Comhairle Contae Mhaigh Eo

Áras an Chontae, Caisleán an Bharraigh, Contae Mhaigh Eo.
Teileafón: (094) 9024444 Facs: (094) 9023937

Do Thag. / Your Ref. A0058-01 Ár dTag. / Our Ref. WS 512

5th September 2010.

Administration,
Environmental Licensing Programme,
Office of Climate, Licensing & Resource Use,
Environmental Protection Agency,
Headquarters,
P.O. Box 3000 Johnstown Castle Estate,
County Wexford.

RE: **WASTE WATER DISCHARGE CERTIFICATE APPLICATION**
REGISTRATION NO: A0058-01 – TOORMAKEADY

Dear Dr. Creed,

Further to your letter of 7th April 2010, I enclose the required response to the query raised in the correspondence.

This documentation includes:

- 1 no. signed copy & 1 no. copy in hardcopy format of the documentation
- 1 no. copies of all files in electronic searchable PDF format on CD-ROM
- 1 copies of digital geo-referenced drawing files on CD ROM

The content of the electronic files on the accompanying CD-ROM is a true copy of the original documentation.

Thank you,

Yours sincerely

P Mahon

Paddy Mahon
DIRECTOR OF SERVICES

www.mayococo.ie

Mayo County Council

Áras an Chontae, Castlebar, Co. Mayo. Tel: (094) 9024444 Fax: (094) 9023937

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Assess the likelihood of significant effects of the waste water discharges from the above agglomerations on the relevant European sites by referring to Circular L8/08 ' Water Services Investment and Rural Water Programmes - Protection of Natural Heritage and National Monuments' issued by the Department of Environment, Heritage and Local Government.

In particular, the flow diagram in Appendix 1 should be completed and the results of each section recorded.

Provide details of the results of this assessment within one month of the date of this notice.

If significant effects are likely then an appropriate assessment must be carried out and a report of this assessment forwarded to the Agency within one month of the date of this notice.

You are advised to provide the requested information in accordance with the 'Note on Appropriate Assessments for the purposes of the Waste Water Discharge (Authorisation) Regulations, 2007 (S.1. 684 of2007)' which is available at www.epa.ie. /downloads/forms/lic/wwda/

Answer No. 1

Attachment F.1 contains a copy of the “A0058-01, Appropriate Assessment Screening for Toormakeady Wastewater Discharge Certificate of Authorisation Application, August 2010”.

The screening indicates that a full Appropriate Assessment will not be required.

MAYO COUNTY COUNCIL

TOORMAKEADY

WASTE WATER DISCHARGE

Certificate of Authorisation Application

ATTACHMENT F.1

Appropriate Assessment Screening

A0058-01

APPROPRIATE ASSESSMENT SCREENING

For

TOORMAKEADY WASTEWATER DISCHARGE

Certificate of Authorisation Application

August 2010

In accordance with the Waste Water Discharge (Authorisation) Regulations, 2007 (S.I. No. 684 of 2007)

And

Article 6(3) and 6 (4) of the

Habitats Directive 92/43/EEC

1. INTRODUCTION

Mayo County Council, Aras an Chontae, The Mall, Castlebar, Co. Mayo made an application to the Environmental Protection Agency (EPA) for a Waste Water Discharge Certificate of Authorisation, for Toormakeady Agglomeration in compliance with the Waste Water Discharge (Authorisation) Regulations, 2007 (S.I. No. 684 of 2007), in December 2009.

Under Part II, Article 6 (5) of the Wastewater Discharge (Authorisation) Regulations, 2007, where it appears to the EPA that the discharge concerned, or the proposed discharge, as the case may be, is likely to have a significant impact on a European site, either alone or in combination with other operations or activities, the EPA shall cause an assessment to be made of the implications for the site in view of the conservation objectives of that site, and in considering the application the EPA shall have regard to the conclusions of the assessment.

The Toormakeady Wastewater Treatment Plant is located to the east of Toormakeady village in south Mayo, approximately 9 km from the Galway / Mayo border. With a current population equivalent (PE) of 114 and an estimated BOD loading of 0.64 $kgday^{-1}$, two effluent discharges; one primary and one secondary discharge directly to the Glensaul River ((110112 E, 268030 N) and (109723 E, 268101 N) respectively), as illustrated in Fig. 1.1.

The relatively short but fast-flowing Glensaul River meanders in an easterly direction through Toormakeady draining a total catchment of 24.3 km^2 and flowing into Lough Mask at (110600 E, 267800 N). The Glensaul River catchment is primarily composed of bog land, with woodland present to a lesser extent while small pockets of agricultural lands and mixed forested areas are also represented. The upper reaches of the river are quite turbulent and hence well-aerated; an impressive waterfall is located approximately 1 km upstream of Toormakeady village, within a Coillte-designated Recreational Site. The river is not designated as a Sensitive Area under the Environmental Protection Agency Act, 1992 (Urban Waste Water Treatment) Regulations, 1994 (S.I. No. 419/1994) and is not referred to in the First Schedule of the Salmonid Regulations (S.I. No. 293/1988). However, the Glensaul River discharges to the western shore of Lough Mask, approximately 0.9 km downstream of the primary discharge point of Toormakeady Wastewater Treatment Plant. While no proposed Natural Heritage Areas (NHAs) are located within a 5 km radius of the primary discharge point, Lough Mask forms part of the Lough Mask / Carra Complex SAC while the country's sixth largest lake is also a designated SPA.

The Glensaul River, was designated as of 'good status' under the Western River Basin Management Plan – this status will need to be maintained under the requirements of the Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for the Community action in the field of water policy or EU Water Framework Directive, transposed into Irish law as the European Communities (Water Policy) Regulations, 2003 (as amended) (S.I. No. 722/2003).

This current report includes, inter alia:

1. Screening of the proposed plan in order to determine whether an Appropriate Assessment is required.

Purpose of Appropriate Assessment

Articles 6(3) and 6(4) of the Habitats Directive 92/43/EEC require an Appropriate Assessment of plans to prevent significant adverse effect on Natura 2000 sites.

Article 6(3) 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 for the site in view of the site's conservation objectives. In the 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) If, in spite of a negative assessment of the implications for the 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 social or economic nature, the Member State shall take all compensatory measures necessary to ensure that the overall coherence of the Nature 2000 site is protected. It shall inform the Commission of the compensatory measures adopted.

Where the site concerned hosts a priority natural habitat type and/or a priority species, the only considerations which may be raised are those relating to human health or public safety, to beneficial consequences of primary importance for the environment or, further to an opinion from the Commission, to other imperative reasons of overriding public interest (IROPI).

The purpose of this Appropriate Assessment Screening Document is to address the potential impacts of discharges from the Toormakeady Wastewater Treatment Plant on the conservation objectives of Natura 2000 Sites – the Lough Carra / Mask Complex SAC (site code: 001774) and Lough Mask SPA (site code: 004062) and the Glensaul River itself.

If an Appropriate Assessment (AA) is required it must determine whether the project is likely to have significant adverse effects on these sites either alone or in conjunction with other plans and projects in the area and whether these effects will negatively impact the conservation objectives of the SAC and the SPA.

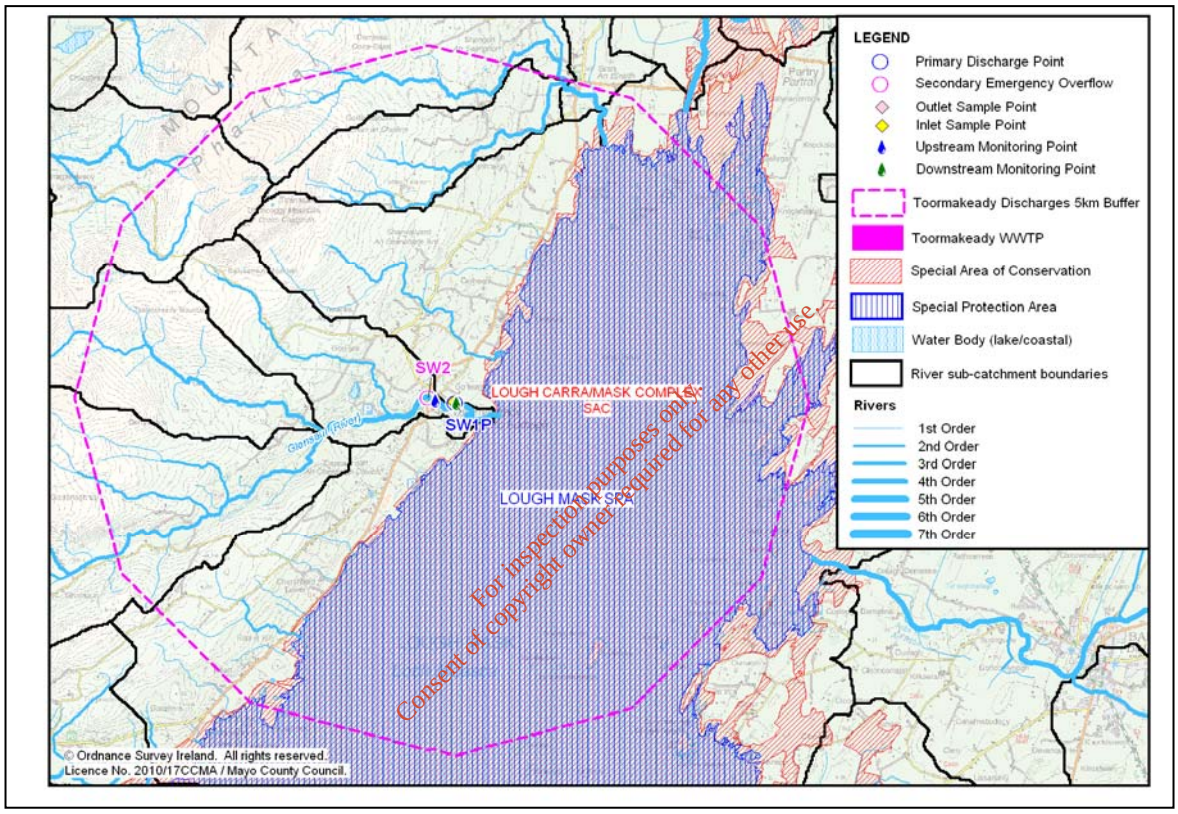

Figure 1.1 - Location Map showing Toormakeady WwTP and adjacent Natura 2000 sites – Lough Carra / Mask Complex SAC and Lough Mask SPA within 5 km radial buffer

2. APPROPRIATE ASSESSMENT - THE PROCESS

According to European Commission Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EC (2001) and Managing Natura 2000 Sites (2000), the assessment requirements of Article 6 establish a stage-by-stage approach as follows:

Stage 1 - Screening for a likely significant effect: An initial assessment of the project or plans effect on a European site(s). If it cannot be concluded that there will be no significant effect upon a European site, an AA is required.

Stage 2 - Appropriate Assessment: Essentially, an AA is the consideration of the impact on the integrity of the Natura 2000 site of the project or plan, either alone or in combination with other projects of plans, with respect to the site's structure and function and its conservation objectives. In addition, where there are adverse effects, an assessment of the potential mitigation of those impacts are made.

Stage 3 – Assessment of alternative solutions: This refers to the process in which alternative ways of achieving the objectives of the project or plan that avoid adverse impacts on the integrity of the Natura 2000 site are examined.

Stage 4 – Assessment where no alternative solutions exist and 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.

Each stage determines whether a further stage in the process is required. If, for example, the conclusions at the end of Stage 1 are that there will be no significant impacts on the Natura 2000 site, there is no requirement to proceed further.

Sources / References

The following evaluation has been prepared in consultation with the documents listed in the Bibliography Section of this document.

3. STAGE 1 - SCREENING

Screening is the process of deciding whether or not an AA is required for the project or plan. Screening only requires sufficient information to determine if there is a likely significant effect on a Natura 2000 site and does not require the detailed information necessary for an AA.

The following Stage 1: Screening was undertaken according to the Department of Environment, Heritage and Local Government Circular L8/08 and EC Methodological guidance on the provision of Article 6 (3) and (4) of the Habitats Directive 92/443/EEC and is incorporated as a tool to ascertain if an AA is required.

3.1 – Description of the Project

The Wastewater Treatment Works in Toormakeady, commissioned in 1997, provides a collection network and WwTP for a PE (population equivalent) of 250. Treated effluent from the plant is discharged to the Glensaul River through a primary discharge point (SW1P) and from a secondary discharge point located a few hundred metres upstream (SW2). The WwTP consists of an attached growth process in a package plant consisting of influent sampling point, influent chamber, primary settlement tank, rotating biological discs, sludge storage tank, sludge return system and final effluent sampling point. An outline of the process includes the entrance of raw sewage to the Primary Settlement Tank (PST) of the Biodisc by an inlet pipe, with solids depositing onto the floor of this compartment as the flow passes through the primary zone. The retained solids (primary sludge) are drawn off by a vacuum tanker and removed for off-site treatment at Ballinrobe Wastewater Treatment Plant by a permitted waste collection permit holder. The settled or partially clarified liquor passes into the Rotor Modules (biozone) for further treatment by the activated sludge process; biological decomposition of soluble and suspended organic matter in a more settleable inorganic form. The treated effluent from the biozone then enters the final settlement tank for secondary settlement of both effluent and the biological culture from the latter stages of the RBC. Tertiary treatment is not currently undertaken so nutrient removal has never been initiated. Unfortunately, the phosphorus loadings to Lough Mask have been steadily increasing in recent years so nutrient removal would be a beneficial future consideration. The WwTP is designed to treat wastewater to the following standards:

- BOD 25 mgL^{-1} O_2,
- COD 125 mgL^{-1} O_2,
- Suspended Solids 35 mgL^{-1} SS

The estimated throughput of the WwTP is 26 m^3day^{-1} at DWF (dry weather flow). Emissions are currently monitored bi-annually and this is proposed to continue. No future changes / modifications are presently proposed for this Plant or sewerage scheme.

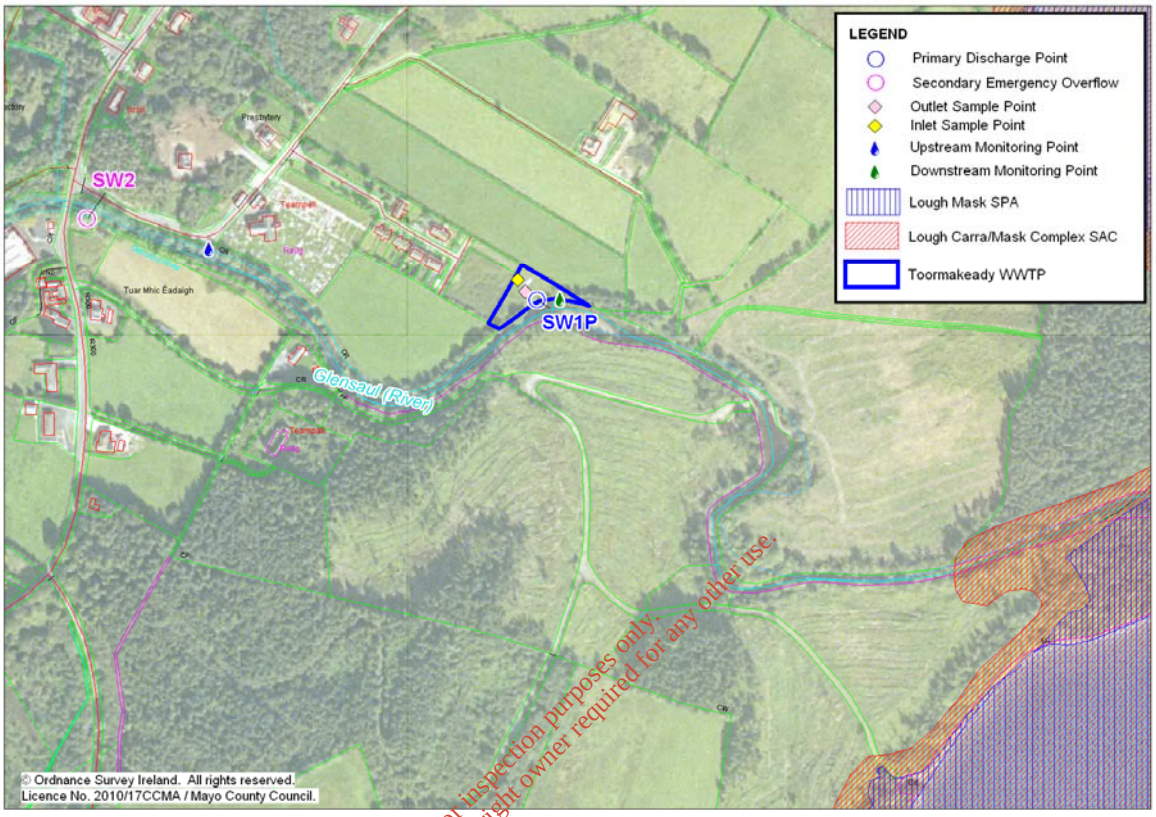

Fig. 3.1 Location of Toormakeady WwTP, primary and secondary discharge points (SW1P and SW2) and monitoring points on Glensaul River, tributary of Lough Mask

3.2 – Description of Natura 2000 Site

The Toormakeady WwTP and agglomeration is located on the boundary of a Natura 2000 Site; the Glensaul River drains a small catchment and discharges to the Lough Carra / Mask Complex SAC (site code: 001774) and Lough Mask SPA (site code: 004062). All emissions from the existing and Wastewater Treatment Plant and agglomeration are currently discharged directly into the Glensaul River, a tributary of Lough Mask.

Lough Carra / Mask Complex SAC (Site Code 001774)

(see Appendix I for a site synopsis)

As stated previously, the Glensaul River is a tributary of Lough Mask which is part of a Special Area of Conservation (SAC) and also a Special Protected Area (SPA). The Lough Carra / Mask Complex SAC includes three main lakes namely, Lough Mask, Carra and the smaller Cloon Lough. The SAC has been designated in consideration of the following habitats:

- Limestone pavement (Habitat Code 8240) – also a priority habitat;
- Alkaline fen (Habitat code 7230);
- Lowland oligotrophic lakes (Habitat code 3130);
- Marl Lakes;
- European Dry heaths (Habitat Code 4030);
- Calcareous Fens with Cladium mariscus (Code 7210).

Furthermore the SAC has been designated in consideration of the following species:

- Otter (Lutra lutra) (species code 1355);
- White-clawed Crayfish (Austropotamobius pallipes) (species code 1092);
- Lesser Horseshoe Bat (Rhinolophus hipposideros) (species code 1303).

Though the western shoreline of Lough Mask is less diverse and considerably deeper than its eastern shores, also lacking the limestone communities, there are records of notable Annex II species such as Freshwater Pearl Mussel (Margaritifera margaritifera) and otter (Lutra lutra), in addition to the Common Frog (Rana temporaria). Also, there are records of taxa protected under the Flora Protection Order (1987) including Irish St. John's wort (Hypericum canadense), Pillwort (Pilularia globulifera) and Small Cudweed (Logfia minima). Finally, the deep waters of Lough Mask are home to a population of the glacial relict Arctic Char (Salvelinus alpinus) (a Red Data Book species) while an uncommon amphipod (Niphargus spp.) also inhabits the lake waters. Lough Mask is also a notable Brown Trout (Salmo trutta) and Salmonid fishery.

Lough Mask SPA (Site Code 004062)

Lough Mask is a large deep lake (maximum depth 58 m; mean depth 15 m) which drains a catchment approximately 859 km^2 in Counties Mayo and Galway. The Lough Mask SPA has been designated in consideration of its national importance as a breeding site for many gull species including Black-headed Gull (Larus ridibundus), Common Gull (Larus canus) and Lesser Black-backed Gull (Larus fuscus) and is also a traditional breeding site for Common Tern (Sterna hirundo), an Annex I species listed in the E.U. Birds Directive. While the site also supports a good diversity of wintering waterfowl, including a nationally important population of Tufted Duck (Aythya fuligula), the occurrence of Whooper Swan (Cygnus cygnus) and Greenland White-fronted Goose (Anser albifrons flavirostris), albeit in small numbers, is of note as these species are also listed on Annex I of the E.U. Birds Directive.

3.3 – Other projects and plans to be considered 'in combination'

There have been 21 planning applications submitted within the agglomeration since 2004 and 15 have obtained permission (Source: Mayo County Council GIS database). Most of the applications refer to residential, retail and relatively small scale commercial projects. One application, however, has been granted for a development with a PE of 61 located within the agglomeration boundary. This particular development has been taken into account when calculating the waste assimilative capacity of the Glensaul river and the maximum permissible loadings – Appendix II. Since the WwTP can cater for a PE of 250 the proposed development will increase the PE to 175 (current PE of 114 and proposed PE of 61) and the outflow to 39 m^3day^{-1}.

There are no IPPC-licensed or discharge licenses within the 5 km radial distance of the Toormakeady WwTP.

3.4 – Assessment Criteria

3.4.1 – Is the development in or on the boundary of the aforementioned nature conservation sites?

Yes, the Toormakeady WwTP and agglomeration is on the boundary (approximately 0.66 km upstream) of the Lough Carra / Mask Complex SAC (site code: 001774) and approximately 0.81 km upstream of the Lough Mask SPA (site code: 004062).

3.4.2 – Is the development a surface water discharge or abstraction in the surface water catchment or immediately downstream of a nature conservation site with water dependant qualifying habitats/species?

The development in question, the Toormakeady WwTP, is a surface water discharge and is approximately 0.66 km upstream of the surface water catchment of a nature conservation site (Lough Carra / Mask Complex SAC [site code: 001774] and 0.81 km upstream of the Lough Mask SPA [site code: 004062]) with water-dependant qualifying habitats and species. In addition, the development is located within approximately 3 km of the abstraction point for the Lough Mask Public Water Supply Scheme (supplying approximately 35 million litres of water day^{-1} to much of County Mayo). Qualifying habitats and species have been listed in section 3.2 and are detailed in Appendix I. A data search of the National Parks and Wildlife 10 km^2 survey grids (M06, M07, M16 and M17) within a 5 km radial buffer zone of the WwTP and agglomeration via the EPA Austropotamobius pallipes records, NPWS datasets and data obtained from the National Parks and Wildlife Service of Ireland website indicated the presence of Irish Hare (Lepus timidus) and Common Frog (Rana temporaria) in the vicinity of the WwTP and agglomeration; neither of which are listed as Annex II species. Though their presence is noted in the vicinity of the Glensaul River (within the river sub-catchment) neither is located downstream of the development in question. The previously-mentioned Flora Protection Order species within the four relevant 10 km^2 grid polygons included at least 14 records of Irish St. John's wort (Hypericum canadense) and one record of Pillwort (Pilularia globulifera). Alder Buckthorn (Frangula alnus), an Irish Red Data book plant was also noted along the stretch of the river, while Marsh Clubmoss (Lycopodiella inundata) was also present within a 5 km radial buffer zone of the Toormakeady WwTP; a species listed in Annex V of the EU Habitats Directive. Particular attention, therefore, is given to the flora taxa as neither R. temporaria nor L. timidus are water-dependant (the most important habitats for breeding frogs are garden ponds, farm ponds, streams, bog pools, drains and ditches with stagnant / semi-flowing water and as such the fast-flowing Glensaul River is discounted as an important frog habitat).

From a macrophyte perspective, P. globulifera is described as **rare** in the National Plant Red List as well as being listed under the Flora (Protection) Order, 1999 (S.I. No. 94/1999) while F. alnus is also classified as **rare**. L. inundata is present as a **rare** taxon in the aforementioned Red List, a species listed in Annex V of the EU Habitats Directive and also under S.I. No. 94/1999. To conclude Hypericum canadense is a **rare** taxon National Plant Red List.

The habitat preference of all four plant taxa are semi-aquatic; all inhabit water-logged soils along margins of lakes, ponds or streams and at least two can tolerate complete submergence by water. On stating this, little research exists upon the actual water quality tolerated by each of the four taxa but Pillwort (P. globulifera) has been cited as associated with mesotrophic pools (Powys County Council, 2002) while concurrently described as threatened by nitrate / phosphate pollution due to the role of increased nutrients in promoting the accelerated growth of competitive species of both native and non-native macrophytes. St. John's wort is generally found in nutrient-poor soils and Alder Buckthorn (F. alnus) avoids both permanently waterlogged and very dry ground.

3.4.3 – Will nationally protected species be directly impacted? Wildlife Acts (1976 and 2000), Flora Protection Order (S.I. 94 of 1999)?

The aforementioned species are all regarded as important and nationally protected – under Annex II of the EU Habitats Directive and under the Flora Protection Order (S.I. No. 94/1999), in addition to some listed in the Irish Red Data Book.

All taxa recorded within the 5 km radial buffer zone of the Toormakeady WwTP were recorded upstream (nearest specimen just less than 3 km). Since river flow is unidirectional downstream reaches are influenced by upstream reaches and hence these sedentary taxa, which are located upstream of the WwTP, will not be influenced by the Treatment Plant discharges. However, the impact on all taxa should be considered with reference to the quality of the Glensaul River in any case. Water quality in the Glensaul River has been classified as 'at risk', 'probably at risk' and 'not at risk'. The 'at risk' status was assigned for the southern tributary of the river, while the 'probably at risk' was allocated to the northern tributary. Finally, the stretch of the river into which Toormakeady WwTP discharges is described as 'not at risk'.

Concerning water body quality status (assigned by one or more of a number of elements including macroinvertebrates, fish, phytobenthos or overall ecological status) again the water body has been assigned varying statuses including 'poor' in the two tributaries (based on fish for one tributary and a combination of fish and macroinvertebrates for the second) whereas the main course of the river is described as good, with a 'high status' describing the macroinvertebrate diversity and abundance.

Regarding the waste assimilative capacity (WAC) of the Glensaul River, it was determined that of the parameters examined; BOD, suspended solids, orthophosphate and ammonia, when expressed as a loading ($kgday^{-1}$) were significantly lower than the allowable WAC as calculated based on limits set in the European Communities Environmental Objectives (Surface Waters) Regulations, 2009 and using current data. A WAC of 9.7 kg day^{-1} O_2 was calculated for the biochemical oxygen demand (BOD) whereas the current loading, using data submitted with the December 2009 Certificate of Authorisation application is approximately 0.20 kg day^{-1} O_2. The suspended solids loading from the WwTP was estimated at 0.16 kg day^{-1} SS, while the calculated WAC, using a maximum limit of 25 mg L^{-1} (from S.I. No. 198/2009) was 139 kg day^{-1} SS. This was considerably within the waste assimilative capacity of the Glensaul River. Regarding orthophosphate, the WAC for this parameter was estimated at 0.3 kg day^{-1} P (as orthophosphate) while that of ammonia was deemed 0.82 kg day^{-1} N, both calculated based on 'good status' from the aforementioned 2009 legislation. While the current orthophosphate loading is 0.21 kg day^{-1} P and within the assimilative capacity of the river, the current ammonia loading is also within the capacity of the Toormakeady River at 0.06 kg day^{-1} N (calculations are detailed in Appendix II). These data demonstrate that, on the balance of probabilities, the physico-chemical characteristics of the effluent should not impact negatively on the quality of the Toormakeady River or on the Natura 2000 species identified therein, from the point of view of the WAC, in addition to the location of all protected and listed flora and fauna taxa of the Toormakeady River.

From the very important aspect of Lough Mask, as part of a notable SAC and an SPA in its own right, the protection of this notable Western lake is paramount and it deserves special attention from the perspective of the potential for compromise of respective waste assimilative capacities of the lake and consequently the Natura 2000 species and habitats therein. Lough Mask is currently of 'Moderate Status' and will have to achieve 'Good Status' by 2015. This current assignment is primarily due to diffuse pollution and to significant increases in phosphorus loadings from its entire catchment (Donnelly, 2001; Styles et al., 2006). Sources of eutrophication-promoting phosphorus include agricultural holdings and lands, domestic septic tanks, worked peat bogs and forestry parcels, to mention a few. The Glensaul River catchment is one of eight principal tributaries which drain the Mask catchment and has contributed considerable loadings of phosphorus to Lough Mask in recent years. From that point of view, the possible impact on the Glensaul River and its allocthonous organic material on the quality of the western shore of Lough Mask must be examined, with respect to the potential impacts of the species and habitats of the Lough Mask SPA and Lough Carra / Lough Mask Complex SAC.

The downstream annual loadings (estimated from the WwTP **only**) are currently (at time of writing) estimated at a BOD loading of just over than 2000 kg $year^{-1}$, SS loading of greater than 4000 kg $year^{-1}$, ortho-P loading of approximately 22 kg $year^{-1}$ and NH_3 loading in the region of 11 kg $year^{-1}$. These contrast quite favourably with, for example, **total phosphorus** loadings in excess of 400 kg $year^{-1}$ (maximum of 600 kg $year^{-1}$) estimated entering Lough Mask from the Glensaul River between 1996 and 1999 (Donnelly, 2001). Hence, these are not considered particularly significant and macrophytes (including Scirpus and Juncus spp.) identified in the littoral zones of the western shores of Lough Mask may even act as sinks for nutrients at least in spring and summer, thus reducing dissolved nutrients in the pelagial zone of the lake. Following addition of macrophytes to the littoral zone of a shallow lake in The Netherlands, submerged macrophyte stands reduced the ammonium and nitrate concentrations in the water to below detection levels (von Donk et al., 1993).

The inflowing Glensaul River has a 95 percentile flow of approximately 0.070 m^3s^{-1} (6048 m^3day^{-1}) and the volume of Lough Mask is 13 x 10^8 m^3, with a residence time of 0.28 years (flushing time approximately three times $year^{-1}$) (Donnelly, 2001). In contrast to a fast-flowing river, then, the influence of an inflowing plume of water from the Glensaul River to Lough Mask is fundamental. A river's capacity to regenerate itself is generally greater than that of a lake or standing water body due to the physical removal of nutrients and pollutants, in addition to the presence of more dissolved oxygen which contributes to biodegradation of organic pollutants. If necessary, the WAC of smaller stratified lakes can be increased by artificial re-aeration of water body by oxygen or air (Kneese et al., 2010). Lough Mask is a very well-mixed lake; hence artificial aeration is not a necessity. A number of factors should be considered in determining the impact on the receiving water of an inflowing plume of water, not least of which includes flow (minimum, maximum and mean), water level and quality of receiving water, thermal stratification and wind conditions. Mean flow has been estimated at 0.070 m^3s^{-1} and is considerably low as to have minimal impact on a large water body such as Lough Mask. The quality of Lough Mask, previously described, is currently described as of 'Moderate Status' and thus must meet the target of 'Good Status' by 2015. Thermal stratification is not a phenomenon which occurs at all frequently on Lough Mask due to the orientation of the lake and the long fetch for wind exposure (Donnelly, pers. comm.). The pathway the Glensaul River takes as it enters Lough Mask can only be accurately determined by use of dye and microbiological tracers, current meters or the development of mathematical models. While this would be a very beneficial exercise, it is suffice to say that due to the depth of the western shore of Lough Mask and to the lake size, the inflowing

waters would be very well-mixed and their contents dispersed throughout this lentic system which is not, in any way, comparable to a smaller quiescent lake. Generally, a plume entering a large lake carries suspended particles, including organic matter, clay, and silt washed from the drainage basin. In addition, sediments can carry substantial quantities of absorbed nutrients and other chemical contaminants. While much of the sediment entering a lake eventually settles to the lake bottom, there is generally lacustrine zonation incorporating littoral, littoriprofundal, profundal and pelagial zones and specific populations of organisms inhabit each zone (Wetzel, 2001). The rate of sedimentation and types, volume and rate of materials deposited determine the physical characteristics of the bottom substrate (profundal zone), which in turn has tremendous influence on oxygen levels in and near the bottom sediments and thus influences the types and productivity of organisms that live there and within the body of the lake – in addition to the Natura 2000 habitats. To conclude, Wetzel (2001) states that this water turbulence (a characteristic of Lough Mask) is of major significance to the biota and productivity of the lake and that this water movement not only influences the aggregation and distribution of nutrients and food, but also the distribution of microorganisms and plankton, which in turn influence taxa at higher trophic levels. Using both expert judgement and a good working knowledge of the catchment in question, one can conclude that the Natura 2000 species and habitats will **not** be directly impacted by the Toormakeady WwTP, either those of the Glensaul River, or those within the receiving lake water.

3.4.4 – Is the development a groundwater discharge or abstraction in the ground water catchment or within 5 km of a nature conservation site with water–dependant qualifying habitats/species?

No, the development is a surface water discharge.

3.4.5 - Is the development in the surface water or groundwater catchment of Salmonid waters?

No, the development is not in the surface water catchment of designated Salmonid waters; the Glensaul River is not listed in the Salmonid Regulations (S.I. No. 293/1988).

3.4.6 – Is the treatment plant in an active or former floodplain or flood zone of a river, lake etc.?

No, the treatment plant is not in an active or former floodplain or flood zone of a river or lake. Floods were previously recorded by the OPW on the south-west and eastern shores of Lough Mask, but not in the vicinity of the Toormakeady WwTP (www.floodmaps.ie). The OPW did, however, identify areas in proximity to the WwTP (0.02 km downstream) deemed as 'benefiting lands' which may profit from arterial drainage schemes. Should drainage occur, it will, undoubtedly, take wetland and semi-aquatic flora and faunal species into account.

Since site suitability tests carried out by Mayo County Council prior to the selection of a site for the construction of a wastewater treatment plant would have taken these considerations into account, this scenario is unlikely. A site is **not** considered suitable where it is situated in an active or former floodplain or flood zone of a river.

3.4.7 – Is the development of a surface discharge or abstraction to or from marine waters and within 3 km of a marine nature conservation site?

No, the development is not discharging to marine waters and is approximately 30 km from the nearest marine / brackish waters.

3.4.8 –Will the project in combination with other projects (existing and proposed) or changes to such projects affect the hydrology or water levels of sites of nature conservation interest or the habitats of protected species?

No. A review of all planning applications in the agglomeration since 2004 (Source: Mayo County Council GIS database), shows no major development has been proposed that would affect the hydrology or water levels of sites of nature conservation interest or the habitats of protected species.

The average outflow from Toormakeady WwTP is currently 26 m^3day^{-1}. EPA hydrology data records estimated a long-term 95 percentile flow of 0.070 m^3s^{-1} or 6048 m^3day^{-1}. Thus, the average flow from the WwTP represents significantly less than 1 % of the average flow of the river. Even considering the DWF of the Glensaul River at 0.025 m^3s^{-1} (2160 m^3day^{-1}), the dilution factor of river to effluent is still very high at 1.2 % or 83:1. Bearing in mind the proposed development with PE of 61 there will be a resultant increase of flow to 39 m^3day^{-1} from the Plant. This proposed flow is still not considered significant when contrasted with the 95 percentile flow of the Glensaul River at approximately 0.65 % of river flow.

It is therefore considered that the discharge from Toormakeady WwTP in combination with other projects (existing or proposed) is unlikely to have an impact on the hydrology or water levels in the river (or on Lough Mask) but any proposed increases in discharge volumes should incorporate maximum permissible volumes so as not to impact negatively on sites of nature conservation interest or the habitats of protected species.

3.4.9 – Conclusion:

It is considered that the WwTP primary discharge and other associated discharges will **not** impact directly on habitats or species of nature conservation importance within the Lough Carra / Lough Mask Complex SAC (site code: 001774) and Lough Mask SPA (site code: 004062) and the Annex II species identified in the vicinity of the WwTP. Taking into account the upper limits set by the European Communities Environmental Objectives (Surface Waters) Regulations, 2009 and the Urban Waste Water Treatment Regulations, 2001 permissible concentrations, inter alia, it is probable that the Annex II species will **not** be significantly impacted by this project and that an appropriate assessment is **not** necessary in this case.

To conclude, this current report is not concerned with the impact of the Toormakeady Wastewater Treatment Plant effluent and Glensaul River quality on the receiving lake water quality – it must be stressed that the report is specific to the impact of the Toormakeady WwTP on Natura 2000 species and habitats. This technicality is crucial so that any opinions given in this report should not be interpreted as compromising the protection of Lough Mask and the objective of its good status by 2015. While it is the author's opinion that an Appropriate Assessment is not deemed necessary in this case, it must be stated that every effort should be made to adhere strictly to Plant certification limits set for this WwTP to prevent any deterioration of this minor river and consequently that of the large mixed lake.

4. FINDINGS OF SIGNIFICANT EFFECTS REPORT MATRIX

4.1 – Name of project or plan	Toormakeady WwTP and Agglomeration
4.2 – Name and location of Natura 2000 sites	Lough Carra / Mask Complex SAC (site code: 001774) and Lough Mask SPA (site code: 004062); all WwTP discharges to Glensaul River, approximately 0.9 km upstream of the receiving water: Lough Mask, and 0.66 km and 0.81 km upstream of the SAC and SPA respectively.
4.3 - Description of the project or plan	As 3.1 above.
4.4 - Is the project or plan directly connected with or necessary to the management of the site (provide details)?	No, the plan is not directly connected with or necessary to the management of the site.
4.5 - Are there other projects or plans that together with the project or plan being assessed could affect the site (provide details)?	No, there are no other projects or plans that together with this current plan could affect the site.

5. – THE ASSESSMENT OF SIGNIFICANCE OF EFFECTS

5.1 - Describe how the project or plan (alone or in combination) is likely to affect the Natura 2000 site.

The current project (WwTP) effluent is discharged to a small tributary of Lough Mask, which is itself a SPA and part of an SAC, but due to the current river water quality, risks assigned in addition to the very satisfactory physico-chemical data and the favourable waste assimilative capacity of the Toormakeady River and finally to the location of any identified Annex II and other listed species relative to the primary and secondary discharges, there are likely to be no significant effects on the Natura 2000 Sites, or their associated species or habitats.

5.2 - Explain why these effects are considered significant.

No significant effects are envisaged at this time.

5.3 - List of Agencies Consulted: Provide contact name and telephone or e-mail address:

1. Naomi Kingston/ Rebecca Jeffrey, National Parks and Wildlife Service,
e-mail: Naomi.Kingston@environ.ie ph: 01 – 888 3293 natureconservation@environ.ie

2. Rebecca Quinn, Environmental Protection Agency,
e-mail: r.quinn@epa.ie ph: 01 – 268 0136

Any available data was assessed from the following websites;

- WFD Ireland,
- Western RBD,
- EPA,
- Department of Environment Heritage and Local Government,
- National Parks and Wildlife:

5.4 - Response to Consultation

All available data has been made available by the NPWS for the purpose of this and any other assessments within County Mayo.

Advice on flow data for the Glensaul River was obtained from the EPA Regional Inspectorate, Castlebar, Co. Mayo and from EPA, Richview

Queries made to Dr. Naomi Kingston regarding the species name of Genus Hypericum were very satisfactorily addressed.

DATA COLLECTED TO CARRY OUT THE ASSESSMENT SCREENING

Who carried out the Appropriate Assessment Screening?

Dr. Karol Donnelly BSc PhD, Environment Section, Mayo County Council

Sources of data

Any available data was accessed from the following websites;

- WFD Ireland,
- Western RBD,
- National Biodiversity Data Centre,
- Department of Environment Heritage and Local Government,
- Environmental Protection Agency,
- Mayo County Council,
- National Parks and Wildlife Service:

Data received directly from the Environment, GIS and Planning Sections, Mayo County Council, EPA and NPWS.

See Bibliography for all references

Level of Assessment

Desk-top study was undertaken by the above named limnologist

Where can the full results of the Assessment Screening be accessed and viewed?

Water Services Capital Works Section, Mayo County Council

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APPENDIX I – SITE SYNOPSES FOR SAC AND SPA

SITE NAME: LOUGH CARRA/MASK COMPLEX (Site Code: 001774)

This site is dominated by two large lakes, Lough Mask and Lough Carra, and includes the smaller Cloon Lough. On the western side, the site is overlooked by the Partry Mountains, while to the east the landscape is largely low-lying agricultural land. The nearest large town is Ballinrobe which is about 4 km east of Lough Mask. The general geological character of the area is Carboniferous limestones, with some shales and sandstones on the western side of Lough Mask.

The underlying geology results in a great diversity of habitats, which support many scarce and rare plants and animals. Six habitats which are on Annex I of the EU Habitats Directive are listed for this site, including two which are priority habitats - limestone pavement and Cladium fen.

Lough Mask, at over 8,000 ha, is the sixth largest lake in the country and with a maximum depth of 58 m it is one of the deepest. It is an excellent example of a lowland oligotrophic lake. Aquatic and wetland plant species present which are characteristic of this habitat include several Pondweed (Potamogeton) species, Water Lobelia (Lobelia dortmanna) and Shoreweed (Littorella uniflora). The eastern part of the lake is shallow and is edged by a low-lying shoreline which is subject to winter flooding. An intricate mixture of plant communities has developed on the limestone, with bare pavement, scrub-dominated pavement, dry grassland and heath. A variety of wetland habitats are also present, along with significant amounts of deciduous woodland along the eastern and southern shores. The western shoreline is less diverse and lacks the limestone communities. However, the fast-flowing Owenbrin River has created at its mouth an interesting delta of coarse sandy sediment.

Lough Carra, which is hydrologially linked to Mask, is one of the best examples in Ireland of a hard water marl lake. It is a shallow (mostly less than 2 m) predominantly spring fed lake with only a few streams flowing into it. Its well known pellucid green colour is due to calcareous encrustations. It has well developed stonewort communities in the submerged zones, with Chara curta, C. desmacantha, C. rudis and C. contraria recorded. Lough Carra, like the eastern and southern shores of Mask, is fringed by a diverse complex of limestone and wetland habitats.

The limestone pavement within this site represents the northern limit of the limestones of Clare and Galway. The limestone is variable in character, from open bare pavement to areas covered with dense scrub. Associated with the pavement are areas of dry calcareous grassland and dry heath. Characteristic species present include Bloody Crane's-bill (Geranium sanguineum), Yellow-wort (Blackstonia perfoliata), Carline Thistle (Carlina vulgaris), Blue Fleabane (Erigeron acer), Wild Madder (Rubia peregrina), Rustyback (Ceterach officinarum) and Quaking-grass (Briza media). Several plant species, notably Spring Gentian (Gentiana verna) and Dense-flowered Orchid (Neotinea maculata), occur at the northern limit of their distribution. The area is also noted for its diversity of orchid species. Scrub vegetation is variable in character, with extensive areas dominated by Hazel (Corylus avellana) and Hawthorn (Crataegus monogyna), with Buckthorn (Rhamnus catharticus), Alder Buckthorn (Frangula alnus), Spindle (Euonymus europaeus) and Ash (Fraxinus excelsior). The dry heath is well developed in places and is characterised by Gorse (Ulex europaeus), Bell Heather (Erica cinerea), Heather (Calluna vulgaris) and St. Dabeoc's Heath (Dabeocia cantabrica). The diminutive orchid Lesser Twayblade (Listera cordata) occurs within the heath communities.

A wide range of wetland habitats occur around Lough Carra and along parts of the eastern and southern shores of Lough Mask, including Cladium fen and alkaline fen, both listed as Annex I habitats on the EU Habitats Directive. The Cladium occurs as pure stands in places but also intermixed with Black Bog-rush (Schoenus nigricans), Common Club-rush (Scirpus lacustris), Common Reed (Phragmites australis) and a number of sedge species (Carex spp.). The alkaline fens are more extensive than the Cladium fens and here Black Bog-rush is a dominant species. A rich diversity of flowering plant occurs in the fen communities. In addition to the fen habitats, there are sparse but widespread reed swamps, wet grassland and some freshwater marshe communities around the lake shores.

Broad-leaved deciduous woodland occurs fairly frequently around much of the shores of the lakes and on some of the islands. This is often scrub-type woodland, which may be either dry and dominated by Hazel, Hawthorn and Ash, or wet and dominated by Birch (Betula spp.), Willow (Salix spp.) and Alder (Alnus glutinosa). In places the woodland is more developed and includes Sessile Oak (Quercus petraea), Holly (Ilex aquifolium) and Rowan (Sorbus aucuparia).

A high concentration of rare plants are found at this site. Five species protected under the Flora Protection Order (1987) occur: Irish St. John's-wort (Hypericum canadense), Chives (Allium schoenoprasum), Pillwort (Pilularia globulifera), Irish Lady's-tresses (Spiranthes romanzoffiana), and Small Cudweed (Logfia minima). Two other Red Data Book plants, Alder Buckthorn (Frangula alnus) and Bird's-nest Orchid (Neottia nidus-avis), also occur, along with two Red Data Book Stonewort species - Chara curta and Chara rudis.

A large loft in the stable block of Curramore House provides a summer breeding site of the Lesser Horseshoe Bat (Rhinolophus hipposideros), a species listed on Annex II of the EU Habitats Directive. The bats gain access to the loft through windows that extend from the ground floor to the loft area. The building is surrounded by mixed woods and is close to the shores of Lough Mask; both of these habitats provide ideal foraging habitat for the bats. In 1993 more than 100 bats were counted at this site, which makes it of international importance. A second internationally important summer roost of Lesser Horseshoe Bats occurs within the site at Ballykyne, near Clonbur. Over 150 bats have been counted at this site in recent years.

The site provide excellent habitat for Otter (Lutra lutra), also an Annex II species on the Habitats Directive, and the area has Pine Marten (Martes martes), a species listed in the Irish Red Data Book.

The site has important bird interests, both in winter and summer. It provides feeding areas for part of the Erriff/Derrycraff population of Greenland White-fronted Geese. This flock has declined somewhat in recent years but is still of national importance, with an average spring peak from 19 8994 of 124 birds. The following count figures are the averages from surveys in January 1995 and January 1996: Wigeon 167; Mallard 397; Shoveler 57; Pochard 91; Tufted Duck 757; Goldeneye 158; Lapwing 233; Curlew 118. Also, 68 Whooper Swan and 25 Gadwall were recorded in January 1996. The Shoveler, Tufted Duck and Goldeneye populations are of national importance. Both lakes are traditional sites for breeding gulls and terns. In 1995, 44 pairs of Common Tern nested at Lough Mask, while in 1992 a census of gulls at both lakes resulted in the following: Black-headed Gull 1,451 pairs, Common Gull 407 pairs and Lesser Black-backed Gull 361 pairs. The Common Gull colony represents 11.3% of the national total, and the Lesser Black-backed Gull colony is 6.9% of the total.

The deep waters of Lough Mask are home to a population of the glacial relict Arctic Char (Salvelinus alpinus), and a rare shrimp (Niphargus spp.) is also found in these waters. Lough Mask is a very important Brown Trout fishery. White-clawed Crayfish (Austropotamobius pallipes), a species listed on Annex II of the Habitats Directive, has been recorded from Lough Carra.

This site is of considerable conservation importance as it has good examples of six habitats listed on Annex I of the EU Habitats Directive: lowland oligotrophic lakes, marl lakes, limestone pavement, dry heath, Cladium fen and alkaline fen. Some of these habitats are amongst the best examples of their kind in the country. It also has two Annex II mammal species and an Annex II invertebrate. The site is of ornithological importance for both wintering and breeding birds, with three Annex I Bird Directive species occurring regularly. A relatively large number of other nationally rare or localised plant and animal species occur, including the glacial relict Arctic Char.

19.2.2004

SITE NAME: LOUGH MASK SPA (Site Code: 004062)

Lough Mask, at over 8,000 ha, is the sixth largest lake in the country. It extends for over 14 km along its long axis and is on average about 5 km in width. The underlying geology is of Carboniferous limestones, with some shales and sandstones. The main inflowing rivers are the Cloon and Robe, and the stream from Lough Carra to the north-east. The main outflow is to Lough Corrib to the south. The lake is shallow off the eastern shore but considerably deeper off the western where there is a long narrow trench with a maximum depth of 58 m. The water of the lake is moderately hard. During the 1990s, the trophic status of Lough Mask has changed from oligotrophic to mesotrophic due to a steady increase in phytoplankton growth. Aquatic and wetland plant species present are characteristic of oligotrophic systems - Water Lobelia (Lobelia dortmanna), Shoreweed (Littorella uniflora) and various Pondweed (Potamogeton) species. The eastern part of the lake is edged by a low-lying shoreline which is subject to winter flooding. An intricate mixture of plant communities has developed on the limestone, with bare pavement, scrub-dominated pavement, dry grassland and heath. The western shoreline is less diverse and lacks the limestone communities. Islands are a feature of the lake, especially in the south-east sector.

Lough Mask is one of the most important sites in the country for nesting Black-headed Gull (329 pairs in 1999), Common Gull (124 pairs in 1999) and Lesser Black-backed Gull (286 pairs in 1999). Whilst higher numbers of nesting gulls have been recorded in the recent past, the 1999 populations of the three species still accounted for 8.4%, 1.7% and 10% of the respective national totals. The lake is also a traditional breeding site for Common Tern, with 44 pairs in 1995 and 39 pairs in 1999.

In winter the site has a range of waterfowl, especially diving duck, with the Tufted Duck population (453) being of national importance - all figures are average peaks for 4 of the 5 winters in the period 1995/96-1999/00. It also supports Whooper Swan (54) and is visited at times by part of the Erriff/Derrycraff population of Greenland White-fronted Goose (16). Other species using the site include Wigeon (84), Teal (99), Mallard (101), Pochard (65), Goldeneye (89), Coot (112), Red-breasted Merganser (12), Little Grebe (17), Mute Swan (49) and Cormorant (36).

The lake has a population of Arctic Char, a Red Data book species, and is an important site for Otter, a species that is listed on Annex II of the E.U. Habitats Directive. Lough Mask is an important salmonid fishery. The lake continues to be vulnerable to enrichment from surrounding agricultural and other commercial/domestic activities. The reasons for the decline in the breeding gull colonies in recent years are unknown, but it is considered that predation by feral American Mink is a problem.

Lough Mask is one of the most important inland gull breeding sites in the country, with nationally important populations of three gull species. It also has a nationally important colony of Common Tern, a species that is listed on Annex I of the E.U. Birds Directive. The site supports a good diversity of wintering waterfowl, including a nationally important population of Tufted Duck. The occurrence of Whooper Swan and Greenland White-fronted Goose, albeit in small numbers, is of note as these species are also listed on Annex I of the E.U. Birds Directive. 19.8.2004

APPENDIX II – WASTE ASSIMILATIVE CAPACITY (WAC) CALCULATIONS

Dilution Rate:

Number of dilutions = Flow in receiving water (m^3day^{-1}) / WwTP discharge volume ($m^3\ day^{-1}$) = 6048 / 26 = 236 (dilution rate for WwTP)

6048 / 39 = 153 (dilution rate for WwTP **and proposed development**)

WAC Calculation:

WAC ($kgday^{-1}$) = (C_{max}-C_{back}) * F95 (m^3s^{-1}) * 86.4

where C_{max} = maximum permissible concentration in receiving water (based on achieving 'good status' under the EC Environmental Objectives (Surface Waters) Regulations 2009 or alternative appropriate legislation).

C_{back} = background (upstream) concentration (mg day^{-1})

F95 = 95 % flow in receiving river (m^3s^{-1}) 0.070 m^3s^{-1}

WAC for BOD = (2.6-1) x 0.070 x 86.4 = **9.7 $kgday^{-1}$ O_2 BOD**

(Using 'good status' from above legislation for C_{max} and aSW1u sample for C_{back})

WAC for Suspended Solids = (25-2) x 0.070 x 86.4 = **139 $kgday^{-1}$ SS**

(Using 'good status' from above legislation for C_{max} and aSW1u sample for C_{back})

WAC for orthophosphate = (0.075-0.021) x 0.070 x 86.4 = **0.3 $kgday^{-1}$ P (as orthophosphate)**

(Using 'good status' from above legislation for C_{max}, and aSW1u sample for C_{back})

WAC for Ammonia = (0.14-0.005) * 0.070 * 86.4 = **0.82 $kgday^{-1}$ N (as NH_3)**

(Using 'good status' from above legislation for C_{max} and aSW1u sample for C_{back})

Loadings from WWTP:

Loading ($kgday^{-1}$) = [discharge concentration (mgl^{-1}) x discharge flow (m^3day^{-1})] / 1000

Utilising mean Table D.1 (i)(b) Emissions to Surface Water Data from Certificate of Authorisation Application for Toormakeady (December 2009)

(Note: current effluent volume is 26 m^3day^{-1} but with additional PE of 61 from proposed development, the effluent volume is predicted to increase to 39 m^3day^{-1})

Discharge concentrations of all parameters for proposed development cannot be accurately predicted but since the Toormakeady WwTP is currently under capacity and will remain so following proposed development (PE 61); the PE will be 175 (< 250 capacity), it can only be assumed that the effluent quality will remain within limits set in relevant legislation. For the purpose of investigation, the maximum permissible effluent concentrations will be utilised.

Current WwTP BOD loading = (5 x 26)/1000 = 0.13 $kgday^{-1}$ BOD
(within assimilative capacity; 9.7 $kgday^{-1}$ BOD)

- **Predicted** WwTP BOD loading (current + proposed) = (25 x 39)/1000 = 0.98 $kgday^{-1}$ BOD **(within assimilative capacity; 9.7 $kgday^{-1}$ BOD)**

Current WwTP Suspended Solids loading = (4 x 26)/1000 = 0.10 $kgday^{-1}$ SS
(within assimilative capacity; 139 $kgday^{-1}$ SS)

- **Predicted** WwTP SS loading (current + proposed) = (35 x 39)/1000 = 1.37 $kgday^{-1}$ SS **(within assimilative capacity; 139 $kgday^{-1}$ SS)**

Current WwTP orthophosphate loading = (5.26 x 26)/1000 = 0.14 $kgday^{-1}$ P (as ortho-P)
(within assimilative capacity; 0.3 $kgday^{-1}$P)

Current WwTP ammonia loading = (1.447 x 26)/1000 = 0.04 $kgday^{-1}$ N (as NH_3)
(within assimilative capacity for achieving 'good status'; 0.82 $kgday^{-1}$N)

APPENDIX III

Flowchart from Appendix I of Circular L8/08 from DoEHLG relating to the present development