Deirdre French
Environmental Licensing Programme
Office of Climate, Licensing & Resource Use
Environmental Protection Agency
PO Box 3000
Johnstown Castle Estate
Co. Wexford.

Uisce Éireann
Bosca OP 6000
Baile Átha Cliath 1
Éire

Irish Water
PO Box 6000
Dublin 1
Ireland

T: +353 1 89 25000
F: +353 1 89 25001
www.water.ie

4th June 2015

IW-ER-LT0265

RE: Clones Waste Water Discharge Licence Application D0206-01

Dear Deirdre French,

In response to the Regulation 18(3)(b)-4 request for further information notice dated the 29th April 2015, please see below relevant information.

You are thereby required to submit a Natura Impact Statement as defined in Regulation 2(1) of the European Communities (Birds and Natural Habitats) Regulations (S.I. No. 477 of 2011).

Please see the attached Appropriate Assessment (Natura Impact Statement) report for the Clones agglomeration as requested. The report concluded that the Clones WwTP discharge, alone or in-combination with other plans and / or projects will not give rise to significant effects on the integrity of the Upper Lough Erne SAC and SPA, as long as the recommended mitigation measures are implemented in full.

The recommended mitigation measures in support of the ongoing operation of Clones WwTP plant are:

- Optimisation of tertiary treatment measures to reduce the levels of Phosphorus currently being discharged from the plant;
- Implementation of a performance management system;
- Ensure that the capacity of the WwTP is not exceeded; and

- Continuation of monitoring of the discharge, both upstream and downstream of the plant on a consistent regular basis. Annual biological water quality monitoring should also be undertaken upstream and downstream of the WwTP primary discharge. Any biological monitoring should be carried out during the summer / autumn periods.

Best Regards,

Gerry Galvin
Chief Technical Advisor

Irish Water Report

Natura Impact Statement as part of the Clones Wastewater Discharge Licence (D0206-01)

Contents

Introduction

This Natura Impact Statement provides an Appropriate Assessment (AA) of the existing Waste Water Treatment Plant (WwTP), located at Clones, County Monaghan, for the purposes of the Waste Water Discharge (Authorisation) Regulations, 2007 (S.I. No. 684 of 2007), as amended. It assesses whether the on-going operation of the plant, alone or in combination with other plans and projects, is likely to have significant effects on a European Site(s) in view of best scientific knowledge and the conservation objectives of the site(s). European Sites are those identified as sites of European Community importance designated as Special Areas of Conservation under the Habitats Directive or as Special Protection Areas under the Birds Directive.

This report follows the guidance for AA published by the Environmental Protection Agency's (EPA) '*Note on Appropriate Assessments for the purposes of the Waste Water Discharge (Authorisation) Regulations, 2007 (S.I. No. 684 of 2007)*' (EPA, 2009); and takes account of the Department of the Environment, Heritage and Local Government's guidelines '*Appropriate Assessment of Plans and Projects in Ireland. Guidance for Planning Authorities*' (DoEHLG, 2009) and Circular L8/08 '*Water Services Investment and Rural Water Programmes – Protection of Natural Heritage and National Monuments*' (DoEHLG, 2008).

The field survey and report was completed by a qualified ecologist, and full member of the CIEEM, working for Tobins Consulting Engineers on behalf of Irish Water.

Legislative Context

The Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora, better known as "The Habitats Directive", provides legal protection for habitats and species of European importance. Articles 3 to 9 provide the legislative means to protect habitats and species of Community interest through the establishment and conservation of an EU-wide network of sites known as Natura 2000. These are Special Areas of Conservation (SACs) designated under the Habitats Directive and Special Protection Areas (SPAs) designated under the Conservation of Wild Birds Directive (79/409/ECC) as codified by Directive 2009/147/EC.

Articles 6(3) and 6(4) of the Habitats Directive set out the decision-making tests for plans and projects likely to affect Natura 2000 sites (Annex 1.1). Article 6(3) establishes the requirement for Appropriate Assessment (AA):

> *Any plan or project not directly connected with or necessary to the management of the [Natura 2000] site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subjected to appropriate assessment of its implications for the site in view of the site's conservation objectives. In light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.*

Article 6(4) states:

> *If, in spite of a negative assessment of the implications for the [Natura 2000] site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, Member States shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted.*

Methodology

Guidance Followed

Both EU and national guidance exists in relation to Member States fulfilling their requirements under the EU Habitats Directive, with particular reference to Article 6(3) and 6(4) of that Directive. The methodology followed in relation to this AA has had regard to the following guidance:

- Note on Appropriate Assessments for the purposes of the Waste Water Discharge (Authorisation) Regulations, 2007 (S.I. No. 684 of 2007). Environmental Protection Agency, (EPA, 2009).

- Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities. Department of Environment, Heritage and Local Government, (DoEHLG, 2010).

- Circular L8/08 – Water Services Investment and Rural Water Programmes – Protection of Natural Heritage and National Monuments. Department of Environment, Heritage and Local Government, (DoEHLG, 2008).

- Communication from the Commission on the Precautionary Principle. Office for Official Publications of the European Communities, Luxembourg, (EC, 2000a).

- Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg, (EC, 2000b).

- Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Articles 6(3) and (4) of the Habitats Directive 92/43/EEC. Office for Official Publications of the European Communities, Brussels (EC, 2001).

- Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC – Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the Commission. Office for Official Publications of the European Communities, Luxembourg, (EC, 2007).

- Nature and biodiversity cases: Ruling of the European Court of Justice. Office for Official Publications of the European Communities, Luxembourg (EC, 2006).

- Marine Natura Impact Statements in Irish Special Areas of Conservation: A working document, National Parks and Wildlife Service, Dublin (NPWS, 2012).

- European Communities (Birds and Natural Habitats) Regulations, 2011 (S.I. No.477 of 2011).

- Interpretation Manual of European Union Habitats. Version EUR 28. European Commission (EC, 2013).

Stages Involved in the Appropriate Assessment Process

Stage 1: Screening / Test of Significance
This process identifies whether the WwTP discharge is directly connected to or necessary for the management of a European Site(s); and identifies whether the discharge is likely to have significant impacts upon a European Site(s) either alone or in combination with other projects or plans.

The output from this stage is a determination for each European Site(s) of not significant, significant, potentially significant, or uncertain effects. The latter three determinations will cause that site to be brought forward to Stage 2.

Stage 2: Appropriate Assessment
This stage considers the impact of the WwTP discharge on the integrity of a European Site(s), either alone or in combination with other projects or plans, with respect to (1) the site's conservation objectives; and (2) the site's structure and function and its overall integrity. Additionally, where there are adverse impacts, an assessment of the potential mitigation of those impacts

The output from this stage is a Natura Impact Statement (NIS). This document must include sufficient information for the EPA to carry out the appropriate assessment. If the assessment is negative, i.e. adverse effects on the integrity of a site cannot be excluded, then the process must consider alternatives (Stage 3) or proceed to Stage 4.

Stage 3: Assessment of Alternatives
This process examines alternative ways of achieving the objectives of the project or plan that avoid adverse impacts on the integrity of the European Site. This assessment may be carried out concurrently with Stage 2 in order to find the most appropriate solution. If no alternatives exist or all alternatives would result in negative impacts to the integrity of the European sites then the process either moves to Stage 4 or the project is abandoned.

Stage 4: Assessment Where Adverse Impacts Remain
An assessment of compensatory measures where, in the light of an assessment of Imperative Reasons of Overriding Public Interest (IROPI), it is deemed that the project or plan should proceed.

Field Walkover Surveys
Field walkover surveys were undertaken by a suitably qualified ecologist on the 22nd of May 2015 to identify the potential for qualifying species and habitats in the surrounding environs of the WwTP discharge.

Consultation
The EPA, as the competent authority, will seek NPWS advice as may be required in reaching their decision on a WwTP discharge. The NPWS can only communicate with the applicant (i.e. Irish Water) on request from the competent authority, when the formal application process to the competent authority has already commenced.

Inland Fisheries Ireland (IFI) Cavan division were contacted requesting any information that might be relevant to this NIS. They have concerns regarding the impact of the discharge on the River Finn and local fish stocks noting that sewage fungus occurs downstream of the WwTP.

Stage 1: Screening

Screening for Appropriate Assessment was undertaken by the Environmental Protection Agency who determined that an Appropriate Assessment of the existing discharge from the Clones WwTP is required due to the potential adverse impact on the qualifying interests of Upper Lough Erne SAC and Upper Lough Erne SPA. This determination was based on the following:

- The Moderate water quality status assigned to the receiving water (Legarhill GBNI1NW363602097) under the Water Framework Directive; and
- The absence of downstream water quality monitoring data.

Therefore, applying the Precautionary Principle and in accordance with Article 6(3) of the Habitats Directive, the current WwTP discharge at Clones will be brought forward for a Stage 2 Appropriate Assessment.

Stage 2: Appropriate Assessment

Upper Lough Erne SAC and SPA, which has been determined as requiring AA, are described and all the potential impacts resulting from the Clones WwTP discharge are discussed in relation to the conservation objectives of these designated sites.

Description of the Project

Clones is a small town in the west of County Monaghan, close to the border with County Fermanagh. Clones WwTP was built in the 1960's and was upgraded in the 1980's. The existing plant has a design capacity of 4,500p.e. and discharges into a tributary of the River Finn.

Data provided by Irish Water indicates that the current population equivalent discharging to the WwTP is 2156p.e. and the estimated 2021 load will be 2326p.e. Based on a loading of 225l/pp/day the dry weather flow for the current discharge is calculated at 0.00561m^3/sec, with the 2021 dry weather flow calculated at 0.00606m^3/sec. The long-term 95-percentile flow for the River Finn as obtained from the EPA Hydrotool website (Station ID: 36015) is 0.184m^3/sec.

Clones catchment is drained by a combination of gravity sewers and four pumping stations to the WwTP. Incoming waste from the Clones sewerage scheme gravitates to the preliminary treatment system. This comprises of a manually raked coarse screen. The screenings are stored temporarily on site prior to disposal at Scotch corner landfill. Primary treatment comproses of two horizontal flow Imhoff tanks operating in parallel and fitted with chain scarper meachnishms. Settled sewage gravitates via a dosing siphon to the secondary treatment system, while settled sluge gravitates directly to the reed beds.

Secondary treatment is carried out in a convential percolating filter system. The percolating filter system consists of two circular trickling filters which operate in parallel and are fitted with randomly packed stone media. Flow from the percolating filter system gravitates to a secondary settlement tank (Humus tank).

Treated effluent which overflows from the secondary settlement tank, gravitates to an on-site chamber. From there the flow graviates to the outfall in the tributary of the River Finn.

A tertiary phoshorus dosing system has been newly installed at Clones WwTP (confirmed by site visit).

The primary discharge consists of a stepped cascade, which increases the DO concentration prior to entering the stream. The final discharge is to a tributary of the River Finn (E 250580, N 325303).

There are three storm water overflows – one at the inlet pumping sation, one at a manhole on the combined sewer at the WwTP, and one at the pumping station in Clones town.

Effluent data from 2014 and 2015 is presented in Table 1.0 together with Urban Wastewater Treatment Regulations (UWWT) limit values.

Table 1.0: Clones WwTP Effluent Monitoring Data (mg/l)

Date	pH	BOD mg/l O2	COD mg/l O2	SS mg/l	Ammonia	Total Nitrogen	Orthophosphate	Total Phosphorus
UWWT EQS		25	125	35		15*		2*
14/01/2014	7.9	8	44	20	0.383	11.7	1.278	1.59
18/02/2014	8.1	5	51	7	0.239	6.8	0.695	0.77
18/03/2014	7.8	3	22	4.9	0.039	9.4	1.057	1.27
22/04/2014	7.8	10	63	14	3.126	25.9	3.241	3.23
19/05/2014	8.5	9	51	17	0.129	18.4	3.306	3.6
10/06/2014	7.7	19	83	26	2.51	21.1	4.834	5.63
08/07/2014	7.6	13	70	14	4.68	29.3	5.981	5.86
12/08/2014	8	5	33	7	0.437	8	1.183	1.28
08/09/2014	7.8	12	72	23	7.381	32.2	4.329	4.56
14/10/2014	7.8	12	66	22	2.621	30.9	4.719	4.86
04/11/2014	8.1	6	37	6	0.338	8.4	1.191	1.14
01/12/2014	8.2	13	60	8	1.2	20.2	2.468	2.86
12/01/2015	8.2	5	30	<5	0.54	8.1	1.19	1.24
02/02/2015	8.3	6	33	6	0.39	9.5	0.943	1.02
09/03/2015	8.4	8	45	<5	1.1	15.6	1.872	2
14/04/2015	7.8	8	41	11	0.5	14	1.53	1.57

*Limits set for sensitive waters listed in Schedule 1 of the Urban Waste Water Treatment (Amendment) Regulations 2010 (S.I. No. 48/2010).

The effluent discharge was in compliance with the Urban Wastewater Treatment Regulations (2001) (S.I. No. 254/2001) (Table 2.0) for all parameters measured. The WwTP does not discharge to a sensitive water listed on Schedule 1 of the Urban Waste Water Treatment (Amendment) Regulations 2010 (S.I. No. 48/2010).

Description of the Receiving Environment and Monitoring Results

Clones WwTP discharges to a tributary the Legarhill stream which then enters the River Finn ca. 1.5km downstream of the discharge point. The River Finn then flows roughly in a south-westerly direction for ca. 8km to enter a small outlying area of Upper Lough Erne SPA. The River Finn flows through this SPA area for 2km, then exits the designation and continues for another 7km before entering the main section of Upper Lough Erne SAC and SPA downstream of Wattle Bridge (a total of 18.5km from the discharge point).

Monitoring data for 2015 upstream and downstream of the discharge location (tributary of Legarhill stream) is presented in Table 2.0.

There were exceedances (highlighted in bold) of standards set out Schedule 5 of the European Communities Environmental Objectives (Surface Water) Regulations 2009 (S.I. No. 272 of 2009) both upstream and downstream of the discharge for BOD, Ammonia and Orthophosphate.

Table 2.0:Monitoring Data both Upstream and Downstream of WwTP Discharge

Parameter	pH	BOD	Ammonia	Orthophosphate
	pH Units	mg/l	mg/l N	mg/l P
SW EQS	4.5-9	≤2.6 (good) ≤2.2 (high)	≤0.14 (good) ≤0.090 (high)	≤0.075 (good) ≤0.045 (high)
Upstream				
12-Jan-2015	7.7	< 1	0.062	<0.009
2-Feb-2015	7.9	< 1	0.038	0.024
9-Mar-2015	8.5	2	0.066	0.053
14-Apr-2015	7.8	< 1	**0.26**	0.062
20-Apr-2015	7.8	**7.4**	**2.5**	**0.265**
Downstream				
12-Jan-2015	7.7	**3**	**0.53**	**0.18**
2-Feb-2015	7.9	<1	0.039	0.057
9-Mar-2015	8.5	**3**	0.14	**0.231**
14-Apr-2015	7.8	<1	**0.25**	**0.078**
20-Apr-2015	8.2	2.4	**1.8**	**0.078**

Monitoring data for 2014 and 2015 upstream (Annamakiff Bridge ca. 5.2km upstream) and downstream (Cumber Bridge ca. 2.3km downstream) of confluence with the River Finn and Legarhill stream is presented in Table 3.0.

There were some exceedances (highlighted in bold) of standards set out Schedule 5 of the European Communities Environmental Objectives (Surface Water) Regulations 2009 (S.I. No. 272 of 2009) at the downstream location with respect to Orthophosphate on 7 occasions and BOD on 1 occasion.

Table 3.0:Monitoring Data from the River Finn

Parameter	pH	BOD	Ammonia	Orthophosphate	Dissolved Oxygen	Nitrite
	pH Units	mg/l	mg/l N	mg/l P	% Sat	mg/l N
SW EQS	4.5-9	≤2.6 (good) ≤2.2 (high)	≤0.14 (good) ≤0.090 (high)	≤0.075 (good) ≤0.045 (high)		
Upstream – Annamakiff Bridge						
08/01/2014	7.7	0.5	0.059	0.039	76	0.009
03/03/2014	7.8	1.3	0.086	0.034	86	0.006
29/04/2014	8	1.2	0.076	0.039	80	0.016
09/07/2014	8.1	0.5	0.032	0.054	10.8	0.024
02/09/2014	7.8	1.4	0.034	0.066	98	0.007
04/11/2014	7.6	1.9	0.046	0.07	84	0.013
04/02/2015	7.8	0.5	0.096	0.031	91	0.009
12/03/2015	7.9	1.4	0.085	0.03	88	0.01
Downstream – Cumber Bridge						
08/01/2014	7.7	1.3	0.043	0.042	88	0.01
03/02/2014	7.7	0.5	0.036	0.042	89	0.009
19/03/2014	7.9	1	0.058	0.044	91	0.017
28/04/2014	8	0.5	0.031	0.051	94	0.016
12/05/2014	7.6	2	0.11	**0.077**	85	0.01
16/06/2014	7.8	0.5	0.076	**0.082**	79	0.03
29/07/2014	7.9	0.5	0.058	**0.13**	81	0.06
18/08/2014	7.8	0.5	0.06	**0.11**	78	0.024
15/09/2014	7.8	0.5	0.035	**0.086**	84	0.017
01/10/2014	8	0.5	0.01	**0.11**	88	0.017
18/11/2014	7.6	0.5	0.062	**0.086**	73	0.025
04/12/2014	7.8	**3.6**	0.13	0.066	72	0.022
19/01/2015	7.7	0.5	0.044	0.043	89	0.009
17/02/2015	7.9	1.2	0.063	0.059	93	0.011
09/03/2015	7.8	0.5	0.062	0.033	90	0.012
08/04/2015	7.9	0.5	0.056	0.03	107	0.012

The EPA monitor the River Finn for biological water quality at Scarvy Bridge (RS36F010400) ca. 650m upstream of the confluence with the Legarhill stream, and at Cumber Bridge (RS36F010400) ca. 2.3km downstream of that confluence. Both stations were assigned a Q3-4 rating in 2013 indicating Moderate water quality status.

A Tobins ecologist sampled three locations for water quality:

- The tributary of the Legarhill stream into which the WwTP discharges was sampled upstream of the WwTP. The stream is ca. 1m wide with steep sided banks (ca. 2m). The substrate comprises a mixture of stones and cobbles with some silt areas and water flow is a fast riffle. Fools watercress *Apium nodiflorum* and reed canary grass *Phalaris arundinacea* grows along the margins of the stream. Bankside vegetation includes great willowherb *Epilobium hirsutum*, willow *Salix* spp., nettles *Urtica dioica*, dock *Rumex obtusifolius*, bush vetch *Vicia sepium* and hogweed *Heracleum sphondylium*. Adjacent landuse is rough wet grassland. The sample was dominated by relatively pollution tolerant taxa and was assigned a Q2-3 rating. Downstream of the WwTP the stream continues through agricultural wet grasslands. It is channelised with a deep muddy substrate and unsuitable for kick sampling/Q-rating.

- The River Finn was sampled upstream of the confluence with the Legarhill stream at Anlore Bridge. The river at this location is 8m wide and 0.3-1m deep. The substrate comprises a mixture of stones and cobbles with some silt areas and water flow is a fast riffle. Instream the moss *Fontinalis antipyretica* was abundant. Marginal vegetation is dominated by reed canary grass Phalaris *arundinacea*. Bankside vegetation is neutral grassland dominated by meadow foxtail *Alopecurus pratensis*, red fescue *Festuca rubra*, field forget-me-not *Myosotis arvensis*, cow parsley *Anthirscus sylvestris*, cuckooflower *Cardamine pratensis* and dock *Rumex obtusifolius*. The sample included some pollution sensitive mayfly species and was assigned a Q3-4 rating.

- The River Finn was sampled downstream of the confluence with the Legarhill stream at Cumber Bridge. The river at this location is 7m wide and 0.3-1m deep. The substrate comprises a mixture of stones and cobbles with some silt areas and water flow is a fast riffle. Marginal vegetation is dominated by reed canary grass *Phalaris arundinacea* and Fools watercress *Apium nodiflorum*. Banks support a woodland type vegetation, with a large area of alluvial deposit on the eastern bank supporting recolonising vegetation. Common flora includes rough meadow grass *Poa trivialis*, wavy bittercress *Cardamine flexuosa,* coltsfoot *Tussilago farfara*, hogweed *Heracleum sphondylium* and cleavers *Galium aparine*. The sample included some pollution sensitive mayfly species and was assigned a Q3-4 rating.

The Water Framework Directive mapping website[1] indicate that the crossborder river waterbody, into which the WwTP discharges (IE_XB_36_east_3), has an overall status of Moderate and an overall ecological status of Moderate. Therefore, the objective under the Water Framework Directive (2000/60/EC) is to Restore Good status. The overall risk status is '2b – Not At Risk'. Upper Lough Erne (IE_XB_36_east_2) also has an overall WFD status, and ecological status, of Moderate. The overall risk status is '1a – At Risk'.

[1] http://watermaps.wfdireland.ie/NsShare_Web/Viewer.aspx?Site=NsShare&ReloadKey=True

Photo 1: Stream Upstream WwTP

Photo 2: River Finn Upstream (Anlore Br)

Photo 3: River Finn Downstream (Cumber Br)

Waste Assimilative Capacity

Table 4.0 summaries the assimilative capacity calculations for the River Finn which are based on the 2021 loading of 2326p.e., 95%ile river flow (0.184m^3/sec) and water quality standards in the European Communities Environmental Objectives (Surface Water) Regulations, 2009 (S.I. No. 272 of 2009). Calculations could not be made with respect to the tributary into which the WwTP discharges as there was no flow data available for this stream. Assimilative capacity calculations use both actual background concentrations and the 'notionally clean river' approach. Actual background concentrations are mean values of figures for upstream samples on the River Finn presented in Table 3.0.

Table 4.0: Assimilative capacity calculations at estimated 2021 loadings of 2326p.e. for actual background concentrations and for a notionally clean river.

Parameter		Background (mg/l)	Predicted downstream quality (mg/l)	EQS* (mg/l)
BOD	Actual Background	1.087	1.335	≤2.6
	Notionally Clean	0.260	0.534	
Ammonia	Actual Background	0.064	0.113	≤0.14
	Notionally Clean	0.008	0.058	
Orthophosphate	Actual Background	0.045	0.123	≤0.075
	Notionally Clean	0.005	0.084	

*European Communities Environmental Objectives (Surface Waters) Regulations 2009, S.I. No. 272 of 2009 (95%ile standards presented for 'good' status)

Using both the actual background concentrations and the notional clean river concentrations demonstrates that the River Finn does not have the sufficient dilution capacity to assimilate Orthophosphate.

Field Walkover Survey

The WwTP is located to the south of the town of Clones adjacent to a small tributary of the Legarhill stream. Adjacent land use is mainly wet grassland, with a large factory (ABP Meats) to the southeast which also discharges to the same tributary ca. 50m downstream of the WwTP discharge. No Annex I habitats occur in the vicinity of the WwTP. No signs of otter were recorded during the site visit, though their distribution is indicated in the 10km square H52 where the WwTP and River Finn are located (NBDC database, NPWS, 2013b).

Downstream of the WwTP the stream continues to flow through agricultural grasslands before joining the main Legarhill stream and ultimately the River Finn.

Fish Stocks

The River Finn at Cumber Bridge was surveyed during fish stock surveys in 2013 (Kelly et al, 2014). Seven fish species were recorded, roach was the most abundant species followed by gudgeon.

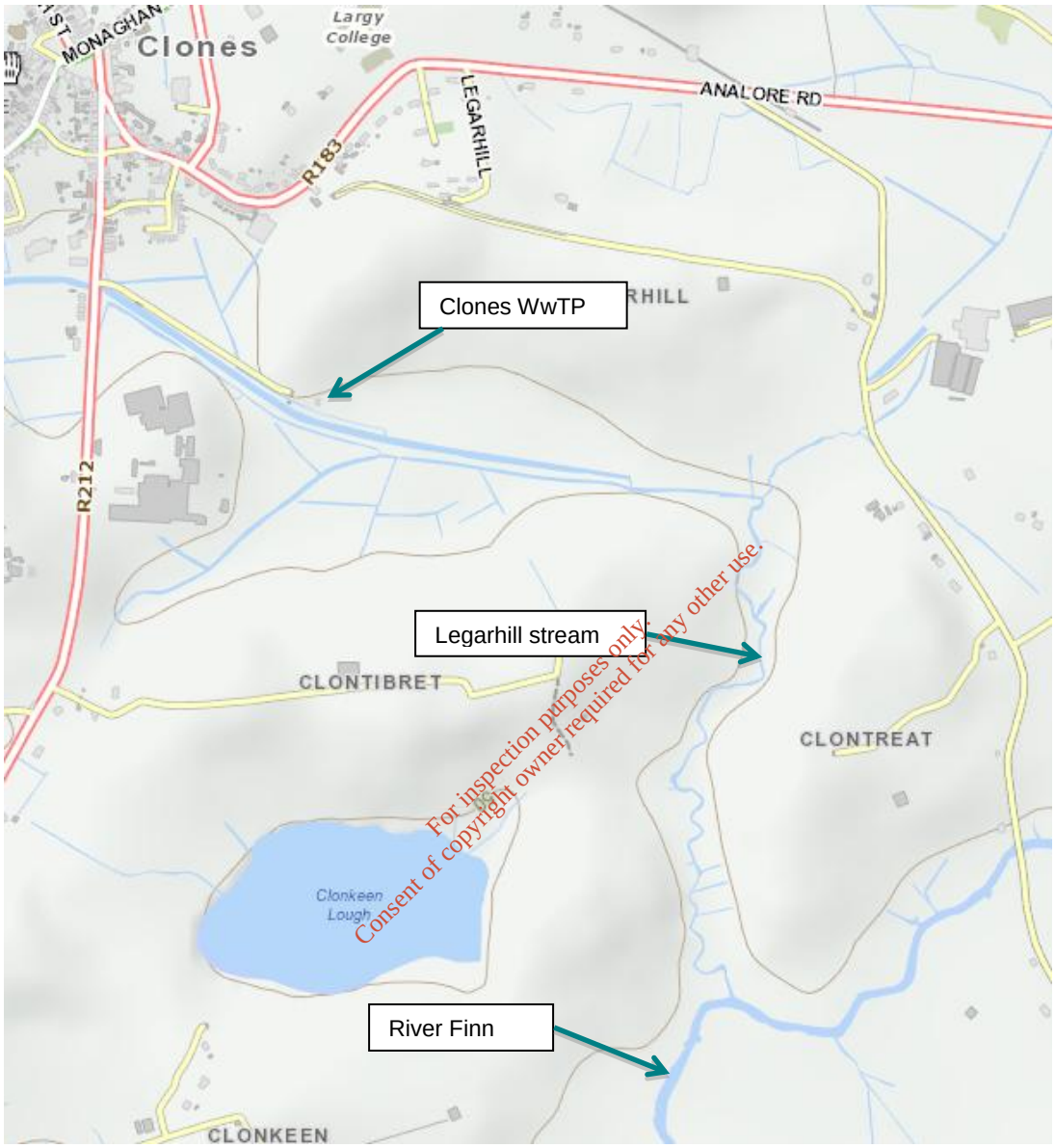

Figure 1: Site location (Source: NPWS Mapviewer)

Description of the Natura 2000 Site Affected

Upper Lough Erne SAC Site Description[2]

Upper Lough Erne SAC (UK0016614) is located in Co. Fermanagh and extends to 5738ha. It is desingated for three habitats – natural eutrophic lakes, old oak woodlands and alluvial forests.

The open waters of the main lough and smaller satellite loughs contain a variety of aquatic communities typical of natural eutrophic lakes. In addition, the shallow sheltered shores support extensive swamp, fen and marsh communities. Behind the open grazed foreshore is species-rich grassland, which occasionally extends back into the old adjacent field systems. Alluvial woodland is found where the shoreline is ungrazed or only very lightly grazed, while occasionally the dryer soils of the drumlins behind support a natural Oak woodland; this is particularly well developed within the Crom Estate to the south and the small island to the north of the Lough. Such diversity of good habitats and communities is reflected in the very large number of rare and notable plants and insects flourishing here: the woods being particularly important for breeding passerines and home for some notable mammals.

Upper Lough Erne in Northern Ireland is a very large natural eutrophic lake situated in a drumlin landscape and has a predominantly limestone catchment. The site is an example of a northern or western eutrophic lake of glacial origin. The lake has a very long shoreline and numerous associated satellite lakes, many of which are included in the site. Aquatic vegetation of the Magnopotamion and Hydrocharition type is extensively developed. Both club-rush – common reed *Scirpo – Phragmitetum* and reed canary-grass – shoreweed – spike-rush *Phalaris – Littorella – Eleocharis* associations are well-developed on the shore. There are transitions to swamp and fen vegetation.

The loughs supports one of the largest areas of semi-natural woodland remaining in Northern Ireland. Drier soils support mature stands of old sessile oak woods, which are particularly well-developed to the south of the lough. The woodlands consist of a canopy dominated by oak *Quercus petraea*, with occasional ash *Fraxinus excelsior* and birch *Betula pubescens*. Hazel *Corylus avellana* and holly *Ilex aquifolium* often form a distinct shrub layer. The ground flora is very variable and consists of a wide variety of species, including bluebell *Hyacinthoides non-scripta*, sanicle *Sanicula europaea*, goldilocks buttercup *Ranunculus auricomus*, great wood-rush *Luzula sylvatica*, and an abundance of the scarce thin-spiked wood-sedge *Carex strigosa*.

Upper Lough Erne is the most extensive area of alluvial forests in Northern Ireland. The woodland occurs in scattered stands around the edges of the lough, where the shoreline is ungrazed or only very lightly grazed. Fluctuating water levels and variations in exposure, substrate and management have resulted in the formation of a wide range of wet woodland communities. These are generally characterised by a canopy in which species such as willow *Salix* spp. and alder *Alnus glutinosa* are dominant, with more notable species such as aspen *Populus tremula*, guelder-rose *Viburnum opulus* and buckthorn *Rhamnus cathartica* scattered throughout. The ground flora is often similar to that of the swamp and fen zone, with a rich variety

[2] Sourced from DOENI http://www.doeni.gov.uk/niea/ramsar/ramsar_upperlerne.shtml and JNCC http://jncc.defra.gov.uk/protectedsites/sacselection/sac.asp?EUCode=UK0016614

of sedges and herbs. In places, there are well-developed transitions to drier woodland types, including 91A0 old sessile oak woods with *Ilex* and *Blechnum*.
This site represents otter *Lutra lutra* in Northern Ireland. The province holds one of the strongest populations of otters in the UK. Upper Lough Erne consists of a large eutrophic lake with very extensive associated wetland habitats that holds a dense and large population of otters. In addition the surrounding countryside is rich in relatively unpolluted rivers and lakes and has a high density of semi-natural habitats, especially wetlands, supporting the otter population within the site.

Excessive eutrophication is a potential threat to the main water body and the satellite lakes which comprise the site. Agricultural change (both intensification and abandonment) and developments (particularly tourist-related) could have an effect on the structure and function of the eutrophic lake or otter populations.

Description of the Conservation Interests of the SAC
Annex I Habitats

Upper Lough Erne SAC supports three Annex I habitats:

- [3150] Natural Eutrophic Lakes
- [9A10] Old Sesile Oak Woods with *Ilex* and *Blechnum* in the British Isles
- [91E0] Alluvial Forests with *Alnus glutinosa* and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion alvae)

Natural eutrophic lakes are characterised by a high abundance and diversity of pondweeds and typically occur in catchments dominated by mineral soils in the midlands and north east of Ireland. They typically have well-developed reedswamp, fen and/or marsh communities around much of their shoreline (NPWS, 2013a). The key threat to these lakes is euthrophication from diffuse and point sources of nutrients. The closest lake habitat is located over 18.5km downstream of the WwTP discharge. Given the distance involved there is little or no potential for the WwTP to impact on this habitat.

Old Oak Woodlands occur on dry soils adjacent to Upper Lough Erne. Terrestrial woodland habitat has no potential to be impacted by the ongoing WwTP discharges.

Alluvial Forests are found in areas subject to flooding along watercourses and water bodies where species tolerant of periodic water logging such as alder *Alnus glutinosa*, ash *Fraxinus excelsior* and willow *Salix* sp. are found. These are water dependant habitats and the problem of pollution finding its way into watercourses is a greater risk than in drier woodland. Key pressures to this habitat noted by NPWS (2013a) were invasive species and problematic native species. Less critical issues include dumping, grazing, thinning, water abstraction, recreational use and long-term flooding. NPWS (2013a) also note that nitrate pollution is an additional possibility when overgrazing occurs and also from effluent run-off. No Alluvial forests were identified downstream of the WwTP on the River Finn during the site visit, or a desktop review of datasets from the National survey of native woodlands and aerial photography. The closest areas of this habitat are associated with the SAC designation over 18.5km downstream of the discharge

location. Alluvial Forests are not threatened to the same degree by nutrient enrichment and there is little/no potential for adverse effects and changes to the conservation status of this habitat.

Table 5.0: Qualifying Habitats along Surveyed Stretch

Site	Qualifying Habitats	Present	
Upper Lough Erne SAC	Eutrophic Lake	Upstream	No
		Downstream	No
	Old Oak Woodlands	Upstream	No
		Downstream	No
	Alluvial Forests	Upstream	No
		Downstream	No

Annex II Species

Upper Lough Erne SAC supports one Annex II species:

- [1355] Otter (*Lutra lutra*)

There are historical records of **Otter** from the River Finn catchment, and while no signs were observed on the River Finn or the tributary into which the WwTP discharges, habitat is generally suitable. Otters have two basic requirements: aquatic prey and safe refuges where they can rest. This species is dependent on fish stocks which are ultimately dependent on water quality. The overall assessment of the conservation status of otter is 'Favourable' (NPWS, 2013b).

Table 6.0: Qualifying Species along Surveyed Stretch

Site	Qualifying Species	Observed or signs of species presence		Suitable Habitat Present	
Upper Lough Erne SAC	Otter	Upstream	No	Upstream	No
		Downstream	No	Downstream	Yes

Conservation Objectives of the Upper Lough Erne SAC

Article 6 of the Habitats Directive states that:

> *Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications of the site in view of the site's conservation objectives.*

The importance of a site designated under the Habitats Directive is defined by its qualifying features or interests. Qualifying interests for any Natura 2000 site are listed on a *pro forma*, called the Natura 2000 standard data form, which forms the basis of the rationale behind

designation, and informs the Conservation Management Plan for targeted management and monitoring of key species and habitats.

Favourable conservation status of a habitat is achieved when:

- Its natural range, and area it covers within that range, are stable or increasing;
- The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future; and
- The conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats;
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

The generic conservation objective is to maintain (or restore where appropriate) the:

- [3150] Natural Eutrophic Lakes (conservation status: inadequate stable)
- [9A10] Old Sesile Oak Woods with *Ilex* and *Blechnum* in the British Isles
- [91E0] Alluvial Forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion alvae)
- [1355] Otter (*Lutra lutra*) (conservation status: favourable)

to favourable conservation status.

Component objectives[3] for each SAC features are provided below.

Natural Eutrophic Lakes:

- Maintain and enhance water quality.
- Maintain a natural hydrological regime.
- Maintain the extent of existing characteristic aquatic and emergent community types.
- Maintain and enhance species diversity within each community including populations of rare and endangered species.
- Maintain purity of the natural and characteristic species composition.
- Minimal sediment load.
- Substrate should be natural & characteristic of lake type.
- Minimal environmental disturbance i.e. minimal negative impact from recreation and artificial structures and no fish farming.
- Instigate cross border monitoring mechanism between the relevant authorities to monitor water quality.

Old Oak Woodlands:

- Maintain and expand the extent of existing oak woodland but not at the expense of other SAC (ABC) features. (There are areas of degraded heath, wetland and damp grassland which have the potential to develop into oak woodland).

[3] DOENI Upper Lough Erne SAC UK0016614 Draft Conservation Objectives. V2. 2015.

- Maintain and enhance Oak woodland species diversity including the presence of notable or rare species.
- Maintain and enhance Oak woodland structure.
- Maintain the diversity and quality of habitats associated with the Oak woodland, e.g. fen meadow, grasslands, wet heath, wet woodland and scrub, especially where these exhibit natural transition to Oak woodland.
- Seek nature conservation management over adjacent forested areas outside the SAC where there may be potential for woodland rehabilitation.
- Seek nature conservation management over suitable areas immediately outside the SAC where there may be potential for woodland expansion.

Alluvial Forests:

- Maintain and expand the extent of existing alluvial forests but not at the expense of other SAC (ABC) features. (There are areas of wetland and damp grassland which have the potential to develop into Alluvial woodland).
- Maintain and enhance Alluvial Forests species diversity including the presence of notable or rare species.
- Maintain and enhance Alluvial forests structure.
- Maintain the diversity and quality of habitats associated with the Alluvial forests, e.g. fen meadow, grasslands, wet heath, wet woodland and scrub, especially where these exhibit natural transition to Alluvial forests.
- Seek nature conservation management over adjacent forested areas outside the SAC where there may be potential for woodland rehabilitation.
- Seek nature conservation management over suitable areas immediately outside the SAC where there may be potential for woodland expansion.

Otter:

- Population numbers and distribution to be maintained and if possible, expanded.
- Maintain the extent and quality of suitable Otter habitat, in particular the chemical and biological quality of the water, and all associated wetland habitats

Upper Lough Erne SPA Site Description[4]

Upper Lough Erne Lough is situated in County Fermanagh in the west of Northern Ireland is a very large and complex freshwater system. A series of flooded drumlins in the course of the River Erne give rise to a complex of islands, bays and many lakes bordered by damp pastures, fens, reedswamp and alder/willow carr and oak woodland.

The Special Protection Area site boundary is entirely coincident with the composite boundary of the following ASSIs: Corraslough Point, Dernish Island, Finn Floods, Inishroosk, Killymackan Lough, Upper Lough Erne - Belleisle, Upper Lough Erne - Crom, Upper Lough Erne - Galloon and Upper Lough Erne – Trannish

[4] Sourced from DOENI http://www.doeni.gov.uk/niea/spec_protect/spec_protect_upperlougherne.shtml

The site qualifies under Article 4.1 of EC Directive 79/409 on the Conservation of Wild Birds by regularly supporting internationally important numbers of wintering Whooper Swans. Upper Lough Erne provides a core protected area for Whooper Swans in the region of Northern Ireland, as there is interchange between the swans using protected areas and those ranging more widely on surrounding farmland.

Upper Lough Erne contributes to the maintenance of the geographic range of the Annex 1 Greenland White-fronted Goose population of Northern Ireland through supporting regionally important numbers.

It also supports an important assemblage of breeding birds including Common Rern and in the past supported breeding Corncrake. Both are Annex 1 species.

Other migratory birds breeding on the site include Great Crested Grebe and important concentrations of three species of waders which are declining elsewhere, Curlew, Snipe and Redshank.

Nationally important wintering wildfowl species, many of which are migratory, include Great Crested Grebe, Cormorant, Mute Swan, Tufted Duck, Wigeon, Teal, Goldeneye, Coot, Mallard, Snipe, Curlew, and Redshank.

Description of the Conservation Interests of the SPA

The SPA is designated for the following bird species:

- *Cygnus cygnus* [Whooper Swan]
- *Podiceps cristatus* [Great Crested Grebe]
- *Phalacrocorax carbo* [Cormorant]
- *Cygnus olor* [Mute Swan]
- *Aythya fuligula* [Tufted Duck]
- *Anas penelope* [Wigeon]
- *Anas crecca* [Teal]
- *Bucephala clangula* [Goldeneye]
- *Fulica atra* [Coot]
- *Anas platyrhynchos* [Mallard]
- *Gallinago gallinago* [Snipe]
- *Numenius arquata* [Curlew]
- *Tringa totanus* [Redshank]

The conservation objectives[5] for this site are: 'To maintain each feature in favourable condition'. The only feature assessed in 2014 was Whooper Swan which was determined to be at Favourable Conservation Status.

Component objectives for this feature are as follows:

- To maintain or enhance the population of the qualifying species;
- To maintain or enhance the range of habitats utilised by the qualifying species;

[5] DOENI Upper Lough Erne Special Protection Area (SPA) UK9020071. Conservation Objectives. V3. 2015.

- To ensure that the integrity of the site is maintained;
- To ensure there is no significant disturbance of the species; and
- To ensure that the following are maintained in the long term:
    - Population of the species as a viable component of the site.
    - Distribution of the species within site.
    - Distribution and extent of habitats supporting the species.
    - Structure, function and supporting processes of habitats supporting the species.

For the Whooper swan wintering population the specific objective listed is 'No significant decrease in population against national trends' For the 'Habitat' feature the specific objective listed is to 'Maintain the extent of main habitat components used by or potentially usable by the feature species subject to natural processes'.

Threats, pressures and site/feature management issues including management of adjoining habitat for Whooper Swan, boating activity, habitat loss, introduced species and water quality.

Information on populations (where available), requirements and sensitivities of key species are considered in more detail below with data taken from Crowe (2005), Birdwatch Irelands website[6], BTO website[7] and WeBS data, and the referenced geese census reports.

Whooper swans are primarily herbivorous, feeding on aquatic plants, grasses and agricultural plants such as grain and vegetables. The most recent published swan census (Hall *et al*, 2012) indicated that just over 50% of the habitat usage records for Whooper Swans were for dry improved pasture with 37.5% seen on arable land. Whooper Swan in Ireland are part of the Icelandic population which migrate south for the winter to Ireland and the UK. Numbers in the Upper Lough Erne during the last published swan census in 2010 were 799, up 29% relative to 2005 (Hall *et al*, 2012) and indicating a population of international importance (greater than 270). The WeBS peak count for winter 2013/2014 was 487.

Great Crested Grebe are a widespread breeding species. It is thought that the majority that breed within Ireland are resident, with individuals breeding at inland wetlands (lakes) moving to coastal areas for the winter period. They are largely piscivorous and make short dives for their prey in the depth range of 2-4m. Upper Lough Erne is an important breeding site for his species. The WeBS peak count for winter 2013/2014 was 93. The current threshold count for national importance is 40.

Cormorants breed primarily on rocky cliffs and offshore islands. While most are resident, a proportion of the Irish population migrates south during winter. The greatest numbers of Cormorants winter in coastal sites with some using inland freshwater sites. The WeBS peak count for winter 2013/2014 was 85.

Mute swan are common and widespread throughout Ireland. They feed mainly on water plants and may also graze on land. The WeBS peak count for winter 2013/2014 was 692.

[6] www.birdwatchireland.ie
[7] http://blx1.bto.org/webs-reporting/

Tufted duck are both a resident species and a winter visitor. They feed predominately on mussels. They are an amber-listed species of conservation concern (Colhoun & Cummins, 2013). The WeBS peak count for winter 2013/2014 was 1354.

Wigeon are common and widespread throughout Ireland in the winter where they occur on the coast and in inland wetlands, lakes and rivers. Away from coasts they graze on algae and also regularly feed on grasslands and cereal crops. They are an amber-listed species of conservation concern (Colhoun & Cummins, 2013). The WeBS peak count for winter 2013/2014 was 554. The current threshold count for national importance is 630.

Wintering **Teal** are widespread in Ireland on wetlands both coastal and inland. They feed predominately on small seeds, with algae (*Ulva* spp.) and molluscs also taken. The WeBS peak count for winter 2013/2014 was 99.

Goldeneye are a winter visitor from Scandanavia. They winter on coastal estuaries and inland lake.s Their diet is principally comprises of crustaceans with occasional molluscs and small fish. The WeBS peak count for winter 2013/2014 was 12.

Coot are both a resident species and a winter visit. They are omnivorous feeding on plant shoots, seeds, insects, algae and fish. The WeBS peak count for winter 2013/2014 was 1874.

Mallard are a widespread wintering species in all wetland habtiats, though don't tend to be as numerous as Wigeon or Teal. They have a variable diet including plant material, molluscs and crustaceans, and grain and stubble. The WeBS peak count for winter 2013/2014 was 389.

Snipe are a summer visitor from west Europe and west Africa and a winter visitor from Faeroe Islands, Iceland and Northern Scotland. They feed mainly on vegetable matter and seeds, together with soil invertebrates. No Snipe were recorded during the winter 2013/2014 WeBS surveys. They are known to breed at Upper Lough Erne.

Curlew winter in a wide range of wetland habitats both coastal and inland. They feed mostly on invertebrates including ragworms, crabs and molluscs. The WeBS peak count for winter 2013/2014 was 75. They are known to breed at Upper Lough Erne.

Redshank winter all around the coast of Ireland, but favour mudflats, large estuaries and inlets. They feed along the upper shore of estuaries and along muddy river channels on *Hydrobia* sp. (bivalve mollusc), Corophium sp.(amphipod) and nereid worms (polychaete). No Redshank were recorded during the winter 2013/2014 WeBS surveys. They are known to breed at Upper Lough Erne.

Table 7.0: Qualifying SPA Features along Surveyed Stretch

Site	Qualifying Species	Observed or signs of species presence within potential zone of influence of discharge	Suitable habitat present within potential zone of influence of discharge
Upper Lough Erne SPA	Whooper Swan	No	Yes
	Great Crested Grebe	No	No
	Cormorant	No	No
	Mute Swan	No	Yes
	Tufted Duck	No	No
	Wigeon	No	No
	Teal	No	No
	Goldeneye	No	No
	Coot	No	Yes
	Mallard	No	Yes
	Snipe	No	Yes
	Curlew	No	No
	Redshank	No	No

Impact Prediction

Impacts on Water Quality

The aquatic conservation interests of Upper Lough Erne SAC and SPA are directly dependant on the aquatic environment. As the Clones WwTP is upstream of these European Sites, there is a connection between this facility and the ecological receptors of these European Sites.

Water quality sampling data downstream of the WwTP discharge indicates some exceedances of the Surface Water Regulations standards with respect to BOD, Ammonia and Orthophosphate. However exceedances also occur upstream and the quality of the effluent being discharged complies with UWWT standards. Assimilative capacity calculations, and exceedances of orthophosphate downstream in the River Finn, indicate that assimilation of Orthophosphate is an issue. The Erne East Water Management Unit Action Plan (NWIRBD, 2010) identifies that risks from Clones WwTP relate to insufficient assimilative capacity for BOD. Based on the current and 2021 population equivalent there is not a capacity issue at this WwTP.

Cumulative impacts in the catchment possibly pose the greatest risk to the conservation objectives. The potential threat(s) of the Clones WwTP on water quality (long term or single event) is greatly increased when taken in combination with other water quality concerns in the catchment.

The Erne East Water Management Unit Action Plan (NWIRBD, 2010) indicates that the largest sources of phosphorus in the catchment are diffuse sources from agriculture (86%), with WwTPs contributing the largest point source of phosphorus (5%). Eleven other WwTP's in this catchment are noted as posing risks to water quality and measures requiring upgrading detailed for seven of these. There are 16 Section 4 licensed facilities, 20 IPPC licensed facilities (abbatoir, animal

food processor and poultry farms) and 13 water treatment plants. ABP Meats (IPPC license no P0190-02) operates directly adjacent to the WwTP and discharges into the same tributary of the Legarhill stream, though it was noted by IFI that upgrades at this facility have greatly improved the quality of the effluent being discharged.

Other impacts which have the potential to act cumulatively and impact on the SAC and SPA result from the following:

- Chemical fertiliser application to agricultural lands (the main fertilisers in use supply nitrogen, phosphorus, potassium and sulphur);
- Agricultural practices such as ploughing leads to greater mineralisation and nitrification, and in the case of old grassland, it can result in an increase in the release of nitrogen over a number of years (OECD, 1986);
- Artificial drainage increases nitrate leaching and reduce the morphological qualities of watercourses, thereby reducing the quality of habitat for flora and fauna;
- Endocrine disruptors in domestic sewage, including the main active component in the oral contraceptive pill, can interfere with the endocrine system of plants and animals which controls a wide range of processes including metabolism, growth and reproduction. Effects include a high degree of intersexuality downstream of sewage works (Routledge *et al*. 1998);
- Forestry may alter water quality indirectly through increased evaporation losses and hence an increase in solute concentrations; and
- On-site wastewater treatment systems, poorly performing septic tank units and other small effluent systems can be significant sources of nutrients to rivers.

While the assimilative capacity in receiving waters is limited particularly with regard the Orthophosphate, the recent installation of a chemical dosing facility for phosphorus removal should improve the effluent in this regard. Given the significant distance to the SAC and SPA, and the quality of the effluent being discharged, it is unlikely that the discharge considered 'alone' would result in adverse impacts on the conservation status of the qualifying interests or the overall integrity of the sites, however precautionary mitigation should be implemented to ensure that the WwTP discharge does not contribute in any way to cumulative pressures on the catchment.

Impacts on Annex I Habitats

The key threat to **Eutrophic Lakes** habitat is eutrophication which can result in a change in the community composition, diversity and biomass of macrophytes, and an increase in negative indicators such as algal abundance. The closest Eutrophic lake habitat the SAC is over 18.5km downstream of the discharge.

Results from biological water quality monitoring (both from EPA and those assigned during the site visit) do not detect a change in water quality in the River Finn downstream of the WwTP discharge. While the ongoing operation of the plant may contribute to impacts on River Finn catchment locally, given the significant distance to Eutrophic lake habitat, there is no potential for the discharge 'alone' to result in an adverse affect on the conservation status of this habitat or the overall integrity of the SAC. However, taking into consideration the pressures on Upper

Lough Erne from the range of catchments that feed into it, particularly with regard to the intensive agricultural activity in the county, precautionary mitigation is recommended in order to monitor the effectiveness of recently installed tertiary treatment measures and ensure that the WwTP is not contributing to cumulative effects on the lake habitat of Upper Lough Erne.

As noted earlier **Alluvial Forests** habitat was not recorded in the vicinity of the WwTP and the nearest locations are a significant distance downstream of the WwTP. This habitat would not be highly sensitive to minor-moderate levels of eutrophication, having some capacity to absorb nutrients (Borin *et al*, 2005; Bongard, 2009). There is no potential for adverse effects to this habitat.

Table 8.0: Qualifying Habitats Potentially Impacted by WwTP Discharge

Qualifying Habitats	Potential Impacts	Brief Explanation	Mitigation required
Eutrophic Lakes	Yes	No impacts of the WwTP alone are predicted however precautionary mitigation recommended to avoid cumulative impacts.	Yes
Old Oak Woodlands	No	Terrestrial habitat - no potential for conservation status to be adversely affected.	No
Alluvial Forests	No	Not a highly sensitive habitat and no potential for significant effects to the conservation status of this habitat.	No

Impacts on Annex II Species

Any significant reduction in water quality and ecological status downstream of the discharge of the Clones WwTP could potentially have indirect effects on **otters**; as a result of reduced food supply i.e. reduced macroinvertebrate and fisheries production. Otter populations associated with the SAC may use the River Finn as part of their territorial range. However, biological water quality monitoring does not indicate a significant decline in water quality downstream of the WwTP, and water quality in the River Finn is Moderate and continues to have the potential to support otter populations. While otter is dependent on fish stocks, which are ultimately dependent on water quality, any potential ongoing localised eutrophication in the River Finn as a result of the discharge is likely to be minor and is more likely to affect fish species composition rather than fish biomass which has negligible potential to significantly affect the otter population. There is no indication that the ongoing operation of this plant is having an adverse effect on otters within Upper Lough Erne SAC as a whole, and no specific additional mitigation is required.

Table 9.0: Qualifying Species Potentially Impacted by WwTP Discharge

Qualifying Species	Potential Impact	Brief Explanation	Mitigation Required
Otter	No	Species not considered highly sensitive to indirect effects of localised nutrient enrichment in this river which has moderate water quality status. Significant effects on the conservation status of otter not predicted.	No

Impacts on designated features of the SPA

The effects of eutrophication on wetland birds species can be varying and complex. Eutrophication causing increased phytoplankton growth could increase the amount of food available for bird species, however it can also lead to an increase in algal blooms which may impact on fishing species such as Great Crested Grebe during the breeding season. There is also evidence to suggest that reduced primary production (measured as chlorophyll a) due to better water quality can lead to a decline in the density and biomass of benthic invertebrates, and a consequent reduction in the abundance of diving ducks as has been the case on Lough Neagh where Pochard, Tufted Duck, Scaup and Goldeneye have all declined in numbers over the last 10 years (Burton *et al*, 2003; Tománková, 2013).

No qualifying species were observed in the vicinity of the WwTP. Wintering Whooper Swan feed primarily on agricultural lands are unlikely to be affected by nutrient enrichment. Upper Lough Erne is classed as having Moderate water quality. The other species for which the SPA is designated are not considered highly sensitive to minor-moderate levels of eutrophication. The distance of the WwTP upstream and the dilution achieved by the effluent downstream in the River Finn mean there is little or no chance for the WwTP to impact significantly on the bird species of the SPA.

There is no evidence to suggest that SPA species have been negatively affected by the operation of the WwTP's located upstream to date.

The potential for adverse effects on the conservation status of SPA Annex I bird species or their wetland habitats is considered negligible, and no specific additional mitigation is required.

Table 10.0: Qualifying Features of SPA Potentially Impacted by WwTP Discharge

Qualifying Features	Potential Impacts	Brief Explanation	Mitigation required
Whooper Swan	No	Feed primarily on agricultural lands and unlikely to affected by any change in the nutrient status of Upper Lough Erne. Internationally important numbers have occurred regularly in recent years while the operation of the WwTP has been ongoing.	No
Great Crested Grebe Cormorant Mute Swan Tufted Duck Wigeon Teal Goldeneye Coot Mallard Snipe Curlew Redshank	No	No qualifying species were observed in the vicinity of the WwTP. There is no evidence to suggest that these species have been impacted by the WwTP to date, or that they would be particularly sensitive to minor changes in nutrient levels in the Upper Lough Erne.	No

Mitigation Measures

Clones WwTP is identified as posing a risk to water quality in the Erne East WMU Action Plan (NWRBD, 2010). These risks are noted as related to the insufficient assimilative capacity of the receiving water. Capacity it not an issue and the discharge meets the UWWT standards, however reduction in levels of phosphorus due to newly installed tertiary treatment should be monitored given the lack of dilution capacity in the River Finn.

To ensure satisfactory operation of the plant mitigation measures recommended for the ongoing operation are as follows:

- Optimisation of tertiary treatment measures to reduce the levels of Phosphorous currently being discharged from the plant;
- Implementation of a performance management system;
- Ensure that the capacity of the WwTP is not exceeded; and
- Continuation of monitoring of the discharge, both upstream and downstream of the plant on a consistent regular basis. Annual biological water quality monitoring should also be undertaken upstream and downstream of the WwTP primary discharge. Any biological monitoring should be carried out during the summer / autumn periods.

Stage 2 Appropriate Assessment Conclusion Statement

The current Appropriate Assessment has been prepared following the EPA (2009) '*Note on Appropriate Assessments for the purposes of the Waste Water Discharge (Authorisation) Regulations, 2007 (S.I. No. 684 of 2007)*'. The Department of the Environment, Heritage and Local Government guidance '*Appropriate Assessment of Plans and Projects in Ireland. Guidance for Planning Authorities'* (DoEHLG, 2009a) has also been taken into account. The current assessment for the Waste Water Discharge Licence Application investigates the potential adverse effects on the aquatic qualifying interests of the Natura 2000 network arising from the plant discharge, in combination with other plans / projects affecting the aquatic environment. The assessment considers whether the discharge, alone or in combination with other projects or plans, will have adverse effects on the *integrity* of a Natura 2000 site, and includes any mitigation measures necessary to avoid, reduce or offset negative effects.

When the above mitigation measures are implemented in full, it is envisaged that there will be no significant adverse effects on the integrity of Upper Lough Erne SAC/SPA in view of these site's conservation objectives and that the conservation status of the Annex I habitats, Annex II species or Annex I bird species will not be compromised by WwTP discharge either directly, indirectly or cumulatively.

It is therefore concluded that the Clones WwTP discharge, alone or in-combination with other plans and / or projects will not give rise to significant effects on the integrity of Upper Lough Erne SAC and SPA, as long as the mitigation measures as listed above are implemented in full. Stage 2 concludes the Appropriate Assessment process of the Clones Waste Water Discharge Licence Application.

References

Bongard, P.M., (2009). Riparian Forest Buffers for Trout Habitat Improvement. Available at:http://www.extension.umn.edu/Agroforestry/components/RFB-literature-review.pdf [Accessed April 1st, 2015].

Borin, M., Vianello, M., Morari, F. and Zanin, G., (2005). Effectiveness of buffer strips in removing pollutants in runoff from a cultivated field in North-East Italy. Agriculture, ecosystems & environment,105(1-2), pp.101-114.

Colhoun, K & Cummins, S.(2013) Birds of Conservation Concern in Ireland 2014-2019. Irish Birds 9: 523-544.

Crowe, O. 2005. Ireland's Wetlands and their Waterbirds: Status and Distribution. BirdWatch Ireland, Rockingham, Co. Wicklow.

Hall C, Glanville J. R., Boland H, Einarsson O, McElwaine G, Holt C. A., Spray C. J., Rees E. R. (2012). Population Size and Breeding Success of Icelandic Whooper Swan *Cygnus Cygnus;* Results of the 2010 International Census. Wildfowl 62:73-96, Wildfowl & Wetlands Trust, Slimbridge, Gloustershire.

Kelly, F.L., Matson, R., Connor, L., Feeney, R., Morrissey, E., Coyne, J. and Rocks, K. (2014) Water Framework Directive Fish Stock Survey of Rivers in the North Western International River Basin District. Inland Fisheries Ireland, 3044 Lake Drive, Citywest Business Campus, Dublin 24, Ireland.

NPWS (2013a) The Status of EU Protected Habitats and Species in Ireland. Habitats Assessments Volume 2, Version 1.0. Unpublished Report, National Parks & Wildlife Services. Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

NPWS (2013b) The Status of EU Protected Habitats and Species in Ireland. Species Assessments Volume 3, Version 1.0. Unpublished Report, National Parks & Wildlife Services. Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

OECD (1986) Water pollution by fertilisers and pesticides. Organisation for Economic Cooperation and Development, Paris, 144 pp.

Routledge, E.J., D. Sheahan, C. Desbrow, G. Brighty, M. Waldock, and J.P. Sumpter (1998). Identification of estrogenic chemicals in sewage treatment effluent, 2. In vivo responses in trout and roach, *Environment, Science and Technology,* 32: 1559-65.

NWIRBD (2010) North West International River Basin Management Plan – Erne East Water Management Unit: http://www.wfdireland.ie/docs/1_River%20Basin%20Management%20Plans%202009%20-%202015/NWIRBD%20RBMP%202010/Water%20Management%20Unit%20Action%20Plans/Erne%20East%20WMU%20Action%20Plan%20March%202010.pdf