalithic Tombs and over 20 Standing Stones. The distribution of these monuments is largely based on the deeply cut sea inlets of northwest Connemara, in particular, Streamstown, Cleggan and Ballynakill Bays.

There are relatively few prehistoric monuments in the inner reaches of Clifden Bay or in the valley of the Owenglin, which runs due east from the head of the bay, why this is so is far from clear but it does seem to be a genuine gap. Nevertheless, there are a number of sites in the general vicinity of the proposed development including a burial site of unknown date 60 metres to the west. A full list of the known archaeological monuments in the area are presented as Appendix VI to the text.

The earliest of the sites in the hinterland of Clifden dates back to the Neolithic, c.3000B.C. It is a Megalithic Tomb, embedded in a bank of peat, 3km northeast of the site to the east in Couravoughil Townland. In the same area there are a number of stretches of partly covered bog walls, probably pre-historic in date. A single long cist set in a low cairn in Falkeeragh, 1 km to the north, is clearly prehistoric and was revealed during turf cutting (Gibbons, E. 1988). Surprisingly there are few prehistoric sites in the immediate environs of Clifden. Finds of evidence indicative of early settlement is also sparse in the Clifden area though settlement is clearly indicated by the discovery of a polished stone axe 500M due north of Clifden (Find reported to the National Museum by Michael Gibbons). This axe is about 5,000 years old. Overlooking the eastern approaches and in the view of the development, 1km to the east in Killymongaun, there is a Hill Top Cashel (Stone Fort) crowning the summit of a prominent hill guarding the entrance to the basin of the Owenglin River. The site is likely to date to the Early Christian Period and is one of a small group of such sites in Connemara. The sub-townland name of Dooneen, further south, is likely to have derived its name from this small Cashel.

To the north-east of the site lies a 19th Century Graveyard, in Tullyvoheen, burial ground of the Clifden Workhouse. There is one possible antiquity in this area also, marked as a grave on the O.S. 6 inch map. The exact nature of the grave is unclear as it has been used as a clearance cairn. No definite structure stones are visible. The present cairn is orientated north – south in marked contrast to its representation on the O.S. Map where it shown as an oval enclosure orientated east – west. A number of other cairns in the field are also said to be graves. However, their present appearance bears a closer resemblance to clearance cairns than to burial monuments. The present state of the cairns does not allow one to classify the monument.

To the south of Clifden there is a Burial Site, still in use, within which is a holy well, Tobar Beaggan. One kilometre west of the site there is a possible standing stone and evidence of a kitchen midden composed almost entirely of oyster shells has recently been exposed during the construction of a small car park, for Glenevin House, on the beach road. No dating evidence is forthcoming and similar sites in west Connemara have been dated to the early Bronze Age.

The nature of the burial is unclear and there is a possibility that it is relatively late in date and may represent an unmarked group of famine burials, which are known from elsewhere in Connemara. On the other hand its present modern appearance as a clearance cairn may hide the remains of an early Bronze Age Long Cist or single burial of Neolithic or Iron Age date.

2.10.2 Archaeological Potential of the Site

Research in intertidal areas has produced a large number of new archaeological sites in recent years. These have ranged from fish traps, weirs, and relict forests to finds of stone axes and human remains. The removal of overlying peat, mud and soil could result in the discovery of similar types of material here.

2.10.3 Conclusion

While there are no visible archaeological features on the site it nevertheless has archaeological potential. This is illustrated by the presence of ships timbers protruding from the mud close to north eastern edge of the site. In view of discoveries elsewhere in similar terrain all work should be monitored.

2.11 Probe survey

Irish Drilling Ltd. carried out a probe survey along the proposed sewage outfall pipeline. The survey was carried out on the 3rd June 2004 at low tide. Figure 2.11.1 shows the locations of the 8 probe stations. The results of the probe survey are presented in Table 2.11.1 below.

Station No.	Description	Depth (in metres)	
		From	To

GALWAY COUNTY COUNCIL

Clifden Sewerage scheme Stage 1
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Appendix II:

Ecological Screening

RYAN HANLEY

October 2008

GALWAY COUNTY COUNCIL
CHOMHAIRLE CONTAE NA GAILLIMHE

CLIFDEN SEWERAGE SCHEME



ECOLOGICAL SCREENING

OCTOBER 2008

RYAN HANLEY
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Quality Control

CLIENT	Galway County Council
PROJECT NO	1367
PROJECT TITLE	Clifden Sewerage Scheme
REPORT TITLE	Ecological Screening

Rev.	Status	Author(s)	Reviewed By	Approved By	Issue Date
1	Issue to Client	GH	TS	MJ	22/10/08

Table of contents

1 Ecological Screening

1.1 Background

A Marine Hydrographic Survey was carried out in 2005 by Aqua-Fact International Sevrices in preparation for the proposed Waste Water Treatment Plant at Clifden, Co. Galway. This included faunal studies of the intertidal and subtidal zones, together with an impact assessment for fish, bird and mammal species associated with Clifden Bay. This document forms a summary of the findings of the aforementioned report and attempts to formalise the appraisal of any potential impacts using a standardised terminology used in Ecological Impact Assessments.

1.2 Protected habitats and species

The Aqua-Fact report states that the general area of Clifden Bay encompasses one SAC, the Connemara Bog Complex. Since this time, a second local region has been designated as an SAC, the Twelve Bens/Garraun Complex, which includes the Owenglin River which flows into Clifden Bay upstream of the proposed Waste Water Treatment Plant. The NPWS site synopsis for this SAC is attached herewith. This SAC is selected for numerous habitat types listed under Annex I of the EU Habitats Directive that are found in the uplands to the east of Clifden. The proposed works will have no impact upon these habitats. However, the site is also selected for the presence of several species listed on Annex II of the Habitats Directive including the following water-dependant species; salmon, otter & freshwater pearl mussel.

The report also references the proximity of the Salt Lake, Mannin Bay and Kingstown Bay cSACs. The Salt Lake cSAC is now contained within the Connemara Bog Complex SAC. The Mannin Bay cSAC is now contained within the Slyne Head Peninsula SAC. Kingstown Bay remains as a discrete SAC unit. NPWS site synopses for all of the aforementioned designated areas are reproduced in Appendix I. The present status of designated sites in the region, as downloaded from the NPWS website *www.designatednatureareas.ie*, is shown in Figure 1.1.

The Department of Environment, Heritage and Local Government Circular L8/08 states that *ecological screening must take place for projects where there will be a surface water discharge in the catchment [including estuaries] or immediately downstream of a nature conservation site with water-dependant qualifying habitats/species*. The freshwater pearl mussel will be unaffected by any such works, but salmon and otter which use the estuary to migrate and feed respectively may be affected by any major changes to the environment within the Owenglin Estuary.

The Aqua-Fact report assesses the impacts upon both these species. Although the Owenglin is not a designated Salmon Water in the European Communities (Quality Of Salmonid Waters) Regulations, 1988, it contains important populations of salmon and sea trout which run from the estuary up the Owenglin River on annual basis. The report states that the likely improvement in water quality resulting from a new Waste Water Treatment Plant will have a positive impact on fish numbers using the river (*Long-term Moderate Positive*). No comment is made on the potential impacts on fish during construction.

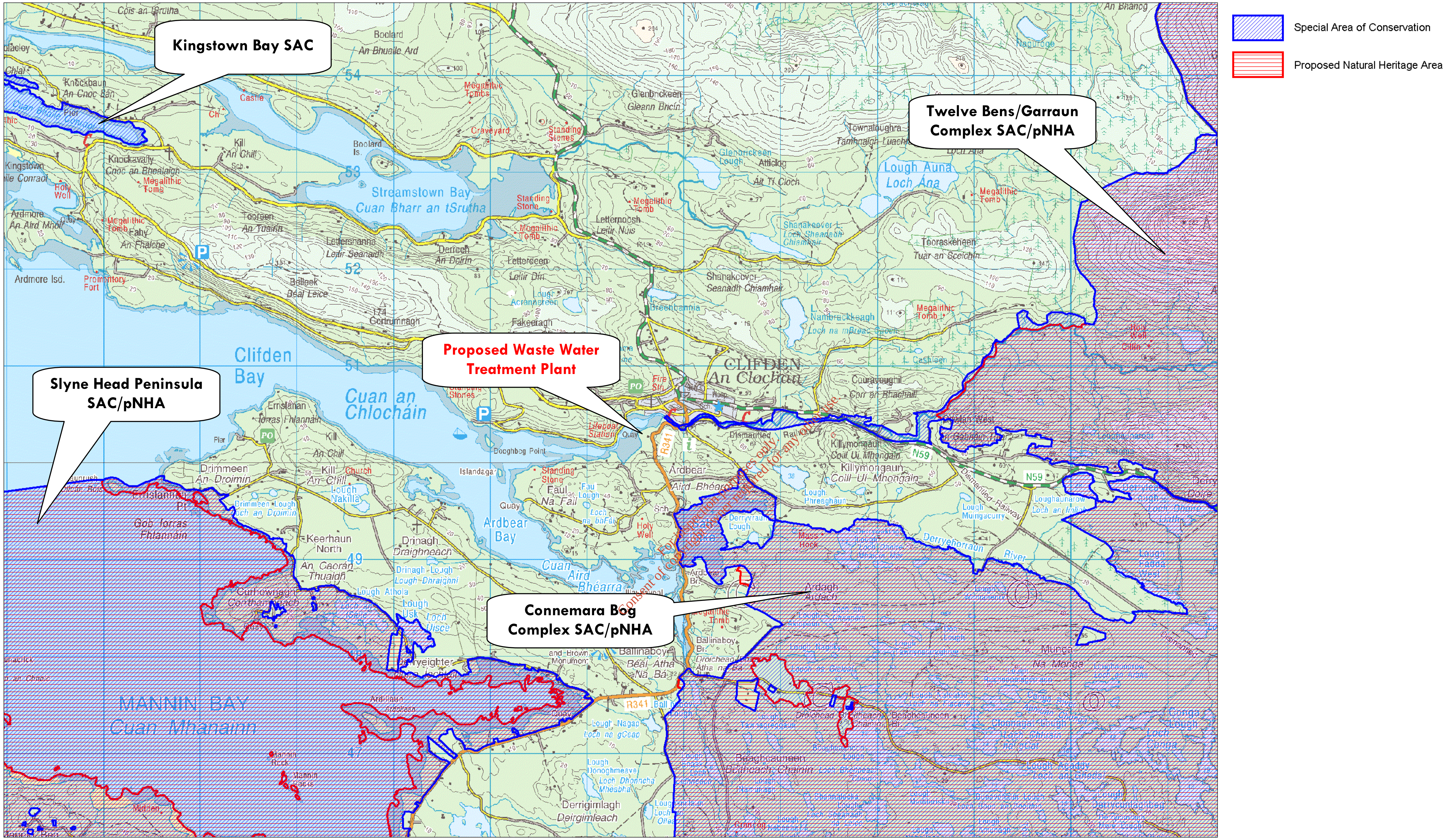

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Figure 1.1 – Designated sites in vicinity of proposed works

Otters are likely to use the Owenglin river and estuary for feeding. The report states that apart from the temporary disturbance (*Temporary Minor Negative*) during construction, the overall resultant improvement in water quality will benefit otter populations (*Long-term Moderate Positive*).

1.3 Other species

Seals such as the Common Seal are sighted infrequently in Clifden Bay; these are also listed under Annex II of the Habitats Directive. The report predicts no negative impacts on seal species from the construction phase, but suggests that an improvement in water quality following completion may be beneficial to populations (*Long-term Moderate Positive*).

The estuary provides valuable habitat for numerous avian species which use the tidal zone for breeding, overwintering and feeding. Again, the report concludes that there may be some minor disturbance to bird populations during construction (*Temporary Minor Negative*), but that the overall outcome of improved water quality in the bay will be of benefit to such species (*Long-term Moderate Positive*).

Invertebrate studies revealed high numbers of oligochaetes (*Tubificoides spp.*) and the capitellid polychaete, *Capitella capitata*. These species are regarded as bioindicators of sites with low oxygen saturations that are likely to be experiencing some degree of organic enrichment from sources such as untreated sewage. The present Clifden sewage outfall is a probable source for such material. Reduced levels of organic enrichment entering the estuary following the construction of a new Waste Water Treatment plant will allow the re-establishment a more natural ecological balance.

Section 2.8 of the Aqua-Fact Report which deals with ecological issues is reproduced in Appendix II.

Table 1 – Summary of ecological impacts as detailed in Aqua-Fact Report

Protected species	Impacts during construction	Impacts following completion
Salmon	*None listed*	*Long-term Moderate Positive*
Otter	*Temporary Minor Negative*	*Long-term Moderate Positive*
Freshwater Pearl Mussel	*No impacts*	*No impacts*
Various Seal Species	*No impacts*	*Long-term Moderate Positive*
Other Species		
Various bird species	*Temporary Minor Negative*	*Long-term Moderate Positive*

1.4 Conclusions / Further Work

In conclusion, it is predicted that providing rigorous mitigation is put in place during construction that there is little risk of major ecological damage, with a net improvement in local ecological status resulting from an increase l water quality. No terrestrial ecological survey work has been carried out on the proposed site for the treatment plant.

It is likely that a further ecological screening of the potential impacts of construction upon protected species will be necessary as and when contractors are appointed for this project and when construction methods are agreed upon. Specific method statements which limit any potential impacts to local ecology will need to be drawn up by the contractors, engineers and appointed ecologist under consultation with the relevant authorities.

APPENDIX I - NPWS Site Synopses

SITE NAME: THE TWELVE BENS/GARRAUN COMPLEX

SITE CODE: 002031

This is an extensive site situated in the north-west of Connemara, dominated by mountaineous terrain. The site is bounded to the south by the Connemara Bog Complex, to the east by the Maumturk Mountains and to the north by Killary Harbour. Included within the site are the Twelve Bens mountain range, the mountains to the north of Kylemore (Doughruagh, Garraun and Benchoona), rivers including the Ballynahinch and Owenglin systems and an area of coastal heath and machair near Glassilaun. The site also includes some extensive tracts of lowland blanket bog which are continuous with the mountains. Most of the mountain summits reach a height in excess of 500 m, the highest being Ben Baun in the Twelve Bens which reaches 730 m. The site includes a large portion of the Connemara National Park and a Statutory Nature Reserve at Derryclare Wood.

Geologically, the site can be divided into two distinct parts. The Twelve Bens are composed of resistant quartzite with schists in the valleys while the mountains north of Kylemore are composed of gneiss and various types of sandstones and mudstones. There are also areas of gabbro (Doughruagh and Currywongaun), mica schist (Muckanaght) and marble outcrops (south of Kylemore Lough). The main soil type within the site is peat.

The site is a candidate SAC selected for active blanket bog a priority habitat on Annex I of the E.U. Habitats Directive. The site is also selected as a candidate SAC for, alpine heath, calcareous rocky, siliceous rocky and siliceous scree vegetation, lowland oligotrophic lakes, Rhynchosporion and old Oak woodlands all habitats listed on Annex I of the E.U. Habitats Directive. The site is also selected for the following species listed on Annex II of the same directive - Freshwater Pearl Mussel, Atlantic Salmon, Otter and the plant Slender Naiad.

The predominant vegetation type on the site is upland blanket bog/heath dominated by Heather (*Calluna vulgaris*), Deergrass (*Scirpus cespitosus*), Cross-leaved Heath (*Erica cinerea*) and the mosses *Racomitrium lanuginosum* and *Sphagnum capillifolium*). In places this vegetation can be rich in liverwort speces such as *Adelanthus lindenbergianus* and *Bazzania pearsonii*. This unusual type of species-rich dwarf shrub heath is almost confined to the mountains of the west of Ireland and Scotland and is particularly well developed in the Twelve Bens. Close to the mountain summits this blanket bog/heath is often very thin with a high proportion of outcropping bedrock.

Another important and widespread habitat is lowland blanket bog dominated by Purple Moor-grass (*Molinia caerulea*), Black Bog-rush (*Schoenus nigricans*), Cross-leaved Heath and the liverwort *Pleurozia purpurea*. These areas of lowland blanket bog usually occur in the valleys between the mountains, e.g. the Gleninagh Valley.

Rhynchosporion vegetation is well represented around pools, in wet hollows and in quaking and flush areas associated with the lowland blanket bog. White Beak-sedge (*Rhynchospora alba)* occurs in association with such species as Bog Cotton (*Eriophorum angustifolium),* Bogbean *(Menyanthes trifoliata),* Black Bog-rush *(Schoenus nigricans),* and a range of bog mosses, including *Sphagnum auriculatum* and *S. cuspidatum*.

The site contains a large range of others habitats, including upland grassland dominated by Sheep's Fescue (*Festuca ovina*) and Mat-grass (*Nardus stricta*), Sessile Oak (*Quercus petraea*) woodland, scree, oligotrophic (nutrient-poor) lakes, rivers, reedbeds, freshwater marshes, coastal heath, machair, sand dune and salt marsh.

A number of rare, Red Data Book plant species are found within the site: Alpine Saw-wort (*Saussurea alpina*), Holly Fern (*Polystichum lonchitis*), Purple Saxifrage (*Saxifraga oppositifolia*), and the legally protected (Flora Protection Order, 1999) Parsley Fern (*Cryptogramma crispa*). These are generally confined to mountains cliffs above 400 m, where a number of other scarce plant species, for example, Alpine Meadow-rue (*Thalictrum alpinum*), are also found. Other Red Data Book species have also been recorded from the site: Marsh Clubmoss (*Lycopodiella inundata*), Corncockle (*Agrostemma githago*) and the legally protected Heath Cudweed (*Omalotheca sylvatica*). The latter two species have not been recorded from the site in recent years. St. Dabeoc's Heath (*Daboecia cantabrica*), a species which in Ireland is restricted to Connemara and south Mayo, occurs commonly within the site.

The suite of lowland lakes that encircle the mountains represent some of the finest oligotrophic lakes in the country and two rare, Red Data Book plant species, Slender Naiad (*Najas flexilis*) and Pillwort (*Pilularia globulifera*) occur. Slender Naiad is rare in Europe and is listed on Annex II of the EU Habitats Directive.

The site contains several small areas of Sessile Oak woodland, a habitat which is particularly rare in Connemara. The best examples on the site of this habitat are found at Kylemore and on the north shore of Derryclare Lough. Derryclare Wood, a Statutory Nature Reserve, has been particularly well studied. It is composed mostly of Sessile Oak, with some Rowan (*Sorbus aucuparia*), Downy Birch (*Betula pubescens*) and occasional Ash (*Fraxinus excelsior*) forming the canopy layer. There is a well-developed lichen and fungus flora present. The fungal parasite, *Hemigrapha astericus*, a native of Australia and South America, was first recorded in the northern hemisphere from this wood. The Kylemore woods, though heavily infested by Rhododendron (*Rhododendron ponticum*), still retain a diverse flora and support interesting communities of mosses and liverworts, including such species as *Radula voluta, Lejeunea holtii, L. hibernica, L. flava* subsp. *moorei, Cephalozia hibernica, Teleranea nematodes, Campylopus setifolius, Oxystegus hibernicus, Grimmia hartmanii* and *G. funalis*.

Irish Hare, Otter, Freshwater Pearl-mussel and Common Frog have been recorded from the site. These species are protected under the 1976 Wildlife Act. The Owenglin River and Ballynahinch system supports an important population of Salmon and salmon nursery grounds. Arctic Charr, a species listed in the Irish Red Data Book as threatened in Ireland, has been recorded from Lough Inagh, Kylemore Lough, Lough

Muck and Lough Fee.

Birdlife reported from the site includes Raven, Wheatear, Stonechat, Meadow Pipit, Red Grouse, a declining species of Heather moorland, Snipe, Curlew, Woodcock, Hooded Crow, Twite, Ring Ouzel (the latter two both Irish Red Data Book species) and the EU Birds Directive Annex I species, Peregrine, Merlin, Golden Plover and Chough. The site provides excellent habitat for Peregrine and this species has traditionally bred at several locations within it.

The upland vegetation of the site is most threatened by overstocking with sheep and by afforestation with coniferous species.

The Twelve Bens/Garraun Complex includes a wide variety of habitat types, eight of which are listed on Annex I of the EU Habitats Directive, and populations of many rare or scarce plant and animal species. It is one of the largest and most varied sites of conservation interest in Ireland.

8.12.2005

LIST OF QUALIFYING INTERESTS UNDER THE HABITATS DIRECTIVE

Site Code: 002031	***Name: THE TWELVE BENS/GARRAUN COMPLEX***
Qualifying Code	***Qualifying Name***
1029+	Freshwater Pearl Mussel (*Margaritifera margaritifera*)
1106	Salmon (*Salmo salar*)
1355+	Otter (*Lutra lutra*)
1833+	Slender Naiad (*Najas flexilis*)
3110	Lowland oligotrophic lakes
4060	Alpine and subalpine heath
7130	Blanket bog (active)
7150	Depressions on peat substrates (*Rhynchosporion*)
8110	Siliceous scree
8210	Calcareous rocky
8220	Siliceous rocky
91A0	Old Oak woodlands

The Wildlife Acts 1976 & 2000 contain obligations for all persons to conserve specific species (including, but not confined to, those with + in the list above) that may occur from time to time within the SAC.

SITE NAME: CONNEMARA BOG COMPLEX

SITE CODE: 002034

The Connemara Bog Complex is a large site encompassing the majority of the south Connemara lowlands, Co. Galway. The site is bounded to the north by the Galway-Clifden road and stretches as far east as the Moycullen-Spiddal road. Because of its large size the site contains a wide range of habitats. Extensive tracts of western blanket bog form the core interest, but there are also areas of heath, woodland, lakes, rivers and streams.

The Connemara Bog Complex is underlain predominantly by various Galway granites, with small areas along the northern boundary of Lakes Marble, schist and gneiss. The Roundstone bog area has a diverse bedrock geology composed mainly of the basic intrusive rock, gabbro. An area of rock, possibly Cambrian in age, called the Delaney Dome Formation occurs in the north-west of this area. Gabbro also occurs in the Kilkieran peninsula and near Cashel. The whole area was glaciated in the last Ice Age which scoured the lowlands of Connemara.

The site is a candidate SAC selected for active blanket bog and lagoons, both priority habitats on Annex I of the E.U. Habitats Directive. The site is also selected as a candidate SAC for floating river vegetation, wet and dry heath, alkaline fen, transition mires, lowland oligotrophic lakes, dystrophic lakes, Rhynchosporion, old Oak woodlands, *Molinia* meadows and reefs, all habitats listed on Annex I of the E.U. Habitats Directive. The site is also selected for the following species listed on Annex II of the same directive - Atlantic Salmon, Otter, the plant Slender Naiad and the Marsh Fritillary butterfly.

The main habitat within this site is lowland Atlantic blanket bog. Most of the area is covered by blanket peat greater than one metre in depth. The Connemara Bog Complex is characterized by areas of deeper peat surrounded by rocky granite outcrops, covered by heath vegetation. The deeper peat areas are often covered by lakes and river systems. A mosaic of different communities therefore exists. These include, hummock/hollow systems, inter-connecting pools, Atlantic blanket bog pools, flushes, transition and quaking mires, freshwater marshes, lakeshore, lake and river systems. The key plant species of lowland blanket bog are Black Bog-rush (*Schoenus nigricans*), Purple Moor-grass (*Molinia caerulea*), Cross-leaved Heath (*Erica tetralix*), Deergrass (*Scirpus cespitosus*), Common Cottongrass (*Eriophorum angustifolium*), Bog Asphodel (*Narthecium ossifragum*), White Beak-sedge (*Rhynchospora alba*) and Bog Moss (*Sphagnum*) species.

Small patches of deciduous woodland and a large number of oligotrophic lakes add to the habitat diversity of the site. Also occurring within the site are several lagoons (a type of brackish lake) which display considerable variations in size, depth and salinity, resulting in a diverse assemblage of floral and faunal communities.
Nine legally protected plant species occur within this site (Flora (Protection) Order, 1999): Forked Spleenwort (*Asplenium septentrionale*), Parsley Fern (*Cryptogramma*

crispa), Bog Hair-grass (*Deschampsia setacea*), Slender Cottongrass (*Eriophorum gracile*), Bog Orchid (*Hammarbya paludosa*), Slender Naiad (*Najas flexilis*), Heath Cudweed (*Omalotheca sylvatica*), Pillwort (*Pilularia globulifera*) and Pale Dog-violet (*Viola lactea*). The rare and threatened species, Dorset Heath (*Erica ciliaris*), Mackay's Heath (*Erica mackaiana*) and Green-winged Orchid (*Orchis morio*) also occur within this site. All the above species are listed in the Irish Red Data Book and Slender Naiad is listed on Annex II of the EU Habitats Directive.

The site is of national importance for wintering populations of Greenland White-fronted Geese. Small flocks (up to 30) are nowadays found on Roundstone Bog and also use the bogs between Recess and Maam Cross. In April 1989 a synchronised ground and air census of the Connemara bogs located 7 flocks of White-fronts, totalling 134-137 birds. In 1991/93 wintering numbers were considered to be not much more than 60 birds.

There is an internationally important breeding area for Cormorants at Lough Scannive with 218 pairs present in 1985 in a colony which is known to have existed pre-1968. Golden Plover, a species listed on Annex I of the EU Birds Directive, nests at up to four locations in the site, with a maximum of two pairs noted at any one location. Another Annex I species known to be present in the site is Merlin. Lough Naskanniva is an important inland breeding site for Common Terns (up to 60 pairs in 1977 and 1992) and Choughs, both of which are also Annex I species under the EU Birds Directive.

Atlantic Salmon, listed under Annex II of the E.U. Habitats Directive occurs in many of the rivers within the site. The Cashla and Ballynahinch systems are good examples of western acidic spate rivers which support the species. Good spawning and nursery grounds for the species occur in these systems. Arctic Charr occurs in a number of lakes within the site: Ballynahinch Lake, Glenicmurrin Lough and Lough Shindilla. The species has also been reported from Lough Oorid and Lough Glendollagh in the past, but has not been recorded from these lakes in recent years. Arctic Charr is listed in the Irish Red Data Book as being threatened.

Otter has been recorded as occurring in the Connemara Bog Complex. Irish Hare, another mammal listed in the Red Data Book, occurs on the site. Common Frog breeds on the site. It is listed in the Irish Red Data Book as internationally important and on Annex V of the EU Habitats Directive.

The main damaging operations and threats in the Connemara Bog Complex are peat-cutting, overgrazing and afforestation. Extensive peat extraction using 'Difco' machines has become common in the region in recent years and cutting by excavator and hopper is also increasing. The handcutting of peat is less threatening as it is usually on a much smaller scale but it still needs to be controlled within the site. Afforestation also threatens the site. Forestry affects habitat uniformity, lake and river catchments, nesting and feeding habitats for animals, and landscape integrity. Overgrazing and poaching by sheep and cattle is a widespread problem within the site, with erosion of peat ensuing. The above operations are the most extensive but other threats and potentially damaging operations include land drainage and reclamation, fertilization, quarrying and dumping.

In summary, the Connemara Bog Complex encompasses a large area of relatively undamaged lowland Atlantic blanket bog of high conservation significance to Ireland as well as Europe. The site has nine protected and threatened Irish Red Data Book plant species. The site is internationally important for Cormorants and nationally important for Greenland White-fronted Geese and contains nesting sites for Golden Plover. The site supports several bird species listed on Annex I of the EU Birds Directive and a range of plant and animal species listed on Annex II of the EU Habitats Directive.

13.12.2005

SITE NAME: SLYNE HEAD PENINSULA

SITE CODE: 002074

This site comprises the peninsula west of Ballyconneely, Co. Galway. It extends northwards to Errislannan Point to include the shallow waters of Mannin Bay. The peninsula is low-lying and undulating, reaching a maximum height of only 64 m (Doon Hill). The underlying rock is predominantly gneiss, except for schist along the northern shores of Mannin Bay, a granite ridge along the western edge of the peninsula and a conspicuous basalt exposure which forms Doon Hill.

The peninsula is fringed with rocky shores and sandy beaches, with some extensive areas of machair and several brackish lakes and lagoons. Inland, the site is a maze of small fields, supporting a mosaic of habitats dominated by grassland and heath, interspersed with numerous lakes and associated swamp, marsh and fen. An important feature of the site is the influence of windblown calcareous sand on these habitats.

The site is a candidate SAC selected for lagoon, machair and orchid-rich grassland, all priority habitats on Annex I of the E.U. Habitats Directive. The site is also selected as a candidate SAC for other habitats listed on Annex I of the directive – lowland hay meadows, alkaline fen, *Molinia* meadows, large shallow inlets and bays, perennial vegetation of stony banks, drift line vegetation, reefs, shifting dunes, Marram dunes, Atlantic saltmarsh, Mediterranean saltmarsh, lowland oligotrophic lakes, hard-water lakes, Juniper scrub and dry heaths. In addition, the site is also selected as a candidate SAC for the liverwort, Petalwort and Slender naiad, both plants listed on Annex II of the E.U. Habitats Directive.

Mannin Bay is an excellent example of a large shallow bay, with a wide range of sediment types. The islets and rocks at the mouth of the bay give some shelter from Atlantic swells. Conditions become more sheltered towards the head of the bay and are extremely sheltered in Mannin Creek. Tidal streams are weak. There are a very high number of sediment communities for such a small area. Mannin Bay is almost unique as a very large proportion of the bay is dominated by a combination of maerl debris and living maerl. Maerl is free living red calcareous algae generally called 'coral'. The two species that are most abundant in Mannin Bay are *Lithothamnion corallioides* and *Phymatolithon calcareum*. In addition *Lithophyllum fasclatum* and *Lithophylum dentatum* have also been recorded. In shallow water, the eelgrass *Zostera marina* and maerl are found together, an uncommon combination known only from two other locations in Ireland. Mannin Bay has excellent examples of communities characterised by burrowing brittlestars *Amphiura brachiata* and *Amphiura filiformis*. The brittle star *Ophiopsila annulosa* is present and is an uncommon species. In addition there is an unusual community characterised by the tubeworm *Sabella pavonina* in Mannin Creek. The shores on the south side of Mannin Creek are known to have bivalve communities with unusually high species diversity. The beaches of Mannin Bay are unusual as they are composed of maerl debris.

Mannin Bay has good examples of littoral reef communities that are sheltered from

wave action and subject to moderate tidal streams. Shoreline communities follow a zonation of lichen zones followed by *Pelvetia canaliculata* and then barnacles and limpets with *Fucus spiralis*. The zones are narrow (1-1.5m), which is typical of sheltered shores. Most of the shore is composed of flat bedrock and boulders characterised by dense *Ascophyllum nodosum* and *Fucus vesiculosus*. The dogwhelk (*Nucella lapillus*) is common. On the lower shore is a band of *Fucus serratus* on boulders and bedrock, with sponges, anemones and red algae. In the sublittoral fringe is a mixed flora of kelps (*Laminaria saccharina*, *Laminaria digitata*, *Saccorhiza polyschides* and *Himanthalia elongata*) and red algae, with areas of sand and gravel with maerl. Sponges, anemones, tunicates and bryozoan crusts are common on the vertical sides and under the boulders. In the shelter of Mannin Creek the uncommon community characterised by *Ascophyllum nodosum* var. *mackii* is found on the north side of the creek.

Machair is particularly well developed and forms extensive plains at Mannin Beg and Aillebrack. The machair has a typically herb-rich sward dominated by species such as Red Fescue (*Festuca rubra*), Wild Thyme (*Thymus praecox*), Lady's bedstraw (*Galium verum*), Daisy (*Bellis perennis*), Clovers (*Trifolium* spp.) and Plantains (*Plantago lanceolata* and *P. coronopus*), with damp areas of Creeping Bent (*Agrostis stolonifera*), Silverweed (*Potentilla anserina*) and small sedges (*Carex* spp.). The rare liverwort *Petalophyllum ralfsii*, a species listed under Annex II of the E.U. Habitats Directive, occurs within damp hollows in the machairs. The population at this site is the largest known in both Ireland and the world.

The machair gives way to bare sand in places with embryonic shifting dunes. These areas are characterised by the presence of Sand Couch (*Elymus farctus*) and Sand Sedge (*Carex arenaria*). Some Marram (*Ammophila arenaria*) dunes occur west of Mannin and towards the tip of the Slyne Head headland. Sandy beaches occur at the seaward side of the machair systems, some of which are 'coral' strands composed of the chalky skeletons of red seaweeds (*Lithothamnion* sp. and *Phymatolithion* sp.). Above the beaches typical driftline vegetation and shingle is found with species such as Prickly Saltwort (*Salsola kali*), Frosted Orache (*Atriplex lacinata*) and Sea Rocket (*Cakile maritima*). Parts of the shoreline, particularly east of Mannin machair, are fringed with saltmarsh vegetation developed on peat. Typical species found here include Common Saltmarsh-grass (*Puccinellia maritima*), Sea Plantain (*Plantago maritima*), Sea Milkwort (*Glaux maritima*) and Thrift (*Armeria maritima*). Saltmarsh dominated by dense stands of Sea Rush (*Juncus maritimus*) occur at the entrance to Salt Lough.

Brackish lakes and lagoons are a feature of this site. These include Ballyconneelly Lake, Lough Silverhill, Lough Aillebrack South and Lough Athola. These lakes are shallow, with sandy bottoms and shores and may be directly connected to the sea. They all receive sea spray and during storms may be flooded by the sea. Characteristic species are Pondweeds (*Potamogeton* spp.), Stoneworts (*Chara* spp.) and Tasselweed (*Ruppia maritima*).

The largest freshwater lake is Lough Anaserd, a typical oligotrophic (nutrient-poor) lake surrounded by heathland. It has a stony shore and numerous rocky islands, some covered with heath vegetation. Aquatic species noted from here include Quillwort

(*Isoetes lacustris*), Bulbous Rush (*Juncus bulbosus*), Pipewort (*Eriocaulon aquaticum*), Alternate Water-milfoil (*Myriophyllum alterniflorum*) and Awlwort (*Subularia aquatica*). The rare Slender Naiad (*Najas flexilis*), a species protected under the Flora (Protection) Order, 1999, and listed on Annex II of the E.U. Habitats Directive, is also found here. Truska Lough is another oligotrophic lake and Manninmore Lake is also probably of this type. Other lakes within the site are more nutrient-rich in character, possibly due to a brackish influence (e.g. Dereen Lough), and are fringed with Common Reed (*Phragmites australis*) and Many-stalked Spike-rush (*Eleocharis multicaulis*). Also of importance are the associated areas of species-rich marsh (e.g. Ballyconneely and Bunowen marshes) and fen (e.g.Triska), the latter dominated by Black Bog-rush (*Schoenus nigricans*), Blunt-flowered Rush (*Juncus subnodulosus*) and sedges (*Carex elata*, *C. lasiocarpa*). A scarce orchid, *Dactylorhiza traunsteineri*, typically found in calcareous marshes and fens, is recorded from this site.

Much of the inland peninsula consists of small fields which contain a complex mosaic of habitats ranging from dry grassland, hay meadow and heath through to wet grassland and marsh. The heath occurs mainly in areas of outcropping rock and is dominated by Western Gorse (*Ulex gallii*), Bell Heather (*Erica cinerea*), Cross-leaved Heath (*Erica tetralix*) and St. Dabeoc's Heath (*Daboecia cantabrica*). Juniper (*Juniperus communis*) is also a frequent component of the heath communities here. The dry grassland supports vegetation rich in orchid species, including Early Purple Orchid (*Orchis mascula*), the two Butterfly orchids (*Platanthera bifolia* and *P. chlorantha*) and the Red Data Book species Green-winged Orchid (*Orchis morio*). Two further Red Data Book species, Pyramidal Bugle (*Ajuga pyramidalis*) and Pale Dog-violet (*Viola lactea*), occur amongst the heath/grassland mosaic.

Three Annex I Bird Directive species are known to breed - Chough (8 pairs in 1992), Sandwich Tern (31 pairs in 1995) and Common Tern (5 pairs in 1995).

The main landuse within the site is grazing by cattle, along with some sheep and horses. This is mostly of low to moderate intensity though parts of the machair may be over-grazed. Part of the machair and dune system at Aillebrack has been damaged by the construction of a golf course and this area is excluded from the site. Leisure and tourist related activities may also be damaging parts of the machair system.

This site is of ecological importance for the range and diversity of its semi-natural habitats, many of which are listed on Annex I of the Habitats Directive. The interface between calcareous sand dunes, machair, heath and grassland communities is of particular note. The site is also important for a number of rare and scarce species, especially the liverwort *Petalophyllum ralfsii*.

16.1.2003

SITE NAME: KINGSTOWN BAY

SITE CODE: 2265

Kingstown Bay is a small, narrow bay situated approximately 7 km north-west of Clifden and south of Streamstown Bay, Co. Galway. It is an unusually shallow bay that is about 3 km long and 500 m wide at the mouth. The north-westerly aspect of the bay and the offshore islands of Omey, Inishturk and Turbot at the mouth afford shelter from Atlantic swells. Conditions become even more sheltered towards the head of the bay where the sediment is muddy. Currents within the bay can be moderately strong.

The bay is of conservation importance because there are excellent populations of the free-living, red coralline algae (maerl-forming species) *Lithophyllum dentatum*, *Lithophyllum fasciculatum* and *Lithothamnion corallioides* (which may be locally known as 'coral'). These occur midway along the bay at 0-2 m in depth. The bed is very dense and is formed by unusually large individuals. It has a very heterogeneous composition in which patches dominated by *Lithophyllum dentatum* and *Lithophyllum fasciculatum* alternate with patches dominated by *Lithothamnion corallioides*. Kingstown Bay has the second largest known population of *Lithophyllum dentatum* in Ireland and the largest population of *Lithophyllum fasciculatum*, but species being rare nationally. There are only three known sites where these three species co-occur (the others being Kilkieran slip and Kinvarra Bay, both also in Galway), and this is by far the best example of this association, in terms of plant density and plant size.

Seagrass (*Zostera marina*) occurs in a number of places in the bay and is dense in areas within the maerl bed. The algal community is characterized by several species of filamentous and foliose red algae (e.g. *Antithamnion* spp., *Ceramium* spp., *Polysiphonia* spp. and *Cryptopleura ramosa*), brown algae (e.g. *Mesogloia vermiculata* and *Dictyota dichotoma*) and green algae (e.g. *Derbesia marina* and *Ulva lactuca*). Several epiphytic algae also occur in the area. Of particular interest are *Gelidiella calcicola*, thought to be endemic to maerl, and the common coralline alga, *Corallina officinalis*, which grows in unattached balls at Kingstown Bay. Sheltered rocky shores are dominated by the brown alga *Ascophyllum nodosum*. The faunal community of the bay includes sponges, anemones, crustaceans, bivalve and gastropod molluscs, and fish. The oyster (*Ostrea edulis*) occurs.

Broken coralline algae accumulates between rocky outcrops on the shore, forming shallow beaches that are approximately 20 – 30 m wide. A small grassy island, Hog Island, occurs at the mouth of the bay.

Kingstown Bay is of high conservation importance owing to the presence of an excellent example of a sheltered bay, a habitat that is listed on Annex I of the EU Habitats Directive.

17.9.2001

2.8. Faunal studies

2.8.1 Intertidal studies

A survey of the intertidal habitats along the proposed route of the pipe and the location where the pipe will enter the sea was undertaken to document the species present and to describe the quality of the habitats. The survey was undertaken on April 6th 2004, when predicted low water was 0.4 m at 12.35. Weather on the day was fine. Three core samples (20 cm diameter) were collected at ca 25 m intervals along the pipeline from the proposed treatment works to the final point of entry to the sea at the narrows. The sediment at some of the stations in the inner part of Clifden Bay was extremely soft, making it impossible to gain access to the sites and therefore impossible to collect samples. Additionally, the presence of large numbers of mussels, *Mytilus edulis*, at the seaward end of the transect made it impossible to collect sediment samples there. Six locations were sampled using the corer while observations were made at the mussel reef for epifaunal species. The sediments from two of the cores were washed through a 1 mm mesh and the material retained was preserved in 70% alcohol for later examination in the lab. A subsample of the third core was retained for granulometric analysis. Observations on the smell and colour of the sediment and any macrofauna noted were made in the field.

The sediment along the proposed pipeline route in the inner part of Clifden Bay had a very strong smell of hydrogen sulphide/methane and except for the top ca 0.5 mm was black in colour. No obvious macrofaunal species were noted in the washed material. A total of 9 species were recorded including Nematodes (indet), 1 oligochate and 7 polychaetes in this inner section of the proposed pipeline route (see Table 2.8.1).

	St. 1	St. 2	St. 3	St. 4	St. 5	St.6
Nematoda	3	5		5	2	7
Oligochaeta	12	17	22	14	27	3
Platyneries dumerilii						3
Spio filicornis				2	3	8
Malacoceros fuligenosus	2	6	8	3	1	1
Capitella capitata	3	5	9	14	19	5
Cirratulidae sp					2	5
Arenicola marina					1	1
Melinna palmata					1	

Table 2.8.1. List of species recorded from six sites along the proposed pipeline route from the treatment works in inner Clifden Bay.

As can be seen from Table 2.8.1 numbers of individuals at the sampled locations along the proposed pipeline route were low with highest numbers being returned for oligochaetes and the capitellid polychaete *Capitella capitata.* These species are tolerant of low levels of sedimentary oxygen and a re typical of areas that are experiencing some level of organic enrichment e.g. untreated sewage.

The results of the granulometric analyses on sediment samples taken at the same 6 locations are presented in Table 2.8.2.

	≤ 0.063 mm	.09 -.125 mm	.125 - .25 mm	.25 - .5 mm	.5 - .85 mm	≥ .85 mm
St. 1	8	39	21	17	12	2
St. 2	7	28	23	21	17	3
St. 3	9	37	22	19	11	1
St. 4	10	53	16	12	9	–
St. 5	11	47	14	15	18	4
St. 6	12	46	21	22	13	5

Table 2.8.2. Results of granulometric analyses on sediment samples taken in inner Clifden Bay.

The results show that the sediments in inner Clifden Bay are characterised by muddy sands and fine sands with low levels of medium and coarse sands present. The intertidal habitat at the final section of the proposed route is completely dominated by mussels, *Mytilus edulis*, that form a carpet of shells over the sea bed.

2.8.2 Subtidal studies

On the 24th March 2004 eight stations were sampled for benthic macrofauna along the pipeline route from the proposed outfall toward the shore at Clifden Beach (see Figure 2.8.1). The station positions were approximately equidistant apart. Two cores (approximately 10cm in diameter) were taken at each station.

These core samples were taken to determine the baseline diversity of fauna, the presence and importance of indicator species and the effects of any organic pollution within the area. On return to the laboratory the samples were washed through a 1mm sieve and preserved in 70% alcohol and were then sorted and identified where possible to species level.

Fifty-one invertebrate species were identified in total, consisting of 26 Polychaeta, 5 Oligochaeta, 9 Crustacea, 7 Mollusca, and 4 species of juvenile fish. No rare or unusual species were recorded. A complete list of the macrofauna recorded can be found in Appendix III.

From the species recorded, there is more than one suitable classification for this type of habitat. According to the Marine Nature Conservation Review (1997) this biotope can be classed as '*Capitella capitata* in enriched sublittoral muddy sediments (IMS.Cap)' or '*Capitella capitata* and *Tubificoides* spp. in reduced salinity infralittoral muddy sediment (IMU.CapTub)' or in the case of the outer Stations 5, 6, 7 and 8 it can be described as '*Nephtys hombergii* and *Tubificoides* spp. in variable salinity infralittoral

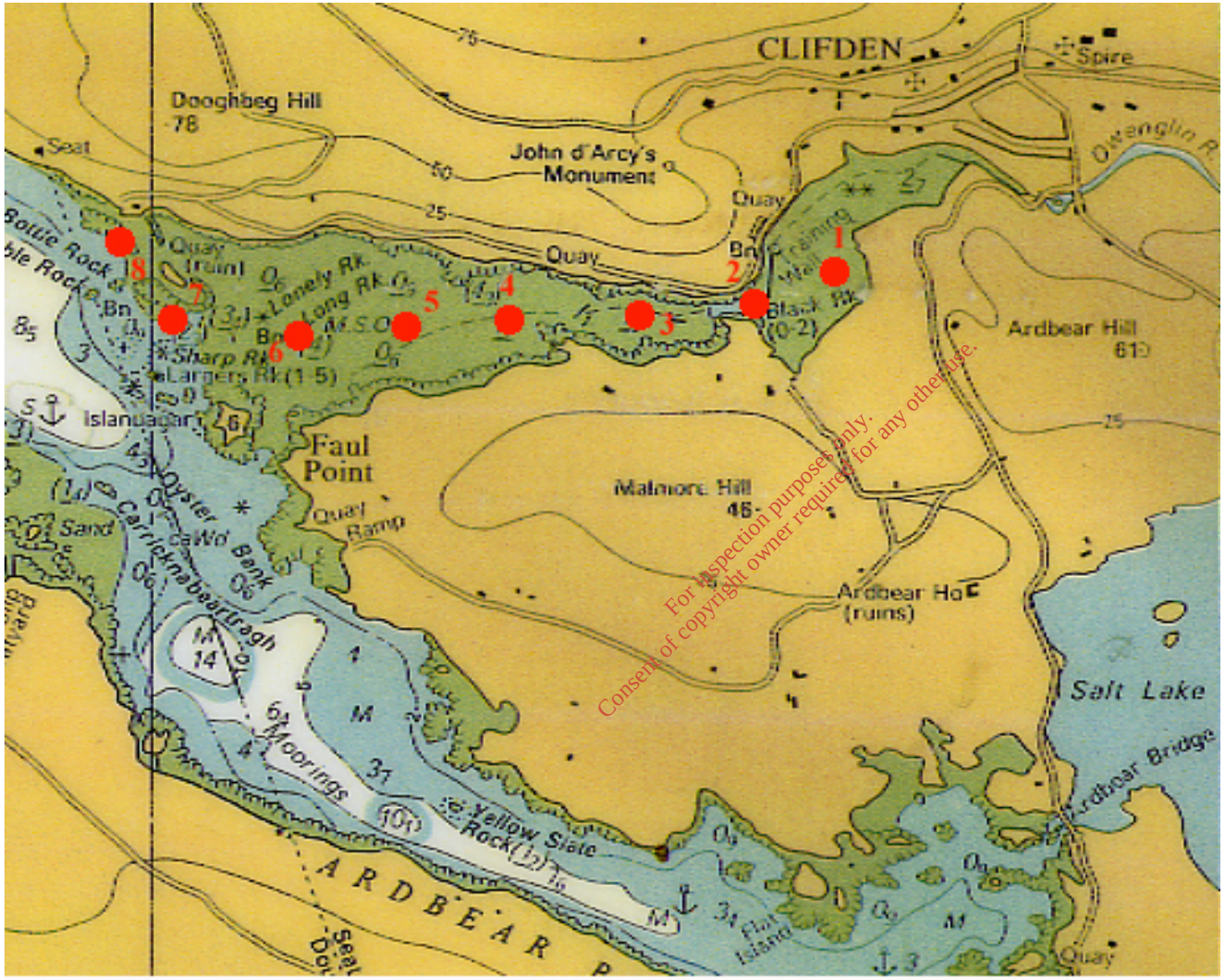

Figure 2.8.1: Map showing faunal core locations in Inner Clifden Bay. Stations 1-8 are marked in red.

soft mud (IMU.NhomTub)'. The polychaete *Capitella capitata* is an opportunist associated with organically enriched and polluted sediments where it may be superabundant. Characterising species such as nematodes, *Tubificoides*, *Pygospio elegans* and *Malacoceros fuliginosus* may also survive in enriched sublittoral muddy sediments, but rarely in high numbers (Connor, 1997). This biotope may occur as a result of anthropogenic activities such as fish farming and sewerage effluent (Connor, 1997). The existing sewerage outfall is located in inner Clifden Bay close to the site of the proposed outfall and thus the sampling stations closest to this area will be enriched by sewerage effluent.

Reduced salinity muddy sediment can also be characterised by low species richness and the presence of the polychaete *Capitella capitata*. Large numbers of the oligochaetes *Tubificoides* spp. may be found in conjunction with *Capitella capitata*. This biotope of reduced salinity infralittoral muddy sediment usually has a high organic content (Connor, 1997) and can also be found in inner Clifden Bay. There are high numbers of oligochaetes recorded from all stations but particularly the inner stations. These inner sampling stations would also be influenced by freshwater from the Owenglin and thus are a suitable habitat for faunal species tolerant of reduced salinity such as *Tubificoides* spp.

The polychaete *Nephtys hombergii* was recorded from the outer sampling stations in Clifden Bay, along with the polychaete *Scoloplos armiger* and relatively high numbers of *Tubificoides* spp. Variable salinity soft infralittoral mud and sandy mud are usually a suitable habitat for these species along with low numbers of the bivalve *Macoma balthica* (Connor, 1997).

2.8.3 Fish

Clifden Bay supports the usual variety of marine fish with such species as blennies, gobies, butter fish, pipe fish, Connemara lump suckers, Pollack, black Pollack, wrasse and eel being common. Salmon and sea-trout have been recorded from the

Owenglin River on an annual basis. The river is considered a sea-trout fishery (season June 1st to September 30th) although stocks have been low in recent years. The salmon season runs from February 1st to September 30th and the brown trout season is from February 15th to October 12th. The proposed sewerage treatment works will improve water quality in inner Clifden Bay and also within the Owenglin estuary. This is expected to have a positive impact on the Owenglin fishery and associated stocks of sea-trout, salmon and trout.

Grilse have been recorded from the Ardbear Bay area and arrive with the first flood in June and continue throughout the season with the average size of fish being small. Fishing is prohibited between the Ardbear New Bridge and the Ardbear Old Bridge on or after May 15th.

2.8.4 Birds

A reasonable variety of bird species can be seen in the Clifden Bay area and included in this list are Great Northern Diver, Great Blackbacked Gull, Lesser Blackbacked Gull, Herring Gull, Blackheaded Gull, "comic" Tern, Sandwich Tern, Fulmar, Black Guillemot, Guillemot, Razorbill, Shag, Cormorant, Heron, Curlew, Whimbrel, Oystercatcher, Turnstone, Redshank, Greenshank, Ringed Plover, Grey Plover, Green Plover, Shellduck, Mallard, Widgeon, Teal, Mute Swan, Rock Dove, Rock Pipit and Peregrine. This is not an exhaustive list. Species that use the sea and the seashore as a feeding/breeding resource are likely to be impacted by a deterioration in water quality. However, as the planned upgrade of the sewage treatment plant will improve water quality, it is extremely unlikely that any bird species will be negatively impacted. The only negative impact will arise during the construction period of the pipeline but as this is likely to be temporally short, the significance of this impact is considered very low.

2.8.5 Mammals

Inner Clifden Bay and specifically the proposed development site are considered too shallow for marine cetaceans and there are no expected negative impacts to these

species as a result of the proposed development. Dolphins are occasionally seen in outer Clifden Bay.

Seals have been sighted in inner Clifden Bay, although infrequently, the Common Seal being the most regular user of the inner bay area. No negative impacts are expected to these mammals as a result of the proposed treatment works. In fact, it is anticipated that the improvement in water quality within Clifden Bay will result in a more favourable environment for seals.

The same habitat improvement will benefit otters. These have been recorded from the general area and will also use the Owenglin and adjoining lakes. Apart from temporary disturbance, there are no significant negative impacts expected for this species during the construction stage, as otters avoid human activity and will only frequent areas less impacted by man.

All cetaceans, seals and otters are protected as Annex II species under the Habitats Directive, 1992.

2.8.6 Special Areas of Conservation

As noted in the introductory chapter of this report, the general area of Clifden Bay encompasses one candidate Special Area of Conservation (cSAC) (see Appendix I, Connemara Bog complex cSAC site synopsis) and there are a number of other cSACs close to the study area (Mannin Bay and Kingstown Bay). These locations require protection under both EU and Irish law and their conservation status should not be compromised by any development.

The ecology of Salt Lake is regulated by catastrophic, natural events that cause the almost complete de-oxygenation of the water column in the sea lake thereby killing all sessile species that inhabit the area. Recovery of a *Serpula vermicularis* reef in Salt Lake, Clifden, Co. Galway following deoxygenation due to oxygen-sediment demand is

nonetheless quite rapid taking ca 1 year. The collapse and recovery of a similar assemblage has been recorded in the Ordovician by Steele-Petrovich and Bolton (1998). This type of ecosystem occurs in other places around the Irish coastline.

Given the distance from the proposed sewage outfall and the fact that the effluent quality will be significantly improved, it is considered impossible that the proposed new scheme could have any negative effect on the functioning of the ecology of Salt Lake. Similarly, due to distances involved and available dilutions, the conservation status of Kingstown and Mannin Bay cSACs will not be affected.

2.9. Hydrodynamic modelling

As part of this study, a computer based hydrodynamic and water quality model called DIVAST, was used to illustrate the changes in water quality in Clifden Bay due to faecal coliform and Biological Oxygen Demand (BOD) discharges from a proposed marine outfall diffuser. In addition to using DIVAST, the U.S. E.P.A.'s Cornell Mixing Zone Expert System (CORMIX) was also used to carry out the environmental design of the diffuser and compare different diffuser configurations to see if there was any difference in the dilution of the effluent in the near field. CORMIX enables the local characteristics of effluent plumes to be simulated based on the outfall diffuser configuration. It provides valuable information relating to plume dispersion, plume dilution and regulatory mixing zone requirements which, when used in conjunction with DIVAST simulations, provides a more comprehensive description of the fate of the effluent discharge.

The purpose of the model simulations, the results of which are presented in section 2.9.8, is to examine the dispersion pattern and concentration of the BOD and faecal coliforms from the outfall and to determine if they satisfy the relevant EU legislation and regulatory requirements specified by the Environmental Protection Agency (E.P.A) for estuarine and coastal waters.

sediments. It can be surmised that the survey at Station P-1 contacted an isolated boulder as it was at a shallower depth of 0.4m.

3. DISCUSSION

Given the fact that there is a cSAC (Salt Lake) within the study site and that there are two other cSAC's close by (Kingstown and Mannin Bay), it is important to undertake an impact hypothesis of the proposed sewage scheme on the status of these areas of conservation. For example impacts on maerl (*Lithothamnium*), salmonids, sea birds and marine mammals need to be addressed.

Given that the water quality at the proposed outfall location will be improved for inner Clifden Bay and will meet standards required for sea water at the nearby bathing beach in Clifden Bay, the ecological functioning of the three cSACs will not be impacted and their conservation status will therefore not be compromised.

Due to improvements in water quality in Inner Clifden Bay, the populations of salmonids that occur there cannot be negatively impacted by the proposed upgrading of the treatment works. This also holds true for marine birds and mammals.

4.CONCLUSION

From both the measurement programme of current velocities, drogue and dye studies and the hydrodynamic model output, it is apparent that with proper engineering solutions, the outfall in the inner part of Clifden Bay can be used to dispose of appropriately treated effluent without compromising either the water quality at the bathing beach or the marine farms in the vicinity. Furthermore, due to the distances involved and the associated dilution, the ecological and conservation status of nearby

cSACs will not be affected. In addition, the continued use of the discharge site in the inner part of Clifden Bay means that a new marine disposal site is not required.

Water quality in terms of nutrients and bacteria is high except on occasions when river flow from the Owenglin is high; this can depress salinities and allow for the westward dispersion of bacteria from the out fall to the bathing beach. With the use of the appropriate level of treatment at the plant, this situation will no longer occur.

The biological communities present along the pipeline route and at the proposed outfall site contain no rare or unusual species and the proposed development will not significantly affect the status of the habitat. Indeed, with time, an improvement is expected.

Due to the long term use of the inner part of Clifden Bay, sediment quality has been impacted by the addition of organic matter in the form of faecal material. This should improve with time once the new plant comes on stream

The terrestrial archaeological survey did not reveal anything of significance in terms of remains and there are no associated significant negative impacts expected from the proposed development. Nonetheless, the pipeline work will need to be monitored and the work should be carried out in as sensitive a manner as possible.

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GALWAY COUNTY COUNCIL

CLIFDEN WASTE WATER DISCHARGE LICENCE APPLICATION

Unsolicited Additional Information

Attachment B.12:

Foreshore Licence Application

RYAN HANLEY

March 2009

GALWAY COUNTY COUNCIL

CLIFDEN SEWERAGE SCHEME
STAGE 1

FORESHORE ACTS 1933 to 2003

FORESHORE LICENCE APPLICATION

October 2008

Department of Agriculture, Fisheries and Food
An Roinn Talmhaíochta, Iascaigh agus Bia

FORESHORE ACTS 1933 TO 2003 - GENERAL GUIDANCE NOTES

The Foreshore Acts require that before the commencement of any works or activity (including the erection of any structures) on State-owned foreshore a licence or lease must be obtained from the Minister for Agriculture, Fisheries and Food. Such a lease or licence is subject to an annual rental payable to the Exchequer. Foreshore is the land and seabed between the high water of ordinary or medium tides (shown HWM on Ordnance Survey Maps) and the twelve-mile limit (twelve nautical miles is approximately 22.24 kilometres).

Applicants for a lease or licence are urged to consult the Department well in advance of finalising their proposals. An application for a lease or licence must be accompanied by 10 copies (15 copies if there is a possibility of significant impact on the marine environment, such as for sewerage schemes, dredging, marinas and any project requiring an EIS) of each of the following documents and be sent to:

Foreshore Section
Coastal Zone Management Division,
Department of Agriculture, Fisheries & Food,
Building C, West Cork Technology Park, Clonakilty,
Co. Cork.

1. Completed application form.**one with original signature**.
2. Ordnance Survey Map of 6" scale (latest edition) showing the precise area and the hectarage involved below the line of high water of medium tides clearly marked on the Map in distinctive colour. Applicants must certify and date all maps submitted, stating the area of foreshore involved in metric measurements (i.e. hectares or square kilometres etc).
3. Plan, elevation and sectional drawing showing clearly the nature of the proposed works and lines and levels of high and low water of Spring tides.
4. Longitudinal section showing clearly how such works will be laid in relation to the surface of the seabed and having delineated on it the lines and levels of high and low water of Spring tides.
5. Certified copy (only 1 copy required) of the Company's Memorandum and Articles of Association and Certificate of Incorporation of a Limited Liability Company/Rule Book/Constitution for a club or Co-Operative Society as appropriate to the particular circumstance.

Additional copies or any or all documents may be requested to facilitate examination by the Department's specialist advisors.

Applicants are required to publish notice of their proposals in newspapers circulating in the area. The Department will prepare the notice and specify the newspapers in which it should be published. A three week period is allowed for representations and objections to be made to the Minister. The applicant is allowed an opportunity to comment on these before the final report is made to the Minister. That report will detail the proposal, the process that has been gone through, objections and commentary on them, and recommend whether or not to grant a lease or licence and if so under what conditions.

Certain developments are subject to the European Communities (Environmental Impact Assessment) Regulations, 1989 to 1999. An application for any development above the relevant threshold in the Regulations must include an Environmental Impact Statement (EIS). Applicants are encouraged to seek the Department's opinion at the scoping stage of the EIS. An appraisal of the environmental effects of a development below the threshold must be submitted by the applicant to allow the Minister to decide whether it is likely to have significant effects on the environment. Where the decision is "yes" an EIS is mandatory. The public consultation period for an application requiring EIS is one month and a copy of the EIS must also be provided by the applicant to the consultative bodies named in the Foreshore (Environmental Impact Assessment) Regulations, 1990 [SI N° 220 of 1990].

Developments on the foreshore require planning permission in addition to a Foreshore Lease/Licence/Permission. All Foreshore Leases, Licences and Permissions are without prejudice to the powers of the local planning authority. Applicants should, therefore, consult initially with the local planning authority regarding their proposal. In the case of developments on foreshore for, by or on behalf of a Local Authority where an EIS is required, applications should be made to An Bord Pleanála under **Part XV, Planning and Development Act 2000**. 10 copies of any applications made under this Act must be sent to this Department at the time of application to An Bord Pleanála.

Applicants seeking permission to lay an outfall or discharge pipe on the foreshore should also apply to the local authority or the Environmental Protection Agency for a licence under the Local Government (Water Pollution) Acts.

Developments on privately owned foreshore also requires the prior permission of the Minister under the Foreshore Acts.

Priority will be given to cases where emergency works are required for the preservation of human life. In such cases the Department should be contacted immediately by an application form with the required documents and drawings made available by whatever means allow for speediest arrival, with an undertaking to comply with any advice or instructions given by the Department. These completed applications would be dealt with as a priority in accordance with standard procedures, but it may be necessary for the Department to require modification of works carried out or their replacement with more permanent works of a design and nature acceptable to the Minister.

The Department of Agriculture, Fisheries and Food (Coastal Zone Management Division) will be pleased to assist with any enquiries.
Telephone: +353 23 59500 LoCall 1890 21 25 41 Fax: +353 23 59508 Email: foreshore@agriculture.gov.ie **Internet:** www.agriculture.gov.ie

Department of Agriculture, Fisheries and Food
An Roinn Talmhaíochta, Iascaigh agus Bia

APPLICATION FOR A LEASE/LICENCE/PERMISSION UNDER THE FORESHORE ACT 1933 (AS AMENDED)*

(This form should NOT be used for Applications for Offshore Electricity Generating Stations)

Please read Guidance Notes before completing this form

USE BLOCK CAPITALS IN BLACK INK

For Office Use
Application Ref. No._____
Date of receipt.

1. A. Name(s) of Applicant(s) in full

GALWAY COUNTY COUNCIL

B. Address(es) of Applicant(s) in full

COUNTY BUILDINGS,

PROSPECT HILL, GALWAY

Telephone (091) 509 000 **Mobile** N/A

Fax (091) 509 010 **E-mail** FHolland@Galwaycoco.ie

RSI/PPS No:/CRO No:_____

C. Signature of Applicant

_____ **Date:** _____

(where the signatory is an officer of a local authority or a company, the position held should be stated and the signatory's name should also be provided in block capitals).

D. Name of contact person if different from above

MS FIONA HOLLAND

Address AS ABOVE

Telephone AS ABOVE **Mobile** AS ABOVE

Fax AS ABOVE **E-mail** AS ABOVE

** Legislation Applicable*
Foreshore Act, 1933 (No. 12); Foreshore (Amendment) Act, 1992 (No.17); Fisheries and Foreshore (Amendment) Act, 1993 (No. 54), Fisheries (Amendment) Act, 2003 (No. 21); European Communities (Environmental Impact Assessment Regulations, 1989 to 1999; Foreshore (Environmental Impact Assessment) Regulations, 1990 (S.I. No. 220); Planning and Development Act 2000 (No. 30) Part XV

E. Name and Address of Applicant's Legal Advisors
(Applicants are strongly advised to seek legal assistance, prior to agreeing to accept an offer of a foreshore lease/licence/permission as all are legally binding documents. Where an offer is made of a Foreshore Lease/Licence/Permission it will be done through the Applicant's Legal Advisors)

_____

_____

Telephone _____ **Fax** _____ **E-mail** _____

2. (A) A detailed description of the proposed works which are to be carried out on the foreshore.
(Please feel free to use additional sheets, which should be signed and dated).

Construction of a buried outfall pipe from the proposed new wastewater treatment plant on the site of the existing WWTP into the channel of the Owenglin River Estuary in inner Clifden Bay. The new outfall pipe will be a 630 mm external diameter HDPE pipe with a minimum wall thickness of 37 mm (SDR 17). The outfall disffuser will consist of four vertical 110 mm external diameter diffusers protruding 300 mm above the sea floor, with tideflex non-return valves on the outlet of each diffuser.

(B) A Statement of reason for the works
The new outfall replaces the existing short outfall pipe which discharges onto the tidal mud flats adjacent to the treatment plant and which is unsatisfactory and has adverse environmental impacts as detailed in the attached Marine Survey Report (2005). The new outfall will extend into the estuary channel and will provide significantly improved dispersion and dilution of treated wastewater from the proposed new Clifden Wastewater Treatment Works

A statement of the disturbance to the foreshore arising from these works, should be attached covering the impact on the marine environment including the impact on coastal erosion, navigation, fishing, fisheries (various species known to inhabit the area), pleasure boating and sailing, air navigation (if appropriate).

(C) Provide the following location details in respect of the area of foreshore for which the Lease/Licence/Permission is sought

(i) Bay Inner Clifden Bay

(ii) County Galway

(iii) Geographic co-ordinates in degrees, minutes and seconds

Outfall Discharge Point: 53° 29' 3.107" N, 10° 1' 48.638" W
Outfall Intersection with HWM: 53° 29' 1.999" N, 10° 1' 37.683" W

(iv) OS Map No. 2794-C, 2794-D, 2862

(v) Size (hectares) Length of outfall pipe in foreshore = 207m; Area = 0.20 Ha

(vi) Local Authority Galway County Council

3. RECORD OF DOCUMENTS ENCLOSED WITH THIS APPLICATION (🗐)

An application for a lease or licence must be accompanied by 10 copies (15 copies if there is a possibility of significant impact on the marine environment, such as for sewerage schemes, dredging, marinas and any project requiring an EIS) of all relevant documents.

(i) Ordnance Survey Map (Scale of 1:10,560, ie a six inch map) ☑

Applicants must certify and date all maps submitted, stating the area of foreshore involved in metric measurements (i.e. hectares or square kilometres etc) with the area involved clearly delineated in red thereon.

(ii) British Admiralty Chart (largest available scale) ☑

(iii) Decision of planning authority or An Bord Pleanála under Planning Acts (Required) ☐

Developments on the foreshore require planning permission in addition to a Foreshore Lease/Licence/Permission. All Foreshore Leases, Licences and Permissions are without prejudice to the powers of the local planning authority. Applicants should, therefore, consult initially with the local planning authority regarding their proposal.

(iv) Copy of licence under Section 4 of Local Government Water Pollution Act, 1977 ☐

(v) Environmental Impact Statement ☐

(vi) Drawings of the structures to be used and/or layout ☑

(vii) Copy of any correspondence with the Department of the Environment, Heritage and Local Government (Heritage and Planning Division) ☐

(viii) Certified copy of Company's Memorandum and Articles of Association (Only one copy is required) ☐

(ix) Certificate of Incorporation of a Limited Liability Company/ Rule Book/Constitution for a Club or Co-Operative Society as appropriate ☐

(x) Other (specify) Statement of the Disturbance to the Foreshore (Ryan Hanley, 2008); Marine Survey Report (Aqua Fact International Ltd, June 2005)

(Note:It may not be necessary to include all of the above documents please refer to the accompanying "Guidance Notes".

4. Details of any previous Leases/Licences/Permissions received by the applicant for this or any adjoining sites (if appropriate)

(i) Date of Lease/Licence/Permission 1954 (existing WWTP outfall licence)

(ii) Reference number(s) MS 51/12/102

An application for a Discharge Licence from the EPA has been lodged under the Waste Water Discharge (Authorisation) Regulations, 2007. An application for Part 8 Planning Approval for the proposed wastewater treatment plant has been lodged under the Planning and Development Act, 2000.

5. Is all or any part of the Foreshore (the subject of this application) in private ownership?
(This search should be carried out in the Registry of Deeds and Land Registry and copies of results, including where appropriate, folio maps should be included).

If yes, please provide details of ownership.

Not in Private Land Ownership

Have adjacent land owners, whose properties may be affected by these works been consulted?
Please provide details/permissions as appropriate.

An application for Part 8 Planning Approval for the proposed Clifden wastewater treatment plant has been lodged under the Planning and Development Act, 2000. Any concerns from adjacent land owners will be dealt with during the Part 8 Planning Process.

6. Employment Implications (if any) There will be staff employed at the Treatment Works site.

The Sewerage Scheme will also facilitate future development in Clifden & Surrounds.

7. Capital cost of proposed works (€ - Euro)

Estimate for Clifden SS = €8.8m. inc VAT Estimate for Outfall pipe = €0.120m inc. VAT

8. Do the proposed works involve the draw down of European Union or State funding?
Yes

If "Yes" give details, including any time restrictions, etc. applying

Water Services Investment Programme 2007-2009, approved

9. Do the proposed works provide for public use, restricted use or strictly private use? (give details)

Public Use: Municipal Wastewater Treatment Works Discharge

10. Are there public health/safety implications arising from the proposed works? (e.g. effluent disposal, removal of derelict or dangerous structures etc.) Partially treated effluent currently discharges onto the Inner Clifden Bay mud flats from the existing Clifden WWTP. The proposed Wastewater Treatment Works and outfall will remove the existing public health risk and provide a sustainable disposal system by providing significantly improved treatment and dispersion of the effluent.

10a. Are there public navigational safety implications arising from the proposed works?

1. What marine activity is there in the area?

The proposed outfall diffusers will be located in the Owenglin River estuary, on the opposite bank from and 150 metres downstream of the Clifden Quay and slipway. Boats will pass the proposed outfall location as they travel to and from the Clifden Quay and slipway.

2. How will the marine activity be affected by the proposed works?

At Mean Low Water Springs (MLWS) the water depth in the channel at the proposed diffuser location is estimated to be 0.70 metres based on the bathymetric survey undertaken in 2005 and documented in the attached Marine Survey Report. The diffusers will protrude 0.30 metres above the channel floor. Stainless steel diffuser guards will surround the diffusers. The diffuser guards will project 0.50 metres above the channel floor, so that the guards will have 0.20 metres of submergence at MLWS. The diffuser section of the outfall will project 12 metres into the channel perpendicular to the flow. The diffusers will not impede marine traffic to and from the slipway as the channel is wide enough to allow boats to avoid the diffusers at low tide. At Mean High Water Springs (MHWS) the depth of water over the diffuser guards is estimated to be 4.20 metres and at Mean Sea Level the depth of submergence of the diffuser guards is estimated to be 2.20 metres.

3. What mitigating measures will be put in place?

Two buoys with warning signs will be placed at either end of the diffuser section of the outfall pipe. The signs will alert marine traffic of the presence of the outfall diffusers and warn all craft to stay clear of the diffuser location.

4. How will the proposed works affect Marine Navigation in the future?

Marine traffic will not be able to pass over the outfall diffusers at low tide due to the shallow depth of submergence however the channel is sufficiently wide to allow all marine traffic to avoid the diffuser location at low tide. Warning signs attached to buoys will alert boat users of the hazard and the need to avoid the diffuser location.

11. Will the works involve the storage and/or disposal of waste?

No

If "Yes" please give details of the type of waste and the proposed method of storage and/or disposal (including location)

**Certain developments are subject to the European Communities (Environmental Impact Assessment) Regulations, 1989 to 1999. It is the responsibility of the applicant to consult and comply with these Regulations. Where the relevant threshold in the Regulations is exceeded an application for permission under the Foreshore Acts must include an Environmental Impact Statement (EIS). Applicants are encouraged to seek the Department's opinion at the scoping stage of the EIS.*

An appraisal of the environmental effects of a development below the threshold must be submitted by the applicant to allow the Minister to decide whether it is likely to have significant effects on the environment. Where the decision is "yes" an EIS is mandatory.

In the case of developments on foreshore for, by or on behalf of a Local Authority where an EIS is required, applications should be made to An Bord Pleanála under Part XV, Planning and Development Act, 2000. 10 copies of any applications made under this Act must be sent to this Department at the time of application to An Bord Pleanála.

Note: While every effort will be made to deal promptly with applications, priority will be given to dealing with applications involving public infrastructure, public health, public use and those having employment implications.

Any additional Information

The Population Equivalent (2025)	=	9,470	PE.
The average flow from the Wastewater Treatment Works (2025)	=	2,130	m^3/day.
The peak flow from the Wastewater Treatment Works (2025)	=	150	litres/second.
Average Quantity of BOD_5, SS & N (expressed as kg/day) (2025)			
BOD_5	=	21	kg/day
SS	=	42	kg/day
N	=	53	kg/day
95th Percentile Concentration of effluent discharged (expressed as mg/litre)			
BOD	=	25	mg/l
SS	=	35	mg/l
N	=	40	mg/l
Faecal Coliforms	=	10,000	fc/100ml

The effluent will be discharged through 4 No. diffusers which are located at the co-ordinates given elsewhere in this form and shown on the attached drawings.

Please send completed application form to:
Foreshore Section
Coastal Zone Management Division
Department of Agriculture, Fisheries & Food
Building C, West Cork Technology Park, Clonakilty, Co. Cork

Tel: **+353 23 59500**
LoCall: **1890 25 27 41**
Fax: **+353 23 59508**
E-mail: **foreshore@agriculture.gov.ie**

Incorrectly completed or incomplete application forms cannot be processed and will be returned

Clifden Sewerage Scheme Stage 1:
Foreshore Licence Application

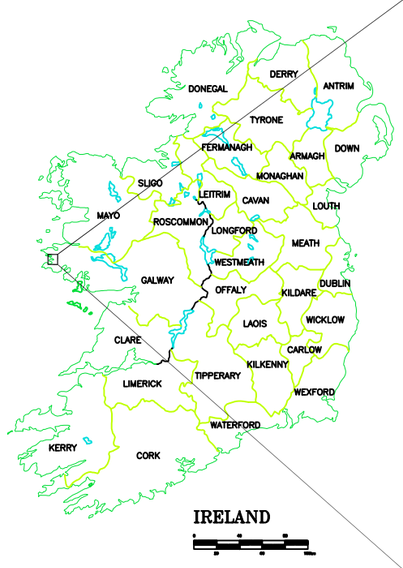
Attached Documents

1 Outfall Layout Plan, Section and Diffuser Detail

2 British Admiralty Chart of Clifden Bay (one copy only)

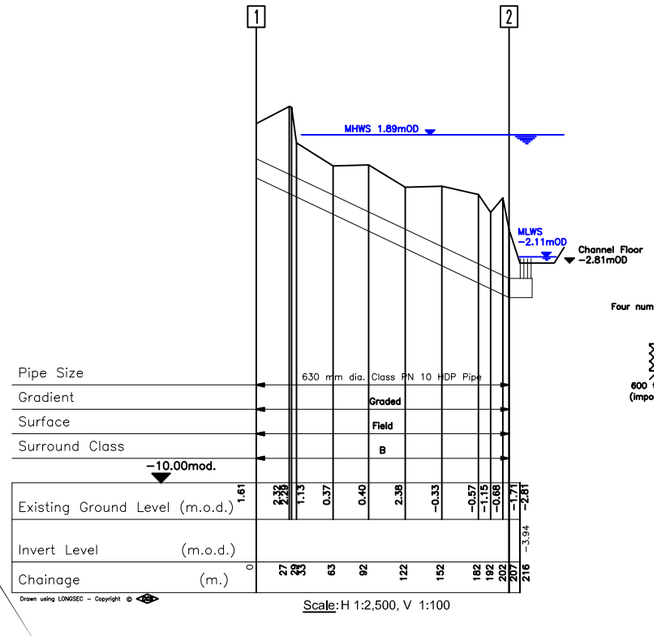
3 Statement of Disturbance of Foreshore (Ryan Hanley, October 2008)

4 Marine Survey Report (Aqua-Fact International Services Ltd June 2005)

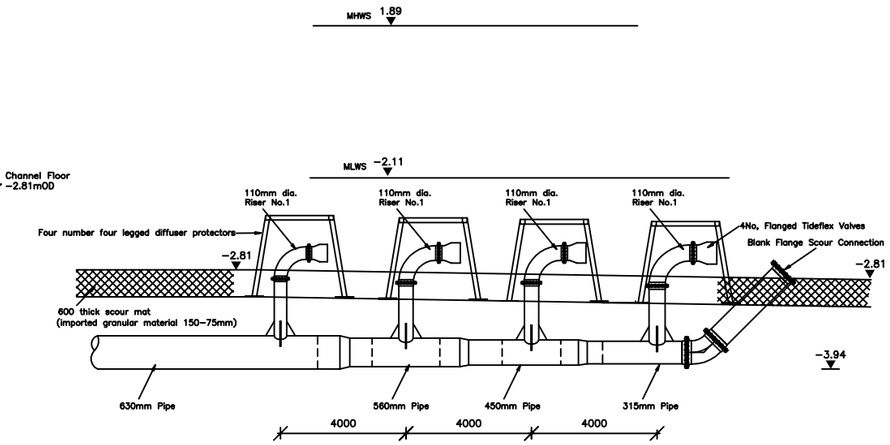


Ordnance Survey Ireland Licence No. EN 0002705 © Government of Ireland EX. O.S. Map 0624 Scale: 1:50,000

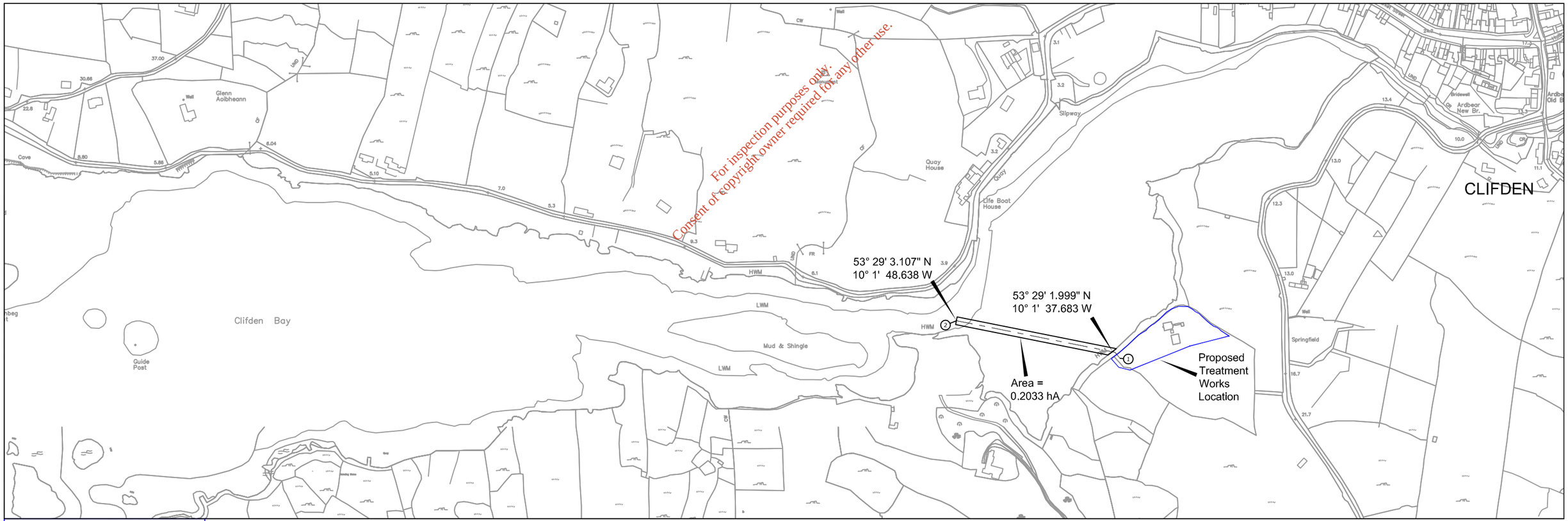
LOCATION PLAN



Scale: H 1:2,500, V 1:100



DIFFUSER CONFIGURATION
Scale: NTS



Ordnance Survey Ireland Licence No. EN 0002705 © Government of Ireland EX. O.S. Maps 2794–C, 2794–D & 2862.

LAYOUT PLAN

Scale: 1:2,500

NOTES:
Levels are in meters and are to Malin Head Datum

client	GALWAY COUNTY COUNCIL
project	CLIFDEN SEWERAGE SCHEME
description	LAYOUT PLAN OF PROPOSED TREATED EFFLUENT OUTFALL
scales	NTS (UNLESS SHOWN)
drawn / checked / approved	F.G. / A.S. / A.S.
job no.	1371
set no.	
date	SEPTEMBER 08
drg.no.	FL1

revision | date | mark | by

Ryan Hanley
consulting engineers
Sherwood House
Sherwood Avenue
Taylor's Hill
Galway
Tel(091)567116 Fax(091)567119

TABLE IV

HEIGHT IN METRES OF CHART DATUM RELATIVE TO THE LAND LEVELLING SYSTEM IN COUNTRIES OUTSIDE THE UNITED KINGDOM

No.	Place	Height	Datum
602	Rosslare Harbour	+1·02	D
604	Wexford Harbour	+1·43	D
611	Arklow	+1·89	D
613	Wicklow	+0·88	D
615	Dun Laoghaire	+0·20	D
616	Dublin Bar	+0·20	D
617	**DUBLIN (NORTH WALL)**	+0·20	D
618	Howth	+0·20	D
621	Malahide	+0·43	D
623	River Boyne Bar	−0·30	D
625	Dundalk (Soldiers Point)	−0·30	D
654	Warren Point	+1·32	D
655	Moville	+1·32	D
656	Quigley Point	+1·32	D
662a	Portmore	+0·42	D
664	Rathmullan	+0·03	D
685	Killybegs	+0·30	D
689	Sligo	+0·69	D
692	Killala Bay	+0·72	D
693	Broadhaven	+0·61	D
695	Bull's Mouth	+0·55	D
697	Inishraher	+0·11	D
701	Killary Bay	+0·11	D
709	**GALWAY**	−0·20	D
713a	Carrigaholt	−0·30	D
714	Kilrush	−0·30	D
715	**TARBERT ISLAND**	−0·30	D
716	Foynes Island	−0·30	D
718	Limerick	−0·46	D
721	Fenit Pier	−0·21	D
725	Knights Town	+0·30	D
733	Castletown	+0·64	D
734	Bantry	+0·52	D
741	Crookhaven	+0·66	D
742	Skull	+0·58	D
747	Kinsale	+0·16	D
751	**COBH**	+0·13	D
752	Passage West	+0·13	D
753	Cork	−0·13	D
755	Youghal	+0·48	D
756	Dungarvan Bay	+0·22	D
761	Dunmore East	+0·15	D
761a	Cheekpoint	0·00	D
762	Waterford	−0·15	D
763	New Ross	0·00	D
1417	**ESBJERG**	−0·69	DNN
1473	Delfzijl	−2·03	NAP
1477	Lauwersoog	−1·90	NAP
1480	Nes	−1·65	NAP
1483	West Terschelling	−1·35	NAP
1484	Vlieland	−1·44	NAP
1485	Harlingen	−1·26	NAP
1486	Kornwerderzand	−1·30	NAP
1487	Den Oever	−1·35	NAP
1488	Oude Schild	−1·22	NAP
1489	Den Helder	−1·22	NAP
1501	Ijmuiden	−1·13	NAP
1503	Scheveningen	−1·10	NAP
1505	**HOEK VAN HOLLAND**	−1·03	NAP
1506	Maassluis	−1·00	NAP
1507	Vlaardingen	−1·00	NAP
1508	Rotterdam	−0·95	NAP
1512	Spijkenisse	−0·95	NAP
1517	Dordrecht	−0·30	NAP
1521	Haringvlietsluizen	−1·07	NAP
1528	Zierikzee	−1·87	NAP
1530	Wemeldinge	−2·16	NAP
1531	Bruinisse	−2·00	NAP
1532	Steenbergsche Sas	−2·15	NAP
1533	Westkapelle	−2·19	NAP
1534	**VLISSINGEN**	−2·50	NAP
1536	Terneuzen	−2·59	NAP
1537	Hansweert	−2·70	NAP
1538	Bath	−2·61	NAP
1539	**PROSPERPOLDER**	−0·23	TAW
1539b	Royerslock	−0·34	TAW
1562	Zeebrugge	−0·22	TAW
1564	Ostend	−0·42	TAW
1565	Nieuport	−0·54	TAW
1568	**DUNKERQUE**	−3·30	L
1570	**CALAIS**	−4·07	L
1572	**BOULOGNE**	−5·02	L
1579	**DIEPPE**	−4·89	L
1581	Fecamp	−4·55	L
1581a	Antifer	−4·72	L
1582	**LE HAVRE**	−4·72	L
1600	**CHERBOURG**	−3·70	L
1614	St. Malo	−6·60	L
1629	Morlaix	−5·11	L
1630	Roscoff	−5·09	L
1636	Le Conquet	−4·10	L
1638	**BREST**	−4·45	L
1640	Douarnenez	−4·01	L
1643	Audierne	−2·90	L
1648	Concarneau	−2·81	L
1650	Port Louis	−2·8[illegible]	L
1651	Lorient	[illegible]	L
1664	St. Nazaire	−3·03	L
1673	Les Sables d'Olonne	−3·06	L
1675	La Pallice	−3·69	L
1676	La Rochelle	−3·69	L
1681	**POINTE DE GRAVE**	−2·93	L
1692	Boucau	−2·17	L
1693	Socoa	−2·17	L
1770	**GIBRALTAR**	−0·25	A
1785	Marseilles	−0·33	L
1786	Toulon	−0·34	L
1820	Arzew	−0·44	NGA
1880	Valletta	−0·41	M
1985	Famagusta	−0·39	C
1988	Beirut	−0·20	LND
1988a	Sidon	−0·30	LND
1991	Port Said	+17·60	S
1992	Alexandria	−0·34	E

TABLE IV (*cont.*)

NOTES ON LAND LEVELLING SYSTEMS

A —Alicante Datum is Mean Sea Level at Alicante based on observations from 1870 to 1872.

D —Ordnance Datum (Dublin)—sometimes called Poolbeg Datum—is the level to which the tide fell on 8th April 1837 in Dublin Bay. It is approximately 2·7 metres below Ordnance Datum (Belfast) (see Table III) and is normally only used in the Republic of Ireland. O.D. (Malin) is the same level as O.D. (Belfast).

DNN—Dansk Normal Null—was determined from observations of Mean Sea Level at ten stations on the Danish coast between 1890 and 1900.

NAP —Normaal Amsterdams Peil—is the level at which the waters of the Zuider Zee were formerly allowed to enter the canals at Amsterdam. It became the land levelling system for the Netherlands in 1891.

L —Nivellement Général de la France (N.G.)—sometimes called the Lallemand System—is based on Mean Sea Level at Marseilles.

NGA—Nivellement Général of Algeria.

M —Ordnance Datum (Malta)—is an arbitrary level which is approximately Mean Sea Level.

C —Land Survey Datum of Cyprus—is approximately Mean Sea Level.

LND—Lebanese National Datum.

S —Suez Canal Datum.

TAW—Tweede Algemene Waterpassing—Second General Water Level is 0·11 m above NKD and 0·14 m above the First Levelling Network of the Belgian Ministry of Public Works.

E —Survey of Egypt Datum.

GALWAY COUNTY COUNCIL

CLIFDEN SEWERAGE SCHEME
STAGE 1

FORESHORE ACTS 1933 to 2003

FORESHORE LICENCE APPLICATION:

STATEMENT OF DISTURBANCE OF FORESHORE

October 2008

Client	**Galway County Council**
Project No.	**1367**
Project Title	**Clifden Sewerage Scheme Stage 1**
Report Title	**Foreshore Licence Application: Statement of Disturbance of Foreshore**

Rev.	Status	Author(s)	Reviewed By	Approved By	Issue Date
1	For Client Review	A Slaney	T Shyrane	T Shyrane	25/9/08
2	For Final Review	A Slaney	T Shryane	T Shyrane	30/9/08

A STATEMENT OF THE DISTURBANCE TO THE FORESHORE ARISING FROM THE PROPOSED CLIFDEN WWTP OUTFALL PIPE

1. COSTAL EROSION

The proposed outfall route is largely through tidal mud flats with the final 15 metres of pipe laid beneath the channel of the Owenglin River estuary in Inner Clifden Bay. No significant effects on coastal erosion are foreseen from the works.

2. NAVIGATION

The proposed outfall diffusers will be located in the Owenglin River estuary, on the opposite bank from and 150 metres downstream of the Clifden Quay and slipway. Boats will pass the proposed outfall location as they travel to and from the Clifden quay or slipway.

At MLWS the depth of water in the estuary channel at the proposed diffuser location is 0.70 metres. The diffusers will protrude 0.3 metres above the channel floor. Stainless steel diffuser guards will surround the diffusers. The diffuser guards will project 0.5 metres above the channel floor, so that the guards will have 0.2 metres of submergence at MLWS. At Mean High Water Springs (MHWS) the depth of water over the diffuser guards is estimated to be 4.20 metres and at Mean Sea Level the depth of submergence of the diffuser guards is estimated to be 2.20 metres.

Marine traffic will have to avoid the outfall diffusers at low tide due to the shallow depth of submergence of the diffusers, however the channel is sufficiently wide to allow all marine traffic to avoid the diffuser location at low tide. Warning signs attached to buoys will alert boat users of the hazard and the need to avoid the diffuser location.

3. FISHING

The proposed wastewater treatment plant and outfall will improve water quality in inner Clifden Bay and also within the Owenglin estuary. This is expected to have a positive impact on the Owenglin fishery and associated stocks of sea-trout, salmon and trout.

No fishing will be possible at the diffuser location, and the proposed warning signs will alert fishers of the presence of the diffusers.

4. FISHERIES

Similar to that of fishing, the proposed wastewater treatment plant and outfall is expected to have a positive impact on the Owenglin fishery and associated stocks of sea-trout, salmon and trout. The Marine Survey Report by Aqua Fact International Services Ltd (June 2005) found that:

"The biological communities present along the pipeline route and at the proposed outfall site contain no rare or unusual species and the proposed development will not significantly affect the status of the habitat. Indeed, with time, an improvement is expected.

Due to the long term use of the inner part of Clifden Bay, sediment quality has been impacted by the addition of organic matter in the form of faecal material. This should improve with time once the new plant comes on stream

The terrestrial archaeological survey did not reveal anything of significance in terms of remains and there are no associated significant negative impacts expected from the proposed development. Nonetheless, the pipeline work will need to be monitored and the work should be carried out in as sensitive a manner as possible."

For further details of the fauna in vicinity of the proposed outfall, and an assessment of the impacts of the outfall, please refer to the Marine Survey Report on the proposed outfall prepared for Galway County Council in 2005 by Aqua Fact International Services Ltd.

5. PLEASURE BOATING & SAILING

The proposed outfall diffusers will be located in the Owenglin River estuary, on the opposite bank from and 150 metres downstream of the Clifden Quay and slipway. Boats will pass the proposed outfall location as they travel to and from the Clifden slipway.

As described above, marine traffic will have to avoid the outfall diffusers at low tide due to the shallow depth of submergence of the diffusers, however the channel is sufficiently wide to allow all marine traffic to avoid the diffuser location at low tide. Warning signs attached to buoys will alert boat users of the hazard and the need to avoid the diffuser location.

6. AIR NAVIGATION

There will be no impact on air navigation as the pipe will not protrude above the sea surface during the lowest astronomical tide.

References:

Aqua-Fact International Services Ltd (June 2005). Hydrographic Survey of Clifden Bay for a Proposed Waste Water Treatment Plant.