



INTERNATIONAL

Lough Ree Power

IE Licence Review – P0610-03

**Screening for Appropriate Assessment & Natura
Impact Statement**

QS-000206-02-R460-006

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1 Introduction

1.1 Objective of this report

This report presents the Screening for Appropriate Assessment (AA) and Natura Impact Statement (NIS) which has been prepared in accordance with the requirements of Article 6(3) of the EU Habitats Directive (Directive 92/43/EEC).

Lough Ree Power (LRP) Station is currently licenced under Industrial Emmsions (IE) Licence P0610-02. Planning permission to increase the capacity of the Ash Disposal Facility (ADF) associated with the LRP Station was sought from Longford County Council (Planning No: 17/320) in December 2017, this planning application was accompanied by an Environmental Impact Assessment Report (EIAR) and a Screening for Appropriate Assessment (AA). Planning was approved by Longford County Council on the 28th March 2018. This expansion in capacity at the ADF has triggered an IE Licence review for LRP.

An AA Screening determination was submitted to ESB by the EPA on December 20th 2018; the determination was made based on the project's hydrological connectivity and the distance to European sites. This determination concluded:

“That the activities are not directly connected with or necessary to the management of any European site and that it cannot be excluded, on the basis of objective information, that the activities, individually or in combination with other plans or projects, will have a significant effect on any European site and accordingly determined that an Appropriate Assessment of the activities is required, and for this reason determined to require the applicant to submit a Natura Impact Statement.”

This report is in support of the IE Licence review process for the entire LRP station. The principal requirement for the IE Licence review arises from the increased capacity requirement at the ADF (Planning Ref: 17/320). The second principal change of relevance to this AA relates to a change to Condition 5.5 which relates to the existing thermal plume for LRP Station. For the purposes of this AA Screening, the '*proposed development*' is defined as encapsulating both the requested change to Condition 5.5 and the permitted increased capacity at the ADF.

The purpose of the Screening for AA is to determine if the activities associated with the proposed licence conditions specified in *Lough Ree Power IE Licence Review Attachment 1-1 - Reason for Licence Review*, either alone or in combination with other plans and projects, is likely to have significant effects on any European Site(s) in view of the site's conservation objectives; the subsequent Natura Impact Statement (NIS) considers whether the amendment, alone or in combination with other projects or plans, will have adverse effects on the integrity of a European site, and includes any mitigation measures necessary to avoid, reduce or offset negative effects.

It is noted that the AA Screening determination received from the EPA exclusively makes reference to European Sites within 15 km of LRP Station and ADF. In order to carry out a robust assessment of the potential indirect impacts associated with the operation of LRP Station (including fuel supply), the Screening for Appropriate Assessment undertaken by ESB International (ESBI) also considers peat harvesting activities at the respective Bord na Móna bog which supply LRP Station.

1.2 Statement of competence

This report was prepared by Geoff Hamilton, Senior Ecologist with ESBI. He has over 13 years' experience in the fields of ecological assessment, agri-environment scheme design and implementation, rural stakeholder consultation and environmental advocacy.

He has been involved in a wide range of infrastructure projects for local authorities and private commercial clients and has carried out a significant number of field surveys to inform Environmental Impact Assessments (EIA), Ecological Impact Assessments (EclA), AA Screening Reports and Natura Impact Statements (NIS).

He has particular experience in the production of ecological reports relating to electricity generation developments such as power stations, wind farms and solar farms. He holds a Master's degree in Zoology and is a Full Member of the Chartered Institute of Ecology and Environmental Management (CIEEM).

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2 Regulatory Context

The EU Habitats Directive 92/43/EEC provides legal protection for habitats and species of European importance through the establishment of a network of designated conservation areas known as the Natura 2000 Network. The Natura 2000 network includes sites designated as Special Areas of Conservation (SAC) under the EU Habitats Directive and Special Protection Areas (SPA) designated under the EU Birds Directive 79/209/EEC. These are collectively referred to as 'European Sites'.

The Habitats Directive was initially transposed into Irish national law in 1997, with the European Communities (Natural Habitats) Regulations, SI 94/1997. These Regulations have since been amended by SI 233/1998 & SI 378/2005. The European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477/2011) consolidate and replace the European Communities (Natural Habitats) Regulations 1997 to 2005 and the European Communities (Birds and Natural Habitats)(Control of Recreational Activities) Regulations 2010 (SI 293/2010).

The requirements for an Appropriate Assessment are set out under Article 6(3) and 6(4) of the Habitats Directive 92/43/EEC which state:

6(3) Any plan or project not directly connected with or necessary to the management of the site (Natura 2000 sites) but likely to have 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 sites 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.

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 Natura 2000 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.

Definitions of conservation status, integrity and significance used in this assessment are defined in accordance with 'Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC' (European Commission, 2000).

- The conservation status of a natural habitat is defined as the sum of the influences acting on a natural habitat and its typical species that may affect

its long-term natural distribution, structure and functions as well as the long-term survival of its typical species.

- The conservation status of a species is defined as the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its population.
- The integrity of a Natura 2000 site is defined as the coherence of the site's ecological structure and function, across its whole area, or the habitats, complex of habitats and/or populations of species for which the site is or will be classified.
- Significant effect should be determined in relation to the specific features and environmental conditions of the protected site concerned by the plan or project, taking particular account of the site's conservation objectives.

2.1 Appropriate Assessment process

Key stages in the Appropriate Assessment process are set out below, as per European and Irish Government guidance (EC 2000, EC 2001 and DoEHLG 2009). The Screening for Appropriate Assessment and subsequent Natura Impact Statement relate to Article 6(3) of the Habitats Directive.

Screening for Appropriate Assessment

The first step in the Screening process is to determine if the plan or project is directly connected to or necessary for the management of a European Site. The process then identifies whether a plan or project, either alone or in combination with other plans or projects, is likely to have significant effects on a European Site in view of its conservation objectives.

Appropriate Assessment (Natura Impact Statement)

This subsequent step considers whether the plan or project, alone or in combination with other projects or plans, will have adverse effects on the integrity of a European Site, and includes any mitigation measures necessary to avoid, reduce or offset negative effects. A Natura Impact Statement (NIS) must be prepared as part of this stage of the process. The AA is carried out by the competent authority, and is supported by the NIS.

3 Methodology

3.1 Assessment criteria

This assessment has been undertaken in accordance with all relevant legislation and best practice guidelines:

- Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg. European Commission.
- European Communities (Birds and Natural Habitats) Regulations 2011, as amended;
- Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities (Department of the Environment Heritage and Local Government, Revision 1, 2010);
- Managing Natura 2000 sites The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (European Commission, 2018)
- Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC, European Commission (2001); and
- Managing Natura 2000 Sites (European Commission, 2000). Assessment of plans and projects significantly affecting Natura 2000 sites. (European Commission, 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. (European Commission 2007);
- EC (2013) Interpretation Manual of European Union Habitats. Version EUR 28. European Commission (European Commission 2013); and
- Assessing Connectivity with Special Protection Areas (SPAs). Scottish Natural Heritage. Scottish Natural Heritage (2016).

3.2 Desk review

A desktop study was conducted to examine the potential zone of influence of the proposed development at LRP Station and associated ADF as well as the respective peat bogs used to supply fuel to LRP, to identify any European Sites within that area which could be impacted.

Available information consulted in the preparation of this AA Screening report included:

- The identification of all European Sites within 15 km of the study area (i.e. LRP Station, ADF and respective supply bogs), and subsequent review of all associated Site Synopses and Conservation Objectives documents as appropriate. This encompasses Special Areas of Conservation (SACs) and Special Protection Areas (SPAs).

- Conservation Status Assessment Reports (CSARs), Backing Documents and Maps prepared in accordance with Article 17 of the Habitats Directive (npws.ie);
- An examination of contemporary and historic mapping and aerial imagery for the LRP Station and ADF sites and its surroundings to determine broad habitat types and successive land use change;
- An examination of contemporary and historic mapping and aerial imagery for the LRP Station and ADF sites and its surroundings to determine broad habitat types and successive land use change;
- A review of the Environmental Impact Statement for the original development of the current LRP Station (ESB International 2001) and associated background ecology reports;
- Lough Ree Power, Thermal Plume Synthesis Report (ESBI/ASU, 2018)
- Lough Ree Power, Thermal Plume Modelling Report (Buckley, A., 2019);
- A review of the EPA IE Licence for the site (P0610-02) and Annual Environmental Reports (AER) submitted by the station to the EPA;
- A review of a suite of reports relevant to aquatic biodiversity, including Inland Fisheries Ireland (IFI) fish survey reports, the EPA water quality monitoring database and associated reports, the Shannon RBMP 2009-2015, the Lough Ree and Upper Shannon WML Action Plans 2009-2015 and The River Basin Management Plan for Ireland 2018-2021 (Department Housing, Planning, Community and Local Government (DHCLG) (17th April, 2018);
- A review of the Bord na Móna Biodiversity Action Plan 2016-2021, baseline ecological studies and data (including baseline reports produced on behalf of Bord na Móna as part of provisional studies to inform the EIA process for Bord na Móna peat supply activities), Draft Rehabilitation Plans and Land Use Mapping;
- The compilation of publicly available biodiversity data for the LRP Station site and its environs, as distributed via the National Parks and Wildlife Service (NPWS) and National Biodiversity Data Centre (NBDC) websites; and
- An appraisal of the BirdWatch Ireland Irish Wetlands Bird Survey (I-WeBS) database for important sites associated with the River Shannon and Lough Ree.

Geographic Information System (GIS) data relating to European sites, protected species distribution, hydrological connectivity and water quality was accessed using the NPWS, EPA and Water Framework Directive online mapviewers and was further interrogated locally using ArcGIS.

Aerial photography was viewed to get an overview of habitats in and around LRP Station and ADF. The National Biodiversity Data Centre (NBDC) mapviewer was also

consulted, with regards to the distribution of protected habitats and species within the study area.

As part of the assessment of potential indirect impacts, peat bogs supplying LRP Station were also identified and relevant ecological data and reports for these areas and associated harvesting activities was compiled, including the Bord na Móna Biodiversity Action Plan 2016-2021, various baseline ecological survey reports and data, supply bog Draft Rehabilitation Plans and Land Use Mapping.

3.3 Potential Zone of Influence

Projects (or operational activities) have the potential to have significant effects on European Sites beyond the confines of the individual sites themselves. The Guidance on Ecological Impact Assessment (IEMA 2006) states that potential effects should be investigated which occur within the Zone of Influence (Zoi) that arises during the whole lifespan of the proposed project.

The potential Zone of Influence is defined as:

- Areas directly within the footprints of LRP Station, ADF and peat supply bogs;
- Areas which will be temporarily affected;
- Areas likely to be impacted by hydrological disruption; and
- Areas where there is a risk of pollution and disturbance (e.g. noise).

The published Departmental guidance document states that *'A distance of 15 km is currently recommended in the case of plans and derives from UK guidance (Scott Wilson et al., 2006). For projects, the distance could be much less than 15 km and in some cases less than 100m, but this must be evaluated on a case-by-case basis....'* (DEHLG, 2010).

The Zone of Influence for direct impacts was considered to comprise the operational footprint of LRP Station and ADF sites and the water column of the River Shannon and Lough Ree downstream of the LRP thermal cooling water outfall where the thermal plume elevates the temperature of the river and the northern inlet bay of Lough Ree. In-river surveys and continuous temperature monitoring data undertaken on behalf of ESB International has indicated that during certain environmental conditions, the thermal plume (i.e. at a temperature greater than 1.5°C above the baseline temperature) can be detected dispersed throughout the northern inlet bay of Lough Ree; this bay enters a narrows (part of the original course of the Shannon) and a parallel artificial navigation channel before opening out into the main body of Lough Ree approximately 2 km downstream of the cooling water outfall. With regard to potential indirect impacts, all European Sites within 15 kilometres of LRP Station and ADF were identified and collated; sites beyond this distance threshold with viable source-receptor impact pathways (such as hydrological connections) were also considered.

In addition, European Sites within a 15 kilometre radius of the respective LRP peat supply bogs commercially operated by Bord na Móna were also identified, as well as those which are hydrologically connected to these bogs; a review of such European Sites with a hydrological connection, but outside the 15 km radius indicated that there were no likely significant effects as a consequence of separation distance and dilution factors and these sites are therefore not considered further in this assessment. This site identification process was carried out using Geographic Information System (GIS) software using datasets sourced from NPWS, EPA and Bord na Móna. Scottish Natural Heritage (2016) guidance relating to core foraging distances for bird species associated with SPAs was also consulted.

The potential for significant effects on European Sites from the proposed development are discussed further in Section 4. It should be noted that power generation with an associated cooling water discharge to the river has taken place at this site since the original Lanesborough Power Station was commissioned in the late 1950s.

3.4 Consultation

Consultation relevant to the biodiversity impact assessment undertaken as part of the EIAR Screening and Scoping and subsequent data gathering exercise for the capacity increase at LRP ADF was undertaken with the following organisations with a potential interest in biodiversity:

- An Taisce
- Birdwatch Ireland
- Longford County Council (Environmental Section)
- Roscommon County Council (Environmental Section)
- Environmental Protection Agency (EPA)
- Bord na Móna
- Friends of the Irish Environment (FoIE)
- Inland Fisheries Ireland (IFI)
- Irish Peatland Conservation Council
- National Parks & Wildlife Services (NPWS)

Of the above, responses were received from Longford County Council (Environment Section), An Taisce, Environmental Protection Agency and Irish Peatland Conservation Council.

Inland Fisheries Ireland (IFI) have also been consulted as part of ESB Fisheries/Aquatic Services Unit fisheries and aquatic ecology studies undertaken in the River Shannon and Lough Ree from 2014 through 2017.

Birdwatch Ireland have also been contacted in relation to the sourcing of Ireland Wetland Bird Survey (I-WeBS) subsite data for locations along the River Shannon upstream of LRP Station and around Lough Ree.

Rare and threatened species data for the study area (incorporating LRP Station, ADF and the respective supply bogs) was requested from the NPWS Scientific Unit and reviewed upon receipt.

3.5 Site surveys

Ecology surveys undertaken by ESBI to inform the Appropriate Assessment process are summarised in **Table 3-1**. Further details of the aspects of the respective surveys are presented in the subsequent text.

Table 3-1: Summary of field surveys undertaken

Survey date	Nature of surveys	Surveyor
10 th June 2016	Terrestrial habitat and species survey at LRP Station	G. Hamilton, ESBI
18 th October 2016	Terrestrial habitat and species survey at LRP ADF	G. Hamilton, ESBI
8 th December 2016	Wintering bird survey adjacent to LRP Station & ADF	G. Hamilton, ESBI
27 th January 2017	Wintering bird survey adjacent to LRP Station & ADF / Terrestrial habitat and species survey at LRP Station	G. Hamilton, ESBI
27 th February 2017	Wintering bird survey adjacent to LRP Station & ADF	G. Hamilton, ESBI
5 th April 2017	Terrestrial habitat and species survey at LRP ADF	G. Hamilton, ESBI
8 th May 2017	Terrestrial habitat and species survey at LRP Station	G. Hamilton, ESBI
26 th October 2017	Terrestrial habitat and species survey at LRP ADF	G. Hamilton, ESBI
9 th January 2018	Wintering bird survey adjacent to LRP Station	G. Hamilton, ESBI

LRP Station

Terrestrial ecology surveys within and adjacent to LRP Station were carried out by an ESBI staff ecologist on the dates outlined in **Table 3-1**. The purpose of these assessments was to identify all habitats in the receiving environment, create a comprehensive species list and to accurately map out the nature and extent of all habitats on-site. The habitats within the site were defined in relation to the habitat

classification scheme published by the Heritage Council in A Guide to Habitats in Ireland (Fossitt, 2000). Habitat mapping follows Smith et al. (2011).

Terrestrial mammal walkover surveys were undertaken during the course of the habitat surveys previously described. The aims of the surveys were to determine which, if any, mammal species utilise the LRP Station site and its adjoining habitats. Mammal tracks and signs were identified according to Bang and Dahlstrom (2001).

Additionally, a specific bat activity survey of the LRP Station site was undertaken on behalf of ESBI by Bat Eco Services on 16th and 17th September 2016 (comprising overnight passive recording monitoring and dusk/dawn heterodyne surveys).

Breeding bird species identified during the field surveys were recorded following the Countryside Bird Survey methodology and identified following Mullarney et al. (1999). Most passerine species detected were present in areas of woodland, scrub and open recolonising ground around the periphery of LRP Station.

Additionally, vantage point-based wintering bird surveys broadly based on Scottish Natural Heritage (2014) were carried out along the bank of the River Shannon immediately east of LRP Station (and at several locations in the northern area of Lough Ree) were carried out on dates noted in **Table 3-1**. These surveys aimed to identify the frequency of occurrence of the Special Conservation Interest species for the Lough Ree SPA in the locality.

The conservation status of each bird species recorded by the study was assessed. 'Birds of Conservation Concern in Ireland' (BoCCI) (Colhoun et al. 2013) are classified into three separate lists, namely Red-listed species of high conservation concern, Amber-listed species of medium conservation concern and Green listed species of no conservation concern. The EU Birds Directive (79/409/EEC) also has a list of high priority bird species, known as Annex-I listed species.

Specific surveys undertaken by and on behalf of ESB and ESBI in relation to aquatic ecology in the River Shannon in the locality of Lanesborough with reference to the LRP cooling water discharge have been carried out between 2014 and (ESBI/ASU 2018 – See **AA - Appendix 1.1**). These studies comprise discrete assessments of macrophytes, diatoms, macroinvertebrates and fish, as well as continuous temperature monitoring and thermal plume modelling.

LRP ADF

Terrestrial ecology walkover surveys were also carried out by an ESBI staff ecologist at the LRP ADF on dates as outlined in **Table 3-1**, during which time habitats and species occurring at the site were assessed using the same protocols as described for the LRP Station site.

The overall ADF site was subject to a multi-disciplinary walkover through the habitats within the proposed footprints of the undeveloped cells to the south of the existing capped and open cells were walked and any mammal tracks or signs e.g. holts, dens, scats etc. were noted, as described in NRA (2009b).

The national bat landscape suitability map hosted by the NBDC was reviewed, as were bat records for the N06 hectad, (which indicated Common pipistrelle, Soprano pipistrelle, Lesser noctule, brown long-eared bat and Natterer's bat for the hectad; the closest such record was of a Soprano pipistrelle, 1 km to the northeast, associated with the woodland surrounding the adjacent ISPCA headquarters). Given the low overall landscape suitability for bat species in general and the absence of mature trees within the bog woodland at the site which could provide roosting habitat (as outlined in BSI (2015)), no specific bat surveys were carried out.

Previous surveys have also been carried out by Bord na Móna Ecologists at the Derraghan Bog site immediately surrounding the ADF, with associated habitats and species being recorded during 2010 surveys. Previous mammal surveys carried out for the original development of the ADF and for ongoing harvesting activities at Derraghan bog have also been consulted as part of this assessment. The broader Mountdillon bog grouping was also subject to ornithology surveys in 2015, carried out by Malachy Walsh and Partners; these reports have also been reviewed.

LRP peat supply bogs

Peat is exclusively supplied to the LRP Station by Bord na Móna and harvested, under licence, from a defined number of existing supply bog groupings as follows:

- P0501-01 (Derrygreenagh Group)
- P0502-01 (Blackwater Group)
- P0503-01 (Allen Group)
- P0504-01 (Mountdillon Group)

Baseline ecology surveys have been carried out by the Bord na Móna in-house ecology team over the last decade, with supplementary baseline information being provided by commissioned sub-consultant ecologists.

Draft rehabilitation plans of the respective bogs have been prepared by Bord na Móna and submitted to the EPA for approval as part of the respective bog grouping IPC licences, with land-use mapping for the supply bog estate also being created and updated as necessary. It should be noted that these draft plans may be subject to change prior to publication by Bord na Móna.

4 Screening for Appropriate Assessment

4.1 Introduction

Screening determines whether appropriate assessment is necessary by examining:

1. Whether a plan or project can be excluded from AA requirements because it is directly connected with or necessary to the management of a European site, and
2. The potential effects of a project or plan, either alone or in-combination with other projects or plans, on a European Site in view of its conservation objectives and considering whether these effects will be significant (DoEHLG, 2010).

The proposed development is not directly connected with or necessary to the management of any European Site.

Screening for AA involves the following:

1. Description of requested condition change and proposed development
2. Identification of relevant European Sites and compilation of information on their qualifying interests and conservation objectives;
3. Assessment of likely effects – direct, indirect and cumulative; and
4. Screening statement with conclusions.

4.2 Description of the Existing Development

4.2.1 LRP Station

4.2.1.1 Existing Station Site

LRP Station is located adjacent to the town of Lanesborough (also spelled Lanesboro) in County Longford and County Roscommon on the River Shannon, just upstream of Lough Ree itself. It is located on the Longford side of the River Shannon to the north of the adjacent village of Lanesborough, which is approximately 200 m to the south, while the River Shannon borders the site to the west. The site covers an area of approximately 36 hectares (ha). See LRP Station location in **Volume 3 - Figure 1.1: LRP Station & ADF Site Location Map**.

4.2.1.2 LRP Station Facilities and Operations

The existing LRP Station site is owned by the ESB and is separated into two areas with separate entrances, the power station and associated buildings and infrastructure which is operated by ESB, and the fuel handling area which is operated by Bord na Móna. The site is accessed via an unnamed road – leading north from the N63.

LRP Station comprises a single boiler/turbine unit with an electrical output of 100 MWe and its main features are as follows:

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- Fuel handling system comprising peat wagon tippers, screens, conveyors and an intermediate peat storage (IPS) facility.
- Water treatment plant (WTP) for processing of water prior to its storage and use in the boiler.
- Cooling water system, comprising a pumphouse, inlet and outlet culverts and outfall, for condenser cooling.
- Flue gas system comprising cyclone separators and bag filters for removal of peat ash from exhaust gases.
- Chimney (base diameter 7 m, height 80 m) for discharge of exhaust gases to the atmosphere.
- Ash handling system comprising conveying systems and storage silos.
- Oil tank for storage of auxiliary fuel.
- Storage facilities for limestone, lime and sand.
- Generator transformers, high voltage switchgear, and unit and house transformers.
- Supporting facilities including the following:
 - administration offices
 - fire protection system
 - auxiliary cooling water system
 - fuel oil pumphouse
 - diesel generator
 - chemicals storage tanks
 - chemical laboratory (limited wet analysis is undertaken)
 - sewage treatment plant
 - workshop and stores

The structural form of station buildings is conventional structural steel supported on reinforced concrete foundations. Gantries and walkways for access to plant and equipment are constructed of stainless/galvanised steel open grating type flooring. These are supported on steel beams and columns. External walls comprise profiled metal cladding and roofs are constructed of profiled metal decking on purlins spanning between rafters. The materials used pose no environmental threat in the event of station closure.

Peat fuel is supplied to LRP Station by Bord na Móna, principally by rail but also by road. LRP Station is equipped to unload up to six rail deliveries of peat each hour and the EIS submitted as part of the planning application for the existing station (Longford Co Co. Reg. Ref. 01/115; An Bord Pleanála Ref. PL14.12554) envisaged that there would be 63 road deliveries of peat per day.

The quantities of fuel used, energy generated and ash disposed of to the ADF for 2017 is provided in **Table 4-1**. Data is derived from the Annual Environmental Report (AER).

Table 4-1: Annual energy generation, fuel use and ash disposal at LRP

Energy Generation, Fuel use, and ash disposal	2017
Total Energy Generated (MWHrs)	622,823
Electricity Consumption (MWHrs)	78,053
Nett Export of energy (MWHrs)	544,770
Light Fuel Oil (m³)	297
Peat (metric tonnes)	739,386
Peat Ash to Landfill (metric tonnes)	27,819

4.2.2 LRP ADF

The station's off-site ADF is located on remote Bord na Móna cutaway bogland approximately 8 km from LRP Station. The ADF site area extends to approximately 33 ha. See ADF location in Derraghan ADF is located approximately 10 km from the LRP Station as shown in **Volume 3 - Figure 1.1: LRP Station & ADF Site Location Map**. The facility is operated by Bord na Móna on the behalf of ESB.

The station received planning permission (Longford County Council reg. Ref. 17/320) to increase the deposition of ash in the existing facility on the 28th March, 2018 which has effect up to the 31st December 2020 (Condition 3).

Access to the ADF is from the R392 Lanesborough – Ballymahon Regional Road, via an unnamed private road. The ADF is located approximately 0.8 km from the junction with the public road. The area is surrounded by tracts of production bogland, scrubland on previously harvested peat land and agricultural fields.

The EPA's IE Licence P0610-02 requires the ADF to be fully in compliance with the EU Landfill Directive (Directive 1999/31/EC on the landfill of waste). The IE Licence in turn requires all relevant requirements of the Directive regarding the design, construction, operation and aftercare management of the landfills to be implemented.

There are two discrete waste streams disposed of at the ADF.

- **Fly ash** is removed from the flue gases by bag filters and conveyed to an ash silo. The ash is transported from LRP Station to the ADF by rail in an ash rake. Each rake comprises a locomotive pulling 10 to 12 wagons each of which carries two ash buckets. Before being loaded into the wagons the ash has 15 to 30% of moisture added; and each wagon has a hydraulically controlled lid

to prevent dust during the journey from LRP Station to the ADF. Circa 21,442 tonnes of fly ash were deposited in the existing ADF in 2017¹

- The combustion of peat gives rise to the production of a relatively small volume of **bottom ash**. It is removed from the combustion chamber and conveyed to a small bottom ash silo on the LRP Station site. It is transferred from the silo by a sealed vacuum system to a skip mounted on a rail bogey and transported to the ADF, also by means of the dedicated rail line. Circa 6,397 tonnes of bottom ash were deposited in the ADF in 2017¹

Ash is transported to the ADF on Bord na Móna's narrow gauge rail system in specially designed covered ash wagons. Typical movements of ash between LRP Station and the ADF site will comprise two to three locomotive runs per day. Each train (rake) contains up to 12 wagons and is used daily Monday – Saturday. Each wagon comprises two ash buckets with combined capacity of approximately 7-9 m³ of ash. The ash is tipped from the wagons and is placed in the cells using low bearing pressure tracked earthmoving plant. The ash is placed semi-dry and is wetted to control potential dust emissions. It is graded to falls during the filling of the cells to ensure that ponding, resulting in leachate generation, does not occur. A tractor drawn spray tanker or fixed spray system is used in wetting the ash to aid compaction and further prevent dust nuisance. Leachate that is generated is re-circulated over the active cell to dampen the ash.

On-site, the location of the off-loading area within the ADF is dependent on which cell is operational and access is arranged by the relocation of the temporary rail tracks on the site. Tracks will be aligned so the ash can be tipped from the rake into each cell where it will be spread, compacted and levelled by a front-end loader to prevent any ponding of water on the surface.

Six cells (Cells 1 to 6 inclusive) are already closed and capped as per the requirements of the current IE licence. Cell 7 has been filled and is partially capped, while Cells 8 and 9 are currently active. Cell 12 will be developed in the future, in-line with permission granted under Longford Co. Co. Planning Ref. 17/320. The development and capping of existing and permitted cells will be completed on an ongoing basis in accordance with the approved Ash Landfill Operational Plan and the existing IE Licence, and as approved by the EPA. It should be noted that a separate Planning Application to transition LRP station from peat fuel to biomass has also been made to Longford County Council in 2019, (see Planning Reference Number 19/38). This proposed future development will see the transition of LRP station from firing solely on peat to firing on sustainable biomass through a transition stage between 2020 and 2027 and solely firing on biomass thereafter; cells 9 and 12 would be utilised

¹ Annual Environmental report of LRP, 2017, [www.epa.ie
http://www.epa.ie/licsearchdownload/CombinedFileView.aspx?regno=P0610-02&classification=Enforcement](http://www.epa.ie/licsearchdownload/CombinedFileView.aspx?regno=P0610-02&classification=Enforcement)

during the early transition phase, with subsequent cells being developed (also refer to Section 6.3).

Each cell is separated from the adjoining cells by inter-cell embankments and by external embankments. Leachate is drained from each cell and recirculated or pumped to the existing leachate storage lagoon.

Cover and capping that is already in place for completed cells comprises a 1 m layer of peat / subsoil, which was added in a concave mound design. Capped cells are naturally revegetated to blend with the natural landscape. Cells 1-6 have a basal and capping liner (permanent low permeability Geosynthetic Clay Liner). Cell 7 has been lined and is partially capped and that the basal liner in Cells 8 and 9 have been partially installed. The material used for the restoration layer comprises a mixture of peat and soil sourced on site from existing uprisings stockpiles and cutaway bog within the site boundary.

4.2.3 Peat supply to LRP Station

The peat that fuels the LRP is harvested by Bord na Móna at a number of supply bogs. These activities are regulated by the EPA under Industrial Pollution and Control (IPC) Licence Registration Numbers P0501-01 (Derrygreenagh Group), P0502-01 (Blackwater Group), P0503- 01 (Allen Group) and P0504- 01 (Mountdillon Group). It is noted that many private operators also operate within the same area as Bord na Móna, however, their peat harvesting activities are generally not licensed by the EPA.

A summary of the bogs that will supply milled peat to Lough Ree Power to the end of 2020 are presented in **Table 4.2** and **Volume 3 - Figure 1.3: Location of Bord na Móna Supply Bogs**.

Milled peat production requires good drying conditions and can commence anytime from mid-April onwards, once suitable drying conditions exist.

There are four stages to the production of milled peat;

- 1. Milling** - During the milling process the top 10-15 mm of the surface of each field is broken into peat crumbs by powered milling drums towed behind agricultural tractors. This layer of crumbed or milled peat is called a crop and has a moisture content of about 80% when milled;
- 2. Harrowing** - After milling, the peat crop is dried. To assist in this drying, the loose peat is harrowed, or turned over. The harrow consists of a series of spoons which are towed behind an agricultural tractor;
- 3. Ridging** - When the milled peat has dried to 45-55% moisture content it is gathered into ridges in the centre of each field. The ridger consists of a pair of blades towed in an open V behind an agricultural tractor. The open V blades rest on the bog and channels the loose crop into a triangular ridge in the centre of each field. This ridge is now ready to be harvested; and

4. Harvesting - Harvesting is the final stage of the milled peat production process. Each individual ridge is lifted mechanically, by a machine called a harvester, transferred and dropped on top of the adjoining field's ridge, until five ridges have been accumulated into a single large ridge. This ridge forms the final lift into the peat storage stockpile.

Typically every 11th field is used to stockpile the peat from the output of five fields either side; this is referred to as the 'Peco' method. This is the typical method employed at the bogs that supply peat to Lough Ree Power station. In some areas a system known as "Haku" is utilized where the harvested peat is deposited into trailers and transported to a central stockpile on the headland.

A stock field typically receives the crops from 10 fields i.e. five fields on either side. Weather permitting, the miller follows the harvester and the production cycle recommences in the emptied fields. Each production cycle is known as a harvest. In a year, of average weather conditions, approximately 12 harvests are completed. When the production season is over, the stockpiles are covered to keep the peat dry, unless the peat is scheduled for immediate sale. Peat is stored in these stockpiles until they are required for use.

At this stage the milled peat is loaded into wagons and transported by narrow gauge railway to the power station. Peat production areas are served by a network of permanent rail tracks, approximately one metre in width. Temporary tracks are also constructed as required to transfer milled peat from peat production areas.

The majority of the supply bogs are gravity drained, however some are pumped. Drainage water (surface water run-off) from the peat production areas is discharged to the nearest watercourse via a silt pond treatment system. Typically drains have been installed at approximately 15 m intervals across the bog and connect to perimeter drains that convey the water to a series of settlement/silt ponds.

Table 4-2: Peat Supply Bogs utilised to supply LRP Station (to end of 2020)

Supply Bog Grouping	Supply Bog	Active Harvesting Area (hectares)
Derrygreenagh	Derryhinch	212
	Drumman	224
	Toar	268
	Ballybeg	280
	Ballivor	182
	Carranstown	178
	Bracklin	117
	Rossan Bogs	212
	Daingean Bog	406
Allen	Esker	421
	Clonad	255
	Ballykean	293
	Mountlucas	402

Supply Bog Grouping	Supply Bog	Active Harvesting Area (hectares)
Blackwater	Boughill	303
	Castlegar (includes Killaderry)	663
	Derryfadda	408
	Gowla	287
Mountdillon	Derraghan	26
	Derryadd 1	357
	Derryadd 2	175
	Derryadd 3/Lough Bannow	400
	Derryshannoge	268
	Killashee	79
	Derrycashel	75
	Granaghan	125
	Derryarogue & Cloonboney	369
	Mountdillon & Curraghroe	210
	Begnagh	195
	Clooneeny	233
	Erenagh	52
	Moher, Clonadra & Clontuskert	321
	Cloonshannagh	307
	Derrycolumb	395
	Derrymoylin	168
	Coolcraff	155
	Coolnagin	252
	Milkemagh	275

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Peat supplied to LRP Station is currently, and will continue to be, sourced from those bogs listed under the aforementioned IPC Licence Registration Numbers P0501-01, P0502-01 and P0503-01 and P0504-01; the potential environmental impacts associated with that activity have been considered as indirect impacts in this Screening for AA.

No new peat supply bogs are being developed as a consequence of this proposed development. Therefore, the consideration of induced indirect effects associated with the supply of milled peat destined to LRP Station is restricted to activities within the catotelm layer of the bogs, which contains dead plant material (as distinct from the acrotelm, which comprises the active growing plant layer on the surface of the bog).

4.2.4 Industrial Emission Licence P0610-02

The existing LRP Station and ADF are specified industrial activities listed in the First Schedule to the Environmental Protection Agency (EPA) Act 1992 as amended and operates under an Industrial Emission (IE) licence² granted and enforced by the Environmental Protection Agency. The existing licence covers the following activities:

- a) the production of energy in combustion plant the rated thermal input of which is equal to or greater than 50MW, and
- b) the recovery or disposal of waste in a facility, within the meaning of the Waste Management Act, 1996, which facility is connected or associated with another activity specified in this Schedule in respect of which a licence or revised licence under Part IV is in force or in respect of which a licence under the said Part is or will be required.

Controls, monitoring and reporting requirements on emissions to the environment arising from the operation of the station and ADF are set by the EPA by means of the Licence, which also sets requirements related to the final closure and decommissioning of the facility. Emission limits are set to ensure no adverse impact on the environment including human health and ecology. As part of the licence monitoring and reporting requirement Annual Environmental Reports (AER) are provided to the EPA, detailing its emissions and operations for the previous year. These AER reports are available on the EPA website.

Changes to IE Licence conditions can be requested by the operator of the facility or can result from changes to legislative requirements and initiated by the EPA. Such changes can be made by way of a clerical amendment, technical amendment or through a full licence review process.

² <http://www.epa.ie/terminalfour/ippc/ippc-view-filter.jsp?regno=P0610-02&filter=c&docfilter=go>

4.3 Requested condition change and proposed development

4.3.1 Requested Condition change to Condition 5.5 related to IE Activity 1

Lough Ree Power was designed to operate with a once through cooling water systems with abstraction from and discharge to the river Shannon under P0610-02. This cooling water discharge is conditioned under condition 5.5 as follows:

Discharges from the installation shall not artificially increase the ambient temperature of the receiving water by more than 1.5C outside the mixing zone. In relation to temperature , the mixing zone shall not exceed 25% of the cross sectional areas of the river at any point.

At the time of submission of the original IE Licence review application a technical amendment request was ongoing in relation to Condition 5.5 of the current LRP IE Licence. This technical amendment request was subsequently withdrawn and an alteration to Condition 5.5 has now been proposed under this IE Licence review application. The proposed Condition 5.5 is as follows;

*Discharges from the installation shall not artificially increase the ambient temperature of the receiving water by more than 1.50C outside the mixing zone. In relation to temperature, the mixing zone shall not exceed 25% of the cross sectional area of the river at any point **where such exceedances would result in contravention of the EPA Act and in particular cause significant environmental pollution to the receiving waters.***

No physical or operational changes are proposed to the LRP station site or its licence activity under this requested change of Condition 5.5.

4.3.2 The Proposed Development related to IE Licence Site Activity 2

The other licence activity related to the LRP station is as follows:

Landfills, within the meaning of section 5 (amended by Regulation 11(1) of the Waste Management (Certification of Historic Unlicensed Waste Disposal and Recovery Activity) Regulations 2008 (S.I. No. 524 of 2008)) of the Act of 1996, receiving more than 10 tonnes of waste per day or with a total capacity exceeding 25,000 tonnes, other than landfills of inert waste.

It is proposed to increase the capacity of the existing ADF and facilitate the disposal of an additional 130,000 tonnes of peat ash. This proposed increase received planning permission in March 2018 and was subject of an EIAR.

The ash will be disposed of in cells that lie within the permitted landfill footprint – completing Cell 8 and within the permitted Cells 9 and 12, all of which are clearly shown on the original planning application drawings. The development of these cells is permitted under the existing planning permission, and were subject of EIA at the

time permission was granted. This application simply seeks permission for the additional quantities of ash to be accepted into the site and disposed of within these cells.

The requirement for additional ash disposal capacity arose in 2018 when the permitted 550,000 tonnes was reached. As the IE licence review process is ongoing a Technical Amendment was sought and approved (Technical Amendment C to P0610-02) by the EPA to allow the temporary storage of ash at the ADF.

The disposal activity will take place in accordance with the current planning permission over approximately 30 months ceasing at the end of 2020 - a duration that is in-line with the overall parent permission for the LRP Station. No other works are required to facilitate the acceptance of the additional ash, as all ancillary developments – the access road, entrance etc. will continue to operate as permitted by that parent permission.

The proposed development will take place on lands located wholly within the existing ADF site. The proposed disposal activity is confined to existing Cell 8 and permitted Cells 9 and 12.

The ADF site is located approximately 10 km from the LRP Station as shown in **Volume 3 - Figure 1.1: LRP Station & ADF Site Location Map** in a remote rural area located approximately 1 km south of the R392 (Lanesborough to Ballymahon) Road. Lanesborough is located approximately 9 km to the northwest, and Ballymahon is located approximately 11 km to the southeast.

The site is served by a dedicated access way from the R392, and also by a railway line privately owned and operated by Bord na Móna. This railway links the LRP and ADF sites, facilitating the transfer of both peat and ash into, and out of, the power station. It is also utilised by other Bord na Móna rail traffic not associated with the ash site.

The surrounding area is characterised by tracts of cutaway bog land, scrub woodland and mixed farmland. Adjoining bog land is commercially harvested for peat on an on-going basis. Opposite the site entrance, to the north of the R392, the Irish Society for the Prevention of Cruelty to Animals (ISPCA) operates an animal centre – the only non-farming activity noted in the area.

Within the wider area, the landscape is predominantly rural, with small residential farms creating a relatively uniform pattern of low hedgerows and bank-enclosed fields. Rural residences are also dispersed throughout the area either clustered around original farms or as roadside ribbon development.

4.4 Impacts of the proposed development with potential for having significant environmental effects

For the purposes of this AA Screening, the '*proposed development*' is defined as encapsulating both the requested change to Condition 5.5 and the permitted increased capacity at the ADF. In addition to assessing the potential impacts from the

above this NIS includes an assessment of potential impacts associated with the continued operation of the LRP station to the end of 2020 in line with its current planning permission.

Impacts of the proposed development including the continued operation of the LRP station to the end of 2020 with the potential for having significant environmental effects are as follows:

- Impacts arising from the ongoing thermal loading of the cooling water discharge where it enters the River Shannon and subsequently disperses in the water column in the northern inlet bay of Lough Ree
- Impacts arising from air quality emissions from LRP Station
- Impacts arising from operational activities at LRP ADF
- Indirect impacts associated with the ongoing harvesting of peat from the respective LRP supply bogs

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5 Description of European Sites

5.1 Identification of European Sites within potential Zone(s) of Influence

Section 3.3 outlines the consideration of the potential Zone of Influence of the proposed development. Designated site GIS data was downloaded from npws.ie (SACs: August 2018 Revision / SPAs: June 2017 Revision). This was displayed and queried locally in ArcGIS. All European Sites within 15 km of LRP Station and ADF were identified. In addition, European Sites within approximately 15 kilometres of the various LRP supply bogs were also identified as well as sites beyond this distance threshold with viable source-receptor impact pathways (such as hydrological connections). These sites are shown in **Volume 3 - Figure 6.3: SACs and SPAs within 15 km of Supply Bogs**.

Table 5-1 presents information relating to the European Sites within 15 km of LRP Station and ADF (or those hydrologically connected).

Table 5-2 presents information relating to all European Sites within 15 km of any of the respective LRP supply bogs (or those hydrologically connected to such supply bogs). With respect to hydro-geological connections, a review of the aquifer vulnerability dataset was also carried out using GIS.

5.1.1 EPA AA Screening Determination

It is noted that an AA Screening Determination was submitted by the EPA on 20th December 20th 2018. This determined "That the activities are not directly connected with or necessary to the management of any European site and that it cannot be excluded, on the basis of objective information, that the activities, individually or in combination with other plans or projects, will have a significant effect on any European site and accordingly determined that an Appropriate Assessment of the activities is required, and for this reason determined to require the applicant to submit a Natura Impact Statement."

The above determination was made based on the project's hydrological connectivity and the distance to European sites (i.e. those within 15 km), namely the following:

- Lough Ree SAC (site code: 000440)
- Lough Ree SPA (site code 004064)
- Corbo Bog SAC (site code 002349)
- Fortwilliam Turlough SAC (site code 000448)
- Lough Forbes Complex SAC (site code 001818)
- Ballykenny-Fisherstown Bog SPA (site code 004101)
- Brown Bog SAC (site code 002346)
- Mount Jessop Bog SAC (site code 002202)
- Clooneen Bog SAC (site code 002348)

It is considered that the potential for likely significant impacts to the majority of the aforementioned European Sites within the 15 km radius of LRP Station and ADF can be ruled out on the basis of separation distance (most are over 5 km from LRP Station and LRP ADF) and the absence of feasible impact pathways (such as being located upstream or in a separate river sub-catchment to LRP Station and LRP ADF, see **Table 5-1**).

Consequently, of the sites listed, the potential for likely significant effects is only considered feasible for Lough Ree SAC and Lough Ree SPA, as noted in **Table 5-1**.

5.1.2 Descriptions of European Sites

An outline of the source-impact-receptor pathways for the respective European Sites is included in **Table 5-1** and **Table 5-2** presenting the rationale for screening out sites or the requirement for any further assessment.

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Table 5-1: European Sites within 15 km of LRP Station & ADF

Designated site	Distance from LRP Station	Distance from ADF	Qualifying Interest / Special Conservation Interest	Possible impact pathways	Potential for significant effects
<p>Conservation objectives indicated as appropriate [R, M, G, U]</p> <p>R = Restore specific QI/SCI M = Maintain specific QI/SCI G = Generic CO for all QI/SCI in N2000 site, i.e. Maintain or Restore U = Site-specific Conservation Objective Under Review</p>					
Lough Ree SAC	0.2 km	3.1 km (6.5 km along hydrological pathway)	<ul style="list-style-type: none"> – Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation [3150] [R] – Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (*important orchid sites) [6210] [R] – Degraded raised bogs still capable of natural regeneration [7120] [R] – Alkaline fens [7230] [M] – Limestone pavements [8240] [M] – Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] [U] – Bog woodland [91D0] [R] – <i>Lutra lutra</i> (Otter) [1355] [M] 	<p>Direct hydrological connection between SAC and LRP Station/ADF (site discharges).</p> <p>LRP Station site is also located within 200 m of the SAC boundary.</p>	<p>Given the spatial proximity of LRP Station to the SAC and the existence of direct discharges to the River Shannon immediately upstream of Lough Ree, there is potential for significant effects from the proposed development at the LRP Station site.</p> <p>Potential for significant effects to the Lough Ree SAC is considered in Section 6.</p>
Lough Ree SPA	0.2 km	3.1 km (6.5 km along hydrological pathway)	<ul style="list-style-type: none"> – Little Grebe (<i>Tachybaptus ruficollis</i>) [A004] [G] – Whooper Swan (<i>Cygnus cygnus</i>) [A038] [G] – Wigeon (<i>Anas penelope</i>) [A050] [G] – Teal (<i>Anas crecca</i>) [A052] [G] – Mallard (<i>Anas platyrhynchos</i>) [A053] [G] – Shoveler (<i>Anas clypeata</i>) [A056] [G] – Tufted Duck (<i>Aythya fuligula</i>) [A061] [G] – Common Scoter (<i>Melanitta nigra</i>) [A065] [G] 	<p>Direct hydrological connection between SAC and LRP Station/ADF (site discharges).</p> <p>LRP Station site is also located within 200 m of the SPA boundary.</p> <p>There is also the potential for disturbance of wintering bird flocks: both LRP Station and ADF are located within the core foraging</p>	<p>Given the spatial proximity of LRP Station to the SPA and the existence of direct discharges to the River Shannon immediately upstream of Lough Ree, there is potential for significant effects from the proposed development at the LRP Station site.</p> <p>Potential for significant effects to the Lough Ree SPA is considered in Section 6.</p>

Designated site	Distance from LRP Station	Distance from ADF	Qualifying Interest / Special Conservation Interest Conservation objectives indicated as appropriate [R, M, G, U] R = Restore specific QI/SCI M = Maintain specific QI/SCI G = Generic CO for all QI/SCI in N2000 site, i.e. Maintain or Restore U = Site-specific Conservation Objective Under Review	Possible impact pathways	Potential for significant effects
			<ul style="list-style-type: none"> – Goldeneye (<i>Bucephala clangula</i>) [A067] [G] – Coot (<i>Fulica atra</i>) [A125] [G] – Golden Plover (<i>Pluvialis apricaria</i>) [A140] [G] – Lapwing (<i>Vanellus vanellus</i>) [A142] [G] – Common Tern (<i>Sterna hirundo</i>) [A193] [G] – Wetland and Waterbirds [A999] [G] 	range of 5 km for whooper swan (SNH 2016).	
Corbo Bog SAC	5.3 km	12.1 km	<ul style="list-style-type: none"> – Active raised bogs [7110] [R] – Degraded raised bogs still capable of natural regeneration [7120] [R] – Depressions on peat substrates of the Rhynchosporion [7150] [R] 	No feasible impact pathways from LRP Station or ADF as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to Corbo Bog SAC from the proposed development at the LRP Station and ADF sites as a consequence of separation distance and absence of hydrological connectivity.
Fortwilliam Turlough SAC	5.5 km	4.3 km	<ul style="list-style-type: none"> – Turloughs [3180] [G] 	No feasible impact pathways from LRP Station or ADF as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to Fortwilliam Turlough SAC from the proposed development at the LRP Station and ADF sites as a consequence of separation distance and absence of hydrological connectivity.
Ballykenny-Fisherstown Bog SPA	8.0 km	11.7 km	<ul style="list-style-type: none"> – Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395] [G] 	No feasible impact pathways envisaged.	There is no potential for significant effects to Fortwilliam Turlough SAC due to the proposed development at the LRP Station and ADFare located outside core foraging distance range for this species (5-8km) as per SNH (2016).
Lough Forbes Complex SAC	8.0 km	11.7 km	<ul style="list-style-type: none"> – Natural eutrophic lakes with Magnopotamion or Hydrocharitum - type vegetation [3150] [R] – Active raised bogs [7110] [R] 	No feasible impact pathways from LRP Station or ADF as a consequence of separation distance	There is no potential for significant effects to Lough Forbes Complex SAC from the proposed development at the LRP Station and ADF sites as a

Designated site	Distance from LRP Station	Distance from ADF	Qualifying Interest / Special Conservation Interest Conservation objectives indicated as appropriate [R, M, G, U] R = Restore specific QI/SCI M = Maintain specific QI/SCI G = Generic CO for all QI/SCI in N2000 site, i.e. Maintain or Restore U = Site-specific Conservation Objective Under Review	Possible impact pathways	Potential for significant effects
			<ul style="list-style-type: none"> Degraded raised bogs still capable of natural regeneration [7120] [R] Depressions on peat substrates of the Rhynchosporion [7150] [R] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0] [R] 	and absence of hydrological connectivity.	consequence of separation distance and absence of hydrological connectivity.
Brown Bog SAC	9.8 km	11.9 km	<ul style="list-style-type: none"> Active raised bogs [7110] [R] Degraded raised bogs still capable of natural regeneration [7120] [R] Depressions on peat substrates of the Rhynchosporion [7150] [R] 	No feasible impact pathways from LRP Station or ADF as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to Brown Bog SAC from the proposed development at the LRP Station and ADF sites as a consequence of separation distance and absence of hydrological connectivity.
Mount Jessop Bog SAC	11.2 km	8.1 km	<ul style="list-style-type: none"> Degraded raised bogs still capable of natural regeneration [7120] [R] Bog Woodland* [91D0] [R] 	No feasible impact pathways from LRP Station or ADF as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to Mount Jessop Bog SAC from the proposed development at the LRP Station and ADF sites as a consequence of separation distance and absence of hydrological connectivity.
Cloneen Bog SAC	13.9 km	19 km	<ul style="list-style-type: none"> Active raised bogs [7110] [R] Degraded raised bogs still capable of natural regeneration [7120] [R] Depressions on peat substrates of the Rhynchosporion [7150] [R] 	No feasible impact pathways from LRP Station or ADF as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to Cloneen Bog SAC from the proposed development at the LRP Station and ADF sites as a consequence of separation distance and absence of hydrological connectivity.

Table 5-2: European Sites within 15 km of peat bogs supplying LRP Station until December 2020

Designated site Distance to closest supply bog	Distance from closest supply bog	Qualifying Interest / Special Conservation Interest Conservation objectives indicated as appropriate [R, M, G, U] R = Restore specific QI/SCI M = Maintain specific QI/SCI G = Generic CO for all QI/SCI in N2000 site, i.e. Maintain or Restore U = Site-specific Conservation Objective Under Review	Possible impact pathways	Potential for significant effects
River Suck Callows SPA	0 km (Boughill/ Castlegar)	<ul style="list-style-type: none"> – Whooper Swan (Cygnus cygnus) [A038] [G] – Wigeon (Anas penelope) [A050] [G] – Golden Plover (Pluvialis apricaria) [A140] [G] – Lapwing (Vanellus vanellus) [A142] [G] – Greenland White-fronted Goose (Anser albifrons flavirostris) [A395] [G] – Wetland and Waterbirds [A999] [G] 	Close spatial proximity and direct hydrological connection between SPA and Bord na Móna peat supply bog(s) (discharges and drainage). There is the potential for disturbance of SCIs for this SPA: the Edera, Boughill and Castlegar supply bogs are located within the core foraging range of 5 km for whooper swan (SNH 2016).	Given the existence of direct discharges to the River Shannon and its tributaries from several peat supply bogs, there is potential for significant effects from continued peat harvesting activities in the catchment. Qualifying interest habitats may also be hydrologically affected by drainage associated with these bogs. Peat harvesting activities may affect the local foraging activities of whooper swan outside the SPA boundary. Potential for significant effects to the River Suck Callows SPA is considered in Section 6.
Lough Ree SAC	0 km (Edera)	Refer to Table 5-1	Close spatial proximity and direct hydrological connection between SAC and Bord na Móna peat supply bog(s) (discharges and drainage). Otter, as a mobile species has the potential to extend its range beyond the SAC boundary into the contributing surface water catchments of Lough Ree and into closer proximity to peat supply bogs.	Given the existence of direct discharges to the River Shannon and Lough Ree and their respective tributaries from several peat supply bogs, there is potential for significant effects from continued peat harvesting activities in the catchment. Qualifying interest habitats may also be hydrologically affected by drainage associated with these bogs. Mobile QI species (i.e. otter) occurring outside the SAC boundary may be affected by reductions in water quality in the respective contributing sub-catchments of Lough Ree. Potential for significant effects to the Lough Ree SAC is considered in Section 6.
Lough Ree SPA	0 km (Edera)	Refer to Table 5-1	Close spatial proximity and direct hydrological connection between SPA and Bord na Móna peat supply	Given the existence of direct discharges to the River Shannon and Lough Ree and their respective tributaries from several peat supply bogs, there is

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			bog(s) (discharges and drainage). There is the potential for disturbance of SCIs for this SPA: the Edera, Boughill and Castlegar supply bogs are located within the core foraging range of 5 km for whooper swan (SNH 2016).	potential for significant effects from continued peat harvesting activities in the catchment. Habitats which indirectly support the SCI species may also be hydrologically affected by drainage associated with these bogs. Peat harvesting activities may affect the local foraging activities of whooper swan outside the SPA boundary. Potential for significant effects to the Lough Ree SPA is considered in Section 6.
Garriskil Bog SAC	0.2 km (Coolnagaun)	<ul style="list-style-type: none"> - Active raised bogs [7110] [R] - Degraded raised bogs still capable of natural regeneration [7120] [R] - Depressions on peat substrates of the Rhynchosporion [7150] [R] 	Close spatial proximity between SAC and Bord na Móna peat supply bog(s)	Given the close spatial proximity of the SAC to Coolnagaun supply bog, there is potential for significant effects from continued peat harvesting activities in the locality. Potential for significant effects to the Garriskil Bog SAC is considered in Section 6.
Garriskil Bog SPA	0.2 km (Coolnagaun)	<ul style="list-style-type: none"> - Greenland White-fronted Goose (Anser albifrons flavirostris) [A395] [G] 	Close spatial proximity between SPA and peat supply bog (potential for disturbance). There is the potential for disturbance of some SCIs for this SPA: the Coolnagaun supply bog is located within the core foraging range of 5-8 km for White-fronted goose (SNH 2016).	At the time this site was designated as an SPA it was known to be utilised by part of an internationally important population of Greenland White-fronted Goose centred around the midland lakes. However, as noted in the site synopsis (NPWS 2012), notes that the geese "have since abandoned the peatland sites in favour of grassland sites elsewhere. The site is within the range of the midland lakes Greenland White-fronted Goose flock, which is centred on four major lakes (Derravaragh, Iron, Owel and Ennell). The last record of Greenland White-fronted Goose at this site was in 1986/87 (43 individuals)."

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			<p>For inspection purposes only. Consent of copyright owner required for any other use.</p>	<p>While the subject site occurs within the core foraging range for Greenland Whitefronted Goose (5-8km core foraging range (SNH 2016), the species has not used the raised bog habitat for many years. Historically, Greenland White-fronted Geese have had a strong association with raised bog habitat, however, in recent decades the species has increasingly deserted semi-natural habitats and low intensity grassland to feed on intensively managed farmland (Norriss & Wilson, 1993; Stroud et al., 2012).</p> <p>Additionally, the only record for this species in the Bird Atlas (2007-2011) for the 10 km grid squares within which Coolnagun bog is located (N36) is associated with Lough Iron, over 8 km to the south.</p> <p>Consequently, there is no potential for significant effects to All Saints Bog SPA on the basis of an absence of the Special Conservation Interest species from the site. No further assessment is deemed necessary.</p>
Ballykenny-Fisherstown Bog SPA	0.3 km (Begnagh)	Refer to Table 5-1	Close spatial proximity between SPA and peat supply bog (potential for disturbance). There is the potential for disturbance of some SCIs for this SPA: the Begnagh supply bog is located within the core foraging	<p>At the time this site was designated as an SPA it was known to be utilised by part of an internationally important population of Greenland White-fronted Goose centred around the midland lakes.</p> <p>However, as noted in the site synopsis (NPWS 2012), notes that the geese "have since abandoned</p>

Designated site Distance to closest supply bog	Distance from closest supply bog	Qualifying Interest / Special Conservation Interest Conservation objectives indicated as appropriate [R, M, G, U] R = Restore specific QI/SCI M = Maintain specific QI/SCI G = Generic CO for all QI/SCI in N2000 site, i.e. Maintain or Restore U = Site-specific Conservation Objective Under Review	Possible impact pathways	Potential for significant effects
			<p>range of 5-8 km for White-fronted goose (SNH 2016).</p> <p style="color: red; transform: rotate(-45deg); font-weight: bold;">Consent of copyright owner required for any other use.</p>	<p><i>the peatland sites in favour of grassland sites elsewhere. The site was regularly utilised during the 1980s and Greenland White-fronted Goose is regarded as a special conservation interest for this SPA. The last record of Greenland White-fronted Goose at this site was in 1990/91 (111 individuals)". Additionally, there are no records from the Bird Atlas (2007-2011) for the 10 km grid squares within which Begnagh bog is located.</i></p> <p>While the subject site occurs within the core foraging range for Greenland Whitefronted Goose (5-8km core foraging range (SNH 2016), the species has not used the raised bog habitat for many years. Historically, Greenland White-fronted Geese have had a strong association with raised bog habitat, however, in recent decades the species has increasingly deserted semi-natural habitats and low intensity grassland to feed on intensively managed farmland (Norriss & Wilson, 1993; Stroud et al., 2012).</p> <p>Consequently, there is no potential for significant effects to All Saints Bog SPA on the basis of an absence of the Special Conservation Interest species from the site. No further assessment is deemed necessary.</p>
Lough Forbes Complex SAC	0.3 km (Begnagh)	Refer to Table 5-1	No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence	There is no potential for significant effects to Lough Forbes Complex SAC on the basis of an absence of

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			of hydrological connectivity. Discharges from the Begnagh & Clooneeny supply bogs are within the Camin River sub-catchment, a discrete waterbody from Lough Forbes.	feasible pathways. No further assessment is deemed necessary.
Lough Kinale and Derragh Lough SPA	0.3 km (Coolcraff)	<ul style="list-style-type: none"> - Pochard (<i>Aythya ferina</i>) [A059] [G] - Tufted Duck (<i>Aythya fuligula</i>) [A061] [G] - Wetland and Waterbirds [A999] [G] 	Lough Kinale is located upstream of Coolcraff Bog. No feasible impact pathways from peat supply bogs as a consequence of an absence of hydrological connectivity.	The SCI species associated with the SPA are not expected to associate with peat harvesting areas. There is no potential for significant effects to Lough Kinale and Derragh Lough SPA on the basis of an absence of feasible pathways. No further assessment is deemed necessary.
Clooneen Bog SAC	0.4 km (Derrymoylin)	<ul style="list-style-type: none"> - Degraded raised bogs still capable of natural regeneration [7120] [R] - Depressions on peat substrates of the <i>Rhynchosporion</i> [7150] [R] - Bog woodland [91D0] [M] 	No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to Clooneen Bog SAC on the basis of an absence of feasible pathways. No further assessment is deemed necessary.
Lough Derravaragh SPA	0.5 km (Coolnagun)	<ul style="list-style-type: none"> - Whooper Swan (<i>Cygnus cygnus</i>) [A038] [G] - Pochard (<i>Aythya ferina</i>) [A059] [G] - Tufted Duck (<i>Aythya fuligula</i>) [A061] [G] - Coot (<i>Fulica atra</i>) [A125] [G] - Wetland and Waterbirds [A999] [G] 	Close spatial proximity and direct hydrological connection between SPA and Bord na Móna peat supply bog(s); Coolnagun, Milkernagh and Coolcraff supply bogs discharge surface water to the River Inny, which passes through Lough Derravaragh.	Given the existence of direct discharges to the River Inny upstream of Lough Derravaragh from several peat supply bogs, there is potential for significant effects from continued peat harvesting activities in the catchment. Potential for significant effects to the Lough Ree SPA is considered in Section 6.
Corbo Bog SAC	0.7 km (Moher)	Refer to Table 5-1	No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to Corbo Bog SAC on the basis of an absence of feasible pathways. No further assessment is deemed necessary.

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River Boyne And River Blackwater SAC	0.8 km (Bracklin)	<ul style="list-style-type: none"> Alkaline fens [7230] [G] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0] [G] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] [G] <i>Salmo salar</i> (Salmon) [1106] [G] <i>Lutra lutra</i> (Otter) [1355] [G] 	Direct hydrological connection between SAC and Bord na Móna peat supply bog (discharge)	<p>Given the existence of direct discharges to a tributary of the River Boyne, there is potential for significant effects from continued peat harvesting activities in the catchment. Otter, a mobile species are considered likely to extend their range further upstream from the SAC boundary into closer proximity to the supply bog.</p> <p>Potential for significant effects to the River Boyne and River Blackwater SAC is considered in Section 6.</p>
River Boyne and River Blackwater SPA	0.8 km (Bracklin)	<ul style="list-style-type: none"> Kingfisher (<i>Alcedo atthis</i>) [A229] [G] 	Direct hydrological connection between SPA and Bord na Móna peat supply bog (discharge)	<p>Given the existence of direct discharges to a tributary of the River Boyne, there is potential for significant effects from continued peat harvesting activities in the catchment.</p> <p>Potential for significant effects to the River Boyne and River Blackwater SPA is considered in Section 6.</p>
Brown Bog SAC	0.8 km (Clooneeny)	Refer to Table 5-1	No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to Brown Bog SAC on the basis of an absence of feasible pathways. No further assessment is deemed necessary.
Derragh Bog SAC	0.8 km (Coolcraff)	<ul style="list-style-type: none"> Degraded raised bogs still capable of natural regeneration [7120] [R] Bog woodland [91D0] [M] 	No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to Derragh Bog SAC on the basis of an absence of feasible pathways. No further assessment is deemed necessary.
Raheenmore Bog SAC	0.8 km (Toar)	<ul style="list-style-type: none"> Active raised bogs [7110] [R] Degraded raised bogs still capable of natural regeneration [7120] [R] 	No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to Raheenmore Bog SAC on the basis of an absence of feasible pathways. No further assessment is deemed necessary.

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		– Depressions on peat substrates of the Rhynchosporion [7150] [R]		
Split Hills And Long Hill Esker SAC	1.4 km (Toar)	– Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brorneta/ia)(impoiant orchid sites) [6210] [G]	No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to Split Hills And Long Hill Esker SAC on the basis of an absence of feasible pathways. No further assessment is deemed necessary.
Fortwilliam Turlough SAC	1.8 km (Derryshanoge)	Refer to Table 5-1	No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to Fortwilliam Turlough SAC on the basis of an absence of feasible pathways. No further assessment is deemed necessary.
Mount Jessop Bog SAC	2.1 km (Clooneeny)	Refer to Table 5-1	No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to Mount Jessop SAC on the basis of an absence of feasible pathways. No further assessment is deemed necessary.
Killeglan Grassland SAC	2.3 km (Derryfadda)	– Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (*important orchid sites) [6210] [G]	No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to Killeglan Grassland SAC on the basis of an absence of feasible pathways. No further assessment is deemed necessary.
Moneybeg And Clareisland Bogs SAC	2.7 km (Coolcraff)	– Active raised bogs [7110] [R] – Degraded raised bogs still capable of natural regeneration [7120] [R] – Depressions on peat substrates of the Rhynchosporion [7150] [R]	No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to Moneybeg And Clareisland Bogs SAC on the basis of an absence of feasible pathways. No further assessment is deemed necessary.
Four Roads Turlough SAC	2.9 km (Boughill)	– Turloughs [3180] [G]	No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to Four Road Turlough SAC on the basis of an absence of feasible pathways. No further assessment is deemed necessary.
Four Roads Turlough SPA	2.9 km (Boughill)	– Golden Plover (Pluvialis apricaria) [A140] [G]	Boughill supply bog occurs within the core foraging distance range for	The Four Roads turlough provides a foraging site for the River Suck Callows goose flock (NPWS site)

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		<ul style="list-style-type: none"> Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395] [G] Wetland and Waterbirds [A999] [G] 	this species (5-8km) as per SNH (2016).	synopsis). This SPA is north east of the River Suck, while Boughill Bog lies to the south west. Given the physical separation of these sites and the fact that commuting geese will not fly over the supply bog, there is no potential for significant effects to Four Roads Turlough SPA .
Lough Sheelin SPA	3.1 km (Coolcraff)	<ul style="list-style-type: none"> Great Crested Grebe (<i>Podiceps cristatus</i>) [A005] [G] Pochard (<i>Aythya ferina</i>) [A059] [G] Tufted Duck (<i>Aythya fuligula</i>) [A061] [G] Goldeneye (<i>Bucephala clangula</i>) [A067] [G] Wetland and Waterbirds [A999] [G] 	Lough Sheelin is located upstream of Coolcraff Bog. No feasible impact pathways from peat supply bogs as a consequence of an absence of hydrological connectivity.	The SCI species associated with the SPA are not expected to associate with peat harvesting areas. There is no potential for significant effects to Lough Kinale and Derragh Lough SPA on the basis of an absence of feasible pathways. No further assessment is deemed necessary.
Mount Hevey Bog SAC	3.3 km (Ballivor)	<ul style="list-style-type: none"> Active raised bogs [7110] [R] Degraded raised bogs still capable of natural regeneration [7120] [R] Depressions on peat substrates of the Rhynchosporion [7150] [R] 	No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to Mount Hevey Bog SAC on the basis of an absence of feasible pathways. No further assessment is deemed necessary.
Ballygar (Aghrane) Bog SAC	4.0 km (Boughill)	<ul style="list-style-type: none"> Active raised bogs [7110] [R] Degraded raised bogs still capable of natural regeneration [7120] [R] 	No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to Ballygar (Aghrane) Bog SAC on the basis of an absence of feasible pathways. No further assessment is deemed necessary.
Lough Iron SPA	4.4 km (Coolnagun)	<ul style="list-style-type: none"> Whooper Swan (<i>Cygnus cygnus</i>) [A038] [G] Wigeon (<i>Anas penelope</i>) [A050] [G] Teal (<i>Anas crecca</i>) [A052] [G] Shoveler (<i>Anas clypeata</i>) [A056] [G] Coot (<i>Fulica atra</i>) [A125] [G] Golden Plover (<i>Pluvialis apricaria</i>) [A140] [G] 	Close spatial proximity and direct hydrological connection between SPA and Bord na Móna peat supply bog(s); Coolnagun, Milkernagh and Coolcraff supply bogs discharge surface water to the River Inny, which passes through Lough Iron.	Given the existence of direct discharges to the River Inny upstream of Lough Derravaragh from several peat supply bogs, there is potential for significant effects from continued peat harvesting activities in the catchment. Peat harvesting activities may affect the local foraging activities of Greenland white-

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		<ul style="list-style-type: none"> Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395] [G] Wetland and Waterbirds [A999] [G] 	Coolnagun supply bog also occurs within the core foraging distance range for Greenland White-fronted Goose (5-8km) and whooper swan (5 km) as per SNH (2016).	fronted goose and whooper swan outside the SPA boundary. Potential for significant effects to the Lough Ree SPA is considered in Section 6.
Aughrim (Aghrane) Bog SAC	4.8 km (Boughill)	<ul style="list-style-type: none"> Degraded raised bogs still capable of natural regeneration [7120] [R] 	No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to Aughrim (Aghrane) Bog SAC on the basis of an absence of feasible pathways. No further assessment is deemed necessary.
Ardagullion Bog SAC	5.0 km (Milkernagh)	<ul style="list-style-type: none"> Active raised bogs [7110] [R] Degraded raised bogs still capable of natural regeneration [7120] [R] Depressions on peat substrates of the Rhynchosporion [7150] [R] 	No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to Ardagullion Bog SAC on the basis of an absence of feasible pathways. No further assessment is deemed necessary.
Lough Croan Turlough SPA	5.2 km (Boughill)	<ul style="list-style-type: none"> Shoveler (<i>Anas clypeata</i>) [A056] [G] Golden Plover (<i>Pluvialis apricaria</i>) [A140] [G] Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395] [G] Wetland and Waterbirds [A999] [G] 	The Boughill and Derryfadda supply bogs occur within the core foraging distance range for Greenland White-fronted Goose (5-8km) as per SNH (2016).	The Lough Croan turlough provides a foraging site for the River Suck Callows goose flock (NPWS site synopsis). The 2007-2011 Bird Atlas notes that geese may occur in very small numbers (2 individuals recorded on 2 occasions) in the M84E 2 km grid square, where Boughill bog is located, in association with callows grassland along the Shiven River. Given the low occurrence in the area by Greenland white-fronted goose (site is towards the outer foraging range for this species), it is considered that there are no likely significant effects on the Lough Croan Turlough SPA.
Lough Croan Turlough SAC	5.3 km (Boughill)	<ul style="list-style-type: none"> Turloughs [3180] [G] 	No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to Lough Croan Turlough SAC on the basis of an absence of feasible pathways. No further assessment is deemed necessary.

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Lough Owel SAC	5.5 km (Coolnagun)	<ul style="list-style-type: none"> – Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. [3140] [G] – Transition mires and quaking bogs [7140] [G] – Alkaline fens [7230] [G] – Austropotamobius pallipes (White-clawed Crayfish) [1092] [G] 	Lough Owel is located in a separate surface water catchment to Coolnagun supply bog. No feasible impact pathways from peat supply bogs as a consequence of an absence of hydrological connectivity.	There is no potential for significant effects to Lough Owel SAC on the basis of an absence of feasible pathways. No further assessment is deemed necessary.
Lough Owel SPA	5.5 km (Lough Owel)	<ul style="list-style-type: none"> – Shoveler (Anas clypeata) [A056] [G] – Coot (Fulica atra) [A125] [G] – Wetland and Waterbirds [A999] [G] 	Lough Owel is located in a separate surface water catchment to Coolnagun supply bog. No feasible impact pathways from peat supply bogs as a consequence of an absence of hydrological connectivity.	The SCI species associated with the SPA are not expected to associate with peat harvesting areas due to the unsuitable nature of the habitats on-site for these species' roosting and foraging requirements. There is no potential for significant effects to Lough Owel SPA on the basis of an absence of feasible pathways. No further assessment is deemed necessary.
Lisduff Turlough SAC	6.2 km (Boughill)	<ul style="list-style-type: none"> – Turloughs [3180] [G] 	No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to Lisduff Turlough SAC on the basis of an absence of feasible pathways. No further assessment is deemed necessary.
Castlesampson Esker SAC	6.6 km (Castlesampson)	<ul style="list-style-type: none"> – Turloughs [3180] [G] – Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210] [G] 	No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to Castlesampson Esker SAC on the basis of an absence of feasible pathways. No further assessment is deemed necessary.
Lough Ennell SAC	6.7 km (Toar)	<ul style="list-style-type: none"> – Alkaline fens [7230] [G] 	No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to Lough Ennell SAC on the basis of an absence of feasible pathways. No further assessment is deemed necessary.

Designated site Distance to closest supply bog	Distance from closest supply bog	Qualifying Interest / Special Conservation Interest Conservation objectives indicated as appropriate [R, M, G, U] R = Restore specific QI/SCI M = Maintain specific QI/SCI G = Generic CO for all QI/SCI in N2000 site, i.e. Maintain or Restore U = Site-specific Conservation Objective Under Review	Possible impact pathways	Potential for significant effects
River Barrow And River Nore SAC	7.4 km (Ballykeane)	<ul style="list-style-type: none"> - Estuaries [1130] [M] - Mudflats and sandflats not covered by seawater at low tide [1140] [M] - Reefs [1170] [M] - Salicornia and other annuals colonising mud and sand [1310] [M] - Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330] [R] - Mediterranean salt meadows (Juncetalia maritimi) [1410] [R] - Water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche-Batrachion vegetation [3260] [M] - European dry heaths [4030] - Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] [M] - Petrifying springs with tufa formation (Cratoneurion) [7220] [M] - Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] [R] - Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) [91E0] [R] - Vertigo moulinsiana (Desmoulin's Whorl Snail) [1016] [M] - Margaritifera margaritifera (Freshwater Pearl Mussel) [1029] [U] 	Direct hydrological connection between SAC and Bord na Móna peat supply bog (discharge)	<p>Given the existence of direct discharges to a tributary of the River Barrow, there is potential for significant effects from continued peat harvesting activities in the catchment.</p> <p>Potential for significant effects to the River Barrow And River Nore SAC is considered in Section 6.</p>

Designated site Distance to closest supply bog	Distance from closest supply bog	Qualifying Interest / Special Conservation Interest Conservation objectives indicated as appropriate [R, M, G, U] R = Restore specific QI/SCI M = Maintain specific QI/SCI G = Generic CO for all QI/SCI in N2000 site, i.e. Maintain or Restore U = Site-specific Conservation Objective Under Review	Possible impact pathways	Potential for significant effects
		<ul style="list-style-type: none"> - Austropotamobius pallipes (White-clawed Crayfish) [1092] [M] - Petromyzon marinus (Sea Lamprey) [1095] [R] - Lampetra planeri (Brook Lamprey) [1096] [R] - Lampetra fluviatilis (River Lamprey) [1099] [R] - Alosa fallax fallax (Twaiite Shad) [1103] [R] - Salmo salar (Salmon) [1106] [R] - Lutra lutra (Otter) [1355] [R] - Trichomanes speciosum (Killarney Fern) [1421] [M] - Margaritifera durrovensis (Nore Pearl Mussel) [1990] [R] 		
Glen Lough SPA	7.4 km (Coolnagun)	<ul style="list-style-type: none"> - Whooper Swan (Cygnus cygnus) [A038] [G] 	No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence of hydrological connectivity. Kilgarvan bog is located outside the core foraging range for Whooper Swan of (5km) as per SNH (2016).	There is no potential for significant effects to Glen Lough SPA on the basis of an absence of feasible pathways. No further assessment is deemed necessary.
Carrownagappul Bog SAC	7.4 km (Gowla)	<ul style="list-style-type: none"> - Active raised bogs [7110] [R] - Degraded raised bogs still capable of natural regeneration [7120] [R] - Depressions on peat substrates of the Rhynchosporion [7150] [R] 	No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to Carrownagappul Bog SAC on the basis of an absence of feasible pathways. No further assessment is deemed necessary.
Lough Ennell SPA	7.8 km (Toar)	<ul style="list-style-type: none"> - Pochard (Aythya ferina) [A059] [G] - Tufted Duck (Aythya fuligula) [A061] [G] 	No feasible impact pathways from peat supply bogs as a consequence	There is no potential for significant effects to Lough Ennell SPA on the basis of an absence of feasible

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		<ul style="list-style-type: none"> – Coot (<i>Fulica atra</i>) [A125] [G] – Wetland and Waterbirds [A999] [G] 	of separation distance and absence of hydrological connectivity.	pathways. No further assessment is deemed necessary.
Ballynamona Bog And Corkip Lough SAC	8.3 km (Derryfadda)	<ul style="list-style-type: none"> – Turloughs [3180] [R] – Active raised bogs [7110] [R] – Degraded raised bogs still capable of natural regeneration [7120] [R] – Depressions on peat substrates of the Rhynchosporion [7150] [R] – Bog woodland [91D0] [R] 	No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to Ballynamona Bog And Corkip Lough SAC on the basis of an absence of feasible pathways. No further assessment is deemed necessary.
The Long Derries, Edenderry SAC	8.5 km (Esker)	<ul style="list-style-type: none"> – Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210] 	No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to the Long Derries, Edenderry SAC on the basis of an absence of feasible pathways. No further assessment is deemed necessary.
Scragh Bog SAC	8.8 km (Coolnagun)	<ul style="list-style-type: none"> – Transition mires and quaking bogs [7140] [G] – Alkaline fens [7230] [G] – Drepanocladus vernicosus (Slender Green Feather-moss) [1393] [G] 	No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to the Scragh Bog SAC on the basis of an absence of feasible pathways. No further assessment is deemed necessary.
Annaghmore Lough (Roscommon) SAC	8.9 km (Granaghan)	<ul style="list-style-type: none"> – Alkaline fens [7230] [G] – <i>Vertigo geyeri</i> (Geyer's Whorl Snail) [1013] [G] 	No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to the Annaghmore Lough (Roscommon) SAC on the basis of an absence of feasible pathways. No further assessment is deemed necessary.
Curraglehanagh Bog SAC	9.2 km (Gowla)	<ul style="list-style-type: none"> – Active raised bogs [7110] [R] – Degraded raised bogs still capable of natural regeneration [7120] [R] – Depressions on peat substrates of the Rhynchosporion [7150] [R] 	No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to the Curraglehanagh Bog SAC on the basis of an absence of feasible pathways. No further assessment is deemed necessary.
Ballinturly Turlough SAC	9.3 km (Boughill)	<ul style="list-style-type: none"> – Turloughs [3180] [G] 	No feasible impact pathways from peat supply bogs as a consequence	There is no potential for significant effects to the Ballinturly Turlough SAC on the basis of an absence

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			of separation distance and absence of hydrological connectivity.	of feasible pathways. No further assessment is deemed necessary.
Glenloughaun Esker SAC	9.3 km (Castlegar)	– Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brorneta/ia)(impoiant orchid sites) [6210] [G]	No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to the Glenloughaun Esker SAC on the basis of an absence of feasible pathways. No further assessment is deemed necessary.
Camderry Bog SAC	9.6 km (Boughill)	– Active raised bogs [7110] [R] – Degraded raised bogs still capable of natural regeneration [7120] [R] – Depressions on peat substrates of the Rhynchosporion [7150] [R]	No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to the Camderry Bog SAC on the basis of an absence of feasible pathways. No further assessment is deemed necessary.
Lough Lene SAC	10.1 km (Coolnagun)	– Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. [3140] [G] – Austropotamobius pallipes (White-clawed Crayfish) [1092] [G]	Lough Lene SAC is located in a separate surface water catchment to the Coolnagun, Milkernagh and Coolcraff supply bogs. No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to the Lough Lene SAC on the basis of an absence of feasible pathways. No further assessment is deemed necessary.
Wooddown Bog SAC	10.1 km (Derryhinch)	– Degraded raised bogs still capable of natural regeneration [7120] [R]	No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to the Wooddown Bog SAC on the basis of an absence of feasible pathways. No further assessment is deemed necessary.
Lough Funshinagh SAC	10.3 km (Boughill)	– Turloughs [3180] [G] – Rivers with muddy banks with Chenopodium rubri p.p. and Bidenton p.p. vegetation [3270] [G]	Boughill bog is hydrologically separated from Lough Funshinagh by the River Suck. No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to the Lough Funshinagh SAC on the basis of an absence of feasible pathways. No further assessment is deemed necessary.

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White Lough, Ben Loughs And Lough Doo SAC	10.4 km (Coolcraff)	<ul style="list-style-type: none"> Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. [3140] [G] Austropotamobius pallipes (White-clawed Crayfish) [1092] [G] 	White Lough, Ben Loughs And Lough Doo SAC is located in a separate surface water catchment to the Coolnagun, Milkernagh and Coolcraff supply bogs. No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to the Lough Lene SAC on the basis of an absence of feasible pathways. No further assessment is deemed necessary.
Mountmellick SAC	10.8 km (Ballykeane)	<ul style="list-style-type: none"> Vertigo moulinsiana (Desmoulin's Whorl Snail) [1016] [G] 	No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to the Mountmellick SAC on the basis of an absence of feasible pathways. No further assessment is deemed necessary.
Shankill West Bog SAC	12.6 km (Gowla)	<ul style="list-style-type: none"> Active raised bogs [7110] [R] Degraded raised bogs still capable of natural regeneration [7120] [R] Depressions on peat substrates of the Rhynchosporion [7150] [R] 	No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to the Shankill West Bog SAC on the basis of an absence of feasible pathways. No further assessment is deemed necessary.
Charleville Wood SAC	12.6 km (Toar)	<ul style="list-style-type: none"> Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] [G] Vertigo moulinsiana (Desmoulin's Whorl Snail) [1016] [G] 	No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to the Charleville Wood SAC on the basis of an absence of feasible pathways. No further assessment is deemed necessary.
Clara Bog SAC	12.8 km (Toar)	<ul style="list-style-type: none"> Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210] [R] Active raised bogs [7110] [R] Degraded raised bogs still capable of natural regeneration [7120] [R] 	No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to the Clara Bog SAC on the basis of an absence of feasible pathways. No further assessment is deemed necessary.

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		<ul style="list-style-type: none"> Depressions on peat substrates of the Rhynchosporion [7150] [R]Bog woodland [91D0] [M] 		
Girley (Drewstown) Bog SAC	12.9 km (Bracklin)	<ul style="list-style-type: none"> Degraded raised bogs still capable of natural regeneration [7120] [R] 	No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to the Girley (Drewstown) Bog SAC on the basis of an absence of feasible pathways. No further assessment is deemed necessary.
Lough Bane And Lough Glass SAC	13.2 km (Coolcraff)	<ul style="list-style-type: none"> Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. [3140] [G] Austropotamobius pallipes (White-clawed Crayfish) [1092] [G] 	Lough Bane And Lough Glass SAC is located in a separate surface water catchment to the Coolnagun, Milkernagh and Coolcraff supply bogs. No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to the Lough Bane And Lough Glass SAC on the basis of an absence of feasible pathways. No further assessment is deemed necessary.
Lough Lurgeen Bog/Glenamaddy Turlough SAC	13.3 km (Boughill)	<ul style="list-style-type: none"> Turloughs [3180] [R] Rivers with muddy banks with Chenopodium rubri p.p. and Bidention p.p. vegetation [3270] [M] Active raised bogs [7110] [R] Degraded raised bogs still capable of natural regeneration [7120] [R] Depressions on peat substrates of the Rhynchosporion [7150] [R] 	Lough Lurgeen Bog/Glenamaddy Turlough SAC is located upstream of the Boughill supply bog. No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to the Lough Lurgeen Bog/Glenamaddy Turlough SAC on the basis of an absence of feasible pathways. No further assessment is deemed necessary.
Carn Park Bog SAC	13.8 km (Edera)	<ul style="list-style-type: none"> Active raised bogs [7110] [R] Degraded raised bogs still capable of natural regeneration [7120] [R] 	No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to the Carn Park Bog SAC on the basis of an absence of feasible pathways. No further assessment is deemed necessary.

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Ballymore Fen SAC	14.1 km (Edera)	– Transition mires and quaking bogs [7140] [G]	No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence of hydrological connectivity.	There is no potential for significant effects to the Ballymore Fen SAC on the basis of an absence of feasible pathways. No further assessment is deemed necessary.
Slieve Bloom Mountains SPA	14.5 km (Ballykeane)	– Hen Harrier (<i>Circus cyaneus</i>) [A082] [G]	No feasible impact pathways from peat supply bogs as a consequence of separation distance and absence of landscape and habitat changes within the SPA.	There is no potential for significant effects to the Slieve Bloom Mountains SPA on the basis of an absence of feasible pathways and the location of the site outside the core foraging range for this species during the nesting season (males are known to range up to 11.4 km from the nest in Ireland (Irwin et al. 2012)). No further assessment is deemed necessary.
River Shannon Callows SAC	14.8 km (Castlegar)	– Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinia caerulea</i>) [6410] [G] – Lowland hay meadows (<i>Alopecurus pratensis</i> , <i>Sanguisorba officinalis</i>) [6510] [G] – Limestone pavements [8240] [G] – Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) [91E0] [G] – Lutra lutra (Otter) [1355] [G]	No feasible impact pathways from peat supply bogs as a consequence of separation distance and dilution factors.	While there is a direct hydrological connection between the respective supply bogs in the Blackwater bog grouping and the River Shannon Callows SAC, the large intervening distance and dilution factor occurring along the course of the River Suck and at the confluence with the River Shannon means that impacts arising from upstream bog discharges will be negligible. No further assessment is deemed necessary.
Middle Shannon Callows SPA	14.8 km (Castlegar)	– Whooper Swan (<i>Cygnus cygnus</i>) [A038] [G] – Wigeon (<i>Anas penelope</i>) [A050] [G] – Corncrake (<i>Crex crex</i>) [A122] [G] – Golden Plover (<i>Pluvialis apricaria</i>) [A140] [G] – Lapwing (<i>Vanellus vanellus</i>) [A142] [G]	No feasible impact pathways from peat supply bogs as a consequence of separation distance and dilution factors.	While there is a direct hydrological connection between the respective supply bogs in the Blackwater bog grouping and the Middle Shannon Callows SPA, the large intervening distance and dilution factor occurring along the course of the River Suck and at the confluence with the River Shannon means that impacts arising from upstream bog

Designated site Distance to closest supply bog	Distance from closest supply bog	Qualifying Interest / Special Conservation Interest Conservation objectives indicated as appropriate [R, M, G, U] R = Restore specific QI/SCI M = Maintain specific QI/SCI G = Generic CO for all QI/SCI in N2000 site, i.e. Maintain or Restore U = Site-specific Conservation Objective Under Review	Possible impact pathways	Potential for significant effects
		<ul style="list-style-type: none"> - Black-tailed Godwit (<i>Limosa limosa</i>) [A156] [G] - Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] [G] - Wetland and Waterbirds [A999] [G] 		discharges will be negligible. No further assessment is deemed necessary.

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6 Assessment of likely effects

An assessment of likely effects of the proposed development is presented herein. It should be noted at this stage that operations associated with LRP Station and LRP ADF are assessed for both direct and indirect effects on European Sites. Peat supply to LRP Station is assessed for indirect effects, insofar as it is carried out by a third party (Bord na Móna) under a contractual agreement with ESB.

6.1 Direct Impacts

6.1.1 LRP Station

Operational activities at LRP Station are entirely contained within the industrialised footprint of the existing power station. The proposed licence amendments will not result in changes to the footprint of LRP Station, or to any terrestrial habitats associated with the site. However, discharges originating from the LRP Station site flow to the River Shannon upstream of Lanesborough Bridge. The northern boundaries of Lough Ree SAC and Lough Ree SPA are defined by this bridge, which is located 160 m downstream of the LRP Station cooling water outfall; only these two European Sites are considered to be within the Zone of Influence for direct impacts arising as a result of site activities. No feasible impact pathways to the remainder of the European Sites identified in **Section 5.1** exist, based on separation distance and absence of hydrological connectivity.

From information garnered from the desktop study and field surveys, **Table 6-1** below outlines the potential presence of the Qualifying Interests and Special Conservation Interests of the respective European Sites within the potential Zone of Influence.

Table 6-1: Presence of European Site Qualifying Interests / Special Conservation Interests in Zone of Influence of LRP Station

European Site	Qualifying Interest / Special Conservation Interest/ Conservation Objective	Code	Occurrence/ distribution in Zone of Influence	Rationale
Lough Ree SAC	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation <u>CO: Restore</u>	[3150] [R]	Present immediately downstream of cooling water discharge	The entire waterbody of Lough Ree has been identified as supporting the 3150 habitat type; the overall lake has been classified as mesotrophic in quality, but the size of the system means that a range of conditions prevail depending upon, for example, rock type. This gives rise to local variations in nutrient status and pH, which in turn results in variations in the phytoplankton and macrophyte flora. Therefore species indicative of oligotrophic, mesotrophic, eutrophic and base-rich situations occur (NPWS 2016).
	Semi-natural dry grasslands and scrubland facies on calcareous	[6210] [R]	Not present	Dry calcareous grassland is a terrestrial habitat which is scattered around the lake shore of Lough Ree. There is no

European Site	Qualifying Interest / Special Conservation Interest/ Conservation Objective	Code	Occurrence/ distribution in Zone of Influence	Rationale
	substrates (<i>Festuco-Brometalia</i>) (*important orchid sites) <u>CO: Restore</u>			indication of any corresponding habitat in the immediate proximity of LRP Station.
	Degraded raised bogs still capable of natural regeneration <u>CO: Restore</u>	[7120] [R]	Not present	The raised bog components of the SAC are found at Clooncraff and Cloonlarge, at the north-western corner of Lough Ree between the Clooneigh and Hind rivers. These are located over 4 km to the southwest of LRP Station. There is no indication of any corresponding habitat in the immediate proximity of LRP Station.
	Alkaline fens <u>CO: Maintain</u>	[7230] [M]	Not present	Reedbeds of Common Reed (<i>Phragmites australis</i>) are an extensive habitat in a number of more sheltered places around the lake, but single-species 'swamps' consisting of such species as Common Club-rush (<i>Scirpus lacustris</i>), Slender Sedge (<i>Carex lasiocarpa</i>), Great Fensedge (<i>Cladium mariscus</i>) and two scarce species of sedge (<i>Carex appropinquata</i> and <i>C. elata</i>) also occur in suitable places. Some of these grade up into species-rich alkaline fen with Black Bog-rush (<i>Schoenus nigricans</i>) and Whorl-grass (<i>Catabrosa aquatica</i>), or freshwater marsh with abundant Water Dock (<i>Rumex hydrolapathum</i>) and Hemp-agrimony (<i>Eupatorium cannabinum</i>). While extensive reedbeds occur along the southern shore of the northeastern lagoon of Lough Ree at Curreen townland, these are relatively exposed and lack the habitat grading typically associated with alkaline fen.
	Limestone pavements <u>CO: Maintain</u>	[8240] [M]	Not present	Limestone pavement occurs occasionally around the lake shore. The most substantial area is at Rathcline in the extreme north-east; this site displays a diverse representation of pavement types, from the typical clint-gryke system to large blocky pavements and scattered boulders. This site is located 1 km south of LRP Station. There is no indication of any corresponding habitat in the immediate proximity of LRP Station. As a terrestrial habitat, this will not be affected by any discharges originating from the LRP Station site (any inundation of limestone pavement only occurs during high water periods, when the assimilative capacity of Lough Ree is significantly increased).

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European Site	Qualifying Interest / Special Conservation Interest/ Conservation Objective	Code	Occurrence/ distribution in Zone of Influence	Rationale
	Old sessile oak woods with Ilex and Blechnum in the British Isles <u>CO: Under Review</u>	[91A0] [U]	Not present	The areas of woodland potentially corresponding to this habitat type are associated with the lake shore and islands in the southern part of Lough Ree, over 20 km south of LRP Station. There is no indication of any corresponding habitat in the immediate proximity of LRP Station.
	Bog woodland <u>CO: Restore</u>	[91D0] [R]	Not present	The bog woodland components of the SAC are associated with areas of raised bog at Clooncraff and Cloonlarge, at the north-western corner of Lough Ree between the Clooneigh and Hind rivers. These are located over 5 km to the southwest of LRP Station. There is no indication of any corresponding habitat in the immediate proximity of LRP Station.
	<i>Lutra lutra</i> (Otter) <u>CO: Maintain</u>	[1355] [M]	Potentially present	Otter occurs widely along the course of the River Shannon and around the shores of Lough Ree. Feeding remains were found in the area of wet woodland immediately northwest of the LRP Station boundary during ecological site surveys in December 2016 while spraints were noted under Lanesborough bridge in January 2018, immediately adjacent to the cooling outfall channel.
Lough Ree SPA	Little Grebe Whooper Swan Wigeon Teal Mallard Shoveler Tufted Duck Common Scoter Goldeneye Coot Golden Plover Lapwing Common Tern Wetland and Waterbirds <u>CO: Maintain or Restore</u>	[A004] [A038] [A050] [A052] [A053] [A056] [A061] [A065] [A067] [A125] [A140] [A142] [A193] [A999]	Potentially present	Lough Ree SPA comprises a wide range of habitats of ecological value to waterbirds. The lake has a very long, indented shoreline and hence has many sheltered bays. It also has a good scattering of islands, most of which are included in the site. Reedbeds are an extensive habitat in a number of the more sheltered places around the lake; some of these grade into species-rich calcareous fen or freshwater marsh. Lowland wet grassland, some of which floods in winter, occurs frequently around the shore. Areas of such reedbed and open water which have the potential to be used by the respective Special Conservation Interest species are found immediately west and south of LRP Station.

6.1.1.1 General operational activities

As with any operational industrial facility, in the absence of specific environmental control measures, there is the potential for accidental leaks and spills of potentially polluting substances (e.g. oils, etc.) to impact on European Sites, particularly given the close proximity of LRP Station to the River Shannon, just upstream of the Lough

Ree SAC and SPA, and the existence of several surface water discharges from the site.

Any impact associated with anthropogenic polluting substances during the station's operation could have an impact on the water quality of the river and on the respective European Sites.

Operational activities causing noise (e.g. peat deliveries) also have the potential to cause disturbance to Special Conservation Interest species of the Lough Ree SPA.

The potential for significant effects upon the aforementioned European Sites arising from operational activities at LRP Station is uncertain in the absence of mitigation measures; such impacts and any associated mitigation must be further assessed in the Natura Impact Statement (see Section 8).

6.1.1.2 Cooling water abstraction and discharge

The primary direct potential impact pathway related LRP Station is associated with the cooling water abstraction from and discharging to the River Shannon. The thermal cooling water discharge from LRP Station occurs on the east bank, 160 m upstream of the bridge over the River Shannon in Lanesborough village.

The cooling water consists of a flow through the condenser of 5.5 m³/s which is subject to a temperature rise of approximately 8.5 °C. The flow through the condenser can vary slightly depending on the level of the River Shannon but load will vary with a corresponding variation in the rise in temperature.

The thermal plume arising from the cooling water discharge disperses in the water column downstream of the outlet (i.e. extending into the Lough Ree SAC and SPA).

Following the Licence Review undertaken in 2013 (which established an additional mixing zone requirement in relation to temperature in Condition 5.5), the ESB conducted Thermal Plume surveys in 2014. Subsequently following the submission of the 2014 Thermal Plume Survey report to the EPA, Compliance Investigation CI00930, CI00896 and CI001709 were opened. CI00930 and CI00896 were closed out in 16/07/2015 and 14/11/18 respectively, CI001709 was opened on the 14/11/18 and remains open.

The proposed alteration to Condition 5.5 under the current IE Licence Review is as follows: *“Discharges from the installation shall not artificially increase the ambient temperature of the receiving water by more than 1.5°C outside the mixing zone. In relation to temperature, the mixing zone shall not exceed 25% of the cross sectional area of the river at any point where such exceedances would result in contravention of the EPA Act and in particular cause significant environmental pollution to the receiving waters”*. Potential impacts to the Lough Ree SAC and Lough Ree SPA occurring as a result of LRP Station activities under the altered Condition 5.5 are determined as:

- Impacts on water quality (due to temperature change and effluent input) in the River Shannon arising as a result of LRP Station discharges, with

consequent impacts on species dependent on the aquatic and seasonally flooded habitats of the respective European Sites.

The Shannon re-enters its riverine course downstream of Lough Ree; the River Callows SAC and Middle Shannon Callows SPA are associated with the river downstream of Athlone. The River Callows SAC is predominantly designated for the presence of habitats which are associated with the seasonally flooded, semi-natural, lowland wet grassland, along and beside the river; the site is also internationally important for numbers and species of wintering waterfowl; consequently much of the SAC overlaps with the Middle Shannon Callows SPA. These sites, while hydrologically connected to LRP Station, are over 30 km downstream, and any potential impacts via a hydrological pathway are considered to be negligible given this distance and intervening dilution factors. There are no hydrological impact pathways from LRP Station to any other European Sites.

Studies on a range of ecological indicators and physical parameters in the River Shannon upstream and downstream of the cooling water discharge (including the northern bay of Lough Ree) have been undertaken in recent years. The Thermal Discharge Synthesis Report (ESBI/ASU 2018) outlines the findings of a suite of biological studies undertaken from 2014 through 2017 on communities of potential indicators for ecological effects on Lough Ree downstream of LRP Station.

Three annual surveys were undertaken which covered diatoms, macrophytes and macroinvertebrates at a series of sites on the River Shannon upstream and downstream of the thermal outfalls at both power stations. Biotic communities sampled and analysed for composition and abundance during the aquatic ecology survey were: (i) aquatic macrophytes; (ii) benthic diatoms; and (iii) benthic macroinvertebrates. Fisheries studies were also undertaken to survey the area within the plume and external to the plume of the cooling water outfall point located at the LRP Station. The objective was to see if there was any difference in fish populations between the warmer water areas below the outfall point and along the thermal plume areas and into the cooler non-thermal plume affected Shannon waters.

- **Biotic communities**

Macrophytes: There were some upstream/downstream differences detected in the aquatic macrophyte communities present in relation to the thermal discharge location, but the effects of hydromorphological impacts could not be separated from other pressures. There were no fundamental changes in the macrophyte species composition between 2016 and previous years. Factors such as depth; light; flow; turbidity and drainage / dredging seem likely the strongest determinant of species distribution at the Lanesborough sites.

Diatoms: There was a clear relationship between increased water temperature downstream of the thermal discharge and decreased ecological status classification according to diatom communities. Ecological status declined from 'High / Good' at upstream sites, to 'Moderate' just downstream of the outfall, persisting 'Moderate' for up to 415 m, then returning back to

Good Status at the next sampling point, 580 m downstream of the discharge location.

Macroinvertebrates: The study concludes that there is no indication from the data that the thermal discharge is unequivocally impacting the distribution or densities of most macroinvertebrate species, which appear more affected by river hydromorphology. The benthic study noted that Asian clam occurred at higher densities at sampling sites within the outfall canal experiencing on average elevated temperatures, suggesting that this species is locally enhanced by the thermal discharge. However it also notes that this effect is spatially confined. Zebra mussel was more prevalent in cooler water outside the outfall canal.

Based on a review of the above findings, it is concluded that the cooling water outfall is not having a significant effect on the local benthic ecology of the River Shannon or on Lough Ree downstream of Lanesborough Bridge.

- **Fisheries**

The fisheries study found perch, roach, bream, roach-bream hybrids, eel, tench, pike, gudgeon, trout and pollan in the sampled sites along the River Shannon near Lanesborough. No juvenile nor adult salmon were recorded at any sampling site. This is consistent with the findings of Inland Fisheries Ireland as part of the water framework directive fish assessments carried out in 2010. The study found that whilst a range of species of various age cohorts were captured, the higher densities of fish were found within the warmer water sections of the river for each of the three discrete sampling periods.

The typical Shannon silver eel (migratory phase of the eel lifecycle), migration period occurs for the period October to December each year. However, in late 2016 and early 2017, due to low river levels, the eel migration season was shown to be protracted to cover the period January - April 2017. Therefore, the silver eel captured during the last fyke net survey period was representative of the Shannon 2016/2017 silver eel migration.

The fisheries study presents an analysis of the River Shannon salmon census data for the 2016/2017 season, which indicates that the vast majority of the wild salmon (n=1,153), which entered the upper Shannon catchment in 2016 do so during the period when the thermal plume is greatest. However, it is noted that the thermal plume at LRP is located in a riverine section of the Shannon whereas it is considered likely that migrating salmon will continue to inhabit the cooler and deeper waters of Lough Derg until late summer before ascending further upstream.

It is known that the warm water discharge suits various species of fish. This is aptly demonstrated by the large number of coarse fish angling activity along the eastern bank which attracts much angling activity. This survey shows that cyprinids such as perch, roach, bream, roach-bream hybrids and pike all

appear to favour the warm water stretch downstream of the outfall. This increased concentration of coarse fish species has the potential to provide an increased localised feeding resource for otter.

Based on a review of the above findings, it is concluded that the cooling water outfall is not having a significant negative impact on the local fisheries ecology of the River Shannon or of Lough Ree downstream of Lanesborough Bridge.

It is also likely that localised increases in coarse fish numbers downstream of the cooling water outfall will be beneficial to the local otter population, as the local foraging resource will be increased.

- **Invasive species**

The exotic invasive species Zebra mussel and Asian clam are known to occur in the River Shannon in the proximity of Lanesborough. Trial dredging was carried out by Inland Fisheries Ireland (IFI) in 2015 to assess the feasibility of Asian clam eradication. The report from this trial recommends that a further extensive control programme would not be advisable. It stressed that any control programme would also increase the risk of spreading the clam to other catchments particularly in the absence of a safe disposal site in the locality. Strict bio-security conditions are currently in place for anglers who wish to fish in the outfall canal.

Otter occurs widely along the course of the River Shannon and around the shore of Lough Ree. The terrestrial surveys undertaken in the locality of LRP Station found positive signs of otter both upstream and downstream of the site. As a highly mobile species, otter would not be expected to be negatively impacted by any localised increases in water temperature associated with the cooling water discharge. Fisheries studies undertaken indicate that the River Shannon at this location comprises a wide diversity of cyprinid species in good numbers; these are likely to provide an excellent local foraging resource for otter. No negative impacts to otters are therefore envisaged.

Based on a review of the Synthesis Report and the known distribution and activity patterns of otter in the locality, it is not envisaged that the ongoing operation of the LRP Station cooling water discharge as currently operating is likely to be having a significant effect on the water-dependent qualifying interests of Lough Ree SAC.

The wintering bird species listed as SCIs for the Lough Ree SPA typically occur on the lake between October and March (peaking December-January), a period when average water levels can be expected to be elevated and average ambient water temperatures reduced. Consequently, the thermal assimilative capacity of the receiving water under such conditions is expected to be relatively large and as a result, influence on wintering bird populations is expected to be negligible. As previously noted, the cooling water discharge does not comprise any increased nutrient concentrations and consequently any effect on bird species feeding on the

aquatic and shoreline wetland habitats as a result of local trophic changes is not expected to occur.

With regards to the Special Conservation Interest bird species associated with Lough Ree SPA, the closest I-WeBS count sub-site is located at Ballyclare marina on the northern shore of the northern inlet bay, approximately 300 m southwest of LRP Station; I-WeBS data for this sub-site supplied by Birdwatch Ireland very small numbers of mallard, coot, moorhen and common gull, as well as a count of 22 whooper swans during the 2004/05 count; no such whooper swan observations featured in the 2014/15 count. Surveys undertaken by ESBI between 2016 and 2018 indicate that the closest significant wildfowl aggregation to the LRP Station is associated with a shallow bay in northern Lough Ree, between Cullighy and Ballyclare, 2 km to the west of the power station, on the far side of a low-lying peninsula. This area comprises a shallow bay with fringing reedbeds abutting wet grassland which also presents a muddy substrate during lower water levels. Observations from this bay are summarised in Table 6-2. Again, no whooper swans were observed in the northern inlet bay of Lough Ree during these surveys. Table 6-2: Wintering bird records associated with Cullighy Bay (ESBI surveys 2016-2018).

Survey date	Species	Count
8th December 2016	Lapwing	280
	Pochard	45
	Mallard	15
	Golden plover	150
	Teal	10
	Black-headed gull	4
27th January 2017	Lapwing	30
	Mallard	8
27th February 2017	Golden plover	85
	Mute swan	1
9th January 2018	Lapwing	120
	Golden Plover	65
	Mute swan	2
	Mallard	9

It is considered that the habitat associated with this bay will be unaffected by the the proposed development and that bird flocks occurring here would not be disturbed or displaced by the ongoing cooling water discharge; significant indirect impacts to the Special Conservation Interests of Lough Ree SPA are therefore also not predicted.

None of the terrestrial habitats or water-dependent species associated with the European Sites within the Zone of Influence of LRP Station are therefore considered likely to be significantly impacted as a result of the existing nature of the cooling water discharge.

The proposed amendment to Condition 5.5 of IE Licence P0610-02 (currently subject to the current IE Licence Review) will not result in any changes to the physical

parameters of the existing cooling water discharge; consequently, potential significant effects to Lough Ree SAC and SPA are not considered likely. No further assessment is deemed necessary with regard to the LRP Station cooling water discharge.

6.1.1.3 Other discharges

In addition to the cooling water outfall (SW1 Condenser Cooling Water), a number of other emission points exist on the LRP site (SW2 – SW6) which also discharge to the River Shannon; all of the site discharges are currently licensed under IE License P0610-02.

The potential for significant effects upon the aforementioned European Sites arising from operational discharges at LRP Station is uncertain in the absence of mitigation measures; such impacts and any associated mitigation must be further assessed in the Natura Impact Statement (see **Section 8**).

6.1.2 LRP ADF

6.1.2.1 Cell development and operational activities

There are no Natura 2000 sites in the immediate locality of the Derraghan ADF boundary. No direct impacts to such sites are therefore envisaged as a result of the ongoing operation and cell development at Derraghan ADF.

The proposed amendments to the IE Licence will not result in any additional impact arising from the current ADF site activities. Internal vehicle movement to facilitate deposition of ash in the ADF cells will continue at the current rate. Ash deposition will progressively occur within different parts of the overall ADF site boundary as cells are filled and capped.

Annex 1 bird species, which are Special Conservation Interests for a number of SPAs in the midlands, may occur outside the SPA boundaries and potentially transiently in the locality of the ADF. Wintering bird surveys undertaken on behalf of Bord na Móna for the Moundillon bog grouping (which comprises Derraghan bog) do not indicate the occurrence of any significant flocks of wintering Annex 1 bird species close to the ADF site. Wintering golden plover are known to occur regularly in the wider locality, roosting on bare peat fields (2014 / 15 records relate to the adjacent Derrycolumb and Derryadd Bogs). The development of the ADF will not impinge on such wintering flocks and the potential impact is considered to be imperceptible. Annex-1 listed birds of prey historically recorded within a 5 km radius of the site (peregrine falcon, merlin, hen harrier (winter)) are also not expected to be significantly impacted by the development and operation of the ADF cells and the associated change in habitat.

None of the European Sites within the Zone of Influence of LRP ADF are therefore considered likely to be significantly affected as a consequence of species disturbance during its continued operation and associated cell development; no further assessment is deemed necessary.

6.1.2.2 Discharges

Surface water currently discharges from the site via a main drain that leads to a Bord na Móna piped outfall to the south of the site; the development does not propose any change to this discharge location.

The existing drainage network at LRP ADF collects run-off migrating through the ash and discharges to the leachate lagoon on site. This leachate is used to wet the ash to prevent dust nuisance and help condition the ash.

All cells are capped within two years of completion and the capping of the cell with an impermeable liner will prevent the ingress of water thereby preventing the generation of further leachate once the cell has been capped. A leachate recirculation regime is utilised to deal with leachate generated on the site. No leachate is currently discharged from the ADF (the existing IPC licence issued by the EPA does not permit the discharge of any leachate to surface waters); it is not proposed to discharge any leachate as part of the proposed development.

Surface water runoff from the site discharges into the local peat bog drainage system network; passing through a number of silt ponds before discharging into the Newtown Flannigan River. With regard to water quality, this surface water discharge is not a significant concern, and it enters a wider drainage system that is joined by water from many other peat drains before it is pumped to any major natural watercourse. No indirect impacts to water quality in Derrymacar Lough or Lough Ree further downstream are envisaged from the ongoing operation of the ADF. Significant impacts to Lough Ree SAC and SPA are therefore not predicted to occur.

However, general operational activities at the ADF have the potential to release pollutants (e.g. fuel, oil) to the surface water catchment upstream of Lough Ree SAC and SPA.

The potential for significant effects upon the aforementioned European Sites arising from operational discharges at LRP ADF is therefore uncertain in the absence of mitigation measures; such impacts and any associated mitigation must be further assessed in the Natura Impact Statement (see Section 8).

6.1.2.3 Atmospheric emissions

With reference to potential air pollution, the peat ash is not a source of air emissions of sulphur, nitrogen or carbon oxides. Under certain conditions, transport and deposition of ash at the LRP ADF have the capacity to generate airborne dust. Deposition of ash on adjacent habitats is considered to be a potential impact, though the spatial extent of any effect is likely to be limited to European Sites comprising sensitive floral communities such as species-rich grasslands. There are no such sites within 5 km of the ADF. Potential significant effects to European Sites arising as a result of emissions from the ADF are therefore not considered likely and no further assessment is deemed necessary.

6.2 Indirect impacts

6.2.1 LRP Supply Bogs

Potential indirect impacts to European Sites occurring as a result of the ongoing extraction of peat from the respective LRP supply bogs are determined as:

- Hydrological impacts on Qualifying Interest or Special Conservation Interest habitats due to ongoing drainage required to facilitate peat harvesting activities.
- Impacts on water quality (due to silt and ammonia release to surface waters) arising as a result of peat harvesting activities.
- Under certain conditions, peat supply activities have the capacity to generate airborne dust. Harvesting is typically the stage wherein most dust is generated. Deposition of peat dust on adjacent sensitive habitats is considered to be a potential impact.

6.2.1.1 Disturbance to habitats (including hydrological effects)

The National Raised Bog SAC Management Plan 2017-2022 (DCHG 2017) notes that *“Quantifying the impacts of marginal drains on peat structure proves particularly important for Irish raised bogs as one of the principal threats to their ecology comes from marginal drainage associated with peat cutting. Basic engineering calculations (using the Dupuit-Forcheimer solution for unconfined systems (Forcheimer, 1898)) show that changes in water levels in peat (and the changes they cause to its thickness) depend on how deep a drain has cut into the bog margin. The impact of these changes becomes progressively less moving away from the drain. Critically water levels change by a fixed proportion for each interval of distance. For example, if the water level reaches back to half its original level over 20 m, it will be another quarter, or half of a half over the next 20 m.”* The plan proceeds to outline empirical data gathered from Fir Bog (part of Lough Ree SAC), which relates organic matter in peat to distance to the closest drain (as the main influence on the change in peat organic matter content is water level changes). It is worth noting that nearly all the data points presented by the model in DCHG (2017) show the majority of the impact relationship occurs within 100 m of the closest drain; a minimal level of impact was noted at a number of locations <10 m from the closest drain, though a very small proportion of data points noted a measureable impact between 150 m and 200 m from the nearest drain.

A 100 m external buffer from the IPC boundaries was utilised for this exercise, however, it should be noted that Bord na Móna have commenced investigations on a number of sites to determine appropriate buffers between designated sites and actual production area boundaries to mitigate against any potential dust and hydrology impacts. 100 m from the IPC boundary was considered to be an adequate buffer to appropriately capture sites where there is the potential for significant impacts, as actual production area boundaries generally have greater separation distance from designated sites when compared to IPC boundaries (harvesting of peat does not typically extend to the IPC boundaries as a result of practical constraints).

A GIS-based proximity analysis of European Sites within 100 m of the respective LRP supply bogs' IPC boundaries was therefore undertaken to inform this AA Screening; this is considered a highly conservative estimate of the extent of the respective active harvesting areas, within which the outermost harvesting drains would be located.

The following European Sites were identified by this 100 m buffer analysis:

- Lough Ree SAC
- Lough Ree SPA
- River Suck Callows SPA

The potential for significant effects upon the aforementioned European Sites is uncertain in the absence of mitigation measures; such impacts and any associated mitigation must be further assessed in the Natura Impact Statement (see Section 8).

Garriskil Bog SAC is located 200 m south of the Coolnagun supply bog; there is an intervening corridor of improved agricultural grassland which is transected by the Dublin to Sligo rail line. A review of aerial imagery of the site indicates that the outer 200 m periphery inside the northwestern boundary of the SAC comprises wet and rank grassland as well as scrub habitats. Consequently, the Qualifying Interest raised bog habitats of the SAC are approximately 400 m from the harvesting area associated with Coolnagun Bog. Given this separation distance and the intervening agricultural habitat and rail line, it is envisaged that potential hydrological impacts upon Garriskil Bog SAC are negligible and this European Site is therefore not considered further.

6.2.1.2 Disturbance to species

Activities associated with peat supply can generate noise via the operation of mobile machinery comprising harvesters, tractors and staff vehicles, as well as the operation of the narrow gauge railway network with associated small diesel locomotives and wagons.

While peat harvesting areas within the Bord na Móna estate are of low ecological value in general, they are known to support a number of Annex 1 bird species which are Special Conservation Interests of the Lough Ree SPA and River Suck Callows SPA, which are adjacent to active peat harvesting areas. Golden plover and lapwing may roost or rest on bare peat fields. Wintering flocks of whooper swan may occur on harvesting areas where there are temporary areas of standing water found in association with recolonizing surface vegetation upon which the flocks forage. These species may be locally displaced by human activity and noise generated by machinery at the respective supply bogs.

The potential for significant effects upon the European Sites is uncertain in the absence of mitigation measures; such impacts and any associated mitigation must be further assessed in the Natura Impact Statement (see Section 8).

6.2.1.3 Surface water discharges

Potential indirect impacts arising as a result of the ongoing peat harvesting at the respective supply bogs are related to ongoing drainage and discharges occurring at each bog.

The LRP supply bog estate is distributed over a number of river catchments; a GIS analysis was undertaken to identify these catchments and hydrological connectivity between the supply bogs and receiving waterbodies.

The majority of the bogs that supply LRP are located within water body catchment areas of Moderate / Poor Status. While there are a number of pressures affecting river water quality in this area, the Ireland River Basin Management Plan 2018 – 2021 notes that *“Peat extraction has been identified as causing a significant risk to ecological status in 119 water bodies, which represents 8% of all water bodies that have been identified as At Risk [...] Of these, 115 are rivers, 3 are lakes and 1 is groundwater. The environmental impacts generally relate to suspended solids, ammonia and hydromorphological alterations. There is evidence that high levels of ammonia are being released from peat-extraction activities during the draining process and, along with suspended solids, may be causing ecological impacts in receiving water bodies”*.

The majority of LRP peat supply bogs are located within the Shannon catchment; Bord na Móna owns 370 km² (18.5%) of peatlands in the this catchment. The remaining 1,630 km² of peatlands in the Shannon Catchment falls into the following categories:

- Peatlands used by commercial turf and peat producers
- Peatlands used for private turf production
- Virgin peatlands, some of which are designated sites

Of the 370 km² of peatlands owned by Bord na Móna in the Shannon Catchment, drainage is maintained by means of gravity and pumping, on 300 km² of peatlands. This represents 1.69% of the total land-use in the catchment.

Surface water discharges from the respective peat supply bogs occur directly to, or in the surface water catchments associated with the following European Sites:

- Lough Ree SAC
- Lough Ree SPA
- River Suck Callows SPA
- River Barrow and River Nore SAC
- River Boyne and River Blackwater SAC
- Lough Iron SPA
- Lough Derravaragh SPA

Peat extraction has the potential to release silt particles and aqueous ammonia to surface waters under typical rainfall conditions and drainage regimes; these inputs have the potential to negatively impact upon the ecology of receiving waterbodies as a consequence of increased turbidity, sediment deposition and chemical change.

The potential for significant effects upon the aforementioned European Sites is uncertain in the absence of mitigation measures; such impacts and any associated mitigation must be further assessed in the Natura Impact Statement (see Section 8).

6.2.1.4 Atmospheric emissions

Under certain conditions, peat supply activities have the capacity to generate airborne dust. Harvesting (3 to 5 contiguous days, recurring on average 12 times per annum), is typically the stage wherein most dust is generated. Deposition of peat dust on adjacent habitats is considered to be a potential impact, though the spatial extent of any effect is likely to be limited to European Sites comprising sensitive floral communities (such as species-rich grassland or orchid communities found on eskers) which are located directly adjacent to harvesting areas. While the impact pathway is different (airborne versus hydrological), it is considered that directly adjacent European Sites are captured by the 100 m buffer analysis outlined in Section 6.2.1.1. No European Sites with sensitive floral communities were identified in this buffer analysis. The closest such site to a supply bog is Split Hills and Long Hill Esker SAC, 1.2 km west of Toar Bog; as a consequence of prevailing winds and separation distance, no significant effects to the SAC as a consequence of dust transmission and deposition are considered likely.

6.3 In-combination effects

The potential cumulative impact of the proposed development in combination with other existing and/or approved developments in the area is considered below with the purpose of identifying the influence the proposed development will have on European Sites when considered cumulatively and in combination with relevant existing and/or approved projects.

6.3.1 Existing plans, projects and activities

The only potential source for in-combination ecological impacts arising in the immediate locality of LRP Station is the Ballyleague wastewater treatment plant (WWTP). This plant is located on the northwestern shore of the northern inlet bay of Lough Ree and discharges treated effluent via a 300 m outfall pipe to the south of Ballyleague marina. The WWTP was upgraded in 2012 with a design population equivalent of 3200. The waste water treatment plant operates the activated sludge process. In order to achieve a final effluent total phosphorus level of 2 mg/l the plant includes chemical phosphorous removal. In addition, nitrification/denitrification facilities are in place which incorporates an anoxic element with supernatant return in order to attain nitrogen standards. The WWTP was subject to Appropriate Assessment in 2015 as part of its Waste Water Discharge License (WWDL) application (Ref: D0229-01) and currently discharges a high quality effluent. The Natura Impact Statement for the WWTP concludes that there will be no significant adverse effects on the integrity of Lough Ree SAC and SPA in view of these sites'

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 the WWTP discharge either directly, indirectly or cumulatively.

The NPWS site synopsis for the Lough Ree SAC notes that “*Land uses within the site include recreation in the form of cruiser hire, angling, camping, picnicking and shooting. Chalet accommodation occurs at a few locations around the lake. Low-intensity grazing occurs on dry and wet grassland around the shore, and some hay is made within the site. Some of these activities are damaging, but in a very localised way, and require careful planning. The main threat to the aquatic life in the lake comes from artificial enrichment of the waters by agricultural and domestic waste*”.

Siltation arising from peat silt entering the system is also noted as a pressure. Several of the bogs which supply fuel peat to LRP Station also supply the other ESB-owned midland power station at Shannonbridge (West Offaly Power (WOP) station), which also receives peat exclusively from a number of other supply bogs in the region. The Bord na Móna-owned Edenderry Power Limited (EPL) power station is also supplied by Bord na Móna bogs, predominantly in the east midlands. Bord na Móna also harvests peat for other end uses (e.g. horticulture) on a suite of sites around the midlands, within the same surface water catchments as the WOP supply bogs. These other bogs are also subject to IPC licencing and associated conditioned water quality protection measures.

WOP Station also discharges cooling water to the River Shannon at Shannonbridge, approximately 50 km downstream of LRP Station; there is no spatial overlap in the thermal influence of the discharges of WOP and LRP Stations. EPL station discharges a combined wastewater stream (including cooling water) through a settlement lagoon to the Figle River, a tributary of the River Barrow. Consequently both WOP and EPL station are considered to be outside the potential Zone of Influence of LRP Station and in-combination effects arising from the operation of the respective power stations are therefore ruled out on the basis of physical separation and absence of hydrological connections.

Third-party harvesting of peat also occurs on bogs throughout the midlands, ranging from small scale turbary for domestic fuel to commercial scale peat removal for horticultural purposes. Several of these are located in close proximity to Bord na Móna properties and drains from these sites discharge to the same receiving waterbodies via sediment control systems of varying scales.

6.3.2 Proposed plans and activities

To address possible in-combination effects from future developments within a 15 km radius of LRP Station and ADF, a search was undertaken for planning applications within this radius. This was completed to ensure that all projects which have secured approval/planning permission but which may not yet have been constructed were identified and included in the assessment for in-combination effects. To fully consider in-combination effects with the potential indirect impacts associated with the supply of peat to LRP Station, this search was extended to cover a 15 km radius from the

LRP supply bog estate. This relates to an area encompassing parts of several midland counties, namely Longford, Cavan, Offaly, Galway, Roscommon, Leitrim Westmeath, Laois, Kildare and Meath.

Strategic infrastructure projects were considered relevant as these tend to be significant developments whose applications are generally accompanied by an environmental impact statement. In the case of the planning applications submitted to the Local Authorities (in their role as Planning Authorities), the screening criteria for plans and projects to have the potential for significant effects were those where either an Environmental Impact Statement and / or a Natura Impact Statement were prepared. In the case of planning applications, all planning permissions granted within the relevant Local Authority areas within the last 5 years and which met the screening criteria described above were assessed.

From the long list of permissions granted (including appealed permissions), the applications were initially screened to remove small residential or agricultural permissions which were considered to be minor in scale to the extent that no significant in-combination effect was deemed likely to arise. The remaining permissions were compiled and classified according to the nature of the development.

Based on a review of the feasible impact pathways associated with activities at LRP Station, ADF and respective supply bogs, the aforementioned planning application shortlist was subsequently reviewed for any proposed developments with potential impacts with the capacity to interact with the identified impacts of the proposed development (e.g. as a consequence of their immediate proximity to LRP Station, ADF or peat supply bogs due to spatial proximity or via hydrological interactions as a result of discharges or drainage). These projects are presented in **Table 6-3**.

Table 6-3: Potential in-combination projects

Development name, location and description	Nature of potential interaction	Assessment of potential interaction
Lough Ree Power Transition to Biomass, Lanesborough, Co. Longford (In Planning)	Proposal relates to developments within LRP Station and ADF sites	The Electricity Supply Board (ESB) intends to apply for planning permission for development at the existing LRP Station. The proposed development will enable the continued operation of LRP Station and the associated ADF; and the phased transition of LRP Station from being fuelled by peat, to biomass. The development will consist of: <ul style="list-style-type: none"> - continue operating LRP Station and the associated ADF (including utilising all permitted landfill capacity at that site) after the permitted end date of 31st December 2020;

Development name, location and description	Nature of potential interaction	Assessment of potential interaction
		<ul style="list-style-type: none"> - transition the station from peat to biomass, reducing the volume of peat by at least 40% (of current levels) from early 2020 (subject to consent of planning permission) and progressively replacing peat with biomass, until the end of 2027 after which the Station will be fuelled by biomass only; - develop fuel management and handling facilities at LRP Station (necessitating site clearance and development works including minor demolition works); - develop additional landfill capacity at the existing ADF to facilitate the disposal an additional c.706,360 tonnes of ash. <p>A Natura Impact Statement was submitted as part of the planning application which considered the potential impacts of the construction of the associated biomass infrastructure at the LRP site and the potential impacts of the ongoing operation of LRP Station, the latter remaining functionally the same as is currently the case at the site with regards to discharges and emissions. The NIS concluded no significant impacts to any European Site, direct, indirect or in-combination.</p>
<p>Derryadd Wind Farm, Derryadd, Co. Longford</p> <p>ABP Ref. PL14.303592</p> <p>(In Planning)</p>	<p>Close spatial proximity to LRP ADF and possible temporal overlap in construction and operational activities</p>	<p>Bord na Móna have submitted a planning application to ABP for a wind farm comprising 24 No. turbines located at the Moundillon bog grouping in Co. Longford (ABP Ref: PL14.303592), referred to as 'Derryadd Wind Farm'. There is potential for the construction and operation of the wind farm to temporally overlap with the construction and operational phases of the proposed LRP development. The southwestern boundary of the wind farm is located approximately 500 m from the ADF; there is no spatial overlap between the wind farm and LRP development proposals. The proposed wind farm has been subject to extensive ecological studies (including 4 years of ornithological studies) to inform the EIAR and NIS submitted with the planning</p>

Development name, location and description	Nature of potential interaction	Assessment of potential interaction
		application. The EIAR and NIS comprise a comprehensive suite of mitigation measures and both conclude no significant impacts to ecological receptors. Impacts arising from the proposed development at LRP Station and the ADF, cumulatively with the Derryadd wind farm development are considered to be negligible.
Residential development, Lanesborough, Co. Longford. Planning Ref: PL.18/241	Close spatial proximity to LRP Station and overlap of construction activities with station operation	This comprises a small development of 8 semi-detached houses on a partially developed site adjacent to the southern boundary of LRP Station. The development will connect to the existing Lanesborough wastewater collection network and subsequently to the Ballykeane WWTP. No significant in-combination effects are predicted.
Post Office redevelopment, Lanesborough, Co. Longford Planning Ref: PL.16/256	Close spatial proximity to LRP Station and overlap of construction activities with station operation	This project comprises the redevelopment of an existing building into a distillery and visitor centre with ancillary development. Works to facilitate this will be immediately adjacent to the northern boundary of the Lough Ree SAC/SPA. Works on the site are expected to be complete by late Autumn 2019; it is not envisaged there will be any temporal overlap in works. The site will incorporate a surface drainage network (with oil interceptor) which will connect to the existing Lanesborough drainage network. No process effluent from the operational distillery will discharge directly to Lough Ree. No significant in-combination effects are predicted.
Center Parcs holiday village, Newcastle woods, Ballymahon, Co. Longford Planning Ref: PL.15/174, ABP Ref. PL14.246336	Overlap of construction activities with station operation	This holiday resort development approximately 20 km southeast of Lanesborough is already well-advanced through the construction phase, with completion expected in summer 2019. No significant in-combination effects are predicted.
A biomass processing combined heat	In same hydrological catchment as Ballybeg supply bog	Environmental Impact Report submitted as part of original planning application concludes no impacts to ecology and notes

Development name, location and description	Nature of potential interaction	Assessment of potential interaction
<p>and power (CHP) facility, Rhode, Co. Offaly</p> <p>Planning Ref: 9537 (Planning extension on 2010 approval submitted in 2015)</p>		<p>environmental control measures to downstream discharges to mitigate against aquatic impacts.</p> <p>Given the absence of any impacts arising therefrom, no in-combination impacts with the proposed LRP operation and developments or peat supply are predicted.</p>
<p>Yellow River Wind Farm, Rhode, Co. Offaly</p> <p>Wind farm comprising 29 turbines.</p> <p>Planning Ref: ABP PA0032</p>	<p>In same hydrological catchment as Ballybeg supply bog</p>	<p>An AA Screening was carried out as part of the wind farm planning application which concluded no significant impacts to any European Site, direct, indirect or in-combination.</p> <p>Given the absence of any impacts arising therefrom, no in-combination impacts with the proposed LRP operation and developments or peat supply are predicted.</p>
<p>Clooncreen Wind Farm, Co. Offaly</p> <p>Wind farm comprising 29 turbines.</p> <p>Planning Ref: ABP PA0047</p>	<p>Spatial proximity to Esker supply bog</p>	<p>A Natura Impact Statement was submitted as part of the wind farm planning application which concluded no significant impacts to any European Site, direct, indirect or in-combination.</p> <p>Given the absence of any impacts arising therefrom, no in-combination impacts with the proposed LRP operation and developments or peat supply are predicted.</p>
<p>Quarry (sand and gravel), Derryarkin, Co. Offaly</p> <p>Planning Ref: 1849</p>	<p>Spatial proximity to Drumman supply bog</p>	<p>An AA Screening was carried out as part of the landfill planning application which concluded no significant impacts to any European Site, direct, indirect or in-combination.</p> <p>Given the absence of any impacts arising therefrom, no in-combination impacts with the proposed LRP operation and developments or peat supply are predicted.</p>

Development name, location and description	Nature of potential interaction	Assessment of potential interaction
100MW gas fired power plant, Monksland, Athlone, Co. Roscommon Planning Ref: 18256	Spatial proximity to River Shannon (plant will not result in any discharges to River Shannon).	<p>An AA Screening was carried out as part of the power plant planning application which concluded no significant impacts to any European Site, direct, indirect or in-combination.</p> <p>Given the absence of any impacts arising therefrom, no in-combination impacts with the proposed LRP operation and developments or peat supply are predicted.</p>

This project screening process concluded that there were no other proposed projects in the identified Zone of Influence with the potential to interact to a sufficient degree with the proposed development (as a consequence of an absence of interaction pathways or the absence of impacts from the identified projects within the Zone of Influence) that could significantly impact upon any European Site.

A number of strategic and local plans are currently in operation with the potential to influence the significance of the potential impacts of the proposed development, including:

- National Raised Bog Special Areas of Conservation Management Plan 2017 - 2022 (DCHG 2017)
- National Peatlands Strategy (NPWS 2015)
- River Basin Management Plan for Ireland 2018-2021 (DHPLG 2018)
- Biodiversity Action Plan 2016 - 2021 (Bord na Móna 2016)
- National Biodiversity Plan 2017 – 2021 (NPWS 2017)
- Supply bog rehabilitation plans (Bord na Móna, Draft)
- Forestry Programme 2014 – 2020 (Department of Agriculture 2015)
- National Mitigation Plan (Department of Communications, Climate Action and Environment 2017)
- Respective Local Authority Development Plans

7 Screening statement and conclusion

This screening process has examined the details of the proposed development and has considered the risk and significance of potential impacts to European Sites in the Zone of Influence.

The assessment has determined that significant effects on European Sites, as a result of the ongoing operation of the cooling water discharge from LRP Station are not predicted. However the potential for significant effects arising from other

discharges from the station and ADF during the respective operational phases in the absence of mitigation is unclear and these aspects require further assessment.

The assessment has also determined that the potential for significant effects on a number of European Sites arising from the ongoing harvesting and supply of peat to LRP Station until the end of 2020, individually or in combination with other plans or projects, in the absence of mitigation, cannot be excluded.

The assessment is summarised in the Appropriate Assessment Screening matrix presented in

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Table 7-1. As a consequence, an Appropriate Assessment under the Habitats Directive is required for the IE Licence Review (including continued operation), to include the harvesting and supply of peat during this transition period. A Natura Impact Statement to inform the AA to be undertaken by the Competent Authority (EPA) is therefore presented in Section 8.

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Table 7-1: Appropriate Assessment Screening Matrix

Appropriate Assessment Screening Matrix		
Project / Plan	Brief description of the project or plan	<p>The Existing Development related to IE Licence Activity 1</p> <p>The primary IE licence activity at the site is as follows:</p> <p style="padding-left: 40px;">Combustion of fuels in installations with as total rated thermal input of 50MW or more.</p> <p style="padding-left: 40px;">The production of energy in combustion plant the rated thermal input of which is equal to or greater than 50MW,</p> <p>The power station covers approximately 36 hectares (ha) and is adjacent to the site of former Lanesborough Generating Station, which operated as a peat burning power station from the early-1960s until its closure in 2004. The station comprises a single boiler/turbine unit with an electrical output of 100 MW Peat Supply to LRP Station</p> <p>The peat that fuels the LRP is harvested by Bord na Móna at a number of supply bogs. These activities are regulated by the EPA under Industrial Pollution Control (IPC) Licence Registration Numbers P0501-01 (Derrygreenagh Group), P0502-01 (Blackwater Group), P0503-01 (Allen Group) and P0504-01 (Mountdillon Group). It is noted that many private operators also operate within the same area as Bord na Móna, however, their peat harvesting activities are generally not licensed by the EPA.</p> <p>No physical or operational changes are proposed to the LRP station site or its licence activity under this IE licence review.</p> <p>Requested Condition change to Condition 5.5 related to IE Activity 1</p> <p>Lough Ree Power was designed to operate with a once through cooling water systems with abstraction from and discharge to the river Shannon under P0610-02. This cooling water discharge is conditioned under condition 5.5 as follows:</p>

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Discharges from the installation shall not artificially increase the ambient temperature of the receiving water by more than 1.5C outside the mixing zone. In relation to temperature , the mixing zone shall not exceed 25% of the cross sectional areas of the river at any point.

At the time of submission of the original IE Licence review application a technical amendment request was ongoing in relation to Condition 5.5 of the current LRP IE Licence. This technical amendment request was subsequently been withdrawn and the proposedan alteration to Condition 5.5 has now been proposed under this IE Licence review application. The proposed Ccondition 5.5 is as follows;

Discharges from the installation shall not artificially increase the ambient temperature of the receiving water by more than 1.50C outside the mixing zone. In relation to temperature, the mixing zone shall not exceed 25% of the cross sectional area of the river at any point where such exceedances would result in contravention of the EPA Act and in particular cause significant environmental pollution to the receiving waters.

No physical or operational changes are proposed to the LRP station site or its licence activity under this requested change of Condition 5.5.

1.4.5 The Proposed Development related to IE Licence Site Activity 2

The other licence activity related to the LRP station at the site is as follows:

Landfills, within the meaning of section 5 (amended by Regulation 11(1) of the Waste Management (Certification of Historic Unlicensed Waste Disposal and Recovery Activity) Regulations 2008 (S.I. No. 524 of 2008)) of the Act of 1996, receiving more than 10 tonnes of waste per day or with a total capacity exceeding 25,000 tonnes, other than landfills of inert waste.

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		<p>the recovery or disposal of waste in a facility, within the meaning of the Waste Management Act, 1996, which facility is connected or associated with another activity specified in this Schedule in respect of which a licence or revised licence under Part IV is in force or in respect of which a licence under the said Part is or will be required,</p> <p>It is proposed to increase the capacity of the existing ADF and facilitate the disposal of an additional 130,000 tonnes of peat ash. This proposed increase received planning permission in March 2018 and was subject of an EIAR.</p> <p>The ash will be disposed of in cells that lie within the permitted landfill footprint – completing Cell 8 and within the permitted Cells 9 and 12, all of which are clearly shown on the original planning application drawings. The development of these cells is permitted under the existing planning permission, and were subject of EIA at the time permission was granted. This application simply seeks permission for the additional quantities of ash to be accepted into the site and disposed of within these cells.</p> <p>The requirement for additional ash disposal capacity arose in 2018 when the permitted 550,000 tonnes was reached. As the IE licence review process is ongoing a Technical Amendment was sought and approved (Technical Amendment C to P0610-02) by the EPA to allow the temporary storage of ash at the ADF.</p> <p>The disposal activity will take place in accordance with the current planning permission over approximately 30 months ceasing at the end of 2020 - a duration that is in-line with the overall parent permission for the LRP Station. No other works are required to facilitate the acceptance of the additional ash, as all ancillary developments – the access road, entrance etc. will continue to operate as permitted by that parent permission.</p>
<p>European Site under Consideration</p>	<p>Brief description of the European Site(s)</p>	<ul style="list-style-type: none"> • Lough Ree SAC • Lough Ree SPA • River Suck Callows SPA

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		<ul style="list-style-type: none"> • Garriskil Bog SAC • Garriskil Bog SPA • Ballykenny-Fisherstown Bog SPA • Lough Forbes Complex SAC • Lough Kinale and Derragh Lough SPA • Clooneen Bog SAC • Lough Derravaragh SPA • Corbo Bog SAC • Brown Bog SAC • Derragh Bog SAC • Raheenmore Bog SAC • River Boyne And River Blackwater SAC • River Boyne and River Blackwater SPA • Split Hills And Long Hill Esker SAC • Fortwilliam Turlough SAC • Mount Jessop Bog SAC • Killeglan Grassland SAC • Moneybeg And Clareisland Bogs SAC • Four Roads Turlough SAC • Four Roads Turlough SPA • Lough Sheelin SPA • Mount Hevey Bog SAC • Ballygar (Aghrane) Bog SAC • Lough Iron SPA • Aughrim (Aghrane) Bog SAC • Ardagullion Bog SAC • Lough Croan Turlough SPA • Lough Croan Turlough SAC • Lough Owel SAC • Lough Owel SPA • Lisduff Turlough SAC • Castlesampson Esker SAC • Lough Ennell SAC • Carrownagappul Bog SAC • River Barrow And River Nore SAC • Glen Lough SPA • Lough Ennell SPA • Ballynamona Bog And Corkip Lough SAC • The Long Derries, Edenderry SAC • Scragh Bog SAC • Annaghmore Lough (Roscommon) SAC • Curraglehanagh Bog SAC • Ballinturly Turlough SAC • Glenloughaun Esker SAC
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		<ul style="list-style-type: none"> • Camderry Bog SAC • Lough Lene SAC • Wooddown Bog SAC • Lough Funshinagh SAC • White Lough, Ben Loughs And Lough Doo SAC • Mountmellick SAC • Charleville Wood SAC • Shankill West Bog SAC • Clara Bog SAC • Girley (Drewstown) Bog SAC • Lough Bane And Lough Glass SAC • Lough Lurgeen Bog/Glenamaddy Turlough SAC • Carn Park Bog SAC • Ballymore Fen SAC • Slieve Bloom Mountains SPA • River Shannon Callows SAC • Middle Shannon Callows SPA
<p>Assessment Criteria</p>	<p>Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site</p> <p>Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of:</p> <ul style="list-style-type: none"> • Size and scale • Land-take • Distance from the European Site or key features of the site • Resource requirements 	<p>The ongoing operation of the cooling water discharge from LRP Station is not expected likely to give rise to significant impacts to any European Sites.</p> <p>Other discharges from the LRP Station and ADF sites (controlled or accidental) have the potential to cause indirect impacts to European Sites.</p> <p>The harvesting and supply of peat to fuel LRP Station has the potential to cause indirect impacts to European Sites.</p> <ul style="list-style-type: none"> • Release of polluting material from LRP Station and ADF sites to surface waters during operational activities. • Impacts to European Sites may arise as a result of the peat extraction requirements to supply peat fuel to LRP Station. Impacts which may occur by virtue of the proximity and footprint of the respective harvesting areas to European Sites are as follows: <ul style="list-style-type: none"> ○ Excavation of peat may lead to hydrological impacts on adjacent habitats within European Sites. ○ Emissions to surface waters from supply bogs may lead to impacts on water quality.

	<ul style="list-style-type: none"> • Emissions • Excavation requirements (e.g. impacts of local hydrogeology) • Transportation requirements • Duration of construction, operation etc. 	<ul style="list-style-type: none"> ○ Dust generated during peat harvesting may be deposited inside adjacent European Sites.
	<p>Describe any likely changes to the site arising as a result of:</p> <ul style="list-style-type: none"> • Reduction of habitat area • Disturbance to key species • Habitat or species fragmentation • Reduction in species density • Changes in key indicators of conservation value (e.g. water quality, etc.) 	<p>There is the potential for pollution of surface waterbodies to occur during the operational phase of LRP Station and ADF. Potential sources of sediment and/or polluting substances relate to:</p> <ul style="list-style-type: none"> • Accidental spillage of anthropogenic polluting substances in or adjacent to waterbodies and drainage networks associated with LRP Station and ADF. <p>Significant indirect effects to water quality in receiving waterbodies associated with the following European Sites arising as a result of operational activities at LRP Station and ADF have the potential to occur in the absence of mitigation:</p> <ul style="list-style-type: none"> • Lough Ree SAC • Lough Ree SPA <p>Peat extraction has the potential to release silt particles and aqueous ammonia to surface waters under typical rainfall conditions and drainage regimes; these inputs have the potential to negatively impact upon the ecology of receiving waterbodies as a consequence of increased turbidity, sediment deposition and chemical change. Significant indirect effects to water quality in receiving waterbodies associated with the following European Sites arising as a result of peat harvesting activities have the potential to occur in the absence of mitigation:</p> <ul style="list-style-type: none"> • Lough Ree SAC • Lough Ree SPA • River Barrow and River Nore SAC • River Boyne and River Blackwater SAC • River Boyne and River Blackwater SPA

		<ul style="list-style-type: none"> • Lough Derravaragh SPA • Lough Iron SPA <p>Peat harvesting activities require ongoing drainage of peat supply bogs. Indirect impacts upon habitats within the following European Sites arising as a result of ongoing drainage have the potential to occur in the absence of mitigation:</p> <ul style="list-style-type: none"> • River Suck Callows SPA
	<p>Describe any likely impacts on the European Site as a whole in terms of:</p> <ul style="list-style-type: none"> • Interference with the key relationships that define the structure of the site • Interference with key relationships that define the function of the site 	<p>In the absence of mitigation, emissions to surface water from the respective supply bogs may interfere with trophic pathways and physical parameters in the waterbodies associated with the various European Sites; this is a consequence of increased turbidity, sediment deposition and chemical change.</p>
	<p>Provide indicators of significance as a result of the identification of impacts set out above in terms of:</p> <ul style="list-style-type: none"> • Reduction of habitat area • Disturbance to key species • Habitat or species fragmentation • Loss • Change to key elements of the site (e.g. water quality, hydrological regime, etc) 	<ul style="list-style-type: none"> • Ecological status of receiving waters of European Sites. • Hydrological status of habitats of European Sites, measureable by changes in associated plant communities or species usage.
	<p>Describe from the above those elements of the project, or combination of elements, where the</p>	<ul style="list-style-type: none"> • Impacts to water quality as a result of operational activities • Impacts to water quality as a result of bog discharges

	above impacts are likely to be significant or where the scale or magnitude of impacts is not known.	<ul style="list-style-type: none"> Impacts to habitats as a result of bog drainage
Conclusion	European Sites where significant impacts are considered likely in the absence of mitigation (Refer to Section 8 - Natura Impact Statement)	<ul style="list-style-type: none"> Lough Ree SAC Lough Ree SPA River Barrow and River Nore SAC River Boyne and River Blackwater SAC River Boyne and River Blackwater SPA Lough Iron SPA Lough Derravaragh SPA River Suck Callows SPA
	European Sites where significant impacts are not considered likely (Refer to Tables 5-1 and 5-2 for rationale for screening out of impacts (e.g. lack of source-receptor pathways, separation distance, dilution factors)).	<ul style="list-style-type: none"> Garriskil Bog SAC Garriskil Bog SPA Ballykenny-Fisherstown Bog SPA Lough Forbes Complex SAC Lough Kinale and Derragh Lough SPA Clooneen Bog SAC Corbo Bog SAC Brown Bog SAC Derragh Bog SAC Raheenmore Bog SAC River Boyne and River Blackwater SPA Split Hills And Long Hill Esker SAC Fortwilliam Turlough SAC Mount Jessop Bog SAC Killeglan Grassland SAC Moneybeg And Clareisland Bogs SAC Four Roads Turlough SAC Four Roads Turlough SPA Lough Sheelin SPA Mount Hevey Bog SAC Ballygar (Aghrane) Bog SAC Aughrim (Aghrane) Bog SAC Ardagullion Bog SAC Lough Croan Turlough SPA Lough Croan Turlough SAC Lough Owel SAC Lough Owel SPA Lisduff Turlough SAC Castlesampson Esker SAC Lough Ennell SAC Carrownagappul Bog SAC Glen Lough SPA Lough Ennell SPA Ballynamona Bog And Corkip Lough SAC The Long Derries, Edenderry SAC

	<ul style="list-style-type: none">• Scragh Bog SAC• Annaghmore Lough (Roscommon) SAC• Curraglehanagh Bog SAC• Ballinturly Turlough SAC• Glenloughaun Esker SAC• Camderry Bog SAC• Lough Lene SAC• Wooddown Bog SAC• Lough Funshinagh SAC• White Lough, Ben Loughs And Lough Doo SAC• Mountmellick SAC• Charleville Wood SAC• Shankill West Bog SAC• Clara Bog SAC• Girley (Drewstown) Bog SAC• Lough Bane And Lough Glass SAC• Lough Lurgeen Bog/Glenamaddy Turlough SAC• Carn Park Bog SAC• Ballymore Fen SAC• Slieve Bloom Mountains SPA• River Shannon Callows SAC• Middle Shannon Callows SPA
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8 Natura Impact Statement

This Natura Impact Statement (NIS) considers any adverse impacts that the proposed development may have on the integrity of the following European Sites:

- Lough Ree SAC
- Lough Ree SPA
- River Suck Callows SPA
- River Barrow and River Nore SAC
- River Boyne and River Blackwater SAC
- River Boyne and River Blackwater SPA
- Lough Iron SPA
- Lough Derravaragh SPA

The most recently updated site synopses and conservation objectives documents have been sourced from the NPWS website.

This NIS presents a scientific examination of the proposed development in the context of any relevant European Site(s) and associated qualifying interests and conservation objectives. The purpose of this scientific examination is to identify and characterise any possible impact the proposed development may have (individually or in combination with other plans and projects) on the qualifying interests of the European Site(s), and to identify and detail any proposed mitigation measures to avoid, reduce or offset the risk of these impacts.

When describing changes/activities and impacts on ecosystem structure and function, the types of impacts that are commonly presented are;

- direct and indirect effects,
- short and long-term effects,
- construction, operational and decommissioning effects, and
- isolated, interactive and cumulative effects.

Impacts that could potentially occur through the implementation of the project can be categorised under a number of impact categories as follows:

- Loss/Reduction of habitat area,
- Disturbance to key species,
- Habitat or species fragmentation,
- Reduction in species density, and
- Changes in key indicators of conservation value such as decrease in water quality and quantity.

EC (2000) defines European Site integrity as follows; 'The integrity of a site involves its ecological functions. The decision as to whether it is adversely affected should focus on and be limited to the site's conservation objectives'.

The precautionary principle is detailed in Article 191 of the *Treaty on the Functioning of the European Union*. It aims at ensuring a higher level of environmental protection through preventative decision-taking in the case of risk and underpins the Habitats Directive (DoEHLG 2010). The precautionary principle is the underlying concept of

sustainable development which implies that prudent action be taken to protect the environment even in the absence of scientific certainty (DoEHLG 2010).

8.1 Lough Ree SAC

The AA Screening for the proposed development identified potential pathways to impact upon the Lough Ree SAC. LRP Station, ADF and the respective peat supply bogs feature discharges to surface water upstream of the SAC. Potential impacts on the respective Qualifying Interests may arise as a result of:

- Discharges to surface waters from LRP Station and ADF leading to impacts on water quality in the Lough Ree SAC.
- Emissions to surface waters from supply bogs leading to impacts on water quality in the Lough Ree SAC.

The conservation objectives document for this SAC of this designated site presents specific targets and attributes for the respective Qualifying Interests. Table 8-1 highlights the Qualifying Interests occurring in the potential Zone of Influence for which the above impact pathways may result in adverse effects.

Table 8-1: SAC Qualifying Interests and Potential Impact Pathways

QI	Assessment of Pathway for Effects
Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	Potential impacts on this species may arise from aquatic discharges from LRP Station, ADF and peat supply bogs within the Lough Ree catchment. The potential for adverse effects on these species is considered further in this document.
Lutra lutra (Otter)	Potential impacts on this species may arise from aquatic discharges from LRP Station, ADF and peat supply bogs within the Lough Ree catchment. The potential for adverse effects on these species is considered further in this document.

8.1.1 Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation

The Status of EU Protected Habitats and Species in Ireland (NPWS 2013), outlines the following summary of this habitat:

Natural eutrophic lakes with Magnopotamion or Hydrocharition — type vegetation occurs in lowland, base-rich lakes in the midlands and north east of Ireland. The habitat is generally associated with large lakes, such as those of the Shannon system, and with small, but naturally productive lakes, such as those found in parts of the drumlin-belt of Cavan, Monaghan and Leitrim or the lowlands south east of the Burren. The name of this habitat (“eutrophic”) has caused some confusion and discomfiture with freshwater ecologists specialising in water quality. Ireland does not have significant phosphorus-rich deposits, hence there are few, if any, lakes that can be characterised as naturally “eutrophic” in line with the standard OECD approach of using total phosphorus and chlorophyll a concentrations, and water transparency (OECD, 1982). It is possible that naturally eutrophic conditions do exist in some coastal freshwater lakes (these could perhaps be considered the ‘freshwater extreme’ of the coastal lagoon habitat), however such sites require further investigation. While further study of the habitat is required, it seems certain that the pondweed-rich variant found in Ireland requires mesotrophic waters, as defined by the OECD methods. 3150 lakes typically have well-developed reedswamp, fen and/or marsh communities around much of their shoreline. Wet woodland would have surrounded much of their shoreline in the past and has survived or re-colonised patches of many 3150 lake shores. Lakes with habitat 3150 are associated with catchments dominated by mineral soils and, hence, some of the most intensive agricultural lands in Ireland. Consequently, the habitat has been under significant pressure from eutrophication since the 1970s or before.

The range of this habitat in Ireland has been assessed as *Favourable* and the area assessed as *Favourable*. The specific structures and functions as well as its future prospects have both been assessed as *Inadequate (Stable)*. The overall assessment of conservation status is *Inadequate (trend stable)*.

The pressures and threats (National level) relating to this species, as identified in NPWS (2013) are as follows:

- Diffuse pollution to surface waters due to agricultural and forestry activities - high importance
- Pollution to surface waters by industrial plants - high importance
- Other point source pollution to surface water - medium importance
- Diffuse pollution to surface waters due to household sewage and waste waters - medium importance
- Diffuse pollution to surface waters due to other sources not listed - medium importance
- Water abstractions from groundwater - low importance
- Diffuse pollution to surface waters via storm overflows or urban run-off - low importance
- Surface water abstractions for public water supply - low importance
- Other major surface water abstractions - low importance
- Surface water abstractions for agriculture - low importance
- Mechanical removal of peat - low importance
- Invasive non-native species – low importance

Based on a review of the above threats and pressures, emissions to surface waters leading to pollution within or upstream of Lough Ree SAC have the potential to affect this habitat.

Table 8-2: Impact Assessment in relation to Attributes and Targets of Conservation Objectives (based on Lower River Shannon SAC)

Attribute	Target	Assessment
Habitat area	Area stable or increasing, subject to natural processes	There will be no direct land take or infilling of the aquatic habitats arising from operational activities at LRP Station under the proposed alteration to Condition 5.5 or expansion in capacity at the ADF. This is also the case for the respective peat supply bogs.
Habitat distribution	No decline, subject to natural processes	Release of pollutants to surface water (e.g. fuel spills or elevated pH discharges) from LRP Station or ADF may impact upon water quality, which indirectly may adversely influence aquatic species occurrence, distribution and composition.
Typical species	Typical species present, in good condition, and demonstrating typical abundances and distribution	
Vegetation composition: characteristic zonation	All characteristic zones should be present, correctly distributed and in good condition	Input of peat silt from supply bogs has the potential to reduce light penetration and increase organic content within the water column; this may adversely influence aquatic species occurrence, distribution and composition.
Vegetation distribution: maximum depth	Maintain maximum depth of vegetation, subject to natural processes	
Hydrological regime: water level fluctuations	Maintain appropriate natural hydrological regime necessary to support the habitat	There will be no change to the hydrological regime of Lough Ree arising from operational activities at LRP Station or ADF. This is also the case for the respective peat supply bogs.
Lake substratum quality	Maintain appropriate substratum type, extent and chemistry to support the vegetation	Input of peat silt from supply bogs has the potential to change lake substratum as consequence of sediment deposition; this may adversely influence lake substratum quality.
Water quality: transparency	Maintain/restore appropriate Secchi transparency. There should be no decline in Secchi depth/transparency	Input of peat silt from supply bogs has the potential to reduce light penetration and increase organic content within the water

Attribute	Target	Assessment
		column; this may adversely influence transparency of the water column.
Water quality: nutrients	Maintain the concentration of nutrients in the water column to sufficiently low levels to support the habitat and its typical species	Input of peat silt from supply bogs has the potential to increase ammonia concentrations within the water column; this may adversely influence the nutrient status of the water column.
Water quality: phytoplankton biomass	Maintain appropriate water quality to support the habitat, including good chlorophyll a status	Input of peat silt from supply bogs has the potential to reduce light penetration and increase organic content within the water column; this may influence transparency of the water column which in turn may adversely affect the status of phytoplankton, alga and macrophytes associated with Lough Ree.
Water quality: phytoplankton composition	Maintain appropriate water quality to support the habitat, including good phytoplankton composition status	
Water quality: attached algal biomass	Maintain trace/absent attached algal biomass (<5% cover) and good phytobenthos status	
Water quality: macrophyte status	Restore good macrophyte status	
Acidification status	Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the habitat, subject to natural processes	
Water colour	Maintain appropriate water colour to support the habitat	Input of peat silt from supply bogs has the potential to reduce light penetration and increase organic content within the water column; this may adversely influence observed colour of the water column.
Dissolved organic carbon (DOC)	Maintain appropriate organic carbon levels to support the habitat	Input of peat silt from supply bogs has the potential to increase organic content within the water column; this may adversely influence the nutrient status of the water column.
Turbidity	Maintain appropriate turbidity to support the habitat	Input of peat silt from supply bogs has the potential to reduce light penetration and increase organic content within the water column; this may adversely influence observed colour of the water column.

Attribute	Target	Assessment
Fringing habitat: area	Maintain the area and condition of fringing habitats necessary to support the natural structure and functioning of the lake habitat	There will be no direct land take or infilling of the fringing habitats arising from operational activities at LRP Station or ADF. This is also the case for the respective peat supply bogs.

Measures which mitigate against the potential adverse effects noted above are presented in **Section 8.10**.

8.1.2 Otter (*Lutra lutra*)

The Status of EU Protected Habitats and Species in Ireland (NPWS 2013), outlines the following summary of this species:

Dramatic declines occurred in many European otter populations during the latter half of the 20th Century. As a result, otters became extinct in several countries. However, Ireland has remained a strong-hold for the species and the latest estimate puts the population at approximately 15-20,000 animals. Otters have two basic requirements: aquatic prey and safe refuges where they can rest. In Ireland, otter populations are found along clean rivers and lakes, where fish and other prey are abundant, and where the adjacent habitat offers plenty of cover. Otters maintain territories and will defend their stretches of river bank or lake shore from other otters. In lowland rivers and fish-rich lakes otters only need to maintain small territories, but on smaller rivers and in upland areas, where food tends to be less abundant, otter territories can stretch to 10 or 20 km. Along coasts otters require sources of freshwater to wash their coats and their territories will always include a stream or spring.

The range of this species in Ireland has been assessed as *Favourable* and the population assessed as *Favourable*. The supporting habitat for this species as well as its future prospects have both been assessed as *Favourable*. The overall assessment of conservation status is *Favourable*.

The pressures and threats (National level) relating to this species, as identified in NPWS (2013) are as follows:

- Roads, motorways - medium importance
- Professional passive fishing - low importance
- Pollution to surface waters (limnic & terrestrial, marine & brackish) – low importance

Based on a review of the above threats and pressures, emissions to surface waters leading to pollution within or upstream of the River Shannon Callows SAC have the potential to affect otter populations.

Whilst only the generic Conservation Objectives are currently available for the River Shannon Callows SAC, targets and attributes for the conservation of this habitat are published for other SACs. For the purposes of this assessment, attributes and related targets for this habitat are referenced from the Lower River Shannon SAC. These are listed in **Table 8-3** below, together with an assessment of the potential impacts on each attribute.

Table 8-3: Impact Assessment in relation to Attributes and Targets of Conservation Objectives (based on Lower River Shannon SAC)

Attribute	Target	Assessment
Distribution	No significant decline	No land take outside the LRP Station boundary is required as a result of operational activities under the proposed alteration to Condition 5.5; no loss of terrestrial habitat (including potential couching sites or holts) will therefore occur. There is no suitable habitat for otter within the footprint of the ADF (including the area permitted for capacity increase). No physical alterations to any watercourses are required as a result of operational activities; no loss of aquatic habitat will therefore occur. With regards to potential changes to distribution arising as a result of impacts upon available foraging resources, refer to 'Fish biomass available' row.
Extent of terrestrial habitat	No significant decline.	
Extent of marine habitat	No significant decline.	
Extent of freshwater (river) habitat	No significant decline.	
Extent of freshwater (lake/lagoon) habitat	No significant decline.	
Couching sites and holts	No significant decline	
Fish biomass available	No significant decline	

Attribute	Target	Assessment
		Aquatic discharges from the respective supply bogs in the Shannon catchment have the potential to reduce fish biomass as a result of siltation and chemical content (i.e. Ammonia). In the absence of mitigation, this could have an effect on the broader otter population in the catchment.
Barriers to connectivity	No significant increase	The proposed development will not lead to any barriers to foraging or commuting otters.

Measures which mitigate against the potential adverse effects noted in **Table 8-3** above are presented in Section 8.10.

8.2 Lough Ree SPA

The AA Screening for the proposed development identified potential pathways to impact upon the Lough Ree SPA. Potential impacts on the respective Special Conservation Interests may arise as a result of:

- Extraction of peat leading to hydrological impacts on adjacent habitats within the Lough Ree SPA.
- Emissions to surface waters leading to impacts on water quality within or upstream of the Lough Ree SPA.
- Operational activities causing noise have the potential to cause disturbance to Special Conservation Interest species of the Lough Ree SPA.

Table 8-4 highlights the Special Conservation Interest (SCI) species and supporting habitats occurring in the potential Zone of Influence for which the above impact pathways may result in adverse effects.

Table 8-4: SPA SCIs and Potential Impact Pathways

SCI	Assessment of Pathway for Effects
Little Grebe Whooper Swan Wigeon Teal Mallard Shoveler Tufted Duck Common Scoter Goldeneye Coot Golden Plover Lapwing Common Tern	<p>Potential impacts on these SCIs may arise in the form of discharges to the River Shannon immediately upstream of Lough Ree resulting from operational activities at LRP Station and ADF, as well as from discharges from peat supply bogs to Lough Ree and its respective tributaries.</p> <p>The potential for adverse effects on these SCI species is considered in Table 8-5.</p>
Wetlands and Waterbirds	<p>Potential impacts on this SCI may arise in the form of discharges to the River Shannon and Lough Ree resulting from operational activities at LRP Station and from discharges from peat supply bogs the River Shannon and its broader catchment. Potential habitat change arising from peat supply bog drainage may also occur. The potential for adverse effects on this SCI is considered further in this document.</p>

To acknowledge the importance of Ireland's wetlands to wintering waterbirds, "Wetlands and Waterbirds" is included as a Special Conservation Interest for the Lough Ree SPA as it comprises a wetland site of significant importance to one or more of the species of Special Conservation Interest. Thus, a specific Conservation Objective is as follows:

"To maintain or restore the favourable conservation condition of the wetland habitat at Lough Ree SPA as a resource for the regularly-occurring migratory waterbirds that utilise it."

While no site-specific targets and attributes are published for the Lough Ree SPA, it is assumed that the following apply (based on the Conservation Objectives of other SPAs of importance to wintering bird flocks, such as the Wexford Harbour and Slobs SPA).

Table 8-5: Impact Assessment in relation to Attributes and Targets of Conservation Objectives (based on Wexford Harbour and Slobs SPA)

Attribute	Target	Assessment
Population trend (all SCI species)	Long term population trend stable or increasing	A potential pollution event arising during operational activities at LRP Station or ADF has the potential to lead to a localised drop off in aquatic vegetation and fish present in the northern inlet bay of Lough Ree or in Derrymacar Lough; these form the dietary resource used by the respective SCI species. This has the potential to cause localised declines in bird populations.
Distribution (all SCI species)	There should be no significant decrease in the numbers or range of areas used by waterbird species, other than that occurring from natural patterns of variation	<p>Aquatic discharges from the respective supply bogs in the Lough Ree catchment have the potential to reduce foraging resources for bird flocks as a result of increased turbidity leading to lower aquatic vegetation productivity. Similarly, fish biomass in the Lough Ree may also be negatively affected by siltation and ammonia inputs; this may impact upon piscivorous species. In the absence of mitigation, this could have an effect on population numbers and distribution of SCI species in the catchment.</p> <p>With regard to operational noise potentially affecting the local distributions of the respective SCI species, it is noted that the immediate environs of LRP Station (including the River Shannon to the east) does not comprise any habitats with the potential to support large aggregations of wildfowl. Wintering bird surveys undertaken by ESBI between November 2016 and January 2018 found that the closest significant aggregation of SCI species was associated with the shallow bay between Culliagh and Ballyclare, comprising mixed foraging flocks of golden plover and lapwing on the shoreline, with smaller numbers of teal and mallard utilising fringing reedbeds at this location. This bay is located 2 km to the west of LRP Station and is comprehensively screened from the station by the peninsula extending south of Ballyclare. Operational activities within</p>

Attribute	Target	Assessment
		<p>the LRP site boundary do not result in a significant noise or other sources of disturbance.</p> <p>Given the described absence of important areas of roosting or foraging habitat on the River Shannon immediately around the LRP Station site, or in the northern inlet bay of Lough Ree (in the context of more extensive areas of such habitat at Ballyclare/Culliagh and further south into Lough Ree), no adverse effects to the distribution of the respective SCI species will occur as a result of the the proposed development.</p> <p>Activities associated with peat supply can generate noise via the operation of mobile machinery comprising harvesters, tractors and staff vehicles, as well as the operation of the narrow gauge railway network with associated small diesel locomotives and wagons. Golden plover and Lapwing may roost or rest on bare peat fields, while wintering flocks of Whooper swan may occur on harvesting areas where there are temporary areas of standing water found in association with recolonizing surface vegetation upon which the flocks forage. These species may be locally displaced by human activity and noise generated by machinery at the respective supply bogs. However, it must be noted that production of milled peat is generally carried out during the months of April to September, during periods of good drying weather; consequently there is negligible seasonal overlap between the main operational activities at supply bogs and the wintering bird season.</p>
Wetland habitat	The permanent area occupied by the wetland habitat should be stable other than that due to natural patterns of variation	Ongoing peat harvesting has the potential to lead to drying of peripheral remnant bog habitats as a result of localised drainage and the resultant localised fall in the water table in such areas. Drying out of such peripheral habitats has the potential to reduce the suitability and availability of such habitat to the SCI species, such as Golden Plover.

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Attribute	Target	Assessment
		<p>A GIS analysis of the intercepts between a 100 m buffer around the respective supply bogs and the boundaries of the Lough Ree SPA (refer to Section 6.2.1.1) indicated that no such intercepts occur with areas of peatland associated with the shoreline of Lough Ree; the closest comparable site is the area of bog around the shore of Derrymacar Lough, which is located over 300 m from the Derrycolumb supply bog; no adverse effects to such peatland areas within the SPA are therefore expected to occur as a result of any localised hydrological impacts associated with peat harvesting activities.</p> <p>Consequently ongoing peat harvesting activities are not predicted to result in significant permanent loss of wetland habitat associated with the Lough Ree SPA.</p>

Measures which mitigate against the potential adverse effects noted in **Table 8-5** above are presented in Section 8.10.

8.3 River Suck Callows SPA

The AA Screening for the proposed development identified potential pathways to impact upon the River Suck Callows SPA. Potential impacts on the respective Special Conservation Interests may arise as a result of:

- Extraction of peat leading to hydrological impacts on adjacent habitats within the River Suck Callows SPA.
- Emissions to surface waters leading to impacts on water quality within or upstream of the River Suck Callows SPA.

Table 8-6 highlights the Special Conservation Interest (SCI) species and supporting habitats occurring in the potential Zone of Influence for which the above impact pathways may result in adverse effects.

Table 8-6: SPA SCIs and Potential Impact Pathways

SCI	Assessment of Pathway for Effects
Whooper Swan Wigeon Golden Plover Lapwing Greenland White-fronted Goose Wetlands and Waterbirds	Potential impacts on these SCIs may arise in the form of discharges from peat supply bogs to the River Suck and its broader catchment. Potential habitat change arising from peat supply bog drainage may also occur. The potential for adverse effects on this SCI is considered further in this document.

To acknowledge the importance of Ireland's wetlands to wintering waterbirds, "Wetlands and Waterbirds" is included as an SCI for the River Suck Callows SPA as it comprises a wetland site of significant importance to one or more of the species of Special Conservation Interest. Thus, a specific Conservation Objective is as follows:

"To maintain or restore the favourable conservation condition of the wetland habitat at Suck River Callows SPA as a resource for the regularly-occurring migratory waterbirds that utilise it."

While no site-specific targets and attributes are published for the River Suck Callows SPA, it is assumed that the following apply (based on the Conservation Objectives of other SPAs of importance to wintering bird flocks, such as the Wexford Harbour and Slobs SPA).

Table 8-7: Impact Assessment in relation to Attributes and Targets of Conservation Objectives (based on Wexford Harbour and Slobs SPA)

Attribute	Target	Assessment
Population trend (all SCI species)	Long term population trend stable or increasing	Aquatic discharges from the respective supply bogs in the Suck catchment have the potential to reduce foraging resources as a result of increased turbidity leading to lower aquatic vegetation productivity. In the absence of mitigation, this could have an adverse effect on population numbers and distribution of SCI species in the catchment.
Distribution (all SCI species)	There should be no significant decrease in the numbers or range of areas used by waterbird species, other than that occurring from natural patterns of variation	

Attribute	Target	Assessment
Wetland habitat	The permanent area occupied by the wetland habitat should be stable other than that due to natural patterns of variation	<p>Ongoing peat harvesting has the potential to lead to drying of peripheral remnant bog habitats as a result of localised drainage and the resultant localised fall in the water table in such areas. Drying out of such peripheral habitats has the potential to reduce the suitability and availability of such habitat to the SCI species, such as Golden Plover.</p> <p>A GIS analysis of the intercepts between a 100 m buffer around the respective supply bogs and the boundaries of the River Suck Callows SPA indicated that such intercepts occur at a number of locations along the course of the River Suck. These intercepts predominantly relate to callows grassland habitats which abut the IPC boundaries of a number of peat supply bogs along the River Suck. Hydrological influence on such callows habitat is dominated by the River Suck; localised drainage associated with peat supply bogs is not expected to affect the callows wetland habitat distribution along the river.</p> <p>A review of aerial imagery of these intercepts indicate that only a very minor proportion relate to peripheral areas of remnant bog between the existing peat harvesting areas and the aforementioned callows habitats. The NPWS Natura 2000 data form notes that 10% of the SPA coverage relates to bog habitat. The aforementioned intercept areas form a non-significant proportion of this 10% bog area. Additionally, several areas are adjacent to peat harvesting fields recently or soon to be taken out of production and are in the process of (or will be) recolonising as cutaway bog habitats that may be utilised by bird flocks associated with the SPA such as golden plover and whooper swan.</p> <p>Consequently ongoing peat harvesting activities are not predicted to result in significant permanent loss of wetland</p>

Attribute	Target	Assessment
		habitat associated with the River Suck Callows SPA.

Measures which mitigate against the potential adverse effects noted in Table 8-7 above are presented in Section 8.10.

8.4 River Boyne and River Blackwater SAC

The AA Screening for the proposed development identified potential pathways to impact upon the River Boyne and River Blackwater SAC. The Ballivor, Carranstown and Bracklin supply bogs discharge surface water to the upper tributaries of the River Boyne (namely tributaries of the Deel and Stoneyford Rivers; the closest discharge is associated with the western side of Bracklin supply bog, located 1 km upstream of the SAC boundary, where it is associated with the River Deel. The distribution of a number of the Qualifying Interest species of the SAC may extend further inland into these tributaries, and therefore contribute to the overall integrity of the respective populations. Potential impacts on the respective Qualifying Interests may arise as a result of:

- Emissions to surface waters from supply bogs leading to impacts on water quality in the surface water catchment of the River Boyne and River Blackwater SAC.

The generic conservation objective of this designated site is: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected.

Table 8-8 highlights the Qualifying Interests occurring in the potential Zone of Influence for which the above impact pathways may result in adverse effects.

Table 8-8: SAC Qualifying Interests and Potential Impact Pathways

QI	Assessment of Pathway for Effects
Alkaline fens	The main areas of alkaline fen in this site are concentrated in the vicinity of Lough Shesk, Freehan Lough and Newtown Lough. These are over 7.5 km north of the identified supply bogs and consequently are considered to be unaffected by ongoing peat harvesting activities.
Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>)	The alluvial woodland component of the Boyne catchment is associated with the lower reaches of the River; consequently these areas are considered to be unaffected by ongoing peat harvesting activities.
River Lamprey	

Salmon	Potential impacts on these QIs may arise from discharges from the identified peat supply bogs within the Boyne catchment. The potential for adverse effects on these species is considered further in this document.
Otter	

8.4.1 River lamprey (*Lampetra fluviatilis*)

Three indigenous species of lamprey occur in Ireland; the non-parasitic resident brook lamprey *Lampetra planeri*, and the parasitic anadromous river lamprey *Lampetra fluviatilis* and sea lamprey *Petromyzon marinus*.

Maitland (2003), notes: “*The river lamprey is intermediate in size between the large sea lamprey and the small brook lamprey. The average adult length is around 30 cm with a corresponding weight of about 60 g, but specimens over 40 cm can be found. It is a migratory species, which grows to maturity in estuaries... then moves into fresh water to spawn in clean rivers and streams. The larvae spend several years in silt beds before metamorphosing and migrating downstream to estuaries.*”

In a survey of juvenile lamprey populations in the overall Boyne catchment (O'Connor 2006), the report author noted that it is likely that only one species of lamprey occurs in the Deel and Stonyford catchments, namely brook lamprey *Lampetra planeri*. River lamprey *Lampetra fluviatilis* are by contrast, associated with the lower reaches of the Boyne catchment. River Lamprey are poor swimmers and cannot jump or climb (Rousson et al, 2011), so are likely to have significant difficulty getting past the main stem weirs on the River Boyne. River lamprey are therefore not predicted to occur in significant numbers in the watercourses in closest proximity to the respective LRP supply bogs in the upper Boyne catchment.

The range and population for this species in Ireland has been assessed as *Favourable* as per NPWS (2013). The habitat for the species has been assessed as *Favourable* and future prospects for the species have been assessed as *Favourable*. On the basis of the above, the overall assessment of conservation status is *Favourable*.

The pressures and threats (National level) relating to this species, as identified in NPWS (2013) are as follows:

- Dredging/ removal of limnic sediments - high importance
- Siltation rate changes, dumping, depositing of dredged deposits - high importance
- Reduction in migration/ migration barriers - high importance
- Other point source pollution to surface water - high importance
- Invasive non-native species - medium importance
- Diffuse pollution to surface waters due to agricultural and forestry activities – medium importance

Based on a review of the above threats and pressures, siltation in receiving waterbodies which support this species is considered to be a potential impact arising from peat harvesting activities, as well as overall reductions in water quality.

Whilst only the generic Conservation Objectives are currently available for the River Boyne and Blackwater SAC, targets and attributes for the conservation of this habitat are published for other SACs. For the purposes of this assessment, attributes and related targets for this habitat are referenced from the Lower River Shannon SAC. These are listed in **Table 8-9** below, together with an assessment of the potential impacts on each attribute.

Table 8-9: Impact Assessment in relation to Attributes and Targets of Conservation Objectives (based on Lower River Shannon SAC)

Attribute	Target	Assessment
Distribution	Access to all water courses down to first order streams	While it is considered that the majority of the River Lamprey population of the Boyne is associated with the lower part of the catchment, there remains some potential for surface water run-off from the LRP peat supply bogs in the upper Boyne catchment to result in adverse impacts on the defined attributes associated with River Lamprey within the River Boyne and River Blackwater SAC. This is primarily associated with released sediment being transported downstream and its potential settlement on spawning habitat, which has potential consequent effects on juvenile density and population structure. As a result, in the absence of mitigation, there is potential for surface water run-off from the Bracklin, Carranstown and Ballivor bogs to have an effect on the conservation objectives of River Lamprey in the River Boyne and Blackwater SAC.
Population structure of juveniles	At least three age/size groups of river/brook lamprey present	
Juvenile density in fine sediment	Mean catchment juvenile density of river/brook lamprey at least 2/m ²	
Extent and distribution of spawning habitat	No decline in extent and distribution of spawning beds	
Availability of juvenile habitat	More than 50% of sample sites positive	

Measures which mitigate against the potential adverse effects noted in Table 8-9 above are presented in Section 8.10.

8.4.2 Salmon

The Status of EU Protected Habitats and Species in Ireland (NPWS 2013), outlines the following summary of this species:

The Atlantic Salmon is an anadromous species indigenous to the North Atlantic. In freshwater it is found in an arc from Northern Portugal in the east, to Connecticut River, New England, United States in the west. Salmon use

rivers to reproduce and as nursery areas during their juvenile phase. Adults spend one to three years at sea where growth rates are much greater. Eggs are deposited during the winter in a depression, called a redd, excavated in river gravels. The eggs are then covered over with gravel. The eggs develop protected within the substrate and during spring hatch into alevins, at this stage the juvenile fish feed exclusively from their yolk sac, when this is depleted they begin to feed and become known as fry, the fry feed for the summer then over the autumn and gradually develop characteristic vertical bars and become parr. Fry and parr feed primarily upon invertebrates. The Irish population generally comprises fish that spend two winters (small numbers spend one or three winters) in freshwater before going to sea, in spring, as smolts. The smoltification process involves physiological, morphological and behavioural changes which begin when the parr reach around 10-25 cm in length. The smolts migrate to sea mainly from April to June. At sea the salmon feed upon crustaceans such as amphipods and euphausiids, and fish such as capelin and sandeels as they migrate to feeding grounds in the North Atlantic; growth is rapid. The majority of Irish fish spend one winter at sea before returning to their natal rivers, mainly during the summer, as grilse. Smaller numbers spend two winters at sea, returning mainly in spring, hence "spring" salmon. Older salmon are uncommon. A small proportion of the adult population returns to the sea post-spawning (known at this spent stage as a kelt) and can return to spawn again.

Atlantic Salmon (*Salmo salar*) use the Boyne tributaries and headwaters as spawning grounds; salmon are known to occur as far inland as the Deel River which receives discharges from the Bracklin and Ballivor supply bogs.

The range for this species in Ireland has been assessed as *Favourable* as per NPWS (2013). The population has been assessed as *Inadequate (Stable)*, while the habitat for the species has been assessed as *Favourable* and future prospects for the species have been assessed as *Favourable*. On the basis of the above, the overall assessment of conservation status is *Inadequate (Stable)*.

The pressures and threats (National level) relating to this habitat, as identified in NPWS (2013) are as follows:

- Agricultural intensification - high importance
- Intensive sheep grazing - medium importance
- Fertilisation - medium importance
- Artificial planting on open ground (non-native trees) - medium importance
- Forest replanting (non native trees) - medium importance
- Use of fertilizers (forestry) - medium importance
- Peat extraction - low importance
- Disposal of household / recreational facility waste - high importance
- Disposal of industrial waste - medium importance
- Intensive fish farming, intensification - medium importance

- Poaching - high importance
- Pollution to surface waters by industrial plants - low importance
- Forestry activities - high importance
- Diffuse pollution to surface waters due to household sewage and waste waters - high importance
- Invasive non-native species - low importance
- Modification of hydrographic functioning, general - low importance
- Water abstractions from surface waters - medium importance
- Management of aquatic and bank vegetation for drainage purposes - low importance
- Predation - medium importance

Based on a review of the above threats and pressures, reduction in water quality and change to spawning habitat arising as a result of peat harvesting activities are considered to be potential impacts arising from peat harvesting activities.

Whilst only the generic Conservation Objectives are currently available for the River Boyne and Blackwater SAC, targets and attributes for the conservation of this habitat are published for other SACs. For the purposes of this assessment, attributes and related targets for this habitat are referenced from the Lower River Shannon SAC. These are listed in **Table 8-10** below, together with an assessment of the potential impacts on each attribute.

Table 8-10: Impact Assessment in relation to Attributes and Targets of Conservation Objectives (based on Lower River Shannon SAC)

Attribute	Target	Assessment
Distribution: extent of anadromy	100% of river channels down to second order accessible from estuary	Peat harvesting activities will not lead to any river channel barriers.
Adult spawning fish	Conservation Limit (CL) for each system consistently exceeded	The River Deel is known to support Salmon, comprises some areas considered suitable for salmonid spawning and has features that provide adequate cover for juvenile salmon.
Salmon fry abundance	Maintain or exceed 0+ fry mean catchment-wide abundance threshold value. Currently set at 17 salmon fry/5 min sampling	There is some potential for surface water run-off from the LRP peat supply bogs to the River Deel to result in adverse impacts on the following attributes associated with Salmon within the River Boyne and River Blackwater SAC. This is primarily associated with potential siltation on suitable spawning habitat, which has
Out-migrating smolt abundance	No significant decline	

Attribute	Target	Assessment
Number and distribution of redds	No decline in number and distribution of spawning redds due to anthropogenic causes	<p>consequent effects on fry abundance density and population structure. The adjacent sub-catchment of the Stonyford River also receives run-off from the Ballivor, Bracklin and Carranstown supply bogs.</p> <p>As a result, in the absence of mitigation, there is potential for surface water run-off from Ballivor, Bracklin and Carranstown bogs to have an effect on the conservation objectives of Salmon in the River Boyne and Blackwater SAC.</p>
Water quality	At least Q4 at all sites sampled by EPA	<p>EPA surveys from 2015 indicate that the Deel (Raharney) River was in a satisfactory ecological condition at three of the five stations surveyed in 2015. The macroinvertebrate fauna indicated satisfactory ecological conditions near Mabestown (0070), however siltation was an issue. A return to satisfactory conditions was noted at sites 0200 and 0300. Sites 0400 (Inan Bridge) and 0600 (Bridge u/s Boyne River confluence) remain in unsatisfactory ecological condition. Consequently 2 of the 5 sites along the River Deel (0400 and 0600) do not currently conform to the attribute target.</p> <p>The Stonyford River was in a satisfactory ecological condition at all four stations surveyed in 2015. Good ecological conditions persisted in the upper reaches (0065) and had improved to good at 0075, 0100 and 0400.</p> <p>As a result, in the absence of mitigation, there is potential for surface water run-off from the Bracklin, Carranstown and Ballivor bogs to have an effect on the conservation objectives of Atlantic Salmon in the River Boyne and Blackwater SAC.</p>

Measures which mitigate against the potential adverse effects noted in Table 8-10 above are presented in Section 8.10.

8.4.3 Otter

Section 8.1 presents the potential for impacts to otters arising from peat harvesting activities in the Lough Ree surface water catchment. The same potential impacts can be considered applicable to the Boyne and Blackwater catchments. Mitigation measures relating to otter populations in the River Boyne and River Blackwater SAC are presented in Section 8.10.

8.5 River Boyne and River Blackwater SPA

The AA Screening for the proposed development identified potential pathways to impact upon the River Boyne and River Blackwater SAC. The Ballivor, Carranstown and Bracklin supply bogs discharge surface water to the upper tributaries of the River Boyne (namely tributaries of the Deel and Stoneyford Rivers; the closest discharge is associated with the western side of Bracklin supply bog, located 1 km upstream of the SPA boundary, where it is associated with the River Deel. Potential impacts on the Special Conservation Interest (Kingfisher) may arise as a result of:

- Emissions to surface waters from supply bogs leading to impacts on water quality in the surface water catchment of the River Boyne and River Blackwater SAC.

The generic conservation objective of this designated site is: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA. Table 8-11 highlights the Special Conservation Interests occurring in the potential Zone of Influence for which the above impact pathways may result in adverse effects.

Table 8-11: SPA Special Conservation Interests and Potential Impact Pathways

SCI	Assessment of Pathway for Effects
Kingfisher	Potential impacts on this SCI may arise from the surface water discharge from the respective bogs within the Derrygreenagh Bog Group to the River Deel; these impacts relate to potential reductions in water quality as a result of these discharges which may in turn lead to reductions in biomass of fish species which provide the dietary resource for this bird species. The potential for adverse effects on kingfisher is considered further in this document.

At present, there are no specific Conservation Objective targets for SPAs designated for kingfisher. As noted in Crowe (2010):

The Kingfisher is widely distributed as a breeding bird in Ireland and across Europe. The population has been estimated at less than 60,000 breeding pairs in Europe (Hagemeijer and Blair 1997) with 1,300 to 2,100 pairs in Ireland (Gibbons et al. 1993). It is regarded as sedentary, and shows some local

movement to coastal areas in winter. They are widespread, and are present mainly lowland rivers, streams and other water bodies with shallow, slow-moving water (Morgan and Glue 1977) that contain thriving populations of small fish on which it feeds. They prefer stagnant waters, and strongly avoid rivers with scarce or very dense riparian vegetation. However, they do require trees and/or shrubs on the streams edges, which are used as perches for plunge diving (Peris and Rodriguez 1996). Vertical banks of fairly soft material are required for excavation of nesting burrows (Boag 1982). There is evidence to suggest that Kingfisher prefer banks with more loam than sand to nest in, differing to Sand Martins (Heneberg 2004). Nests tend to be located in banks where natural erosion is taking place as a result of the force of water in the channel.

There are no predicted impacts to river bank morphology as a result of ongoing peat harvesting; peaty riverbank soils are also not suitable for kingfisher nesting burrows. Consequently, it is not expected there will be any adverse effect to breeding habitat for kingfisher.

Reductions in water quality have the potential to locally affect kingfisher populations through reductions in biomass of the main prey species, namely minnows and sticklebacks, but also aquatic insects, freshwater shrimps and tadpoles. For the purposes of this assessment, it is assumed that the Conservation Objective targets for Atlantic salmon will contribute to the maintenance of kingfisher populations in the Boyne catchment. EPA surveys from 2015 indicate that the Deel (Raharney) River was in a satisfactory ecological condition at three of the five stations surveyed in 2015. As previously noted, 2 of the 5 sites along the River Deel (0400 and 0600) do not currently conform to the salmon attribute target for water quality based on ecological Q-rating. The Stonyford River was in a satisfactory ecological condition at all four stations surveyed in 2015. Good ecological conditions persisted in the upper reaches (0065) and had improved to good at 0075, 0100 and 0400.

However, it should also be noted that surveys undertaken on behalf of NPWS in 2010 (Cummins et al. 2010) found that "*Comparison of territories per kilometre in 2010 with those reported in 2008 (Crowe et al. 2008) on the Boyne and Munster Blackwater systems indicate that the relative abundance of territories on the Boyne has remained unchanged.*" This is indicative of the existing pressures in the Boyne system (including peat harvesting) not currently having a significant negative impact upon kingfisher populations.

In light of the above, it can be argued that, in the absence of mitigation, there is potential for surface water run-off from the Bracklin, Carranstown and Ballivor bogs to have an effect on the conservation objectives of kingfisher in the River Boyne and Blackwater SAC.

Measures which mitigate against the potential adverse effects noted above are presented in Section 8.10.

8.6 River Barrow and River Nore SAC

The AA Screening for the proposed development identified potential pathways to impact upon the River Barrow and River Nore SAC.

The Allen Bog Group (Esker, Clonad, Ballykeane and Mountlucas) is located in the surface water catchment of the River Barrow, specifically in the sub-catchment of the Figile River and its tributary, the Esker Stream. These supply bogs are located 20 km upstream of the River Barrow and River Nore SAC, which does not comprise the Figile catchment.

Potential impacts on the respective Qualifying Interests may arise as a result of:

- Emissions to surface waters from peat supply bogs leading to impacts on water quality in the River Barrow and River Nore SAC.

The conservation objectives document for this SAC of this designated site presents specific targets and attributes for the respective Qualifying Interests. **Table 8-12** highlights the Qualifying Interests occurring in the potential Zone of Influence for which the above impact pathways may result in adverse effects.

Table 8-12: SAC Qualifying Interests and Potential Impact Pathways

QI	Assessment of Pathway for Effects
Estuaries Mudflats and sandflats not covered by seawater at low tide Reefs Salicornia and other annuals colonising mud and sand Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) Mediterranean salt meadows (<i>Juncetalia maritimi</i>)	It is considered that, due to the considerable hydrological separation distance between activities associated with the peat extraction in the Allen Bog Group, and tidal and estuary habitats in the lower reaches of the Barrow, these habitats are not likely to be impacted by peat extraction activities in light of the respective conservation objectives.
Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260]	Primary distribution of these habitats is associated with the River Nore catchment. Due to the hydrological separation between activities associated with peat extraction in the Allen Bog Group, these habitats are not likely to be impacted by peat extraction activities in light of the respective conservation objectives.

<p>Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220]</p>	
<p>European dry heaths [4030] Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0]</p>	<p>These QIs relate to terrestrial habitats and species with no impact pathways from peat extraction activities at the respective bogs within the Allen Bog Group. These habitats and species are not likely to be impacted by peat extraction activities in light of the respective conservation objectives.</p>
<p>Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430]</p>	<p>This QI occurs in association with habitats found along the floodplain of slow flowing stretches of river within the SAC. It does not occur in the upland parts of the Barrow catchment. This habitat is not likely to be impacted by peat extraction activities in light of the respective conservation objectives.</p>
<p><i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029]</p>	<p>Nore Pearl Mussel is associated with the Nore catchment and therefore there are no impact pathways from peat extraction activities at the respective bogs within the Allen Bog Group. This species is not likely to be impacted by peat extraction activities in light of the conservation objectives.</p>
<p><i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Alosa fallax fallax</i> (Twaite Shad) [1103] <i>Trichomanes speciosum</i> (Killarney Fern) [1421]</p>	<p>There is considerable hydrological separation distance between activities associated with the peat extraction at the respective bogs within the Allen Bog Group, and the habitats associated with the lower Barrow catchment which support these species. These species are therefore not likely to be impacted by peat extraction activities in light of the respective conservation objectives.</p>
<p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p>	<p>The closest area of alluvial woodland (based on Perrin et al. 2008) is Rathcoffey wood on the northern edge of the Slieve Bloom mountains. This site is in a discrete sub-catchment in the Barrow system. This habitat is not likely to be impacted by peat extraction activities in light of the respective conservation objectives.</p>
<p><i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099]</p>	<p>Potential impacts on these QIs may arise from the surface water discharge from the respective bogs within the Allen Bog Group to the River Barrow; these impacts relate to potential reductions in water quality as a result of these discharges. The potential for adverse effects on these species is considered further in this document.</p>

Salmo salar (Salmon)

[1106]

Lutra lutra (Otter) [1355]

8.6.1 River/Brook Lamprey

A summary of lamprey ecology, conservation status and pressures is presented in Section 8.4.1. Based on this, siltation in receiving waterbodies which support this species is considered to be a potential impact arising from peat harvesting activities, as well as overall reductions in water quality.

The Conservation Objectives for the River Barrow and River Nore SAC aim to restore the favourable conservation condition of Brook Lamprey and River Lamprey in the site. This is defined by the list of attributes and targets presented in **Table 8-13** below, together with an assessment of the potential impacts on each attribute.

Table 8-13: Impact Assessment in relation to Attributes and Targets of Conservation Objectives (based on Lower River Shannon SAC)

Attribute	Target	Assessment
Distribution	Access to all water courses down to first order streams	King (2006) surveyed the Barrow catchment for juvenile lampreys; low numbers were recorded in the main channel of the River Barrow upstream of Monasterevin. However, due to the physical characteristics of the Figile River, wherein there is a paucity of lamprey spawning gravels, this sub-catchment is considered to be sub-optimal for lamprey; consequently this sub-catchment is not expected to be integral to the overall lamprey population in the broader Barrow system. Discharges arising from the respective Allen Group supply bogs are therefore not predicted to have any adverse effects on lamprey as a consequence of the absence of these species in the Figile sub-catchment and the large separation distance between the supply bogs and the SAC boundary (>20 km).
Population structure of juveniles	At least three age/size groups of river/brook lamprey present	
Juvenile density in fine sediment	Mean catchment juvenile density of river/brook lamprey at least 2/m ²	
Extent and distribution of spawning habitat	No decline in extent and distribution of spawning beds	
Availability of juvenile habitat	More than 50% of sample sites positive	

8.6.2 Salmon

A summary of Salmon ecology, conservation status and pressures is presented in Section 8.4. Based on a review of this, reduction in water quality and change to spawning habitat arising as a result of peat harvesting activities are considered to be potential impacts arising from peat harvesting activities.

The Conservation Objectives for the River Barrow and River Nore SAC aim to restore the favourable conservation condition of Salmon in the site. This is defined by the list of attributes and targets presented in **Table 8-14** below, together with an assessment of the potential impacts on each attribute.

Table 8-14: Impact Assessment in relation to Attributes and Targets of Conservation Objectives (based on Lower River Shannon SAC)

Attribute	Target	Assessment
Distribution: extent of anadromy	100% of river channels down to second order accessible from estuary	Peat harvesting activities will not lead to any river channel barriers.
Adult spawning fish	Conservation Limit (CL) for each system consistently exceeded	Inland Fisheries Ireland electrofishing surveys undertaken in 2015 (IFI 2017) found that salmon were present at 57% of the sites surveyed on the main Barrow channel. By contrast, no salmon were recorded in the Figile sub-catchment. The physical characteristics of the Figile River, namely a paucity of spawning gravels in combination with slow flows over a low gradient, make this sub-catchment sub-optimal for salmon; consequently this sub-catchment is not expected to be integral to the overall salmon population in the broader Barrow system.
Salmon fry abundance	Maintain or exceed 0.4 fry mean catchment-wide abundance threshold value. Currently set at 17 salmon fry/5 min sampling	
Out-migrating smolt abundance	No significant decline	
Number and distribution of redds	No decline in number and distribution of spawning redds due to anthropogenic causes	Discharges arising from the respective Allen Group supply bogs are therefore not predicted to have any adverse effects on salmon as a consequence of the likely absence of this species in the Figile sub-catchment and the large separation distance between the supply bogs and the SAC boundary (>20 km).
Water quality	At least Q4 at all sites sampled by EPA	The most recent Q-ratings recorded by the EPA along the Figile River downstream of the respective supply bogs noted that the Clonbulloge Br. (0300), Andra Br. (0500) and Derrygarran Br.

Attribute	Target	Assessment
		<p>(0400) remained in satisfactory condition (Q4).</p> <p>Additionally, the first EPA Q-rating site inside the River Barrow and River Nore SAC downstream of the Figile River confluence recorded a rating of Q4 in 2011, the most recent sampling for this site.</p> <p>It is therefore not envisaged that discharges from the Clonad, Mountlucas and Ballykeane supply bogs to the Figile River sub-catchment are having any adverse effect upon water quality.</p>

8.6.3 Otter

Section 8.1 presents the potential for impacts to otters in the Shannon catchment. The same potential impacts can be considered applicable to the Barrow catchment; otters are widely distributed throughout the River Barrow and River Nore SAC. The species also extends its distribution beyond the SAC boundary; numerous positive otter records have been recorded throughout the Clonad, Mountlucas and Ballykeane supply bog properties (Bord na Móna Commission Survey 2014-15 – Biodiversity Ireland webmapper record). This is indicative of an absence of adverse effects on the local otter population close to these bogs.

8.6.4 White-clawed crayfish

The Status of EU Protected Habitats and Species in Ireland (NPWS 2013), outlines the following summary of this species:

The crayfish occupies a wide range of habitat in Ireland from small headwater streams to some substantial lakes. It is considered there is sufficient habitat to support the long-term survival of the species. Declines in water quality or a significant reduction in the heterogeneity of habitat could impact the habitat resource for the species but there is perhaps a greater tolerance for apparently sub-optimal conditions than previously considered. However there are now policies in place to maintain and improve water quality in rivers and lakes and to mitigate the potential impact of drainage maintenance work which should benefit this species.

Habitat quality in particular the loss of heterogeneity along river systems and a reduction in water quality in some lakes caused the loss of some populations before the Directive came into force. However there has been recovery in range, habitat quality and population. If there is no change in the

trend of improving water quality and no alteration in the area of habitat, the prospects for the species should be good.

White-clawed crayfish is present almost throughout the River Barrow and River Nore SAC. The species also extends its distribution beyond the SAC boundary; records are known from the Esker Stream and Figile Rivers (EPA Freshwater Biologist database – Biodiversity Ireland webmapper records). Whilst nominally outside the SAC boundary, this sub-catchment population can be considered to be contributing to the overall integrity of the Barrow system population.

The pressures and threats (National level) relating to this species, as identified in NPWS (2013) are as follows:

- Invasive non-native species - high importance
- Leisure fishing - low importance
- Dredging/ removal of limnic sediments - low importance
- Management of aquatic and bank vegetation for drainage purposes - low importance
- Introduction of disease (microbial pathogens) - high importance
- Pollution to surface waters (limnic & terrestrial, marine & brackish) - high importance

With reference to the above 'Introduction of disease' threat to crayfish populations, crayfish plague has recently been recorded in the River Barrow. This relates to the lower Barrow, from just upstream of Leighlinbridge to downstream of Graiguenamanagh.

Based on a review of the above threats and pressures, reduction in water quality and change to spawning habitat arising as a result of peat harvesting activities are considered to be potential impacts arising from peat harvesting activities.

The Conservation Objectives for the River Barrow and River Nore SAC aim to maintain the favourable conservation condition of Crayfish in the site. This is defined by the list of attributes and targets presented in **Table 8-15**, together with an assessment of the potential impacts on each attribute.

Table 8-15: Impact Assessment in relation to Attributes and Targets of Conservation Objectives (based on Lower River Shannon SAC)

Attribute	Target	Assessment
Distribution	No reduction from baseline.	Distribution and population structure is dependent on maintaining existing levels of recruitment in the population. Changes in habitat or water quality which may impact upon eggs or hatchlings have the potential to reduce local recruitment rates. Crayfish are known to occur in the Figile and Philpstown Rivers, to which the Clonad, Mountlucas and Ballykeane
Population structure: recruitment	Juveniles and/or females with eggs in at least 50% of positive samples	

Attribute	Target	Assessment
		supply bogs discharge surface water to. As a result, in the absence of mitigation, there is potential for surface water run-off from these bogs to have an effect on the conservation objectives of crayfish in the River Barrow and River Nore SAC.
Negative indicator species	No alien crayfish species	There is no alien species introduction pathway associated with the peat harvesting activities at the Clonad, Mountlucas and Ballykeane supply bogs.
Disease	No instances of disease	There is no crayfish disease introduction pathway associated with the peat harvesting activities at the Clonad, Mountlucas and Ballykeane supply bogs.
Water quality	At least Q3-4 at all sites sampled by EPA	<p>The most recent Q-ratings recorded by the EPA along the Figile River downstream of the respective supply bogs noted that the Clonbulloge Br. (0300), Andra Br. (0500) and Derrygarran Br. (0400) remained in satisfactory condition (Q4).</p> <p>Additionally, the first EPA Q-rating site inside the River Barrow and River Nore SAC downstream of the Figile River confluence recorded a rating of Q4 in 2011, the most recent sampling for this site.</p> <p>It is therefore not envisaged that discharges from the Clonad, Mountlucas and Ballykeane supply bogs to the Figile River sub-catchment are having any adverse effect upon water quality.</p>
Habitat quality: heterogeneity	No decline in heterogeneity or habitat quality	<p>Crayfish need high habitat heterogeneity. Larger crayfish must have stones to hide under, or an earthen bank in which to burrow. Hatchlings shelter in vegetation, gravel and among fine tree-roots. Smaller crayfish are typically found among weed and debris in shallow water. Larger juveniles in particular may also be found among cobbles and detritus such as leaf litter. These conditions must be available on the whole length of occupied habitat.</p> <p>Siltation in a watercourse has the potential to reduce this heterogeneity. As a result,</p>

Attribute	Target	Assessment
		in the absence of mitigation, there is potential for surface water run-off from the Clonad, Mountlucas and Ballykeane supply bogs to have an effect on the conservation objectives of crayfish in the River Barrow and River Nore SAC.

8.7 Lough Derravaragh SPA

The AA Screening for the proposed development identified potential pathways to impact upon the Lough Derravaragh SPA. Potential impacts on the respective Special Conservation Interests may arise as a result of:

- Emissions to surface waters from peat supply bogs leading to impacts on water quality within or upstream of the Lough Derravaragh SPA.

As noted in Table 5-2, direct disturbance to SCI species arising as a consequence of the operation of machinery required for peat harvesting is not predicted as a consequence of the spatial separation between the respective supply bogs and the SPA.

Table 8-16 highlights the Special Conservation Interest (SCI) species and supporting habitats occurring in the potential Zone of Influence for which the above impact pathways may result in adverse effects.

Table 8-16: SPA SCIs and Potential Impact Pathways

SCI	Assessment of Pathway for Effects
Whooper Swan Pochard Tufted Duck Coot	Potential impacts on these SCIs may arise in the form of discharges from the Coolnagun, Milkernagh and Coolcraff peat supply bogs which are located in the surface water catchment of the River Inny, upstream of Lough Derravaragh. The potential for adverse effects on these SCI species is considered further in this document.
Wetlands and Waterbirds	Potential impacts on the habitats which support the aforementioned SCI species may arise in the form of discharges from the Coolnagun, Milkernagh and Coolcraff peat supply bogs which are located in the surface water catchment of the River Inny, upstream of Lough Derravaragh. The potential for adverse effects on these SCI species is considered further in this document.

The generic Conservation Objective for this SPA is as follows:

“To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA”.

To acknowledge the importance of Ireland's wetlands to wintering waterbirds, “Wetlands and Waterbirds” is included as a Special Conservation Interest for Lough Derravaragh SPA as it comprises a wetland site of significant importance to one or more of the species of Special Conservation Interest. Thus, a specific Conservation Objective is as follows:

“To maintain or restore the favourable conservation condition of the wetland habitat at Middle Shannon Callows SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.”

While no site-specific targets and attributes are published for Lough Derravaragh SPA, it is assumed that the following apply (based on the Conservation Objectives of other SPAs of importance to wintering bird flocks, such as the Wexford Harbour and Slobs SPA).

Table 8-17: Impact Assessment in relation to Attributes and Targets of Conservation Objectives (based on Wexford Harbour and Slobs SPA)

Attribute	Target	Assessment
Population trend (all SCI species)	Long term population trend stable or increasing	Aquatic discharges from the respective supply bogs in the River Inny catchment have the potential to reduce foraging resources for bird flocks as a result of increased turbidity leading to lower aquatic vegetation productivity in Lough Derravaragh.
Distribution (all SCI species)	There should be no significant decrease in the numbers or range of areas used by waterbird species, other than that occurring from natural patterns of variation	<p>Any such decrease in foraging resources has the potential to reduce to carrying capacity for the respective SCI species populations within the SPA.</p> <p>However, it is noted that EPA monitoring on the River Inny in 2017 noted that the lower reaches of the river (including stations both upstream and downstream of Lough Derravaragh) “<i>exhibited high macroinvertebrate diversity and were of satisfactory ecological condition in 2017, with a return to good ecological condition recorded at 0800 (Ballinalack Br.)</i>”. This suggests that ecological pressure as a consequence of peat harvesting is unlikely to be having a significant adverse effect on the SPA.</p>

Attribute	Target	Assessment
Wetland habitat	The permanent area occupied by the wetland habitat should be stable other than that due to natural patterns of variation	Activities associated with peat supply on the Coolcraff, Milkernagh and Coolnagun supply bogs will not result involve any land-take within the SPA boundary. There will be no net change in the wetland habitat area as a result.

8.8 Lough Iron SPA

The AA Screening for the proposed development identified potential pathways to impact upon the Lough Iron SPA. Potential impacts on the respective Special Conservation Interests may arise as a result of:

- Emissions to surface waters from peat supply bogs leading to impacts on water quality within or upstream of the Lough Iron SPA.

As noted in Table 5-2, direct disturbance to SCI species arising as a consequence of the operation of machinery required for peat harvesting is not predicted as a consequence of the spatial separation between the respective supply bogs and the SPA.

Table 8-18 highlights the Special Conservation Interest (SCI) species and supporting habitats occurring in the potential Zone of Influence for which the above impact pathways may result in adverse effects.

Table 8-18: SPA SCIs and Potential Impact Pathways

SCI	Assessment of Pathway for Effects
Whooper Swan Wigeon Teal Shoveler Coot Golden Plover Greenland White-fronted Goose	Potential impacts on these SCIs may arise in the form of discharges from the Coolnagun, Milkernagh and Coolcraff peat supply bogs which are located in the surface water catchment of the River Inny, upstream of Lough Derravaragh. The potential for adverse effects on these SCI species is considered further in this document.

SCI	Assessment of Pathway for Effects
Wetlands and Waterbirds	<p>Potential impacts on the habitats which support the aforementioned SCI species may arise in the form of discharges from the Coolnagun, Milkernagh and Coolcraff peat supply bogs which are located in the surface water catchment of the River Inny, upstream of Lough Iron.</p> <p>The potential for adverse effects on these SCI species is considered further in this document.</p>

The generic Conservation Objective for this SPA is as follows:

“To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA”.

To acknowledge the importance of Ireland's wetlands to wintering waterbirds, “Wetlands and Waterbirds” is included as a Special Conservation Interest for Lough Derravaragh SPA as it comprises a wetland site of significant importance to one or more of the species of Special Conservation Interest. Thus, a specific Conservation Objective is as follows:

“To maintain or restore the favourable conservation condition of the wetland habitat at Middle Shannon Callows SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.”

While no site-specific targets and attributes are published for Lough Iron SPA, it is assumed that the following apply (based on the Conservation Objectives of other SPAs of importance to wintering bird flocks, such as the Wexford Harbour and Slobs SPA).

Table 8-19: Impact Assessment in relation to Attributes and Targets of Conservation Objectives (based on Wexford Harbour and Slobs SPA)

Attribute	Target	Assessment
Population trend (all SCI species)	Long term population trend stable or increasing	Aquatic discharges from the respective supply bogs in the River Inny catchment have the potential to reduce foraging resources for bird flocks as a result of increased turbidity leading to lower aquatic vegetation productivity in Lough Iron.
Distribution (all SCI species)	There should be no significant decrease in the numbers or range of areas used by waterbird species, other than that occurring from natural patterns of variation	<p>Any such decrease in foraging resources has the potential to reduce to carrying capacity for the respective SCI species populations within the SPA.</p> <p>However, it is noted that EPA monitoring on the River Inny in 2017 noted that the lower reaches of the river (including</p>

Attribute	Target	Assessment
		<p>stations both upstream and downstream of Lough Iron) “<i>exhibited high macroinvertebrate diversity and were of satisfactory ecological condition in 2017, with a return to good ecological condition recorded at 0800 (Ballinalack Br.)</i>”. This suggests that ecological pressure as a consequence of peat harvesting is unlikely to be having a significant adverse effect on the SPA.</p> <p>Coolnagun supply bog is located within the potential foraging range for Greenland white-fronted goose (5-8 km). However, there is a considerable optimal foraging resource (agricultural grasslands and intact or recolonising cutover bog within a closer radius of Lough Iron. While flocks may overfly the supply bog it is envisaged that this species does not forage with any regularity in the immediate locality of Coolnagun bog. Peat harvesting is therefore unlikely to be having a significant adverse effect on this SPA SCI as a result of disturbance or displacement.</p>
Wetland habitat	The permanent area occupied by the wetland habitat should be stable other than that due to natural patterns of variation	Activities associated with peat supply on the Coolcraff, Milkernagh and Coolnagun supply bogs will not result involve any land-take within the SPA boundary. There will be no net change in the wetland habitat area as a result.

8.9 Other Plans and Projects

Article 6(3) of the Habitats Directive requires 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 for the site in view of the site’s conservation objectives.

It is therefore required that the potential impacts of the proposed development (including associated peat supply activities) are considered in combination with any other relevant plans or projects.

The assessment of potential in-combination impacts is presented as part of the Screening for Appropriate Assessment (refer to Section 6.3). No in-combination

impacts with other plans and projects were identified and no additional mitigation is therefore proposed as part of the Natura Impact Statement.

8.10 Mitigation

This section outlines measures which reduce the potential for adverse effects on European Sites from the proposed development and the associated harvesting and supply of peat fuel to LRP Station.

8.10.1.1 Operational phase

Sections 8.1 and 8.2 have identified a number of potential adverse effects arising as a result of the proposed development (in the absence of mitigation). These are presented in **Table 8-20**.

Table 8-20: Potential adverse effects for LRP Station operation

European Site	QI/SCI	Potential adverse effect
Lough Ree SAC	Natural eutrophic lakes	Release of pollutants to surface water (e.g. fuel spills) during the operational phase at LRP Station, may adversely affect water quality in Lough Ree
	Otter	A potential pollution event arising at LRP Station during the operational phase has the potential to lead to a localised fish kill, thereby reducing the localised fish biomass available to otter.
Lough Ree SPA	Little Grebe Whooper Swan Wigeon Teal Mallard Shoveler Tufted Duck Common Scoter Goldeneye Coot Golden Plover Lapwing Common Tern Wetlands and Waterbirds	A potential pollution event arising during the operational phase at LRP Station has the potential to lead to a localised drop off in aquatic vegetation and fish which form the dietary resource used by the respective SCI species. This has the potential to cause localised declines in populations.

A suite of environmental control measures (conditioned as part of IE Licence P0610-02 – no changes to these measures are proposed as part of the IE Licence Review) will continue to be implemented through the operational phase of LRP Station as follows:

Surface water– IE Licence environmental control measures

- Monitoring of all surface water discharges in line with IE Licence requirements;
- Oil interceptors which are checked and cleaned regularly;
- Storage tanks, chemical stores, transformers, barrels and containers are kept in permanent or temporary bunds;
- Discharges to greenfield runoff rates;
- Certified Environmental Management System (EMS) including but not limited to the following procedures:
 - Oil Spill Response Plan; and
 - Emergency Procedures for Chemical, Fire or Crisis.
- Oil spill equipment is available on site;
- Monitoring is carried out on the River Shannon up and downstream of discharge points biannually for the following parameters;
 - Temperature;
 - Chlorine;
 - Suspended Solids;
 - Dissolved Solids;
 - Ortho-phosphate (as P);
 - Sulphate; and
 - Heavy Metals.
- Frequent inspections of settlement ponds are carried out.

Noise mitigation – IE Licence control measures

While it is noted in Section 8.2 that significant noise-related disturbance to SCI species is not predicted, noise-related mitigation measures will continue to be implemented during the operational phase (as conditioned under IE Licence P0610-02); Daytime dB(A) LAeq (15 minutes) will be limited to 55 dB while night-time dB(A) LAeq (15 minutes) will be limited to 45 dB. There are no proposed changes to the normal operational noise of the LRP Station from the main generating plant itself.

The above mitigation measures will ensure that the identified potential adverse effects to the respective QI/SCIs during the operational phase of LRP Station (see **Table 8-20**) will be negated.

8.10.2 LRP ADF

Sections 8.1 and 8.2 have identified a number of potential adverse effects arising during the ongoing operational of LRP ADF (in the absence of mitigation). These are presented in **Table 8-21**.

Table 8-21: Potential adverse effects for LRP ADF operation

European Site	QI/SCI	Potential adverse effect
Lough Ree SAC	Natural eutrophic lakes	Release of pollutants to surface water (e.g. fuel spills) during the operational phase at LRP ADF, may adversely affect vegetation composition as a consequence of being transmitted downstream via the Newtownflannigan River and subsequently entering Derrymacar Lough and Lough Ree.
	Otter	A potential pollution event arising at LRP ADF during the operational phase has the potential of being transmitted downstream via the Newtownflannigan River and subsequently entering Derrymacar Lough and Lough Ree and causing a localised fish kill therein; this may reduce the localised fish biomass available to otter.
Lough Ree SPA	Little Grebe Whooper Swan Wigeon Teal Mallard Shoveler Tufted Duck Common Scoter Goldeneye Coot Golden Plover Lapwing Common Tern Wetlands and Waterbirds	A potential pollution event arising during the operational phase at LRP ADF has the potential of being transmitted downstream via Newtownflannigan River and subsequently entering Derrymacar Lough and Lough Ree and causing a localised decline in aquatic vegetation and fish biomass which form the dietary resource used by the respective SCI species. This has the potential to cause localised displacement of foraging birds.

A suite of environmental control measures (conditioned as part of IE Licence P0610-02 – no changes to these measures are proposed as part of the IE Licence Review) which are applicable to the ADF will continue to be implemented through the operational phase of the LRP ADF, as follows:

Surface water - IE Licence environmental control measures

A suite of environmental control measures (conditioned as part of IE Licence P0610-02) will continue to be implemented through the operational phase as follows:

- Monitoring of all surface water discharges in line with IE Licence requirements (note that under the IE Licence, there are no specific Emission Limit Values (ELVs) for surface water discharging from the ADF);

- The recirculation of leachate (partially used for dust suppression) ensures that none of the leachate is discharged from the LRP ADF; all leachate is recirculated in the ash cells and lost through evaporation or absorption by ash. In periods of heavy rain leachate is diverted to lined leachate lagoon for storage.
- Frequent inspections of Bord na Móna silt ponds (which receive ADF surface water) are carried out.
- Bord na Móna (who operate the ADF on behalf of ESB) have developed Specified Engineering Work (SEW) proposals for the construction of each cell within the ADF. These documents detail the scope of the work to be carried out and also includes the specifications to which this work will be completed in accordance with IE Licence P0610-02. Controls included are:
 - All plant and machinery is refuelled using a mobile fuel unit transported to the site by rail;
 - All plant operators are familiar with the Emergency Response Procedure ERP 2.0 (Oil, Diesel & Petrol Spillages) and the Emergency Response in the Event of Oil Spillage; and
 - All service trains / tractors contain a spill kit / dry peat, in the event of an oil / diesel spill.
- Water quality monitoring will be undertaken as indicated in the IE Licence as agreed by the EPA and supported by the existing on site certified EMS system. No further monitoring is proposed above IE Licence requirements.

The above mitigation measures will ensure that the identified potential adverse effects to the respective QI/SCIs during the operational phase at LRP ADF (see **Table 8-21**) will be negated.

8.10.3 LRP Supply Bogs

Sections 8.1 and 8.2 have identified a number of potential adverse effects arising as a result of peat harvesting at the respective LRP supply bogs (in the absence of mitigation). These are presented in **Table 8-22**.

Table 8-22: Summary of potential adverse effects arising from peat supply to LRP Station

European Site	QI/SCI	Potential adverse effect
Lough Ree SAC	Natural eutrophic lakes	Input of peat silt from supply bogs has the potential to cause the following impacts: <ul style="list-style-type: none"> • Changes to lake substratum as consequence of sediment deposition;

European Site	QI/SCI	Potential adverse effect
		<ul style="list-style-type: none"> • Reductions in light penetration and increases in organic content within the water column; • Increases in ammonia concentrations within the water column. <p>In the absence of mitigation measures relating to waterborne peat bog discharges, adverse effects cannot be ruled out.</p>
	Otter	Aquatic discharges from the respective supply bogs in the Lough Ree catchment have the potential to reduce fish biomass as a result of siltation and chemical content (i.e. Ammonia). In the absence of mitigation, this could have an effect on the broader otter population in the catchment.
Lough Ree SPA		<p>Aquatic discharges from the respective supply bogs in the Lough Ree catchment have the potential to reduce foraging resources for bird flocks as a result of increased turbidity leading to lower aquatic vegetation productivity. Similarly, fish biomass in the Shannon catchment may also be negatively affected by siltation and ammonia inputs; this may impact upon piscivorous species. In the absence of mitigation, this could have an effect on population numbers and distribution of SCI species in the catchment.</p> <p>Activities associated with peat supply can generate noise via the operation of mobile machinery comprising harvesters, tractors and staff vehicles, as well as the operation of the narrow gauge railway network with associated small diesel locomotives and wagons. Golden plover and Lapwing may roost or rest on bare peat fields, while wintering flocks of Whooper swan may occur on harvesting areas where there are temporary areas of standing water found in association with recolonizing surface vegetation upon which the flocks forage. These species may be locally displaced by human activity and noise generated by machinery at the respective supply bogs.</p>
Suck River Callows SPA	Whooper Swan Wigeon Golden Plover Lapwing Greenland White-fronted Goose	Aquatic discharges from the respective supply bogs in the Suck catchment have the potential to reduce foraging resources as a result of increased turbidity leading to lower aquatic vegetation productivity. In the absence of mitigation, this could have an adverse effect on population numbers and distribution of SCI species in the catchment.
	River Lamprey	There is potential for surface water run-off from the respective supply bogs in the surface

European Site	QI/SCI	Potential adverse effect
River Boyne and River Blackwater SAC		catchment of the Deel and Stonyford Rivers to result in adverse effects on River Lamprey within the River Boyne and River Blackwater SAC. This is primarily associated with potential siltation on spawning habitat, which has consequent effects on juvenile density and population structure.
	Salmon	There is potential for surface water run-off from the respective supply bogs in the surface catchment of the Deel and Stonyford Rivers to result in adverse effects on Salmon within the River Boyne and River Blackwater SAC. This is primarily associated with potential siltation on suitable spawning habitat, which has consequent effects on fry abundance density and population structure.
	Otter	Aquatic discharges from the respective supply bogs in the Boyne and Blackwater catchments have the potential to reduce fish biomass as a result of siltation and chemical content (i.e. Ammonia). In the absence of mitigation, this could have an effect on the broader otter population in the catchment.
River Barrow and River Nore SAC	River/Brook Lamprey	There is potential for surface water run-off from the respective supply bogs in the surface catchment of the Figile River to result in adverse effects on River/Brook Lamprey within the River Barrow and River Nore SAC. This is primarily associated with potential siltation on spawning habitat, which has consequent effects on juvenile density and population structure.
	Salmon	There is potential for surface water run-off from the respective supply bogs in the surface catchment of the Figile River to result in adverse effects on Salmon within the River Barrow and River Nore SAC. This is primarily associated with potential siltation on suitable spawning habitat, which has consequent effects on fry abundance density and population structure.
	Otter	Aquatic discharges from the respective supply bogs in the Barrow catchment have the potential to reduce fish biomass as a result of siltation and chemical content (i.e. Ammonia). In the absence of mitigation, this could have an effect on the broader otter population in the catchment.
	White-clawed crayfish	Changes in habitat or water quality as a result of peat sediment release to the River Barrow may impact upon eggs or hatchlings; this has the potential to adversely affect local recruitment rates. Siltation in a watercourse also has the

European Site	QI/SCI	Potential adverse effect
		potential to reduce habitat heterogeneity which is required by the different life stages of crayfish.
Lough Derravaragh SPA	Whooper Swan Pochard Tufted Duck Coot Wetland and Waterbirds	Water quality monitoring along the lower Inny River suggests ecological pressure as a consequence of peat harvesting is unlikely to be having a significant adverse effect on the SPA.
Lough Iron SPA	Whooper Swan Wigeon Teal Shoveler Coot Golden Plover Greenland White-fronted Goose Wetland and Waterbirds	Water quality monitoring along the lower Inny River suggests ecological pressure as a consequence of peat harvesting is unlikely to be having a significant adverse effect on the SPA.

Here follows a suite of mitigation measures which will be implemented during LRP Station peat supply activities:

Surface water mitigation – IPC License Measures

A series of standard measures aimed at protecting surface water quality currently implemented at the LRP supply bogs are required under the conditions of the respective IPC licenses as regulated by the EPA. These license conditions are reproduced in **Table 8-23**.

Table 8-23: Peat Supply Bog IPC License Conditions for Surface Water Quality

Measure	Mechanism by which water quality is protected
All drainage water from all boglands in the licensed area are discharged via an appropriately designed silt pond treatment arrangement	Silt ponds facilitate settlement of peat particles in suspension, prior to discharging of drainage water to surface water catchment. Silt content of discharge is significantly reduced.

Measure	Mechanism by which water quality is protected
Silt ponds serving operational bogs are cleaned at a minimum twice a year, once before ditching and once before harvesting, and more frequently as inspections may dictate. The outlet of the silt pond is blocked during cleaning operations to prevent release of sediment during cleaning.	Removal of settled peat silt which has accumulated in silt ponds ensures maximum efficiency of pond operation.
Drainage manholes are protected and maintained free of excessive peat	Combined implementation of these four measures ensure that localised high volumes of milled peat do not directly enter the drainage system (such as during periods of heavy rainfall).
Headlands are kept clean and free of excessive loose peat	
All new manholes and outfalls are set well back from turning grounds, drivers of bog plant do not turn short (over drains) at headlands	
Harrows, millers, ridgers do not drag loose peat onto manholes or into drains, outside harrow spoons are directed away from drains	
Silt run-off is minimised by blocking the silt pond outlet while piping or ditching	Settled peat silt which is disturbed during cleaning of silt pond is not permitted to escape pond prior to re-settlement.
Outfalls are controlled to minimise silt discharge during cleaning operations	
Drains are ditched in dry weather	Loose peat on sides and base of drains will remain in-situ and will not be readily transported to silt ponds during dry weather.
While ditching, outfalls are blocked and ditch towards outfall	
Outlets from stockpile field drains are blocked during stockpile loading	Blocked drains provide additional settlement time for peat silt during stockpile loading, prior to discharge to settlement ponds.
Field drains adjacent to stockpiles are cleaned as soon as practicable after stockpile loading	Settled peat silt which is deposited in drains during stockpile loading is not permitted to escape to silt pond.
Adequate room is allowed for rail beds beside Peco stockpiles	Avoids disturbance of loose peat on Peco stockpiles .
All fields that have been milled are ridged at the end of the production season	Ridging of milled peat minimises run-off of peat particles to drains.
All fields liable to winter flooding are cleared of milled peat or re-compacted at the end of the production season	Minimises suspension and subsequent discharge of peat particles during periods of flooding.
All silt ponds prone to flooding are de-silted by 1st November of each year. Excavated sludge is removed for disposal to a location outside the flood plain.	Removal of settled peat silt which has accumulated in silt ponds ensures maximum efficiency of pond operation.
All silt ponds serving operational bogs achieve the following minimum	Minimum criteria for silt pond capacity ensures maximum efficiency of pond

Measure	Mechanism by which water quality is protected
performance criteria (flood periods excepted): <ul style="list-style-type: none"> - Maximum flow velocity < 10 cms⁻¹ - Silt design capacity of lagoons, minimum 50m³ per nett ha of bog serviced 	operation in relation to scale of area of bog drained. Maximum flow velocity ensures optimum deposition of suspended peat particles prior to pond discharge.

Surface water mitigation – Silt ponds

Ongoing drainage of the respective LRP supply bogs is required to reduce peat moisture content prior to harvesting. The respective LRP supply bogs drain to the nearest surface waterbody. A network of managed silt ponds intercept the drainage prior to discharge, primarily to facilitate the removal of suspended solids.

This silt pond system is considered to reflect proven technologies and procedures for the mitigation of the effects of surface water run-off from peat bogs. The silt ponds are operated as requirements of the conditions of the respective supply bog grouping IPC Licences which are regulated by the EPA. The ELV for suspended solids under these licences is 35 mg/l; this is monitored by Bord na Mona in accordance with licence requirements.

Bord na Móna have an on-going silt pond maintenance programme. These silt ponds are currently being surveyed as part of Bord na Mona's continuous improvement programme to reflect any possible changes to drainage catchments and to assist in the RBMP programme of measures. Changes to drainage catchments are due to the extent of resource extraction since the silt ponds were originally developed as well as changes to internal outfalls and drainage regimes.

Surface water mitigation - River Basin Management Plan

The River Basin Management Plan (RBMP) for Ireland, published in 2018, identified peat extraction as causing a significant risk to ecological status objectives in 119 (8%) of the assessed waterbodies. Additionally, peat extraction is identified as a significant pressure in 16 (13%) high ecological status water bodies. The plan relates environmental impacts to suspended solids, ammonia and hydromorphological alterations (DHPLG, 2017). The RBMP notes that:

“Peat extraction has been identified as causing a significant risk to ecological status in 119 water bodies, which represents 8% of all water bodies that have been identified as At Risk [...] Of these, 115 are rivers, 3 are lakes and 1 is groundwater. The environmental impacts generally relate to suspended solids, ammonia and

hydromorphological alterations. There is evidence that high levels of ammonia are being released from peat-extraction activities during the draining process and, along with suspended solids, may be causing ecological impacts in receiving water bodies. The EPA plans to investigate the background concentrations of ammonia in peatlands to determine if they can be a contributory factor in elevated ammonia concentrations in water bodies.”

Section 7.4 of the RBMP also notes that of the 119 river water bodies that are *At Risk* because of activities taking place within peatlands, 46 (39%) of them are in areas that have peatlands owned by Bord na Móna, which has 87 peatlands in these areas. The remaining 73 water bodies are at risk from other activities, such as domestic turf extraction, unauthorised peat extraction, wind-farm construction, forestry or other commercial peat activities.

There are a number of principle actions proposed in the published RBMP to address these pressures at a strategic scale as follows:

- *The Minister for Housing, Planning, Community and Local Government intends to make regulations in 2017 as soon as possible that will require the EPA to carry out EIA for all existing and new large-scale peat extraction (> 30ha) as part of its examination of IPC license applications for the activity. When these regulations are made, proposals will be developed for public consultation relating to a new regulatory regime that will bring smaller-scale commercial peat extraction (≤ 30ha) under a new local authority licensing system incorporating EIA and AA, as necessary, and enforcement powers.*
- *The DCHG, together with the Peatlands Strategy Implementation Group, will oversee the implementation of the National Peatland Strategy and the first national management plan for Ireland’s raised-bog Special Areas of Conservation (SACs) network.*
- *The Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs will oversee the implementation of the Peatland strategy the principal aim of which is to provide a framework for determining and ensuring the most appropriate future use of cutover and cutaway bogs.*
- *Bord na Móna will implement its Sustainability 2030 Strategy and Biodiversity Action Plan 2016-2021 which addresses the long-term rehabilitation of its cutaway bogs.*
- *By 2021, Bord Na Móna will rehabilitate an additional 25 peatlands covering approximately 9,000ha. This is subject to several assumptions, including the availability of cutaway bogs for rehabilitation.*

As part of the RBMP principal actions, the EPA are assessing whether peat harvesting gives rise to ammonia release and measures to mitigate the generation and impact of ammonia from their cutaway peatlands if these are required. Following the evaluation of 2018 Research Calls, the EPA has awarded the following project: *Strategies to improve Water quality from Managed Peatlands*. The key objectives of the project, which will involve some collaboration with Bord na Móna, are as follows:

- (1) *To improve understanding of the hydrology, hydrogeology, water balances and nutrient exports from drained and extracted peatlands.*
- (2) *To investigate the impacts and pressures on water quality (chemistry, aquatic biota and hydromorphology) arising from the drainage and mining of peatlands by identifying contaminants pressure zones and assessing the significance and extent of these environmental impacts vis-à-vis Water Framework Directive and Flood Directive targets.*
- (3) *To evaluate environmental protection measures in order to develop best practices guidelines by appraising and developing a) robust water purification methods and b) sustainable land-use management practices including restoration/rewetting and after-use of cutaway/cutover bogs.*
- (4) *To integrate solutions to prevent/reduce water pollution with local rehabilitation plans and examine their potential synergy with other climate change -biodiversity measures.*
- (5) *To review and develop hydrological models for cutaway peatlands in order to predict the impacts of peatland drainage and peat extraction on downstream flooding, hydrograph peaks and environmental flows and thus to assess expected pollution levels in affected streams.*

In addition Bord Na Móna commenced work in 2017 on preparing Environmental Impact Assessments on all of its peatlands including AA, where necessary, in anticipation of the new streamlined licensing system for large-scale peat extraction (> 30ha) that will be operated by the EPA.

Expected outcome of the RBMP

Bord Na Móna expects to rehabilitate 9,000 ha. of cutaway bogs (covering 25 peatlands) by 2021 and will look to implement best-available mitigation measures to further reduce water quality impacts caused by peat extraction while the phasing-out process is taking place; this is conditioned under Condition 10 of the relevant IPC Licence. Such measures are the subject of the EPA research project outlined above. The proposal involves evaluating mitigation strategies from improving water quality from drained peatlands.

Of the 119 water bodies where peat extraction and associated drainage works have been identified as a significant pressure, 6 are expected to meet their WFD objectives by 2021; none of these are associated with Bord Na Móna peatlands. A further 62 water bodies are expected to meet their WFD

objectives by 2027; of these, 21 are associated with Bord Na Móna peatlands. Another 51 water bodies are expected to meet their WFD objectives after 2027; of these, 25 are associated with Bord Na Móna peatlands.

It is also noted that the Strategic Environmental Assessment (SEA) undertaken for the RBMP has determined that the above proposed measures will have broadly positive effect on the water environment. This in turn will contribute to delivering upon the attributes and targets of the various Qualifying Interests/Special Conservation Interests of the respective European Sites identified in Sections 8.1 through 8.8.

As noted in the RBMP measures, Bord na Móna is implementing a programme of rehabilitation (drain blocking, rewetting, vegetation) plans in order to stabilise former peat production areas and enhance biodiversity. The rewetting of former peat production areas and the development of wetland habitats will inevitably reduce potential for loss of suspended solids to the drainage network and ultimately to the Shannon, Boyne and Barrow catchments.

Noise and human disturbance

The production of milled peat at bogs adjacent to the River Suck Callows SPA could have the effect, in the absence of mitigation, of causing adverse impacts on Golden plover, Lapwing and Whooper swan as a consequence of disturbance and displacement.

The following mitigation measures relating to such disturbance are conditioned under the IPC licencing regime, as enforced by the EPA, and implemented in full by Bord na Móna.

- Noise emissions during peat extraction are limited by the IPC licensing regimes for the respective bogs, namely;
 - Activities on-site shall not give rise to noise levels off site at any noise sensitive location which exceed the following sound pressure limits (Leq,30min) subject to Condition 3:
 - Daytime: 55 dB(A)
 - Night-time: 45 dB(A)
 - There shall be no clearly audible tonal component or impulsive component in the noise emission from the activity at any noise sensitive location.
- Peat extraction typically only occurs during daylight hours, without any artificial lighting other than vehicular lights; and
- Minimal lighting at staff workshops.

The above mitigation measures will ensure that the identified potential adverse effects to the respective SCIs as a consequence of peat supply (**Table 8-23**) will be negated.

8.11 Residual Impacts

The mitigation measures described in Section 8.10 have been carefully considered to avoid, reduce or offset the possibility of adverse effects on the integrity of European Sites in light of their conservation objectives. The mitigation measures are best practice and comprise proven technologies as appropriate.

Assuming implementation of the mitigation measures during the operational phase at LRP Station and the ongoing implementation of measures during continued peat supply activities, the proposed development will not, either alone or in combination with other projects and plans, adversely impact the integrity of any relevant European Site. This conclusion has been reached on the basis of complete, precise and definitive findings and on the basis of best scientific knowledge and no scientific doubt remains as to the absence of the identified potential effects in circumstances where the mitigation measures will be implemented.

A summary of the assessment with reference to the integrity of site(s) (as reproduced in DEHLG (2010) from EC (2002) is presented below in **Table 8-24**. This table relates to all European Sites assessed in Sections 8.1 through 8.8.

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Table 8-24: Summary checklist - Assessment of impacts on site integrity

Conservation objectives: does the project or plan have the potential to:		Y/N
Cause delays in progress towards achieving the conservation objectives of the site?		N
Interrupt progress towards achieving the conservation objectives of the site?		N
Disrupt those factors that help to maintain the favourable conditions of the site?		N
Interfere with the balance, distribution and density of key species that are the indicators of the favourable condition of the site?		N
Other objectives: does the project or plan have the potential to:		Y/N
Cause changes to the vital defining aspects (e.g. nutrient balance) that determine how the site functions as a habitat or ecosystem?		N
Change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the site?		N
Interfere with predicted or expected natural changes to the site (such as water dynamics or chemical composition)?		N
Reduce the area of key habitats?		N
Reduce the population of key species?		N
Change the balance between key species?		N
Reduce diversity of the site?		N
Result in disturbance that could affect population size or density or the balance between key species?		N
Result in fragmentation?		N
Result in loss or reduction of key features (e.g. tree cover, tidal exposure, annual flooding, etc.)?		N

8.12 Conclusion of NIS

This NIS provides a complete, precise and scientifically robust assessment, in the light of the best scientific knowledge, of the possible adverse effects of the proposed development on the integrity of any European Sites within the identified Zone of Influence.

The assessment has shown beyond reasonable scientific doubt that, based on the evaluation completed and following the implementation of mitigation measures, the proposed continued operation of LRP Station including the ongoing harvesting and supply of peat fuel to the station, either alone or in combination with any other projects or plans, adversely affect the integrity of any European Site.

This Natura Impact Statement contains information which the Competent Authority (EPA), may consider in carrying out its Appropriate Assessment, and making its own complete, precise and definitive findings and conclusions.

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