Planning and Environmental Consultants

Remedial Natura Impact Statement

Peat Extraction Activities at the Ballivor Bog Group, Co. Meath and Westmeath. Substitute Consent Application

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1. INTRODUCTION

1.1 Background

MKO has been appointed to prepare a remedial Natura Impact Statement (rNIS) to allow the competent authority to conduct an Appropriate Assessment under Part XAB of the Planning and Development Acts 2000 (as amended) as part of an application for substitute consent for peat extraction and all peat extraction related activities that have been carried out within the Ballivor Bog Group (namely Ballivor, Carranstown, Bracklin, Lisclogher and Lisclogher West bogs, which are hereafter referred to as the 'Application Site'), located in Counties Meath and Westmeath.

This report also assesses the potential impacts of the implementation of the proposed Cutaway Bog Decommissioning and Rehabilitation plans for the Application Site (hereafter referred to as 'Rehabilitation Plans'), required under Condition 10 of its EPA Licence P0501-01. Henceforth, the above works as described above will be referred to as the Project, for the purposes of this remedial Natura Impact Statement (rNIS).

Section 177G of the Planning and Development Act 2000 (as amended) sets out that the rNIS shall contain:

- a statement of the significant effects, if any, on the relevant European site which have occurred, or which are occurring or which can reasonably be expected to occur because the development the subject of the application for substitute consent was carried out;
- details of any appropriate remedial or mitigation measures undertaken or proposed to be undertaken by the applicant to remedy or mitigate any significant effects on the environment or on the European site;
- details of the period of time within which any such proposed remedial or mitigation measures shall be carried out by or on behalf of the applicant.

A remedial Appropriate Assessment Screening Report (rAASR) has been prepared and is provided in **Appendix 1**. The rAASR identified the European Sites with potential to have been, and to be, significantly affected by peat extraction activities and all ancillary works from 1994. This is the date when the Habitats Directive came into force, although it was not transposed into Irish law until 1997, through the European Communities (Natural Habitats) Regulations 1997 (S.I. No. 94 of 1997), and Appropriate Assessment (AA) became a legal requirement, onwards. The European Sites with potential to be significantly affected by the implementation of the proposed rehabilitation plans for the Application Site were also identified. The potential for impacts on European Sites was assessed under three separate phases:

- **Peat Extraction Phase** - includes all works undertaken from 1994 to the cessation of peat extraction in June 2020. 1994 is when The Habitats Directive came into force, though it was not transposed into Irish law until 1997 through the European Communities (Natural Habitats) Regulations 1997 and when Appropriate Assessment (AA) became a legal requirement.
- **Current Phase**- includes all activities carried out at the site from the cessation of peat extraction in June 2020 to the present day.
- **Remedial Phase** - implementation of the proposed rehabilitation plans for the Application Site, required under Condition 10 of its EPA Licence P0501-01, following the cessation of peat extraction activities in 2020.

The rAASR identified the European Sites upon which significant effects could not be excluded. Those sites will be assessed in this remedial Natura Impact Statement.

This report has been prepared in compliance with Part XAB of the Planning and Development Act 2000 (as amended), the Planning and Development Regulations 2001 (as amended) and relevant

jurisprudence of the European and Irish Courts. It was also prepared in accordance with all relevant guidance including the following:

- Assessment of plans and projects in relation to Natura 2000 sites - Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC (European Commission (EC), 2021);
- Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (EC, 2018);
- Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities (Department of the Environment, December 2009, amended 11 February 2010); and
- Appropriate Assessment Screening for Development Management (Office of the Planning Regulator (OPR), 2021).

The purpose of the rNIS is to assess the implications of the Project, either alone or in-combination with other projects or plans, on the integrity of European sites in view of the sites' conservation objectives.

1.2 Statement of Authority

This report has been prepared by Sarah Mullen (B.Sc., M.Sc., Ph.D., ACIEEM) with input from Pádraig Desmond (B.Sc.) and reviewed by Pat Roberts (B.Sc. MCIEEM).

Pat Roberts is Principal Ecologist at MKO with over 16 years' experience. He currently manages the ecological team within MKO. Pat holds B.Sc. (Hons) in Environmental Science. He has extensive experience of providing ecological consultancy on large scale industrial and civil engineering projects. He is highly experienced in the completion of ecological baseline surveys and impact assessment at the planning stage.

Sarah Mullen holds a B.Sc. (Hons) in Botany, an M.Sc. in Biodiversity and Conservation and a Ph.D. in Botany. Sarah has over 6 years' experience working in ecological consultancy and has extensive experience in undertaking habitat and species surveys and working on Ecological Impact Assessment and Appropriate Assessment. and ensures that the outputs from that team are of a very high standard and meet the requirements of the clients.

Pádraig Desmond is a Project Ecologist within MKO and holds a B.Sc. (Hons) in Ecology and Environmental Biology. He has four years of ecology survey experience and has been in consultancy for three years, working on Ecological Impact Assessment and Appropriate Assessment for a wide range of projects.

The baseline ecological surveys were undertaken between April 2020 and June 2024 by Pat Roberts (B.Sc., MCIEEM), John Hynes (B.Sc., M.Sc., MCIEEM), Sarah Mullen, Inga Reich (BSc., Ph.D.), Patrick Ellison (B.Sc., M.Sc., ACIEEM), Rachel Walsh (B.Sc.), Julie O'Sullivan (B.Sc., M.Sc.), Aoife Joyce (B.Sc., M.Sc.), Luke Dodebier (B.Sc.), Cathal Bergin (B.Sc.) Neansai O'Donovan (B.Sc.) and Neill Campbell (M.Sc.), Stephanie Corkery (B.Sc., M.Sc.), Rudraksh Gupta (B.Sc., M.Sc.), Tom Peters (B.Sc.), Mairead Kavanagh (B.Sc.), Deepali Mooloo (B.Sc., M.Sc.), Cora Twomey (B.Sc.) and Ciara Hackett (B.Sc.) and Pádraig Desmond of MKO.

The hydrological assessment which is included as Chapter 8 of the remedial EIAR which accompanies the substitute consent application, and the results of which have informed the conclusions of this assessment, has been prepared by Michael Gill (BA, BAI, Dip Geol., MSc, MIEI), Adam Keegan (B.Sc., M.Sc.) and Conor McGettigan (B.Sc., M.Sc.) of Hydro Environmental Service (HES).

2. SUMMARY OF REMEDIAL AASR AND ASSESSMENT OF QUALIFYING FEATURES LIKELY TO BE SIGNIFICANTLY AFFECTED

The remedial Appropriate Assessment Screening report (rAASR) that is provided as **Appendix 1** to this remedial Natura Impact Statement (rNIS), concluded that there was potential for the following European Sites to have been, and to be, significantly affected by peat extraction activities and all ancillary works:

- River Boyne and River Blackwater Special Area of Conservation (SAC); and
- River Boyne and River Blackwater Special Protection Area (SPA).

The Qualifying Interests (QIs) and Special Conservation Interests (SCIs) with the potential to be affected and the pathways by which any such effects may have occurred are set out below for each site. The location of the Application Site and connectivity with these EU designated sites is provided as Figure 2.1.

2.1 River Boyne and River Blackwater SAC

The River Boyne and River Blackwater SAC is located adjacent to the north-eastern boundary of the Application Site. Following application of the precautionary principle, a potential pathway for direct effects on otter where they occur outside the SAC, as a result of direct habitat loss was identified. Direct habitat loss could potentially occur or have occurred during drain maintenance works where any otter resting or breeding sites were or are present on the Application Site.

There is hydrological connectivity between the Application Site and this SAC via drainage ditches and watercourses within the Application Site which discharge to the Stonyford River approx. 248m to the east of the Application Site and the Deel (Raharney) River, approximately 767m to the west of the site, both of which are designated as part of the SAC at this location and discharge to the River Boyne downstream of the site. A potential pathway for indirect effects on the aquatic QIs of this SAC as a result of peat extraction activities and all ancillary works during both the Peat Extraction Phase and Current Phase was identified. During these phases there would have been and currently is potential for deterioration in surface and ground water quality due to runoff of pollutants, including silts and hydrocarbons, to watercourses within and downstream of the site. Therefore, a potential pathway for indirect effects on the following aquatic QIs where they occur downstream of the site was identified:

- Alkaline fens [7230]
- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) [91E0]
- *Lampetra fluviatilis* (River Lamprey) [1099]
- *Salmo salar* (Salmon) [1106]
- *Lutra lutra* (Otter) [1355]

During the implementation of the proposed rehabilitation plans for the Application Site there will be a requirement for small volumes of machinery and personnel on site for drain blocking works. Taking a precautionary approach, a potential pathway for indirect effects on the above listed QIs during the implementation of the proposed rehabilitation plans as a result of deterioration of water quality due to runoff of pollutants during such works was identified.

A potential pathway for indirect effects on otter as a result of disturbance was also identified.

2.2 River Boyne and River Blackwater SPA

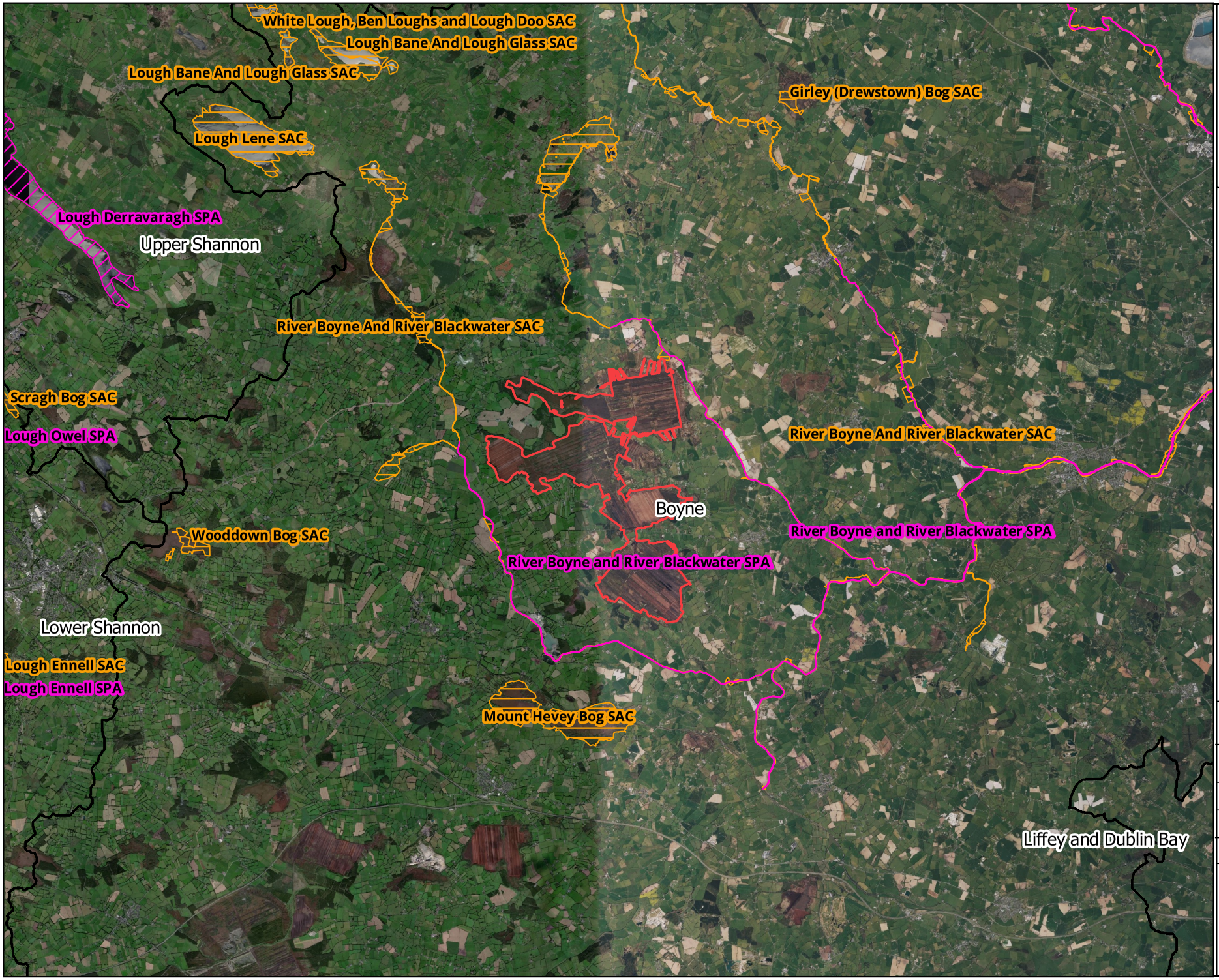
The River Boyne and River Blackwater SPA is located approximately 230m to the east of the Application Site at its closest point. Taking a precautionary approach, a potential pathway for direct effects on Kingfisher, where they occur outside the SPA, as a result of direct habitat loss was identified. Direct habitat loss could potentially occur or have occurred during drain maintenance works where any kingfisher nesting sites were or are present on the site.

There is hydrological connectivity between the Application Site and this SPA via watercourses within the Application Site which discharge to the Stonyford River to the east, the Deel (Raharney) River to the west and the River Boyne, all of which are designated as part of the SPA.

A potential pathway for indirect effects on kingfisher as a result of peat extraction activities and all ancillary works during both the Peat Extraction Phase and Current Phase was identified. During these phases there would have been and currently is potential for deterioration in surface water quality due to run-off of pollutants, including silts and hydrocarbons, to watercourses within and downstream of the site. This has potential to negatively affect availability of food resources for the SCI species kingfisher.

During the implementation of the proposed rehabilitation plans for the Application Site there will likely be a requirement for small volumes of machinery and personnel on site for drain blocking works. Taking a precautionary approach a potential pathway for indirect effects on kingfisher as a result of deterioration of water quality due to runoff of pollutants during such works was identified.

Taking a precautionary approach a potential pathway for indirect effects on kingfisher during all phases of the Project, as a result of disturbance was also identified.



Map Legend

- Application Site Boundary
- Special Protection Area (SPA)
- Special Area of Conservation (SAC)
- WFD Hydrological Catchments

N

Drawing Title
EU Desingnated Sites surrounding the application site

Project Title
Ballivor Substitute Consent Application

Drawn By	Checked By
PD	SM
Project No.	Drawing No.
191137-f	2-1
Scale	Date
1:175,000	02/07/2024

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3. DESCRIPTION OF THE PROJECT

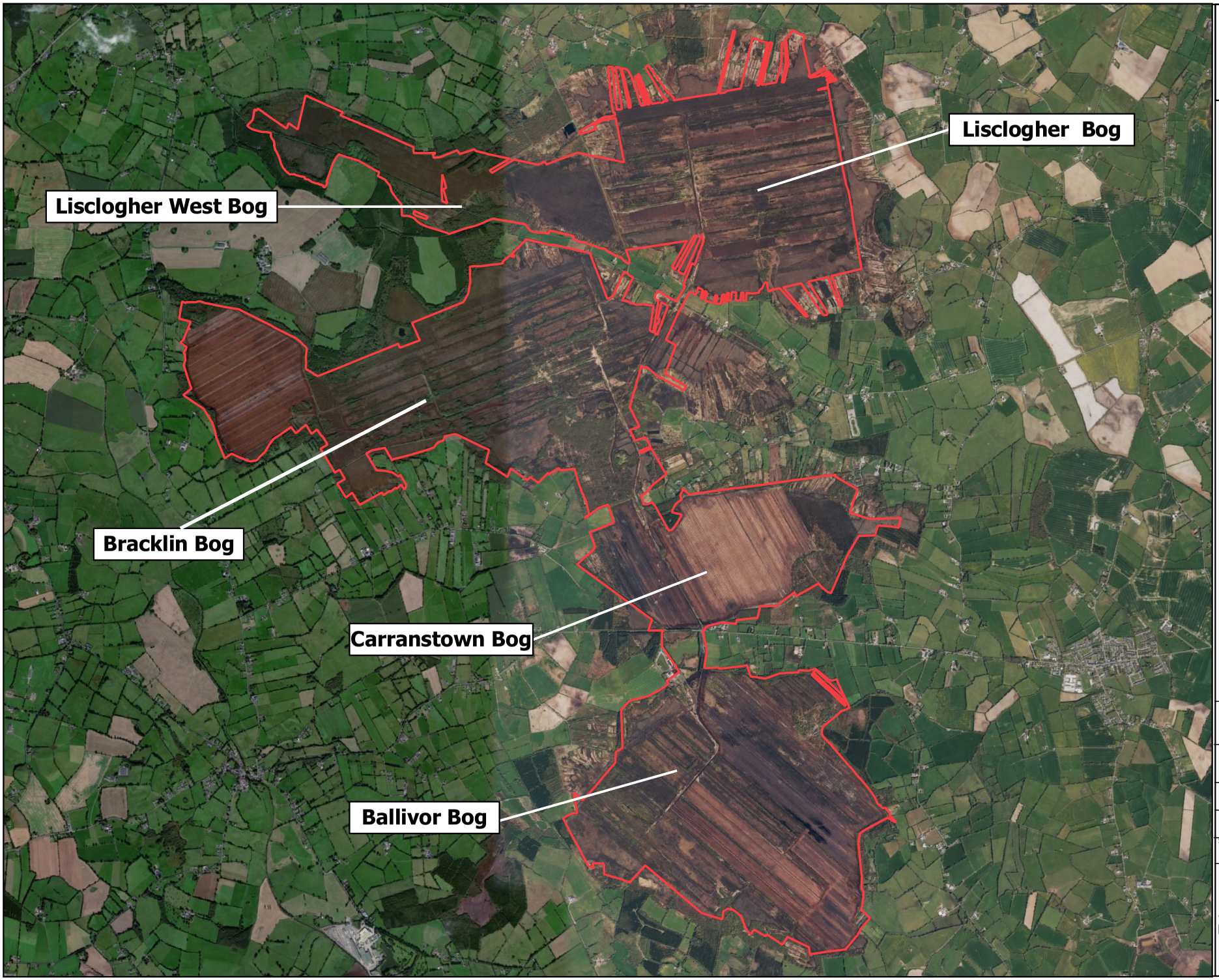
3.1 Site Location

The Application Site comprises five bogs located at the Westmeath-Meath County border. The bogs include: Ballivor, Carranstown, Bracklin, Lisclogher and Lisclogher-West (collectively referred to as Ballivor Bog Group) and comprises a site area of 2,421 hectares (ha) within which bog drainage works began in 1948 followed by the commencement of peat extraction from 1953to 2020. The Application Site is located 2.5 km south-southeast of Delvin, 3.7km east of Raharney and 2.2km west of Ballivor Village. The site location is shown on Figure 3-1. The Application Site covers several townlands which are listed below in Table 3-1. The Application Site measures approximately 9.27km in length from north to south, and approximately 7.0 kilometres from east to west, at its widest point. *Grid Reference co-ordinates for the approximate site centre are E263560, N257213.* Under the Water Framework Directive (WFD), the Application Site is located within the Boyne_SC_040 and Boyne_SC_050 sub catchments and the Boyne (Catchment ID 07).

The current main site access points include a northern and southern entrance off the R156 Regional Road into Carranstown Bog and Ballivor Bog, respectively. Access to the remaining bogs is possible through Carranstown Bog and via local roads off the N52, N51 and N4 such as the L4106, L4101.

Table 3-1 Townlands within which the Application Site is located.

Bog Reference	County	Townlands - Meath	Townlands - Westmeath	Spatial Footprint (ha)
Ballivor	Meath / Westmeath	Clondalee More, Derryconor, Clonycavan, Robinstown Killaconnigan	Grange More, Riverdale	638
Bracklin (including Hill of Downey)	Westmeath	N/A	Craddanstown, Bracklin, Killagh, Ballynaskeagh (Ballynaskeagh E.D.), Mucklin	772
Carranstown	Meath / Westmeath	Killaconnigan, Carranstown Little, Carranstown Great	Grange More	304
Lisclogher	Meath / Westmeath	Coolronan	Lisclogher Great, Cockstown, Clonleame, Bracklin Clonmorrill	479
Lisclogher West	Westmeath	N/A	Bracklin, Ballyhealy or Ballinure, Bolandstown, Martinstown (Ballyhealy E.D).	228
Total Spatial Footprint: 2,421 ha				



Map Legend

Application Site Boundary

N

Drawing Title

Ballivor Bog Group Site

Project Title

Ballivor Substitute Consent Application

Drawn By	Checked By
PD	SM
Project No.	Drawing No.
191137-f	3-1
Scale	Date
1:50,000	02/07/2024

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3.2 Project Details

Chapter 4: Description of the accompanying rEIAR, which is included as Appendix A of the rAASR in **Appendix 1** of this rNIS, provides a description of the activities at the Application Site from 1948. It details activities at the onset of site preparation up to July 1988, a description of the rEIAR baseline as of July 1988, a description of activities from 1988 to the cessation of peat extraction in June of 2020, the management of the Application Site since June 2020 and the activities intended to be carried out at the Application Site into the future.

Whilst Chapter 4: Description includes extensive information on activities within the Application Site from 1948 onwards, this rNIS only assesses activities detailed in Appendix A (Chapter 4: Description) of the rAASR within the Application Site from 1994 onwards. As previously mentioned, 1994 is when The Habitats Directive came into force, though it was not transposed into Irish law until 1997 through the European Communities (Natural Habitats) Regulations 1997 and when Appropriate Assessment (AA) became a legal requirement.

3.2.1 Description of the Site in 1988 & 1994

The paragraphs below are taken from **Appendix A** of the rAASR and describe the bogs within the Application Site at the rEIAR 1988 baseline. Whilst this rAASR only assess activity within the Application from 1994, the majority of the information provided below would still have been applicable at this time as peat extraction continued until 2020.

By July 1988, land use at the Application Site was well established as industrial peat extraction. Apart from Lisclogher West, all bogs were fully drained, sod and milled peat extraction were underway in certain locations and railway infrastructure was in place. The main entrance points to the Application Site were located north and south off the Ballivor-Raharney (R156) road. and the machine pass/rail crossings between Brackiln and Lisclogher bog. The Ballivor Works, which comprised a peat processing plant, canteen, storage sheds, and maintenance buildings, was located in the north of Ballivor Bog, where it is still located in present day. The following ancillary infrastructure was established at the site by July 1988:

- Railway infrastructure (all bogs within the Application Site except Lisclogher West);
- Internal machine passes/tracks (all bogs within the Application Site except Lisclogher West);
- Bulk Loading Facility at the Works of R156 in Ballivor Bog (Planning Grant 1983);
- Workshop and extension at the Works of R156 in Ballivor Bog (Planning Grant 1977);
- Covered Loading Bay at the Works off R156 in Ballivor Bog (Planning Grant 1972);
- Silt ponds and drains (all bogs (apart from Lisclogher West) within the Application Site); and,
- Two pumps at Ballivor Bog and one pump at Lisclogher Bog (Decommissioned by 2000).

Ballivor Bog July 1988

Satellite imagery and annual reports indicate that by July 1988, approx. 473ha of Ballivor Bog were undergoing sod and milled peat extraction. Thus, the main landcover type at this time was cutover peat. Several small areas measuring approx. 165ha of remnant uncut raised bog were located predominantly at the edges of the bog. Drainage was already installed, predominantly in a northwest-southeast orientation and two pumps were in operation. Railway infrastructure was laid in the bog (since the 1950s), terminating at the Works building located in the north of Ballivor Bog, just off the Ballivor-Raharney (R156) road. The Works area housed several peat processing buildings, canteen and welfare facilities, waste storage areas, carparking facilities and a refuelling area. Ballivor Bog included 7 no. artificial silt ponds, and 7 no. surface water emission points which remain *in situ* today. The Clondalee More stream flows out from the southwest of the bog. The main access point to Ballivor Bog was off the Ballivor-Raharney (R156) road adjacent to the Works area. The topography of Ballivor Bog is estimated to have been approx. 74m – 82mOD by July 1988.

Carranstown Bog July 1988

Aerial imagery from 1988 indicates that drainage was in place and extraction of milled peat was underway on approx. 80ha in the western portion of Carranstown Bog. A total of 117ha were drained but not subject to peat extraction. Carranstown bog was linked via railway infrastructure to Ballivor Bog to the south, and to Bracklin Bog to the north-west. The bog included 5 no. artificial silt ponds, and 4 no. surface water emission points which remain *in situ* today. Areas of remnant uncut raised bog remained intact (approx. 187ha), predominantly at the edges of the bog. The Killaconnigan River runs along the southern boundary of Carranstown Bog. The main access point to the Carranstown Bog was to the south of the Application Site via the Ballivor-Raharney (R156) road, which remains the main access point today. The topography of this bog is estimated to have been approx. 72 – 78mOD by July 1988.

Bracklin Bog July 1988

By July 1988, peat extraction was underway across most of Bracklin Bog, (approx. 351ha). Areas of remnant uncut raised bog remained intact across Bracklin Bog (approx. 363ha), predominantly at the edges, with approx. 58ha of Bracklin Bog drained but not yet subject to peat extraction. Drainage for both milled and sod peat extraction was already installed, and railway infrastructure, which was laid throughout the 1950s and 1960s, connected Bracklin Bog to Carranstown Bog (to the south) and Lisclogher Bog (to the north). Bracklin Bog included 6 no. artificial silt ponds, and 5 no. surface water emission points which remain *in situ* today. The main access point to Bracklin Bog is off a local road at the northeast of the bog or internally from the south through Carranstown Bog. The topography of Bracklin Bog is estimated to have been approx. 75m – 89mOD by July 1988.

Lisclogher July 1988

By July 1988 Lisclogher bog had been drained and sod peat extraction was underway across 378ha of the bog, with an estimated 101ha of raised remnant intact bog remaining. Railway infrastructure was also *in situ*, connecting Lisclogher Bog to Bracklin Bog to the southwest. Access to the Lisclogher Bog in 1988 was via the local road to the west of the bog to the machine pass adjacent to the rail crossing, and this remains the main access point at present day. This local road, which runs in a southeast-northwest orientation, defines the western boundary of Lisclogher Bog and separates Lisclogher Bog from Lisclogher-West. The topography of Lisclogher Bog is estimated to have been approx. 73 – 79mOD by July 1988.

Lisclogher West July 1988

Drainage infrastructure was installed in Lisclogher West Bog during 1988 and subsequent years across an area of approx. 22ha, as deduced from available aerial imagery. This area was never subject to peat extraction. An area of 106ha of Lisclogher West Bog was never subject to drainage or peat extraction works and therefore, the landcover in 1988 comprised mainly natural raised bog with raised bog features such as high bog, wet flush areas and bog woodland particularly at the bog borders. The bog includes 6 no. silt ponds and 2 no. surface water emission points. The Cartenstown stream flows in a west-to-east direction through the bog and the Bolandstown stream flows west-to-east along the southern boundary of the bog. Access to Lisclogher West Bog was and remains via a local road which runs through the bog in an east-to-west direction, or via a local road which defines the eastern boundary of Lisclogher West bog and separates Lisclogher West Bog from Lisclogher Bog to the east. The topography of the bog is estimated to have been approx. 77 – 82mOD by July 1988. An esker runs east-west adjacent to the along the northern bog boundary.

3.3 Peat Extraction

Peat extraction, as detailed in Section 4.2.2 of Appendix A of the rAASR, continued at the Application Site until June 2020 when peat extraction ceased across the Application Site. Section 4.5 of Appendix A details the continued peat extraction activities within the Application Site from the rEIAR baseline of 1988 until 2020, which includes the period of assessment for this rAASR (1994 -2020). Section 3.3.1.1 below is a modified version of Section 4.5.1.1 of Appendix A to cover the peat extraction assessment period of this rAASR only.

3.3.1.1 Peat Extraction Volumes July 1994-2020

The volumes of peat removed from the Application Site varied from year to year and were mainly weather dependent. The tonnages of peat extracted are outlined in Plate 3-1 and in Table 3-2 below:

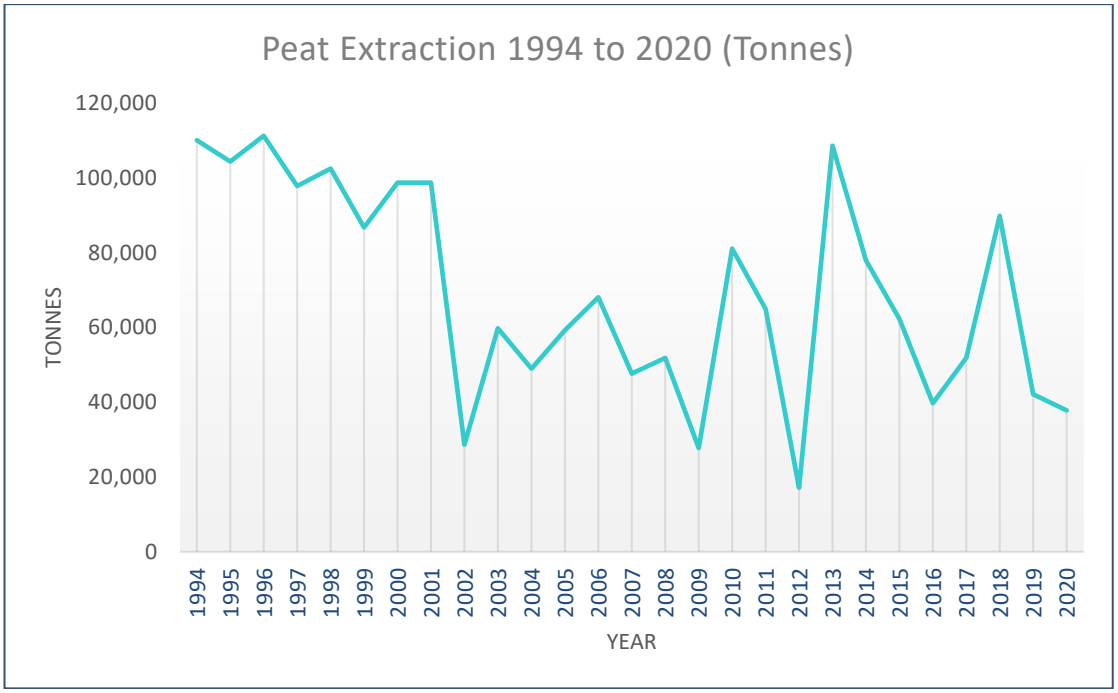

Plate 3-1 Annual Peat Extraction Volumes 1994-2020

Table 3-2 Peat Extraction 1994-2020 (Tonnes)

Year	Tonnes	Year	Tonnes
1994	110,074	2008	51,829
1995	104,384	2009	27,721
1996	111,260	2010	81,062
1997	97,800	2011	64,951
1998	102,495	2012	17,095
1999	86,749	2013	108,605
2000	98,610	2014	77,968

2001	98,610	**2015**	62,267
2002	28,640	**2016**	39,730
2003	59,737	**2017**	51,844
2004	48,956	**2018**	89,839
2005	59,251	**2019**	42,115
2006	68,069	**January- June 2020**	37,782
2007	47,637		
Total Volume Extracted (tonnes)	1,875,080		

Bord na Móna records indicate that from 1994 and until 1999 inclusive, on average 102,127 tonnes of peat (sod and milled) were extracted from Ballivor, Brackin, Lisclogher and Carranstown bogs. There are no peat extraction records for the period 2000 to 2001 inclusive. In determining the overall peat extraction volumes from 1988 until June 2020, an average of the 1990 to 1999 extraction figures was used for the 2000 and 2001 seasons (i.e. 98,610 tonnes) Records indicate that on average, 56,058 tonnes of peat were extracted each year from 2002 to 2020. The total volume of peat extracted from 1994 to 2020 is estimated to be 1,875,080 tonnes.

Full details of peat extraction activity within the Application Site during the assessment period are detailed in Section 4.5.1.1 of **Appendix A**.

4. CHARACTERISTICS OF THE RECEIVING ENVIRONMENT

The ecological surveys that were undertaken to inform this rNIS are fully described in this section. The specific surveys that were undertaken to assess the potential effects on the European Sites identified in Section 2 above are described below.

4.1 Ecological Survey Methodologies

4.1.1 Desk Study Methodology

The desk study undertaken for this assessment included a thorough review of available data pertaining to the Application Site and surrounding area, as well information pertaining to the Screened-in European Sites identified in Table 3-1 of the rAASR and in Section 2 above. The purpose of the desk study was to obtain information on the baseline ecological conditions for the following time periods:

- 1994 - when the Habitats Directive was transposed into Irish Law as referenced in Section 1.
- 2003 - when the River Boyne and River Blackwater SAC was first designated (as a cSAC).
- 2010 - when the River Boyne and River Blackwater SPA was first designated.
- Present day.

Sources of information included the following:

- Bord na Móna Habitat Mapping for the Application Site
  - The Application Site was subject to detailed habitat surveys by Bord na Móna ecologists between 2011 and 2012 (with follow-up site visits in subsequent years as outlined below) and detailed habitat maps were prepared.
    - Ballivor Bog: Site surveyed and mapped December 2011, May 2012. Follow up visits between 2011 and 2021 and habitat maps updated where required.
    - Bracklin Bog: Site surveyed and mapped July 2012. Additional walkover surveys undertaken between 2015-2017 and habitat maps updated where required.
    - Lisclogher Bog: Site surveyed and mapped April 2010. Additional walkover surveys undertaken between 2010 and 2017 and habitat map updated where required.
    - Lisclogher West: Site surveyed and mapped July 2012. Additional site visits undertaken between 2012 and 2016 (visited winter 2016/2017) and habitat maps updated where required.
    - Carranstown Bog: Site surveyed and mapped July 2012. Additional walkover surveys undertaken between 2012 and 2021 and habitat maps updated where required.
- Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plans for Ballivor Bog Group (included in **Appendix 2** of this report)
  - Ballivor Bog 2024 Draft Cutaway Bog Decommissioning and Rehabilitation Plan.
  - Bracklin Bog 2024 Draft Cutaway Bog Decommissioning and Rehabilitation Plan.

- Lisclogher-West 2023 Cutaway Bog Decommissioning and Rehabilitation Plan.
- Lisclogher East 2024 Draft Cutaway Bog Decommissioning and Rehabilitation Plan.
- Carranstown 2022 Cutaway Bog Decommissioning and Rehabilitation Plan.

- Aerial Maps from 1973 to 2020 (included in **Appendix 4-4** of the accompanying rEIAR).
- Review of NPWS Site Synopses, Conservation Objectives for the European Sites
- Review of 2019, 2013 and 2007 EU Habitats Directive (Article 17) Reports.
- Review of online web-mappers: National Parks and Wildlife Service (NPWS), Environmental Protection Agency (EPA), EPA (Envision), Water Framework Directive (WFD), Geological Survey of Ireland (GSI) and Inland Fisheries Ireland (IFI)
- Review of rare and protected species records from the NPWS Rare and Protected Species Database for the hectads N55, N65 and N66 which overlap with the Application Site.
- Review of OS maps and aerial photographs of the site of the Project.
- Review of relevant databases including National Biodiversity Ireland Database and available literature of previous surveys conducted in the area.
- Review of relevant available Plans, including the Meath County Development Plan 2021-2027, Meath County Development Plan 2013-2019, Meath County Development Plan 2007-2013, Westmeath County Development Plan 2021-2027, Westmeath County Development Plans 2014-202, 2008-2014 and 2002-2008, the National Biodiversity Action Plan 2017-2021, County Westmeath Heritage Plan 2018-2023, and the All Ireland Pollinator Plan 2021-2025.
- Section 2.3.4 in Chapter 2 of the accompanying rEIAR also provides a summary of historic County Development Plans for County Meath and County Westmeath dated from 1981 onwards, along with the Ballivor Development Plan form 1993.
- Review of the Bat Conservation Ireland (BCI) Private Database.
- MKO field assessments and bird surveys carried out between 2020 and 2024 and as provided in full in the rEIAR which accompanies the application.
- Cummins et al. (2010). Assessment of the distribution and abundance of Kingfisher [*Alcedo atthis*] and other riparian birds on six SAC river systems in Ireland. A report commissioned by the National Parks and Wildlife Service and prepared by BirdWatch Ireland
- Sharrock, J.T.R. (1976) The atlas of breeding birds in Britain and Ireland.
- Lack, P.C. (1986) The atlas of wintering birds in Britain and Ireland.
- Gibbons, D.W., Reid, J.B. & Chapman, R.A. (1993) The new atlas of breeding birds in Britain and Ireland: 1988-1991.
- Biosphere Environmental Services (BES) breeding and wintering bird survey reports for the Application Site (2012-2020).
- Integrated Pollution Control Licence (IPC) Licence Derrygreenagh Bog Group (Ref. P0501-01) Environmental Protection Agency (**Appendix 3**).
- IPC Licence P0501-01 Application (Available at EPA Headquarters on request).

4.1.2 Scoping and Consultation

MKO undertook a scoping exercise during preparation of the accompanying rEIAR for the substitute consent application. This is described in Section 2.6 of Chapter 2 of the rEIAR.

Copies of all scoping responses are included in Chapter 2: Background of the accompanying rEIAR. Scoping responses relevant to European Designated Sites and Appropriate Assessment are summarised in Table 4-1 below.

Table 4-1 Scoping Responses

No.	Consultee	Date of Response	Response
1	An Taisce	None to date	None to date
2	Bat Conservation Ireland	None to date	None to date
3	Bird Watch Ireland	None to date	None to date
4	Butterfly Conservation Ireland (BCI)	None to date	None to date
5	Commission for Regulation of Utilities	None to date	None to date
6	Department of Agriculture, Food and the Marine (including forestry)	07/01/2022, 14/03,2024	**07/01/2022** No observations to make at the time of response. **14/03/2024** Response received relating to felling licence - see observations attached from their Felling Division.
7	Department of Culture, Heritage and the Gaeltacht	14/02/2022	Response received from Development Applications Unit under the following headings: › Nature Conservation; ○ Ensure no impacts on Designated Sites ○ Cumulatively assess third party turf cutting › Matters relating to the rEIAR ○ rEIAR should assess from Feb 1990 onwards when EIA Directive was transposed into Irish Law ○ Include spatial and temporal peat and drainage info; drainage maintenance activities, ancillary works, vegetation clearance timeframes ○ Should include offsite projects and end-users such as peat processing factory in Ballivor ○ Refer to EPA monitoring data ○ Refer to emissions associated with peat extraction › Matters relating to Appropriate Assessment
7	Department of the Environment, Climate and Communications	21/01/2022	Forwarded on a response from the GSI which was a generalised response recommending we use the GSI mapviewer and forward on any geotechnical reports we produce
8	Department of Housing, Local Government and Heritage	14/01/2022, 16/02/2024	**14/01/2022** Provided heritage related observations and recommendations under the following headings: › Nature Conservation › Archaeological Impact Assessment › Matters related to the rEIAR › Matters related to Appropriate Assessment **16/02/2024**

No.	Consultee	Date of Response	Response
			Provided further heritage related observations and recommendations
9	Department of Tourism, Culture, Arts, Gaeltacht Sport and Media	None to date	None to date
10	Transport Infrastructure Ireland	08/12/2021, 20/03/2024	**08/12/2021** Provided recommendations to be considered in the preparation of rEIAR which may affect national road network. **20/03/2024** Provided updated recommendations to be considered in the preparation of the rEIAR which may affect national road network.
11	Department of Transport	16/12/2021, 29/02/2024	**16/12/2021** No observations to make at the time of response. **29/02/2024** No observations to make at the time of response.
12	Eastern and Midland Regional Assembly	None to date	None to date
13	Environmental Protection Agency	10/12/2021, 21/01/2022, 27/03/2024	**10/12/2021** Requested further comments on the scope and level of detail of the information to be included by the developer in the environmental impact assessment report within two weeks of the response. **21/01/2022** The Agency is of the opinion that the scope and level of detail to be included in the remedial environmental impact assessment report should as a minimum: (i) address the matters raised in the responses received from the bodies detailed above; (ii) have regard to the rehabilitation plan(s) required under Condition 10 of Licence Reg No. P0501 for any relevant bog areas; (iii) consideration should be given to inclusion of any relevant bog areas in an enhanced rehabilitation scheme, e.g., under the Peatlands Climate Action Scheme (PCAS). (iv) have regard to relevant water quality monitoring data. Any gaps in water quality data for receiving waters should be filled by a sampling programme over an appropriately representative period of time. **27/03/2024**

No.	Consultee	Date of Response	Response
			Provided same Scoping Opinion as issued previously.
14	EirGrid	None to date	None to date
15	Fáilte Ireland	19/12/2021, 01/03/2024	**19/12/2021** Provided non-statutory guidance document on the Treatment of Tourism in EIA **01/03/2024** Provided same guidance document as issued previously.
16	Geological Survey of Ireland	15/12/2021, 28/02/2024	**15/12/2021** › Provided list of relevant available datasets, › Recommend referring to GSI Groundwater and Geothermal Unit run GW Climate project; which is a groundwater monitoring and modelling project that aims to investigate the impact of climate change on groundwater in Ireland. This is a follow on from a previous project (GWFlood). › Requests copy of reports detailing any site investigations carried out. **28/02/2024** Provided same list of available datasets and recommendations as issued previously.
17	Health Service Executive	22/12/2021	HSE is satisfied that the Scoping Document identifies the potential environmental effects of the project which will be addressed in the rEIAR.
18	Inland Fisheries Ireland	None to date	
19	Irish Peatland Conservation Council	None to date	None to date
20	Irish Red Grouse Association	None to date	None to date
21	Irish Raptor Study Group	None to date	None to date
22	Irish Water	20/03/2024	Provided recommendations to be considered in the preparation of rEIAR which may affect Water Services.
23	Irish Wildlife Trust	21/02/2024	No capacity to respond at the time.
24	Meath County Council - Planning Department	04/02/2022	› The scope of works proposed in the Biodiversity Section should include reference to invasive species in accordance with European Communities (Birds and Natural Habitats) Regulations 2011 – Third Schedule (Regulations 49 and 50). › Habitat Surveys should have regard to the extent of Annex I habitats on site – in

No.	Consultee	Date of Response	Response
			particular – Annex I habitat Degraded raised bogs still capable of regeneration [code 7120]. › It is noted in section 4.2 - 'In compliance with the IPC licence P0501-01, draft Rehabilitation Plans have been produced by Bord na Móna for all Bogs in the Ballivor Bog Group It is a requirement of Condition 10 of the aforementioned IPC Licence, however, that following decommissioning of use or involvement of all or part of the site in the licensed activity, Bord na Móna prepares (to the satisfaction of the EPA) and implements a final Cutaway Bog Rehabilitation Plan for the Ballivor Bog Group. › The discharge of Condition 10 will facilitate the permanent rehabilitation of the Ballivor Bog Group in conjunction with any parallel future end-uses (wind energy infrastructure)'.
25	Office of Public Works	None to date	None to date
26	Eastern River Basin District	None to date	None to date
27	Sustainable Energy Authority of Ireland	None to date	None to date
28	The Heritage Council	None to date	None to date
29	The Arts Council	None to date	None to date
31	Waterways Ireland	15/02/2024	No observations to make at the time of response.
32	Westmeath County Council - Planning Department	None to date	None to date

The recommendations of the consultees have been taken into consideration in the preparation of this rNIS where relevant.

4.1.3 Field Survey Methodologies

In addition to the desk study described above, a comprehensive survey of the biodiversity of the entire site was undertaken on various dates, set out below, throughout 2020, 2021, 2022, 2023, and 2024 in order to obtain information on the present day ecology of the site. The surveys undertaken are summarised in Table 4-2. The following sections fully describe the ecological surveys that have been undertaken and provide details of the methodologies, dates of survey and guidance followed.

Table 4-2 Summary of surveys undertaken to inform the rNIS

Survey	Dates
Multi-disciplinary walkover survey	23rd April, 26th May, 4th June and 3rd September 2020 26th and 27th May 2021, 8th and 15th July 2021, 27th September 2021 26th April 2022 16th February and 14th and 22nd of August 2023 24th April 2024 6th June 2024
Detailed habitat and vegetation composition surveys	26th and 27th of May 2021, 27th September 2021 Ground truthed in 2023 and 2024
Otter surveys	26th and 27th of May 2021, 27th September 2021 Ground truthed in 2023 and 2024
Aquatic surveys	July 2021 Ground truthed in 2023 and 2024
Bird surveys including kingfisher	Various dates between October 2019 – March 2023

4.1.3.1 Ecological Multidisciplinary Walkover Surveys

Multidisciplinary walkover surveys of the Application Site were undertaken throughout 2020, 2021, 2022, 2023, and 2024. The survey timings fall within the recognised optimum period for vegetation surveys/habitat mapping, i.e. April to September (Smith *et al.*, 2011). During the site visits a comprehensive walkover of the Application Site was completed with incidental records also incorporated from other dedicated species/habitat specific surveys including otter, bats, marsh fritillary or quadrat surveys.

The multi-disciplinary walkover surveys comprehensively covered the Application Site with further detailed targeted surveys carried out for features and locations of ecological significance. These surveys were carried out in accordance with NRA *Guidelines on Ecological Surveying Techniques for Protected Flora and Fauna* on National Road Schemes (NRA, 2009).

During the multidisciplinary surveys, a search for Invasive Alien Species (IAS) listed under the Third Schedule of the European Communities Regulations 2011 (S.I. 477 of 2015) was conducted.

Other targeted survey methodologies undertaken at the Application Site are described in the following subsections.

The Application Site was revisited on various dates during 2023 and 2024 to review the findings of the surveys undertaken and to update with any changes to the ecological baseline that may have occurred over time.

4.1.4 Otter Surveys

Otter is a Qualifying Interest (QI) for the River Boyne and River Blackwater SAC. Therefore, dedicated otter surveys of the watercourses within the Application Site were conducted. Additional otter surveys were undertaken by Ross Macklin of Triturus Environmental Ltd. during aquatic surveying of the watercourses within the vicinity of the Application Site.

The otter surveys were conducted as per NRA (2009) guidelines (Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes). This involved a search for all otter signs e.g. spraints, scat, prints, slides, trails, couches and holts. In addition to the width of the rivers/watercourses, a 10m riparian buffer (both banks) was considered to comprise part of the otter habitat (NPWS 2009). The dedicated otter survey also followed the guidance as set out in NRA (2008) *'Guidelines for the Treatment of Otters Prior to the Construction of National Roads Schemes'* and following CIEEM best practice competencies for species surveys (CIEEM, 2013[1]).

4.1.5 Aquatic Surveys

Aquatic surveys of the watercourses draining the site were conducted by Ross Macklin of Triturus Environmental Ltd. A total of 20 sites were surveyed. The site locations are shown in Figure 2.1 of the Aquatic Report in **Appendix 4**. While the surveys were undertaken to inform the rEIAR for the proposed Ballivor Wind Farm, the survey covered all watercourses draining the Application Site, i.e. the Application Site and provided comprehensive information on the nature of the watercourses within and draining the Application Site.

The surveys included Biological Water Quality (Q sampling) which was assessed through kick sampling, electrofishing and a broad aquatic habitat assessment at each location which assessed watercourses in terms of:

- Physical watercourse/waterbody characteristics (i.e., width, depth etc.)
- Substrate type, listing substrate fractions in order of dominance (i.e., bedrock, boulder, cobble, gravel, sand, silt etc.)
- River profile in the sampling area
- An appraisal of the macrophyte and aquatic bryophyte community at each site
- Riparian vegetation composition

The methodologies for the aquatic surveys are described within the aquatic report.

4.1.6 Kingfisher

Kingfisher is a Special Conservation Interest (SCI) for the River Boyne and River Blackwater SPA. During the multi-disciplinary walkover surveys described above a search for suitable kingfisher habitat was undertaken. In addition, bird surveys were undertaken by MKO at the Application Site. The methodologies are included in the bird survey report in **Appendix 5**. While the surveys were undertaken to inform the rEIAR for the proposed Ballivor Wind Farm, the study area for the bird surveys encompassed the Substitute Consent Application Site. During these surveys all observations of kingfisher were recorded.

[1] *CIEEM, 2013, Technical Guidance Series – Competencies for Species Survey, Online, Available at: https://cieem.net/resource/competencies-for-species-survey-css/ Accessed: 20.03.2021*

4.2 Desk Study Results

The results of a review of the NPWS Site-Specific Conservation Objectives documents, site synopsis documents and Natura 2000 standard data forms for the Screened-in European Sites identified in Section 2 above are presented below.

4.2.1 River Boyne and River Blackwater SAC

The River Boyne and River Blackwater SAC was designated as an SAC (cSAC) in 2003. The Qualifying Interests (QIs) for which the site is designated and their associated conservation objectives (Site Specific Conservation Objectives, NPWS, Version 1 2021) are presented in Table 4-3.

Table 4-3 Qualifying Interest and Conservation Objectives

Qualifying Interest	Conservation Objective
Alkaline fens [7230]	To maintain the favourable conservation condition of Alkaline fens in River Boyne and River Blackwater SAC.
Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) [91E0]	To restore the favourable conservation condition of Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae)* in River Boyne and River Blackwater SAC
Lampetra fluviatilis (River Lamprey) [1099]	To restore the favourable conservation condition of River Lamprey (*Lampetra fluviatilis*) in River Boyne and River Blackwater SAC
Salmo salar (Salmon) [1106]	To restore the favourable conservation condition of Atlantic Salmon (*Salmo salar*) in River Boyne and River Blackwater SAC,
Lutra lutra (Otter) [1355]	To maintain the favourable conservation condition of Otter (*Lutra lutra*) in River Boyne and River Blackwater SAC

4.2.1.1 Main pressures and threats to the SAC

The NPWS Natura 2000 – Standard Data Form for the SAC (available on www.natura2000.eea.europa.eu) was viewed on 03 July 2024. The data form contains a description of the SAC as well as ecological information on the SAC and identifies the main threats and pressures to the SAC.

The threats, pressures and activities identified in the Natura 2000 standard data form for the River Boyne and River Blackwater SAC are listed in Table 4-4.

Table 4-4 Site-specific threats, pressures and activities

Negative Impacts			
Rank	Threats and Pressures		Inside/Outside
M	G02.10	Other sport / leisure complexes	Inside
H	H01	Pollution to surface waters (limnic, terrestrial, marine & brackish)	Inside
L	D01.05	Bridge, viaduct	Inside
M	A07	Use of biocides, hormones and chemicals	Inside
M	A08	Fertilisation	Inside
M	A05.02	Stock feeding	Outside
L	G01	Outdoor sports and leisure activities, recreational activities	Inside
H	J02.15	Other human induced changes in hydraulic conditions	Inside
M	A01	Cultivation	Inside
M	A10.01	Removal of hedges and copses or scrub	Inside
M	C01.01	Sand and gravel extraction	Inside
L	G05.06	Tree surgery, felling for public safety, removal of roadside trees	Inside
L	G05	Other human intrusions and disturbances	Inside
M	A10.01	Removal of hedges and copses or scrub	Inside
M	E05	Storage of materials	Inside
M	E01.04	Other patterns of habitation	Inside
M	J02.11	Siltation rate changes, dumping, depositing of dredged deposits	Inside
M	J02.10	Management of aquatic and bank vegetation for drainage purposes	Inside
M	D01.02	Roads, motorways	Inside
M	E03.02	Disposal of industrial waste	Inside
H	E03.04	Other discharges	Inside
M	J02	Human induced changes in hydraulic conditions	Inside

Negative Impacts			
Rank	Threats and Pressures		Inside/Outside
H	E02	Industrial or commercial area	Inside
H	I01	Invasive non-native species	Inside
M	B01.02	Artificial planting on open ground (non-native trees)	Inside

4.2.1.2 Qualifying Interests

Information on the Qualifying Interests (QIs) for which the site is designated are provided below.

4.2.1.2.1 *Alkaline fens*

According to the site-specific conservation objectives (SSCO) document for the SAC alkaline fen has not been mapped in detail for the River Boyne and River Blackwater SAC. The main areas of alkaline fen in the SAC are documented to occur in the vicinity of Lough Shesk, Freekan Lough, Newtown Lough in the upper reaches of the Stonyford River. At Lough Shesk, the habitat is particularly well-represented and there is a good example of succession from open water to fen-type habitat (NPWS, 2021). The nearest mapped area of alkaline fen is located adjacent to the northern boundary of the Application Site.

4.2.1.2.2 **Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnionincanae, Salicionalbae)*

According to the SSCO document for the SAC this feature is present within River Boyne and River Blackwater SAC. As part of the National Survey of Native Woodlands (NSNW), the sub-sites Grove Island (NSNW site code 688) and Yellow Island (752) were surveyed by Perrin et al. (2008). Yellow Island (code 752) was also included in national monitoring surveys (O'Neill and Barron, 2013; Daly et al., in prep.). Map 3 of the SSCOs shows the minimum area of alluvial forests within the SAC, which is estimated to be 16.7ha (Perrin et al., 2008; Daly et al., in prep.). Further unsurveyed areas of this habitat may also be present within the SAC (NPWS 2021). According to Map 3 of the SSCOs there is an area of alluvial forest mapped approximately 67km downstream of the site, however, further un-surveyed areas of this habitat are likely to occur elsewhere.

4.2.1.2.3 *Lampetra fluviatilis (River Lamprey)*

According to the SSCO document for the SAC artificial barriers can block or impede the passage of upstream migrating lamprey, thereby restricting access to spawning areas. There are a number of weirs along the lower sections of the Boyne main channel. Efforts to trap adult river lamprey were undertaken at four locations throughout the catchment during November 2014 to April 2015. This was augmented in April 2015 by an extensive fyke-netting survey (n=26 sites). No adult river lamprey were encountered, with the only record to date being a dead individual from the River Boyne at Slane in late March 2015. On the Boyne main channel, there is ideal spawning habitat both upstream and downstream of the weir at Blackcastle but spawning has not been observed at these locations to date (NPWS 2021).

4.2.1.2.4 *Salmo salar (Salmon)*

According to the SSCO document for the SAC artificial barriers can block salmons' upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas. There are multiple barriers to fish migration in the Boyne system (NPWS 2021).

4.2.1.2.5 *Lutra lutra (Otter)*

According to the SSCO document for the SAC the current range for this species within the SAC is estimated at 93.6%. The extent of terrestrial habitat is calculated as 447.6 ha along river banks/lake shoreline/around ponds. The extent of freshwater habitat is calculated as 363.3km. According to the SSCOs otters need lying up areas throughout their territory where they are secure from disturbance.

4.2.2 River Boyne and River Blackwater SPA

The River Boyne and River Blackwater SPA was first designated as an SPA in 2010 (formally designated by Statutory Instrument in 2012). The Special Conservation Interest (SCI) for which the site is designated and its associated conservation objective (Site Specific Conservation Objectives, NPWS, Version 1 2024) is presented in Table 4-5.

There are no site-specific conservation objectives for this SPA. The generic conservation objective for kingfisher is therefore presented.

Table 4-5 Qualifying Interest and Conservation Objectives

Special Conservation Interest	Conservation Objective
Kingfisher	To maintain the Favourable conservation condition of Kingfisher in River Boyne and River Blackwater SPA.

4.2.2.1 Main pressures and threats to the SPA

The NPWS Natura 2000 – Standard Data Form for the SPA (available on www.natura2000.eea.europa.eu) was viewed on 03 July 2024. The data form contains a description of the SPA as well as ecological information on the SPA and identifies the main threats ad pressures to the SPA.

As per the Natura 2000 Data Form, the site-specific threats, pressures and activities with potential to effect on the SPA are listed in Table 4-6 below.

Table 4-6 Site-specific threats, pressures and activities

Negative Impacts			
Rank	Threats and Pressures		Inside/Outside
M	J02	Human induced changes in hydraulic conditions	Inside
H	E01	Urbanised areas, human habitation	Outside
H	D01.02	Roads, motorways	Inside
H	D01.02	Roads, motorways	Outside
H	E01.03	Dispersed habitation	Outside

Rank: H = high, M = medium, L = low. i = inside, o = outside, b = both

4.2.2.2 Special Conservation Interests

Information on the Special Conservation Interests (SCIs) for which the site is designated are provided below.

4.2.2.2.1 *Kingfisher [A229]*

According to the SSCO document for this SPA, the all-Ireland population of kingfisher is estimated at 1,300- 2,100 pairs (NPWS, 2013). A survey of six SAC river catchments in 2010 identified this SPA as supporting 15-19 breeding territories/pairs, or up to 1.4% of the all-Ireland population. In 2010, densities of 0.09-0.12 territories/km length of channel were recorded for this site (Cummins et al., 2010), and these were among the highest territory abundance recorded in surveys, with the lowest densities (0.04-0.08 territories/km) found on the Barrow and the Munster Blackwater systems (0.05 territories/km)

According to the site synopsis document the SPA supports a nationally important population of kingfisher and a 2010 survey recorded 19 pairs of kingfisher in the SPA. A survey conducted in 2008 recorded 20-22 Kingfisher territories within the SPA. A study by Cummins et al. (2010) recorded kingfisher sightings along both the Stonyford and Deel (Raharney) rivers. In addition, the study identified a section of the Stonyford River to the east of Lisclogher Bog as a possible kingfisher territory. Other species which occur within the site include Mute Swan, Teal, Mallard, Cormorant, Grey Heron, Moorhen, Snipe and Sand Martin

4.2.3 EPA River Catchments and Watercourses

A summary of the Water Framework Directive (WFD) status and risk result of Surface Water Bodies (SWBs) in the vicinity and downstream of the Application Site are shown in Table 4-7 below.

The western section of Bracklin Bog is drained by the Deel(Raharney)_030 SWB. The status of this SWB has decreased from “Good” in the 2010-2015 round to “Moderate” in the latest round (2013-2018). Further downstream the Deel(Raharney)_040 SWB achieved “Good” status in both monitoring rounds while the Deel(Raharney)_050 SWB was assigned “Moderate” status. The Deel (Raharney)_060 SWB drains the western section of Ballivor Bog and its status has increased from “Moderate” to “Good”.

The Boyne_060 SWB drains the eastern section of Ballivor Bog and Carranstown Bog. This SWB has also experienced an improved status from “Moderate” in 2010-2015 to “Good” in 2013-2018. The Stonyford River drains Lisclogher, Lisclogher West and Bracklin bogs with both SWBs (Stonyford_030 and _040) recording a deteriorating in status from “Good” in 2010-2015 to “Moderate” in 2013-2018. Further downstream the Boyne_070 and Boyne_080 both achieved “Moderate” status in the latest WFD round.

The majority of these SWBs have been deemed to be “At risk” of not meeting their WFD objectives. Hydromorphological changes have been deemed to be significant stressors on several of these SWBs. Hydromorphological pressures mean that the waterbody has experienced change to its physical habitat or natural functioning caused by, for example, channelisation and straightening of rivers or land drainage.

Table 4-7 Summary WFD Information for Surface Water Bodies

River Waterbody	Status 2010-2015	Risk Status 2010-2015	Status 2013-2018	Risk Status 2013-2018
Deel (Raharney)_030	Good	Not at Risk	Moderate	At Risk
Deel (Raharney)_040	Good	Not at Risk	Good	Not at Risk
Deel (Raharney)_050	Moderate	At Risk	Moderate	At Risk
Deel (Raharney)_060	Moderate	At Risk	Good	Under Review
Boyne_050	Good	Not at Risk	Good	Not at Risk
Boyne_060	Moderate	At Risk	Good	At Risk
Stonyford_030	Good	Not at Risk	Moderate	At Risk
Stonyford_040	Good	Not at Risk	Moderate	At Risk
Boyne_070	Good	Not at Risk	Moderate	At Risk
Boyne_080	Moderate	At Risk	Moderate	At Risk

4.2.3.1 EPA Biological Q-Rating Monitoring

A full hydrological assessment of the Application Site was undertaken for the accompanying rEIAR (Chapter 8: Hydrology) and is included in Appendix 6 of this rNIS. Information from this chapter was used to inform the assessment presented in this rNIS.

EPA Q-rating monitoring has been completed at several dates and at multiple locations on the Deel (Raharney), Stonyford and Boyne rivers in the vicinity and downstream of the site between 1990 and 2020. These watercourses are all designated as part of both the River Boyne and River Blackwater SAC and the River Boyne and River Blackwater SPA.

The Deel (Raharney) River receives drainage from Bracklin and Ballivor bogs. Q Values for the River Deel (Raharney) between 1990 and 2020 are shown in Table 4-8. Of the monitoring locations situated downstream of the Application Site, 'High' status was not achieved after 1990. The Deel (Raharney) River achieved 'High' status downstream of the site and upstream of its confluecne with the River Boyne in 1990 (Station Code: RS07D010600). The lowest Q-value assigned to the Deel(Raharney) River downstream of the site occurred at Raharney Bridge in 2003 when it achieved 'Poor' status (Station Code: RS07D010300). Generally however the Q-ratings downstream of the site have fluctauted between 'Moderate' and 'Good' Q status.

Table 4-8 Summary of Q-Ratings on the Deel(Raharney) River from 1990-2020

Station ID	Location Description	Easting	Northing	Available Data	EPA Q-Rating Range
RS07D010070	Bridge west of Mabestown (upstream of site)	255870	265493	1990 - 2020	3.5 – 4.5
RS07D010090	Bridge upstream of Lough Analla (upstream of site)	256495	262448	1990 – 2003	3 - 4
RS07D010100	Bridge upstream of Cummer Bridge (upstream of site)	257915.83	260230.25	1985 - 1990	3.5 – 4.5
RS07D010200	Cummer Bridge	258458	257621	1985 – 2020	3.5 – 4
RS07D010300	Raharney Bridge	260085	253021	1985 - 2020	3.5 – 4
RS07D010400	Inan Brodge	263452	250407	1985 - 2020	3.5 – 4
RS07D010600	Bridge upstream of confluence with Boyne River	269031	249313	1985 - 2020	3.5 - 4

The Stonyford River receives discharge from Lisclogher, Lisclogher West, Bracklin and Carranstown bogs. Q values for the Stonyford River between 1990 and 2020 are shown in Table 4-9. Of the monitoring locations situated downstream of the site, 'High' status was not achieved at any date between 1990 and 2020. The lowest Q-value assigned to the Stonyford River downstream of the site at Stonyford Bridge (Station Code: RS07S020075) and at a bridge near Rathkenna (Station Code: RS07S020100) which both achieved 'Poor' status in 2020. Generally however the Q-ratings downstream of the site have fluctauted between 'Moderate' and 'Good' Q status between the 1990s and 2020.

Table 4-9 Summary of Q-Ratings on the Stonyford River during the Peat Extraction Phase (1994 – 2020)

Station ID	Location Description	Easting	Northing	Available Data	EPA Q-Rating Range
RS07S020065	Bridge near Ballinlough (upstream of site)	262027	264264	2000 - 2020	3.5 – 4
RS07S020070	Bridge near Clonmaskill (upstream of site)	262103	262562	1990 - 1997	3.5

Station ID	Location Description	Easting	Northing	Available Data	EPA Q-Rating Range
RS07S020075	Stonestown Bridge (upstream of site)	263805	261681	2000 - 2020	3 – 4
RS07S020090	Upstream of Rathkenna Bridge	267684	258139	1990 - 2003	3.5 – 4
RS07S020080	Lisclogher Bridge	265568	261131	1990 - 1997	3.5 – 4
RS07S020400	Stonyford Bridge	273148	253252	1990 - 2020	3.5 – 4.5
RS07S020300	Shanco Bridge	270561	254707	1990 - 2003	4
RS07S020200	Earl's Bridge	269403	256080	1990	4

The Boyne River recieves discharge from Carranstown and Ballivor Bogs and from the remainder of the site via the Deel (Raharney) and Stonyford Rivers. Q values for the River Boyne between 1990 and 2020 are shown in Table 4-10 below. Of the monitoring locations situated downstream of the site, 'High' status was achieved on 2 no. occasions at Inchamore Bridge (Station Code: RS07B040800). The lowest Q-rating status assigned to the Boyne River during the Peat Extraction Phase was 'Moderate' status. Generally the Q-ratings downstream of the site have fluctauted between 'Moderate' and 'Good' Q status during this phase of the development.

Table 4-10 Summary of Q-Ratings on the Boyne River during the Peat Extraction Phase (1994– 2020)

Station ID	Location Desciption	Easting	Northing	Available Data	EPA Q-Rating Range
RS07B040600	Ashfield Bridge	268466	244868	1990 - 2020	3 – 3.5
RS07B040800	Inchamore Bridge	271093	249913	1990 - 2020	3.5 – 4.5
RS07B040900	Scariff Bridge	273392	252679	1990 - 2020	3.5 - 5
RS07B041000	Derrinydaly Bridge	276679	253937	1990 - 2020	3.5 – 5
RS07B041100	Downstream of Athboy confluence	278039	256559	1990 - 2020	3.5 - 4

No available EPA Biological Q-rating monitoring data post-dates 2020. The most recent Q-rating data for the Deel (Raharney), Stonyford and Boyne rivers is presented in Table 4-11 below. This data shows the Q-status of the Deel (Raharney), Stonyford and Boyne rivers downstream of the site ranges from 'Poor' to 'Good' status.

Table 4-11 Most recent (2020) Q-ratings

River	Station ID	Location	EPA Q-Rating (Year)	Q-Value Status
Deel (Raharney)	RS07D010200	Cummer Bridge	4 (2020)	Good
Deel (Raharney)	RS07D010300	Raharney Bridge	4 (2020)	Good
Deel (Raharney)	RS07D010400	Inan Bridge	3-4 (2020)	Moderate
Deel (Raharney)	RS07D010600	Bridge upstream of Boyne River confluence	4 (2020)	Good
Boyne	RS07B040800	Inchamore Bridge	4 (2020)	Good
Boyne	RS07B040900	Scariff Bridge	4 (2020)	Good
Stonyford*	RS07S020075	Stonestown Bridge	3 (2020)	Poor
Stonyford	RS07S020100	Bridge upstream of Rathkenna Bridge	3 (2020)	Poor
Stonyford	RS07S020400	Stonyford Bridge	3-4 (2020)	Moderate
Boyne	RS07B041000	Derrinydaly Bridge	3-4 (2020)	Moderate

4.2.3.1.1 Water Framework Directive Groundwater Body Status

Local Groundwater Body (GWB) and Surface water Body (SWB) status reports are available for download from (www.wfdireland.ie).

The Athboy GWB (IE_EA_G_001) underlies the Application Site. This GWB has been assigned 'Good Status' in both the 2010-2015 and 2013-2018 monitoring rounds. This status is defined based on the quantitative status and chemical status of the GWB. The Athboy GWB is deemed to be "At risk" of not meeting its WFD objectives, however, no significant pressures have been identified to be impacting this GWB.

4.3 Ecological Survey Results

4.3.1 Habitat survey

As detailed in Section 4 above, the habitats at the Application Site were the subject of a detailed survey and assessment by Bord na Móna ecologists between 2011 and 2012 and a detailed habitat map was produced of the entire Application Site. This habitat mapping and assessment was undertaken following the Bord na Móna habitat classification scheme and was cross referenced with '*A Guide to Habitats in Ireland*' (Fossitt, 2000).

Between 2020 and 2024, MKO ecologists visited the site to ground-truth the results of the Bord na Móna habitat surveys and mapping and to undertake detailed habitat and botanical surveys. The habitat descriptions in this section are based on the walkover surveys and detailed vegetation surveys undertaken by MKO in 2021, 2022, 2023 and 2024.

The Application Site comprises four large cutover raised bogs classified as **Cutover Bog (PB4)** and one bog where drainage was installed but which was never subject to peat extraction. Large areas of the cutover bog have been undergoing peat extraction until relatively recently (up to 2020) and are characterised by bare peat. Where peat extraction ceased on areas of the cutover bog for a significant period of time, i.e. since the late 80s and early 90s, these areas have since largely revegetated, primarily by dry heath type vegetation dominated by ling heather (*Calluna vulgaris*), birch (*Betula pubescens*) dominated scrub and woodland, pioneer poor fen communities characterised by common cottongrass (*Eriophorum angustifolium*) and small areas of grassland which occur mostly along the existing railway tracks traversing the Application Site. In some areas, particularly lower lying areas where drainage is impeded, embryonic bog communities dominated by common cottongrass and with a rich Sphagnum component have begun to form. The habitats described above occur in intimate mosaics within the Application Site, which show the location and relative cover of the habitats recorded within the site at a high level. The habitats are described in greater details in the sections below.

In addition to the habitats of the cutover bog, there are also a number of small areas of remnant uncut raised bog at various locations throughout the Application Site, predominantly but not exclusively at the edges of the Application Site.

Waterbodies within the Application Site include a network of drainage ditches, small streams/watercourses classified as lowland depositing rivers, small areas of standing open water and artificial silt ponds. The watercourses including streams and drainage ditches provide hydrological connectivity with downstream EU and Nationally designated sites and are described in more detail below.

4.3.1.1 Cutover Bog (PB4)

The vast majority of the Application Site, with the exception of Lisclogher West and small remnant sections of raised bog mainly around the peripheries of the Application Site, comprise of cutover raised bog or cutaway peat classified as **Cutover Bog (PB4)**. Where peat extraction recently ceased on large areas of the Application Site, e.g., Carranstown, the western extent of Bracklin Bog and much of Ballivor Bog, these areas are dominated by bare peat with little growth of vegetation (Plate 4-1). Where vegetation has begun to colonise relatively recently, areas consist of mosaics of bare peat and pioneer open cutaway communities, including pioneer ling heather (*Calluna vulgaris*) dominated Dry heath (HH1) vegetation and pioneer common cottongrass (*Eriophorum angustifolium*) dominated poor fen (PF2) or a mosaic of both.

Where peat extraction has ceased for some time, e.g. much of Bracklin Bog as well as southern extent of Ballivor Bog and Lisclogher, mosaics of well-established secondary dry heath and poor fen type communities as well as birch (*Betula pubescens*) dominated Scrub (WS1) and dry Bog woodland (WN7) are present.

A small number of areas of cutover bog within the Application Site, particularly those in low lying areas with impeded drainage, are relatively wet with some standing water and an abundant Sphagnum component in comparison to drier cutover habitats. These areas have been mapped as embryonic bog vegetation in Bord na Móna habitat surveys in 2011 and 2012 and often occur in associated with areas of standing water and poor fen and flush communities with abundant common cottongrass.

The following sub-sections provide a description of the secondary habitats that have begun to form on the cutover bog following cessation of peat extraction.

Plate 4-1 Cutover bog characterised predominantly by bare peat

4.3.1.1.1 Bog Woodland (WN7)

Birch dominated **Bog Woodland (WN7)** is common throughout the Application Site (Plate 4-2), most notably in Bracklin Bog where it occurs alongside birch dominated Scrub as one of the dominant habitats of the cutover bog. A large area of bog woodland is also present at the south-eastern section of Carranstown and smaller areas are present at various locations throughout Lisclogher and Ballivor Bogs.

Bog woodland within the Application Site is generally dominated by downy birch (*Betula pubescens*) with some willows (*Salix* sp.), and occasional lodgepole pine (*Pinus contorta*), rowan (*Sorbus aucuparia*) and sitka spruce (*Picea sitchensis*). The shrub layer is mostly dominated by brambles (*Rubus fruiticosus agg.*) with ivy (*Hedera helix*) and bracken (*Pteridium aquilinum*) also occurring frequently and bilberry (*Vaccinium myrtillus*) occasionally. Ground flora frequently included wild strawberry (*Fragaria vesca*) and occasionally field woodrush (*Luzula sylvatica*), purple moor grass (*Molinia caerulea*), soft rush (*Juncus effusus*) and hart's tongue fern (*Asplenium scolopendrium*). The areas of bog woodland were mostly dry underfoot with little to no Sphagnum cover and did not conform to Annex I Bog Woodland (91DO). Bryophytes recorded typically included *Thuidium tamariscinum* and *Hypnum jutlandicum*. Areas of bog woodland within the Application Site are generally small in size, often comprising wide linear strips running parallel to drainage ditches, however larger more extensive areas of bog woodland are present in some areas, including at the southern and northern ends of Bracklin Bog, at the southern end of Ballivor Bog and at the eastern extent of Carranstown Bog. The Annex I Bog Woodland habitat (91DO) was not recorded on the Application Site during the Bord na Móna habitat surveys in 2011 and 2012 or during the detailed habitat surveys undertaken by MKO.

Plate 4-2 Area of birch dominated bog woodland at Bracklin Bog

4.3.1.1.2 Scrub (WS1)

Birch dominated **Scrub (WS1)** is also common throughout the Application Site, where it has developed on drier areas of the cutover bog (Plate 4-3). Scrub is generally dominated by downy birch, along with willow species. The ground flora is generally comprised of ling heather (*Calluna vulgaris*), purple moor grass (*Molinia caerulea*) and common cottongrass (*Eriophorum angustifolium*). Scrub habitat within the Application Site often forms mosaics with heath-type vegetation described below. Where scrub was greater than 4 metres in height, it was classified as Bog Woodland (as per Fossitt, 2000).

Plate 4-3 Example of birch dominated scrub in the background

4.3.1.1.3 Cutover bog supporting Secondary dry heath (HH1) type communities

This habitat type covers a broad range of conditions from bare peat and dry but vegetated peat to much wetter areas that grade into poor fen (Plate 4-5 - Plate 4-7). The habitat frequently occurred in a mosaic alongside other habitats including scrub and pioneer poor fen habitat.

Secondary dry heath (HH1) type communities throughout the Application Site are largely dominated by ling heather (*Calluna vulgaris*) along with common cottongrass (*Eriophorum angustifolium*) on dry peats with little to no Sphagnum present. Areas of bare peat are common, particularly where the cutover bog has begun to revegetate more recently. Cross-leaved heath (*Erica tetralix*), hare's tail cottongrass (*Eriophorum vaginatum*) and purple moor grass are also frequent components of the vegetation of these communities and occasional birch and self-seeded lodgepole pine and/or larch saplings are also common.

Wetter areas are characterised by a greater abundance of common cottongrass and also supported occasional deergrass (*Trichophorum germanicum*) and bog asphodel (*Narthecium ossifragum*). These areas occasionally graded into poor fen.

According to Smith and Crowley (2020) cutover bogs should only rarely be considered examples of dry siliceous heath (HH1) or wet heath (HH3). These habitats are defined by peat depths of <0.5m which rarely occur on cutover bog. *Only where a habitat is underlain by shallow peat and good indicators of heath are present, such as Carex binervis, Galium saxatile and Juncus squarrosus, should heath habitats be considered for cutover bog.* The vast majority of heath and heath mosaic habitat within the Application Site occurs on peat with a depth of >0.5m and none of these heath indicator species were recorded within heath habitat during the field surveys undertaken. Therefore, the secondary heath type communities within the Application Site do not conform to Annex I heath habitats. They are secondary, cutover raised bog habitats that are located on deep peat and level ground. They do not conform to Annex I Wet Heath habitat as defined by the Irish Wildlife Manual (Perrin et.al. 2014). Neither do they conform to Annex I Raised Bog habitats or any other Annex I habitat.

Plate 4-4 Dry heath type vegetation with areas of bare peat and encroaching scrub at Lisclogher Bog

Plate 4-5 Example of dry heath type vegetation on cutover bog characterised predominantly by ling heather with common cottongrass and areas of bare peat

Plate 4-6 Dry ling heather dominated dry heath type vegetation in the foreground grading into wetter common cottongrass dominated vegetation in the background at Ballivor Bog.

Plate 4-7 Mosaic of ling heather dominated dry heath and scrub at Bracklin Bog

4.3.1.1.4 Poor Fen (PF2)

This habitat occurs within the Application Site predominantly as pioneer poor fen vegetation with established poor fen and flush being less common within the Application Site.

Many sections of the Application Site supported cutaway bog characterised by pioneer common cottongrass dominated Poor fen (PF2) communities, most notably Lisclogher and Bracklin Bogs. This is one of the first vegetation communities to colonise bare peat following cessation of peat extraction. The habitat was widespread but highly variable mostly occurring as a habitat mosaic along with bare peat, dry heath type vegetation and scrub (Plate 4-8).

Wetter sections of the cutover bog associated with areas of standing water and with a more established poor fen vegetation are also present throughout the Application Site. These areas are dominated by common cottongrass with soft rush (*Juncus effusus*) and *Sphagnum cuspidatum* also present (Plate 4-9) These areas also supported abundant purple moor grass and hummocks of the moss *Polytrichum commune,* whilst the wettest areas with pools of standing water were characterised *by* bottle sedge (*Carex rostrata*) alongside marsh pennywort (*Hydrocotyle vulgaris*), heath bedstraw (*Galium saxatile*), cuckoo flower (*Cardamine pratensis*) and occasional willow (*Salix* sp.) saplings (Plate 4-10).

Plate 4-8 Pioneer common cottongrass dominated poor fen vegetation forming a mosaic with scrub and heath type vegetation at Lisclogher Bog

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Plate 4-9 Area of common cottongrass dominated poor fen at Bracklin Bog

Plate 4-10 Example of poor fen with bottle sedge at Lisclogher Bog

4.3.1.1.5 Open water

No significant areas of permanent open water are present within the Application Site.

Numerous smaller areas of open water are present in the wettest and lower lying areas of the Application Site, often associated with poor fen and flush communities (Plate 4-11). These areas have previously been subject to peat extraction and are often revegetating with bottle sedge (*Carex rostrata*) and common cottongrass. Areas of standing water were also recorded in association with low lying regenerating areas of cutaway bog where embryonic Sphagnum communities were beginning to establish comprising abundant *Sphagnum cuspidatum* and common cottongrass.

Plate 4-11 Small area of open water associated with poor fen and flush vegetation

4.3.1.1.6 Other Artificial Lakes and Ponds

Silt ponds are present at various locations throughout the Application Site and have been classified as Other Artificial lakes and Ponds (FL8). Drainage ditches throughout the Application Site are directed to these silt ponds prior to discharge from the Application Site.

4.3.1.1.7 Drainage Channels (FW4)

The Application Site is extensively drained with channels that run through the Application Site. Drainage ditches ranged from approximately 0.3m in width to approximately 3m in width. Whilst many of the drains within the Application Site have a poor structure and were devoid of vegetation, common components of vegetated drains included bulrush (*Typha latifolia*), horsetails (*Equisetum* sp.), willowherbs (*Epilobium* sp.), hard rush (*Juncus effusus*), and occasionally floating vegetation such as pondweeds. Substrates were predominantly silt/peat. In the areas where the drains are surrounded by heath, scrub and woodland the vegetation within them is sparse and the substrate comprises of bare silt (Plate 4-12 - Plate 4-13)

Plate 4-12 Drainage ditch through an area of birch woodland

Plate 4-13 Example of typical drainage ditch within the site

4.3.1.1.8 *Lowland depositing streams (FW2)*

The Application Site is drained by a number of watercourses within and surrounding the Application Site including the Cartenstown stream, Stonestown river, Ballinn stream, Bolandstown river, Woodtown West stream, Stonyford river, Carranstown Little river, Killaconnigan stream, Kilballivor stream, Ballivor river and two unnamed tributaries, Graffanstown stream, Ballynaskeagh Stream, Mucklin Stream, River Deel, Craddanstown stream and Clondalee More stream.

The Deel (Raharney) river is located approximately 800m to the west of the Application Site and the Stonyford River is located approximately 450m to the east of the Application Site. Both rivers are designated as the River Boyne and River Blackwater SAC. A number of the streams within and adjacent to the Application Site discharge to these rivers which in turn discharge to the River Boyne downstream of the Application Site.

4.3.1.2 Grasslands Habitats

4.3.1.2.1 *Dry calcareous and neutral grassland (GS1) and Dry meadows and grassy verges (GS2)*

Small areas of dry grassland are present within the Application Site, along the sides of the railway lines and existing track verges as well as in areas where underlying glacial till has been exposed (Plate 4-14). The majority of grassland areas are classified as Dry Meadows and Grassy Verges (GS2) with grass species including Yorkshire fog (*Holcus lanatus*), cocks foot (*Dactylis glomerata),* sweet vernal grass (*Anthoxanthum odoratum*) and false oat grass (*Arrhenatherum elatius*). Encroaching scrub was common comprising bramble (*Rubus fruticosus* agg.) and bilberry (*Vaccinium myrtillus*). Other species recorded include bird's foot trefoil (*Lotus corniculatus*), knapweed (*Centaurea nigra*), meadowsweet (*Filipendula ulmaria*), tormentil (*Potentilla erecta*), ribwort plantain (*Plantago lanceolata*), silverweed (*Potentilla anserina*), germander speedwell (*Veronica chamaedrys*) and occasional devil's bit scabious (*Succisa pratensis*). Smaller areas of Dry calcareous and neutral grassland (GS1) were also present throughout the Application Site.

A number of orchid species were recorded in grassy verges along the existing railway lines including twayblade (*Listera ovata*), heath spotted orchid (*Dactylorhiza maculata*), common spotted orchid (*Dactylorhiza fuchsii*) and butterfly orchid (*Platanthera* sp.). Marsh helleborine (*Epipactis palustris*) is also known to occur at the Application Site in small pockets of calcareous grassland.

Other areas grassland habitats comprised of a mix of species typical of both calcareous and peatland habitats. This diversity in species recorded has resulted from the importing of stone for the construction of railway tracks throughout the peatland.

Plate 4-14 Example of dry grassland adjacent to the railway line within the site

4.3.1.2.2 Grassland Habitats: Improved agricultural grassland (GA1), Wet grassland (GS4), Amenity Grassland (GA2)

The Application Site is surrounded by agricultural fields classified as Improved agricultural grassland (GA1) and Wet grassland (GS4). Small areas of Improved agricultural grassland are present in the Application Site boundary, close to the entrance to Ballivor Bog at its northern extent and at the southern extent of Lisclogher. The fields are characterised by species including perennial rye grass (*Lolium perenne*), cocksfoot (*Dactylis glomerata*), Yorkshire fog (*Holcus lanatus*), creeping buttercup (*Ranunculus repens*), common sorrel (*Rumex acetosa*), broadleaved dock (*Rumex obtusifolius*),and dandelion (*Taraxacum officinale*).

Wet grassland occurs mainly around the edges of the Application Site associated with wetter agricultural fields with abundant soft rush (*Juncus effusus*). Small areas of wet grassland dominated by purple moor grass are also present throughout the Application Site on cutover bog, however, these areas occur predominantly as a habitat mosaic alongside scrub and dry heath type communities.

A small area of Amenity grassland (GA2) is present at the northern extent of Ballivor Bog in the built area around Ballivor Works (adjacent to the Application Site boundary).

4.3.1.3 Oak-ash-hazel woodland (WN2)

Two small mineral islands are located on the Carranstown Bog site; these areas contain woodland that is dominated by Hazel (*Corylus avellana*), downy birch and ash (*Fraxinus excelsior*) with smaller amounts of young oak (*Quercus robur*) and are classified as Oak-ash-hazel woodland.

A small woodland copse area with elements of oak-ash-hazel woodland is also present at Bracklin Bog where it has developed on a mound close to the remains of an old Famine House (Plate 4-15). There are several mature Sycamore (*Acer pseudoplatanus*) trees around the house forming the woodland copse. Other species present include hazel (*Coryllus avelana*), holly (*Ilex aquifolium*), hawthorn (*Crataegus monogyna*) and ash (*Fraxinus excelsior*).

Plate 4-15 Oak-ash-hazel woodland close to the remnants of the Famine House at Bracklin Bog

4.3.1.4 Uncut raised bog

There are a number of areas of remnant uncut raised bog habitats within the Application Site boundary (Plate 4-16 - Plate 4-17). These are classified as **Raised Bog (PB1).**

Whilst many areas of remnant raised bog recorded within the Application Site are typically small in area and are very dry with little to no Sphagnum cover, others are in relatively good condition, slightly wetter and support a more diverse raised bog vegetation with a greater abundance and cover of *Sphagnum* species.

Some areas of remnant raised bog had been subject to previous extensive drainage measures, with several parallel drainage channels throughout, but never put into peat extraction and as a result these areas are extremely dry e.g. large areas of Lisclogher West and the norther and southern sections of Lisclogher East. Other sections of remnant raised bog at Lisclogher Bog and Bracklin Bog had also been burned in recent years, see Chapter 4 for details, and, although recovering, still remained relatively dry and degraded.

The majority of remnant raised bog within the Application Site is generally dominated by ling heather. Other species present include *Cladonia* sp., cross leaved heath (*Erica tetralix*), cottongrasses and deergrass (*Trichphorum germanicum*). These areas are relatively dry and degraded with very low and in some cases no *Sphagnum* cover.

The wettest areas of remnant raised bog support bog asphodel (*Narthecium ossifragum*), areas of white beak sedge (*Rhychospora alba*) and a greater abundance and cover of *Sphagnum* species. However, in general, Sphagnum cover did not exceed 30% cover at the majority of remnant raised bog sites where detailed botanical surveys were undertaken and at the vast majority of remnant raised bog sites was more typically absent or < 10% in cover.

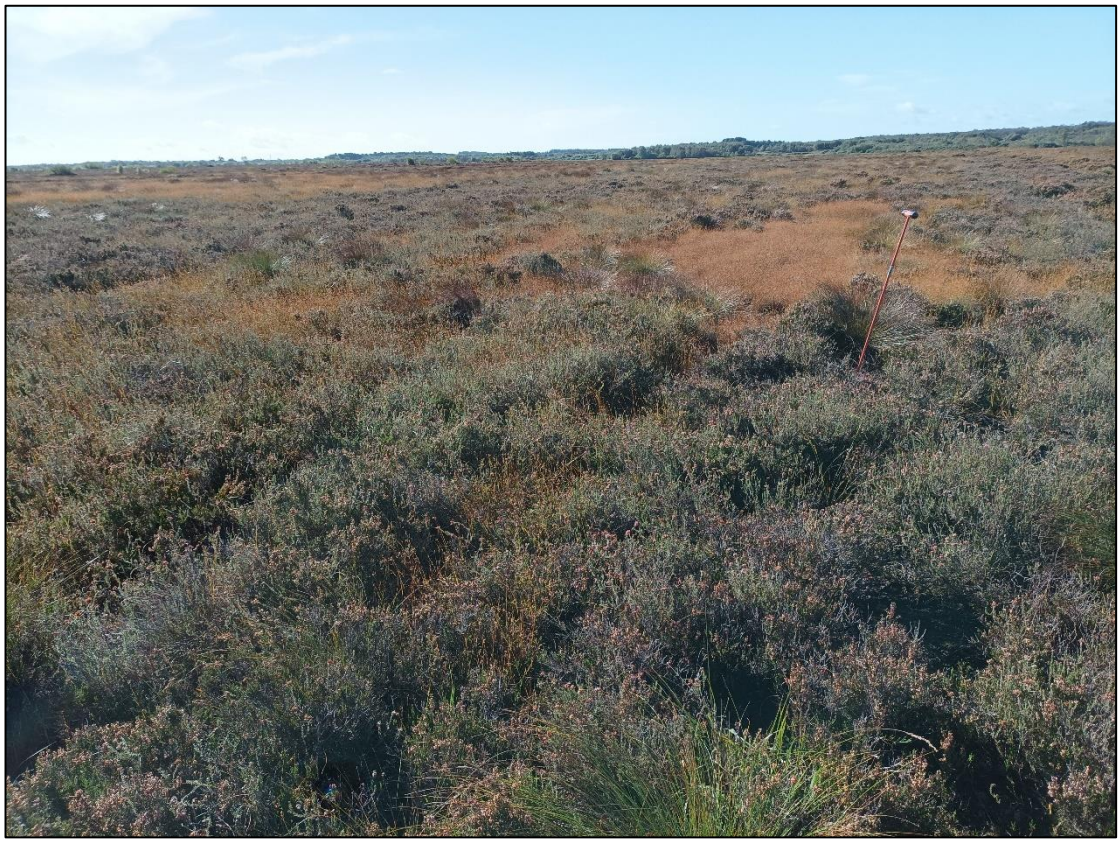

Plate 4-16 Example of uncut but drained and dry raised bog at Bracklin Bog

Plate 4-17 Example of uncut remnant raised bog within the Application Site

4.3.1.5 Conifer Plantation

Small areas of conifer plantation (WD4) are present at the very northern extent of Ballivor Bog within the Application Site. A larger area of conifer plantation is also present along the northern boundary of Lisclogher West Bog within the Application Site.

4.3.1.6 Spoil and bare ground (ED2) and Recolonising bare ground (ED3)

Existing unpaved access tracks throughout the Application Site (Plate 4-18) are classified as Spoil and bare ground (ED2). Areas of spoil and bare ground and recolonising bare ground are also present in works areas associated with the Bord na Móna buildings at the northern extent of Ballivor Bog.

Plate 4-18 Access track at Bracklin Bog classified as Spoil and bare ground

4.3.1.7 Buildings and Artificial Surfaces (BL3)

There are some areas classified as buildings and artificial surfaces (BL3) within the Application Site. The majority of the artificial surfaces are associated with the Ballivor Works (adjacent to the Application Site), and the railway infrastructure (Plate 4-14) and existing local roads throughout the Application Site.

4.3.1.8 Protected Flora

No botanical species protected under the Flora (protection) Order (1999, as amended 2015) were recorded during the surveys undertaken.

4.3.1.9 Invasive species

No invasive species, listed on the Third Schedule of the S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011, were recorded within the Application Site during the walkover surveys.

4.3.2 Faunal Surveys

4.3.2.1 Otter

Otter is listed as a QI of the River Boyne and River Blackwater SAC. Dedicated otter surveys of all watercourses within the Application Site were undertaken. Otter prints were recorded in Lisclogher Bog during the otter surveys in May 2021 in proximity to a wide drainage ditch. No signs of otter were recorded within the site during the aquatic surveys undertaken by Triturus Environmental Ltd in July 2021. However, signs of otter (spraints and/or prints) were recorded outside of and downstream of the

site in the Craddanstown stream to the west of Ballivor Bog and in the Ballivor river to the east of Ballivor Bog during these surveys. The River Stoneyford and River Deel (Rahanrney), both located outside of the site also provide suitable habitat for otter.

No otter resting or breeding sites were recorded within the Application Site during dedicated otter surveys or during the dedicated fisheries assessment or kick sampling of the watercourses surrounding the site undertaken by Triturus Environmental Ltd.

The majority of the drainage ditches within the Application Site are small and are thus not suitable for otter given their small size and highly modified channels of low fisheries value, however it is likely that otter utilise the streams and some of the larger drains for foraging and commuting. The main watercourse/larger artificial drainage channels were assessed as providing suitable commuting and foraging habitat for the species.

4.3.2.2 Kingfisher

Kingfisher is an SCI of the River Boyne and River Blackwater SPA. No kingfisher nesting sites were recorded within the Application Site. Kingfisher was observed flying through the site across cutover bog and silt ponds during bird surveys undertaken by MKO in 2020 and 2021. Kingfisher was also observed travelling along the River Deel (Raharney) in 2021.

5. ASSESSMENT OF POTENTIAL EFFECTS & ASSOCIATED CONTROL /MITIGATION MEASURES

This section provides an assessment of the potential effects of the Project at the Application Site on the Screened-In European Sites identified in Section 2 above, i.e.

- River Boyne and River Blackwater SAC; and
- River Boyne and River Blackwater SPA.

The assessment ascertains whether the peat extraction activities and all ancillary works at the Application Site have had an effect and/or will have an effect on the integrity of the Screened-In European Sites in light of the sites' conservation objectives. The potential for adverse effects on the integrity of the European Sites is assessed under three phases:

- Peat Extraction Phase - includes all works undertaken from 1994 to the cessation of peat extraction in June 2020. 1994 is when The Habitats Directive came into effect, though it was not transposed into Irish law until 1997 through the European Communities (Natural Habitats) Regulations 1997 and when Appropriate Assessment (AA) became a legal requirement.
- Current Phase- includes all activities carried out at the Application Site from the cessation of peat extraction in June 2020 to the present day.
- Remedial Phase - implementation of the proposed rehabilitation plans for the Application Site, required under Condition 10 of its EPA Licence P0501-01, following the cessation of peat extraction activities in 2020.

5.1 Potential for Direct Effects on the European Sites

The Application Site lies entirely outside of the boundaries of any EU designated sites. A potential pathway for direct effects on otter and kingfisher in the form of direct habitat loss, where these species occur outside the River Boyne and River Blackwater SAC and the River Boyne and River Blackwater SPA, was identified in the rASSR. Direct habitat loss could potentially occur during drain maintenance works if any otter or resting or breeding sites or kingfisher nest sites are present on the site. This could potentially have occurred or could occur during the Peat Extraction Phase and Current Phase.

During the site walkover surveys and dedicated otter and bird surveys undertaken at the Application Site in 2020 and 2024, the site was not found to support significant suitable habitat for these species. The drainage ditches and watercourses within the site are small and do not provide optimal habitat for otter or kingfisher given their small size and highly modified channels of low fisheries value, however it is likely that otter utilise the streams, which are mostly located towards the peripheries of the site, and some of the larger drains for foraging and commuting. Given that the site was fully drained and the majority of peat cutting had occurred prior to the designation of the relevant European Sites (i.e. River Boyne and River Blackwater SAC in 2003, River Boyne and River Blackwater SPA in 2010), it is unlikely that significant suitable habitat for otter and kingfisher existed at the site at the time of designation of the European Sites or at the time of the transposition of the Habitats Directive in Irish law.

Given the absence of significant suitable habitat for these species within the site, there is no potential for direct habitat loss to have occurred or to occur where these species are present outside of the relevant SAC and SPA.

During the implementation of the proposed rehabilitation plans for the Application Site there will be a requirement to block drains to rewet the peatland habitats. As outlined above, no otter resting or breeding sites or kingfisher nesting sites were recorded within the Application Site during the field surveys undertaken and the drains within the site were not found to provide optimal habitat for these species. No potential for direct effects on these species during the implementation of the rehabilitation plans for the Application Site during the Current Phase and Remedial Phase is anticipated.

There is no potential for direct adverse effects on the integrity of the River Boyne and River Blackwater SAC or the River Boyne and River Blackwater SPA to have occurred or to occur as a result of peat extraction and associated activities.

5.2 Potential for Indirect Effects on the European Sites

There is hydrological connectivity between the Application Site and the River Boyne and River Blackwater SAC and the River Boyne and River Blackwater SPA via drainage ditches and watercourses within the Application Site which discharge to the Stonyford River approx. 248m to the east of the Application Site and the Deel (Raharney) River, approximately 767m to the west of the site, both of which are designated as part of the SAC and SPA at this location and discharge to the River Boyne downstream of the site. The Ballivor stream which drains Ballivor Bog at the south of the site has connectivity with the River Boyne approximately 5.9km downstream of the Application Site.

A potential pathway for indirect effects on all QIs of the SAC and on the SCI 'Kingfisher' of the SPA due to deterioration of water quality as a result of peat extraction activities was identified. During the Peat Extraction Phase and Current Phase at the Application Site there would have been potential for deterioration in surface and ground water quality as a result of run-off of pollutants, including silts and hydrocarbons, during peat extraction activities and all ancillary works to watercourses within and downstream of the site which have connectivity with the River Boyne and River Blackwater SAC and the River Boyne and River Blackwater SPA. During the implementation of the rehabilitation plans, there will also be some small-scale activity at the site involving machinery and plant with which there is always a risk of accidental spillage of hydrocarbons.

A potential pathway for indirect effects on otter and kingfisher as a result of disturbance was also identified.

The potential for adverse effects on the integrity of these European Sites via a) deterioration of water quality and b) disturbance is discussed in the sections below.

5.2.1 Deterioration of Water Quality

Between 2003 (when the River Boyne and River Blackwater SAC was put forward as a candidate SAC) and 2020, the main activities at the Application Site included peat extraction and the creation and removal of stockpiles of peat, peat transportation and maintenance of drains, machinery and pumps. All bogs had been drained and peat extraction was well underway on all bogs (with the exception of Lisclogher West) which was drained but never brought into production. Railway infrastructure had also been laid within the Application Site by 2003.

Since the cessation of peat extraction at the Application Site in June 2020, the main activities at the Application Site have included removal of stockpiled peat to the Ballivor works for processing prior to transportation to Kilberry Horticulture Works in Co. Kildare and the Edenderry Power Plant and Derrinlough Briquette Factory, both in Co. Offaly.

Taking 2003 as the baseline, i.e. the date when the River Boyne and River Blackwater was put forward as a candidate SAC, in the absence of control and mitigation measures , peat extraction activities and

all ancillary works which were undertaken at different times and at different levels of intensity throughout the Application Site, from 2003 until the cessation of peat extraction in June 2020, are likely to have resulted in indirect effects on water quality within and downstream of the site in the form of water pollution.

During this time there would have been potential for indirect effects on the River Boyne and River Blackwater SAC and the River Boyne and River Blackwater SPA in the form of deterioration of water quality (and therefore degradation of aquatic QI habitats and supporting habitat for QI and SCI species) due to the release of pollutants including suspended solids. This potential for release of suspended solids would have been greatest during the construction of drainage channels, removal of surface vegetation and during peat extraction itself. During the Peat Extraction Phase, there was also an ongoing risk of elevated concentrations of suspended solids making their way into downstream surface watercourses from the erosion of peat sediment via the bog drainage network. In addition, the release of dissolved nutrients, principally ammonia, resulting from the rapid breakdown of organic matter within peat once exposed to air, could also have resulted in deterioration of water quality of watercourses within and downstream of the site which had connectivity with the above European Sites. During the above time period there would also have been potential for pollution of surface water bodies and groundwater due to the accidental spillage of hydrocarbons during refuelling of machinery and plant and due to discharges from wastewater systems (septic tanks) at office buildings, and at productions centres and workshops which could potentially also have caused surface and groundwater contamination.

In the absence of control and mitigation measures there is potential for the above peat extraction activities and all associated works at the Application Site to have had an adverse effect on the integrity of the above European Sites in light of their conservation objectives. The primary potential impact on water quality would have been the increase in suspended solids and the greatest risk would have occurred during times of major earthworks such as during the removal of vegetation and the construction of the bog drainage network. Drainage had already been inserted on all bogs prior to 2003 (when the River Boyne and River Blackwater was first put forward as a candidate SAC, River Boyne and River Blackwater was first designated in 2010), however, there would still have remained some potential for run-off of pollutants during peat extraction itself. With the cessation of peat extraction in June 2020 there was less potential for release of suspended sediments and pollution of water quality including watercourses and groundwater due to the nature of the works, i.e. no extraction, removal of stockpiles only. There would also have been much reduced machinery operating on site reducing the potential for hydrocarbon spillages.

The implementation of the rehabilitation plans for the Application Site aims to stabilise the former peat extraction areas. Natural colonisation and targeted re-wetting will encourage revegetation of the former bare peat areas which in turn will stabilise substrates reducing the potential for elevation concentrations of suspended solids in runoff from the site. This will also have benefits for aquatic fauna in terms of improved water quality and therefore habitat quality. During the implementation of the rehabilitation plans, there will be some small-scale activity at the Application Site involving machinery and plant with which there is always a risk of accidental spillage of hydrocarbons. Similarly, the office buildings at the Ballivor Works (located adjacent to the Application Site) will remain in use or occupied and discharges from wastewater systems (septic tanks) etc. will have the potential to cause surface water and groundwater contamination. The Carranstown Bog – Cutaway Bog Decommissioning and Rehabilitation Plan (2024) includes the targeted application of fertiliser in order to accelerate the establishment on vegetation of bare peat on headlands, on high fields, and within areas of dry cutaway bog. The application of fertilizer has the potential to enrich downstream surface waters and have a negative impact on local surface water quality. However, only a very small area of Carranstown Bog (17.57ha) is proposed to be subject to fertilization. This represents approximately ~5.7% of the total area of Carranstown bog and ~0.7% of the total area of the Application Site.

5.2.1.1 Impact Assessment

In the absence of control and mitigation measures there is potential for the peat extraction activities and all ancillary works at the Application Site to have had and to have an adverse effect on the integrity of the River Boyne and River Blackwater SAC and the River Boyne and River Blackwater SPA in light of their conservation objectives, as a result of deterioration of water quality.

5.2.1.2 Control and Mitigation Measures

Since 2000, all activities at Ballivor Bog have been regulated by the EPA under IPC licence Registration No. P050 and water quality discharge licence limits have been in place for the Application Site since. The regulation of activities at the Application Site predates the designation (both candidacy and formal designation by Statutory Instrument) of the River Boyne and River Blackwater SAC and the River Boyne and River Blackwater SPA.

Suspended Solids

Since April 2000 peat extraction activities and all ancillary works at the Application Site have been regulated under IPC licence Registration No. P0501 and have been subject to the conditions of that licence which include discharge limits for suspended solids and nutrients including ammonia and phosphorous. The Ballivor Bog Group also has a Surface Water Management Plan which defines how compliance with the Licences is achieved. The drainage system in place at the bogs comprising field drains, main drains, piped drains, silt ponds upstream of outfall locations, is designed to prevent the release of elevated concentrations of suspended sediments into nearby surface waterbodies. As part of the IPC Licence, there is a limit of 35mg/l for suspended solids.

Existing control measures which were implemented under the IPC licence are also designed to limit runoff rates from the bog units. These include:

- Silt ponds providing attenuation limited runoff during periods of intense rainfall.
- Continuous mitigation included maintaining the schedule of cleaning the silt ponds at a minimum of twice per year.

Accidental leaks and spillages

The refuelling procedures control measures implemented by Bord na Móna prior to regulation under IPC licence were upgraded and enhanced in order to comply with IPC licence conditions with the Application Site being regulated by the EPA under IPC Licence Registration No. P0501 since 2000. The Ballivor Bog Group also has a Surface Water Management Plan which defines how compliance with the Licence is achieved. The list below outlines control measures conditioned under the IPC licencing regime, as regulated by the EPA:

- Effective spill/leak management of mobile fuelling units was undertaken;
- Replacement (and remediation where necessary) of all underground fuel tanks was undertaken;
- There was no other emissions to water of environmental significance;
- All tank and drum storage areas were rendered impervious to the materials stored therein. In addition, tank and drum storage areas was bunded;
- Drainage from bunded areas was diverted for collection and safe disposal;
- The integrity and water tightness of all the bunding structures and their resistance to penetration by water or other materials stored therein was tested and demonstrated by the licensee to the satisfaction of the Agency and shall be reported to the Agency within eighteen months from the date of grant of this licence and every two years thereafter;

- The loading and unloading of fuel oils was carried out in designated areas protected against spillage and leachate run-off;
- While awaiting disposal, all materials were collected and stored in designated areas protected against spillage and leachate run-off;
- Except for roof water, all surface water discharges from workshop areas were fitted with oil interceptors;
- An inspection for leaks on all flanges and valves on over-ground pipes used to transport materials other than water was carried out weekly;
- Bord na Móna undertook a programme of testing and inspection of underground fuel pipelines to ensure that all underground fuel lines were tested at least every three years; and,
- Bord na Móna maintained (in storage) an adequate supply of containment booms and/or suitable absorbent material to contain and absorb any spillage.

During the implementation of the proposed rehabilitation plans for the Application Site, the existing silt control measures will continue to operate during the early stages of the rehabilitation plans when there is potential for the entrainment of suspended solids in surface waters during drain blocking. During this time no remedial works will be completed during periods of prolonged rainfall. Silt ponds will continue to be in use and will be regularly inspected and maintained as per IPC licence requirements.

Fertiliser Application

The Carranstown Bog – Cutaway Bog Decommissioning and Rehabilitation Plan (2022) includes mitigation measures for the application of fertiliser which are summarised below:

- Fertiliser will not be applied on land which is waterlogged, flooded, likely to flood, frozen or covered with snow;
- No fertiliser will be applied when heavy rain is forecast within the succeeding 48 hours;
- No fertiliser will be applied on steeply sloping ground or where there is a rick of water pollution (i.e. the presence of drains); and,
- No fertiliser will be spread on land within 2m of a surface watercourse.

Buffer zones, in accordance with EPA guidelines (www.epa.ie), will be utilised and adhered to in respect of waterbodies during fertiliser application.

Following implementation of the rehabilitation measures a programme of aftercare and maintenance, designed in accorded to meet the Conditions of the IPC Licence, will be completed at the Application Site. This will comprise of initial quarterly monitoring, with the number of site visits reducing after 2 years to bi-annually and then after 5 years to annual visits. A water quality monitoring program will be established to monitor the impact of rehabilitation on water quality discharge from the bog. The monitoring results will be reported on each year to the EPA with the parameters to be included as follows: monthly monitoring for pH, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD and DOC.

In addition:

- During periods of heavy precipitation and run-off, activities will be halted.
- All machines will be regularly checked and maintained prior to arrival at the site to prevent hydrocarbon leakage.
- Fuelling and lubrication of equipment shall only be carried out in designated areas away from surface water drainage features and ecologically sensitive areas.
- Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for disposal or re-cycling.
- Vehicles will never be left unattended during refuelling.

- No direct discharges to waters will be made. No washings from vehicles, plant or equipment will be carried out onsite.
- All plant refuelling will take place using mobile fuel bowsers. Only dedicated trained and competent personnel will carry out refuelling operations.
- Mobile storage such as fuel bowsers will be bunded to 110% capacity to prevent spills. Tanks for bowsers and generators shall be double skinned. When not in use, all valves and fuel trigger guns from fuel storage containers will be locked. All pumps using fuel or containing oil will be locally and securely bunded where there is the possibility of discharge to waters.
- Potential impacts caused by spillages etc. during rehabilitation will be reduced by keeping spill kits and other appropriate equipment on-site.

5.2.2 Disturbance

The peat extraction activities and all ancillary works during the Peat Extraction Phase between 2003 and 2020, which required the presence of machinery and personnel on site would have created potential for disturbance of the QI species otter associated with the River Boyne and River Blackwater SAC as well as the SCI species kingfisher associated with the River Boyne and River Blackwater SPA. Since the cessation of peat extraction at the Application Site in June 2020, volumes of machinery and personnel on site have been much reduced due to the nature of the ongoing activities, i.e. removal of peat stockpiles. Therefore potential for disturbance of these species would be of a much reduced scale. Similarly, the implementation of the rehabilitation plans for the Application Site will involve drain blocking and re-wetting, which will involve the presence of small-scale machinery and personnel on site which creates potential for disturbance of otter and kingfisher utilising the site. While there will be some potential for disturbance of otter during the Remedial Phase, this will be of a much-reduced nature when compared to the Peat Extraction Phase.

The potential for adverse effects on the integrity of the otter population associated with the SAC and the kingfisher population associated with the SPA as a result of disturbance is considered below.

5.2.2.1 Otter

A potential pathway for indirect effects in the form of disturbance of otter populations associated with The River Boyne and Blackwater SAC is considered below on a precautionary basis.

Although a small number of streams and rivers drain the site, the majority of these are located towards the peripheries of the site and the vast majority of watercourses within the site are artificial drainage channels with low suitability for otter, although they may be used on occasion for commuting or foraging. During the walkover surveys and dedicated otter surveys undertaken, no otter resting or breeding sites were identified within or adjacent to the Application Site and the small, modified watercourses and drains within the site were not found to support significant suitable habitat for this species.

Otter are predominantly crepuscular in nature and are unlikely to have been adversely impacted by the peat harvesting activities. The NPWS Threat Response Plan for Otter acknowledges that "*Little evidence has come to light in recent studies to suggest that disturbance by recreation is a significant pressure.*" It also identifies that Otter are known to travel significant distances from streams and lakes in search of new territory and feeding areas.

Channin P (2003)1 provides a literary review with regard to anthropogenic disturbance and refers to several reports which have found that disturbance is not detrimental to Otters (Jefferies (1987), (Durbin 1993). (Green & Green 1997). The report also describes successful breeding in towns, under ferry terminals and under the jetties of one of Europe's largest oil and gas terminals at Sullom Voe in North Scotland.

Irish Wildlife Manual No 23 (National Otter Survey of Ireland 2004/2005) found no significant relationship between disturbance and otter occurrence. In addition, no significant difference in otter presence was found between sites with and without recreational activity. It also states, *"the lowest percentage occurrence was found at the sites with the lowest recorded disturbance"* Irish Wildlife Manual No 76 (National Otter Survey of Ireland 2010/2012) notes that the occurrence of Otter was unaffected by perceived levels of disturbance at the survey sites. It also notes that there is little published evidence demonstrating any consistent relationship between Otter occurrence and human disturbance (Mason & Macdonald 1986, Delibes et al. 1991; Bailey & Rochford, 2006). In addition to the above, the stream is protected from the development by a natural vegetation buffer between the construction footprint and the stream. Best practice disturbance limitation measures have been included in the Project design and are described in Section 3 above.

Based on the above review of scientific literature and the recorded absence of optimal habitat for this species within the Application Site during the site surveys undertaken between 2020 and 2022, no potential for adverse effects to have occurred on the integrity of the otter population associated with the River Boyne and Blackwater SAC as a result of disturbance was identified.

There is no potential for adverse effects on otter as a result of the implementation of the proposed rehabilitation plans for the Application Site.

5.2.2.2 Kingfisher

A potential pathway for indirect effects in the form of disturbance of kingfisher populations associated with the River Boyne and Blackwater SPA is considered below on a precautionary basis.

The watercourses within the Application Site do not provide optimal nesting habitat for kingfisher. Although kingfisher were recorded flying through the site during bird surveys in 2020 and 2021, no kingfisher nesting sites were identified within or adjacent to the Application Site during the walkover surveys or bird surveys undertaken. Given that the Application Site was drained and the majority of peat extraction had commenced prior to the designation of the relevant European Sites (i.e. River Boyne and River Blackwater SAC in 2003, River Boyne and River Blackwater SPA in 2010), it is unlikely that significant suitable habitat for otter and kingfisher existed at the Application Site at the time of designation of the European Sites or at the time of the transposition of the Habitats Directive in Irish law.

More suitable kingfisher habitat is present outside of the Application Site in the Stonyford River and the Deel (Raharney) river to the east and west of the site respectively. These rivers are designated as part of the River Boyne and River Blackwater SPA. A study by Cummins et al. (2010) recorded kingfisher sightings along both the Stonyford and Deel (Raharney) rivers. In addition, the study identified a section of the Stonyford River to the east of Lisclogher Bog as a possible kingfisher territory. These rivers are buffered from the Application Site by fields of agricultural grassland. Any nesting kingfisher within these watercourses are extremely unlikely to have been disturbed by peat extraction activities and all ancillary works, which were confined to the boundaries of the Application Site.

Additionally, there is no potential the implementation of the proposed rehabilitation plans for the Application Site to result in disturbance to kingfisher populations associated with the SPA.

There is no potential for adverse effects to have occurred or to occur on the integrity of the kingfisher population associated with the SPA as a result of disturbance related to peat extraction activities and all ancillary works.

5.2.2.3 Impact Assessment

In the absence of mitigation there is potential for the peat extraction activities and all ancillary works at the Application Site to have had and to have an adverse effect on the integrity of the River Boyne and

River Blackwater SAC and the River Boyne and River Blackwater SPA in light of their conservation objectives, as a result of deterioration of water quality.

5.2.2.4 Control and Mitigation Measures

No control measures in relation to disturbance or otter or kingfisher was in place during the Peat Extraction Phase and Current Phase.

Although there is no potential for adverse effects on otter or kingfisher due to disturbance during the implementation of the rehabilitation plans for the Application Site, and therefore no potential for adverse effects on the integrity of the River Boyne and River Blackwater SAC and SPA, the following best practice noise reduction measures will be in place.

- The proposed rehabilitation will have due regard to noise limits and hours of operation (i.e. dusk and dawn) to minimise any potential disturbance on resident and local fauna that utilise the site and immediate environs.
- All plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations (SI 359/1996).
- The proposed activities will be restricted to daylight hours and there will be no requirement for artificial lighting.

6. ASSESSMENT OF RESIDUAL ADVERSE EFFECTS

The sections provided below detail the site-specific residual impact assessment in relation to the QIs of the River Boyne and Blackwater SAC and the SCI of River Boyne and Blackwater SPA in light of their conservation objectives. The assessment takes into consideration measures contained within the IPC licence to avoid impacts on water quality within and downstream of the Application Site. The River Boyne and River Blackwater SAC was put forward as a candidate SAC in 2003. The River Boyne and River Blackwater SPA was put forward as a candidate SPA in 2010 and formally designated by Statutory Instrument in 2012. Therefore, peat extraction activities and all ancillary works at the Application Site were regulated under IPC licence prior to the designation of either of these European Sites.

6.1 River Boyne and River Blackwater SAC

The potential for residual adverse effects on each of the individual Qualifying Interests that were identified as being at risk of potential effects in Section 2 above is assessed in this section in view of the Conservation Objectives of those habitats and species.

6.1.1 Alkaline Fens [7230]

The Site specific conservation objectives for this QI is:

'*To maintain the favourable conservation condition of Alkaline fens in River Boyne and River Blackwater SAC*,

The attributes and targets for this habitat as per the Site-Specific Conservation Objectives (SSCOs) (NPWS Version 1, 2021) were reviewed and an assessment of peat extraction activities and all ancillary works at the Application Site against the attributes and targets is provided in Table 6-1 below.

Table 6-1 Targets and attributes associated with nominated site-specific conservation objectives for Alkaline fens [7230]

Attribute	Target	Assessment
Habitat area	Area stable or increasing, subject to natural processes.	All peat extraction activities and all ancillary works between 2003 (when the site was put forward as a candidate SAC) and 2020 were confined to the boundaries of the Application Site. There was no loss of alkaline fen associated with the SAC. In addition, drainage had been inserted on all bogs at the Application Site between the 1948 and 1995, prior to the designation of the SAC. No potential for peat extraction activities and all ancillary works to have resulted in adverse effects on alkaline fen associated with the SAC in respect of habitat area or distribution was identified. There is no potential for adverse effects on alkaline fen associated with
Habitat distribution	No decline, subject to natural processes.	

		the SAC in respect of habitat area or distribution as a result of the implementation of the proposed rehabilitation plans for the Application Site. These works will involve the rewetting and revegetation of the bog and will not impact on alkaline fen habitat associated with the SAC.
Ecosystem function: soil nutrients	Maintain soil pH and nutrient status within natural ranges	Since the regulation of peat extraction activities at Ballivor Bog under IPC licence in April 2000, which predates the designation of the SAC, a range of measures to ensure the protection of water quality have been in place. Drainage was inserted on all bogs between 1948 and 1995. Following this initial drainage, only minor annual changes in local bog hydrology and hydrogeology associated with the annual removal of peat and deepening of drains would have occurred (refer to Chapter 8 Hydrology of the rEIAR which accompanies the application for substitute consent). No potential for adverse effects to have occurred on alkaline fen in respect of ecosystem function was identified. There is no potential for adverse effects on alkaline fen in respect of ecosystem function as a result of the implementation of the proposed rehabilitation plans for the Application Site.
Ecosystem function: peat formation	Maintain active peat formation, where appropriate	
Ecosystem function: hydrology - groundwater levels	Maintain, or where necessary restore, appropriate natural hydrological regimes necessary to support the natural structure and functioning of the habitat	
Ecosystem function: hydrology - surface water flow	Maintain, or where necessary restore, as close as possible to natural or semi-natural, drainage conditions	
Ecosystem function: water quality	Maintain appropriate water quality, particularly pH and nutrient levels, to support the natural structure and functioning of the habitat	
Vegetation composition: community diversity	Maintain variety of vegetation communities, subject to natural processes	The peat extraction activities and all ancillary works at the Application Site since the designation of the SAC have been confined to the boundary of the Application Site. Drainage was inserted on all bogs between 1948 and 1995. Following this initial drainage, only minor annual changes in local bog hydrology and hydrogeology associated with the annual extraction of peat and deepening of drains would have occurred (refer to Chapter 8 Hydrology of the rEIAR which accompanies the application for substitute consent). Since the regulation of peat extraction activities and all ancillary works at the Application Site under
Vegetation composition: typical brown mosses	Maintain adequate cover of typical brown moss species	
Vegetation composition: typical vascular plants	Maintain adequate cover of typical vascular plant species	
Vegetation composition: native negative indicator species	Cover of native negative indicator species at insignificant levels	
Vegetation composition: non-native species	Cover of non-native species less than 1%	

Vegetation composition: native trees and shrubs	Cover of scattered native trees and shrubs less than 10%	IPC licence in April 2000, which predates the designation of the SAC, a range of measures have been in place to ensure that there is no deterioration in water quality due to peat extraction activities and all ancillary works. Considering the above, there is no potential for adverse effects on alkaline fen in respect of vegetation composition or structure as a result of the implementation of the proposed rehabilitation plans for the Application Site.
Vegetation composition: algal cover	Cover of algae less than 2%	
Vegetation structure: vegetation height	At least 50% of the live leaves/flowering shoots are more than either 5cm or 15cm above ground surface depending on community type	
Physical structure: disturbed bare ground	Cover of disturbed bare ground not more than 10%	There is no potential for adverse effects to have occurred to alkaline fen in respect of physical structure. The peat extraction activities and all ancillary works at the Application Site since the designation of the SAC have been confined to the boundary of the Application Site. Drainage was inserted on all bogs between 1948 and 1995. Following this initial drainage, only minor annual changes in local bog hydrology and hydrogeology associated with the annual removal of peat and deepening of drains would have occurred (refer to Chapter 9 Hydrology of the rEIAR which accompanies the application for substitute consent). Since the regulation of peat extraction activities and all ancillary works at the Application Site under IPC licence in April 2000, which predates the designation of the SAC, a range of measures have been in place to ensure that there is no deterioration in water quality due to peat extraction activities. There is no potential for adverse effects on alkaline fen in respect of physical structure as a result of the implementation of the proposed rehabilitation plans for the Application Site.
Physical structure: tufa formations	Disturbed proportion of vegetation cover where tufa is present is less than 1%	
Indicators of local distinctiveness	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat; maintain features of local distinctiveness, subject to natural processes	There is no potential for adverse effects to have occurred to alkaline fen in respect of indicators of local distinctiveness. The peat extraction activities and all ancillary works at the Application Site since the designation of the SAC have been confined to the boundary of the

		Application Site. Drainage was inserted on all bogs between 1948 and 1995. Following this initial drainage, only minor annual changes in local bog hydrology and hydrogeology associated with the annual removal of peat and deepening of drains would have occurred (refer to Chapter 9 Hydrology of the rEIAR which accompanies the application for substitute consent). Since the regulation of peat extraction activities at the Application Site under IPC licence in April 2000, which predates the designation of the SAC, a range of measures have been in place to ensure that there is no deterioration in water quality due to peat extraction activities and all ancillary works. There is no potential for adverse effects on alkaline fen in respect of indicators of local distinctiveness as a result of the implementation of the proposed rehabilitation plans for the Application Site.
Transitional areas between fen and adjacent habitats	Maintain adequate transitional areas to support/protect the alkaline fen ecosystem and the services it provides	There is no potential for adverse effects to have occurred to alkaline fen in respect of transitional areas between fen and adjacent habitats. The peat extraction activities and all ancillary works at the Application Site since the designation of the SAC have been confined to the boundary of the Application Site. Drainage was inserted on all bogs between 1948 and 1995. Following this initial drainage, only minor annual changes in local bog hydrology and hydrogeology associated with the annual removal of peat and deepening of drains would have occurred (refer to Chapter 8 Hydrology of the rEIAR which accompanies the application for substitute consent). Since the regulation of peat extraction activities and all ancillary works at the Application Site under IPC licence in April 2000, which predates the designation of the SAC, a range of measures have been in place to ensure that there is no deterioration in water quality due to peat extraction activities and all ancillary works.

		There is no potential for adverse effects on alkaline fen in respect of indicators of local distinctiveness as a result of the implementation of the proposed rehabilitation plans for the Application Site.

6.1.1.1 Determination on potential for adverse effects

Based on the above, it can be concluded, in view of best scientific knowledge and based on objective information, that there is no potential for adverse effects to have occurred on the QI Alkaline fens [7230] associated with the River Boyne and River Blackwater SAC, as a result of peat extraction activities and all ancillary works at the Application Site.

Based on the above, it can be concluded, in view of best scientific knowledge and based on objective information, that there is no potential for adverse effects on alkaline fen as a result of the implementation of the proposed rehabilitation plans for the Application Site.

No potential for adverse effects on the integrity of the SAC in light of its conservation objectives was identified.

6.1.2 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno- Padion, Alnionincanae, Salicion albae*)

The Site specific Conservation Objectives for this QI is:

> *'To restore the favourable conservation condition of Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)* in River Boyne and River Blackwater SAC'*

The attributes and targets for this habitat as per the SSCOs (NPWS Version 1, 2021) were reviewed and an assessment of all peat extraction activities and all ancillary works at the Application Site against the attributes and targets is provided in Table 6-2.

Table 6-2 Targets and attributes associated with the conservation objectives for Alluvial forests

Attribute	Target	Assessment
Habitat area	Area stable or increasing, subject to natural processes.	Peat extraction activities and all ancillary works were confined to the boundaries of the Application Site, outside of the SAC. No potential for adverse effects to have occurred on alluvial forest within the SAC, in respect of habitat area of distribution, was identified. There is no potential for adverse effects on alluvial forest in respect of habitat area or distribution as a result of the implementation of the proposed rehabilitation plans for the Application Site.
Habitat distribution	No decline, subject to natural processes.	
Woodland Size	Area stable or increasing. Where topographically possible, "large" woods at least 25ha in size and "small" woods at least 3ha in size.	Peat extraction activities and all ancillary works were confined to the boundaries of the Application Site, outside of the SAC. No potential for adverse effects to have occurred

Attribute	Target	Assessment
Woodland structure: cover and height	Total canopy cover at least 30%; median canopy height at least 7m; native shrub layer cover 10-75%; native herb/dwarf shrub layer cover at least 20% and height at least 20cm; bryophyte cover at least 4%	on alluvial forest within the SAC, in respect of woodland size or structure, was identified. There is no potential for adverse effects on alluvial forest in respect of woodland size or structure as a result of the implementation of the proposed rehabilitation plans for the Application Site.
Woodland Structure: community diversity and extent	Maintain diversity and extent of community types	
Woodland structure: natural regeneration	Seedlings, saplings and pole age-classes of target species for 91E0* woodlands and other native tree species occur in adequate proportions to ensure survival of woodland canopy	
Hydrological regime: Flooding Depth/height of water table	Appropriate hydrological regime necessary for maintenance of alluvial vegetation	Drainage was inserted on all bogs between 1948 and 1995. Following this initial drainage, only minor annual changes in local bog hydrology and hydrogeology associated with the annual removal of peat and deepening of drains would have occurred (refer to Chapter 8 Hydrology of the rEIAR which accompanies the application for substitute consent). No potential for adverse effects on hydrological regime in the SAC as a result of peat extraction activities and all ancillary works at the Application Site was identified. There is no potential for adverse effects on alluvial forest in respect of habitat hydrological regime as a result of the implementation of the proposed rehabilitation plans for the Application Site.
Woodland structure: dead wood	At least 19 stems/ha of dead wood of at least 20cm diameter	Peat extraction activities and all ancillary works were confined to the boundaries of the Application Site, outside of the SAC. No potential for adverse effects to have occurred on alluvial forest within the SAC, in respect of woodland structure, was identified. There is no potential for adverse effects on alluvial forest in respect of woodland structure as a result of the implementation of the proposed rehabilitation plans for the Application Site.
Woodland structure: veteran trees	No decline	
Woodland structure: indicators of local distinctiveness.	No decline in distribution and, in the case of red listed and other rare or localised species, population size	
Woodland structure: indicators of overgrazing	All five indicators of overgrazing absent	
Vegetation composition: native tree cover	No decline. Native tree cover at least 90% of canopy; target species cover at least 50% of canopy	Peat extraction activities and all ancillary works were confined to the boundaries of the Application Site, outside of the SAC. No

Attribute	Target	Assessment
Vegetation composition: typical species	At least 1 target species for 91E0* woodlands present; at least 6 positive indicator species for 91E0* woodlands present	potential for adverse effects to have occurred on alluvial forest within the SAC, in respect of vegetation composition, was identified. There is no potential for adverse effects on alluvial forest in respect of vegetation composition as a result of the implementation of the proposed rehabilitation plans for the Application Site.
Vegetation composition: negative indicator species	Negative indicator species cover not greater than 10%; regeneration of negative indicator species absent	
Vegetation composition: problematic native species	Cover of common nettle (Urtica dioica) less than 75%	

6.1.2.1 Determination

Based on the above, it can be concluded, in view of best scientific knowledge and based on objective information, that there is no potential for adverse effects to have occurred on the QI Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno- Padion, Alnionincanae, Salicion albae) associated with the River Boyne and River Blackwater SAC, as a result of peat extraction activities and all ancillary works at the Application Site.

Based on the above, it can be concluded, in view of best scientific knowledge and based on objective information, that there is no potential for adverse effects on Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno- Padion, Alnionincanae, Salicion albae) as a result of the implementation of the proposed rehabilitation plans for the Application Site.

No potential for adverse effects on the integrity of the SAC in light of its conservation objectives was identified.

6.1.3 *Lampetra fluviatilis* (River lamprey) [1099]

The Site specific Conservation Objectives for this QI is:

> *'To restore the favourable conservation condition of River Lamprey (Lampetra fluviatilis)in River Boyne and River Blackwater SAC'*

The attributes and targets for this species as per the SSCOs(NPWS Version 1, 2021) were reviewed and an assessment of peat extraction activities and all ancillary works at the Application Site against the attributes and targets is provided in Table 6-3.

Table 6-3 Targets and attributes associated with the conservation objectives for river lamprey

Attribute	Target	Assessment
Distribution	Restore access to all water courses down to first order streams	There were no barriers to access to watercourses as a result of peat extraction activities and all ancillary works. Since the regulation of peat extraction activities and all ancillary works at the Application Site under IPC licence in April 2000, which predates the designation of the SAC, a range of measures have been in place to ensure that there is no deterioration in water quality due to peat extraction activities. There is no potential

Attribute	Target	Assessment
		for adverse effects on lamprey in respect of distribution to have occurred. There is no potential for adverse effects on lamprey in respect of distribution as a result of the implementation of the proposed rehabilitation plans for the Application Site.
Distribution of larvae	Not less than 50% of sample sites with suitable habitat positive for larval brook/river lamprey	Since the regulation of peat extraction activities and all ancillary works at the Application Site under IPC licence in April 2000, which predates the designation of the SAC, a range of measures have been in place to ensure that there is no deterioration in water quality due to peat extraction activities and all ancillary works. There is no potential for adverse effects on lamprey in respect of distribution to have occurred. There is no potential for adverse effects on lamprey in respect of distribution of larvae or population structure of larvae as a result of the implementation of the proposed rehabilitation plans for the Application Site.
Population structure of larvae	At least three age/size classes of larval brook/river lamprey present	
Larval lamprey density in fine sediment	Mean density of brook/river larval lamprey in sites with suitable habitat more than 5/m^2	Since the regulation of peat extraction activities and all ancillary works at the Application Site under IPC licence in April 2000, which predates the designation of the SAC, a range of measures have been in place to ensure that there is no deterioration in water quality due to peat extraction activities and all ancillary works. There is no potential for adverse effects on lamprey in respect of distribution to have occurred. There is no potential for adverse effects on lamprey in respect of larval lamprey density in fine sediment as a result of the implementation of the proposed rehabilitation plans for the Application Site.
Extent and distribution of spawning nursery habitat	No decline in extent and distribution of spawning and nursery beds	Since the regulation of peat extraction activities and all ancillary works at the Application Site under IPC licence in April 2000, which predates the designation of the SAC, a range of measures have been in place to ensure that there is no deterioration in water quality due to peat extraction activities and all ancillary works. There is no potential for adverse effects on lamprey in respect of distribution to have occurred. There is no potential for adverse effects on lamprey in respect of extent and distribution of spawning nursery habitat as a result of the implementation of the proposed rehabilitation plans for the Application Site.

6.1.3.1 Determination

Based on the above, it can be concluded, in view of best scientific knowledge and based on objective information, that there is no potential for adverse effects to have occurred on the QI river lamprey associated with the River Boyne and River Blackwater SAC, as a result of the peat extraction activities and all ancillary works at the Application Site.

Based on the above, it can be concluded, in view of best scientific knowledge and based on objective information, that there is no potential for adverse effects on river lamprey as a result of the implementation of the proposed rehabilitation plans for the Application Site.

No potential for adverse effects on the integrity of the SAC in light of its conservation objectives was identified.

6.1.4 *Salmo salar* (Atlantic salmon) [1106]

The Site specific Conservation Objectives for this QI is:

> *'To restore the favourable conservation condition of Atlantic salmon (Salmo salar) in River Boyne and River Blackwater SAC'*

The attributes and targets for this species as per the SSCOs (NPWS Version 1, 2021) were reviewed and an assessment of all peat extraction activities and all ancillary works at the Application Site against the attributes and targets is provided in Table 6-4.

Table 6-4 Targets and attributes associated with the conservation objectives for Atlantic salmon

Attribute	Target	Assessment
Distribution: extent of anadromy	100% of river channels down to second order accessible from estuary	There were no barriers to access to watercourses as a result of peat extraction activities and all ancillary works. Since the regulation of peat extraction activities and all ancillary works at the Application Site under IPC licence in April 2000, which predates the designation of the SAC, a range of measures have been in place to ensure that there is no deterioration in water quality due to peat extraction activities and all ancillary works. There is no potential for adverse effects on salmon in respect of distribution to have occurred. There is no potential for adverse effects on Atlantic salmon in respect of distribution to occur as a result of the implementation of the proposed rehabilitation plans for the Application Site.
Adult spawning fish	Conservation Limit (CL) for each system consistently exceeded	Since the regulation of peat extraction activities and all ancillary works at the Application Site under IPC licence in April 2000, which predates the designation of the SAC, a range of measures have been in place to ensure that there is no deterioration in water quality due to peat extraction activities and all ancillary works. There is no potential for adverse effects on Atlantic salmon in respect of adult spawning fish, salmon
Salmon fry abundance	Maintain or exceed 0+ fry mean catchment-wide abundance threshold value. Currently set at 17 salmon fry/5 min sampling	

Attribute	Target	Assessment
Out-migrating smolt abundance	No significant decline	fry abundance, out-migrating smolt abundance or number and distribution of redds to have occurred. There is no potential for adverse effects on Atlantic salmon in respect of adult spawning fish, salmon fry abundance, out-migrating smolt abundance or number and distribution of redds as a result of the implementation of the proposed rehabilitation plans for the Application Site.
Number and distribution of redds	No decline in number and distribution of spawning redds due to anthropogenic causes	
Water quality	At least Q4 at all sites sampled by EPA	Since the regulation of peat extraction activities and all ancillary works at the Application Site under IPC licence in April 2000, which predates the designation of the SAC, a range of measures have been in place to ensure that there is no deterioration in water quality due to peat extraction activities and all ancillary works. There is no potential for adverse effects on Atlantic salmon in respect of water quality to have occurred. There is no potential for adverse effects on Atlantic salmon in respect of water quality as a result of the implementation of the proposed rehabilitation plans for the Application Site.

6.1.4.1 Determination

Based on the above, it can be concluded, in view of best scientific knowledge and based on objective information, that there is no potential for adverse effects to have occurred on the QI Atlantic salmon associated with the River Boyne and River Blackwater SAC, as a result of peat extraction activities and all ancillary activities at the Application Site.

Based on the above, it can be concluded, in view of best scientific knowledge and based on objective information, that there is no potential for adverse effects on Atlantic salmon as a result of the implementation of the proposed rehabilitation plans for the Application Site.

No potential for adverse effects on the integrity of the SAC in light of its conservation objectives was identified.

6.1.5 *Lutra lutra* (Otter) [1355]

The Site specific Conservation Objectives for this QI is:

> *'To maintain the favourable conservation condition of Otter (Lutra lutra) in River Boyne and River Blackwater SAC'*

The attributes and targets for this species as per the Site-Specific Conservation Objectives (SSCOs) (NPWS Version 1, 2021) were reviewed and an assessment of all peat extraction activities and all ancillary works at the Application Site against the attributes and targets is provided in Table 6-5.

Table 6-5 Targets and attributes associated with the conservation objectives for Otter

Attribute	Target	Assessment
Distribution	No significant decline	Although otter are likely utilise the site for commuting and foraging, the site does not provide optimal habitat for otter. Since the regulation of peat extraction activities and all ancillary works at the Application Site under IPC licence in April 2000, which predates the designation of the SAC, a range of measures have been in place to ensure there is no deterioration of water quality. There is no potential for adverse effects on otter to have occurred in respect of distribution. There is no potential for adverse effects on otter in respect of water quality as a result of the implementation of the proposed rehabilitation plans for the Application Site.
Extent of terrestrial habitat	No significant decline	Although otter are likely utilise the site for commuting and foraging, the site does not provide optimal habitat for otter. More suitable habitat occurs in the watercourses outside the site. Since the site was put forward as a cSAC, peat extraction activities and all ancillary works at the site have comprised predominantly of peat extraction, creation and removal of stockpile and drain maintenance. There is no potential for adverse effects on otter populations associated with the SAC due to significant declines in terrestrial or freshwater habitat to have occurred. There is no potential for adverse effects on otter in respect of extent of habitat extent as a result of the implementation of the proposed rehabilitation plans for the Application Site.
Extent of freshwater (river) habitat	No significant decline	
Extent of freshwater (lake) habitat	No significant decline	
Couching sites and holts	No significant decline	Although otter likely utilise the site for commuting and foraging, the site does not provide optimal habitat for otter. There is no potential for adverse effects on otter populations associated with the SAC due to significant declines in couching sites to have occurred. There is no potential for adverse effects on otter in respect of couching sites and holts as a result of the implementation of the proposed rehabilitation plans for the Application Site.
Fish biomass available	No significant decline	Since the regulation of peat extraction activities and all ancillary works at the Application Site under IPC licence in April 2000, which predates the designation of the SAC, a range of measures have been in place to ensure there is no deterioration of water quality. There is no potential for adverse effects on otter, in respect of fish biomass available, to have occurred.

Attribute	Target	Assessment
		There is no potential for adverse effects on otter in respect of fish biomass available as a result of the implementation of the proposed rehabilitation plans for the Application Site.
Barriers to connectivity	No significant decline	Since the regulation of peat extraction activities and all ancillary works at Ballivor Bog under IPC licence in April 2000, which predates the designation of the SAC, there is no potential for adverse effects on otter, in respect of barriers to connectivity, to have occurred. There is no potential for adverse effects on otter in respect of barriers to connectivity as a result of the implementation of the proposed rehabilitation plans for the Application Site.

6.1.5.1 Determination

Based on the above, it can be concluded, in view of best scientific knowledge and based on objective information, that there is no potential for adverse effects to have occurred on the QI otter associated with the River Boyne and River Blackwater SAC, as a result of peat extraction activities at the Application Site.

Based on the above, it can be concluded, in view of best scientific knowledge and based on objective information, that there is no potential for adverse effects on otter as a result of the implementation of the proposed rehabilitation plans for the Application Site.

No potential for adverse effects on the integrity of the SAC in light of its conservation objectives was identified.

6.1.6 Determination on Potential Adverse Effects in the River Boyne and River Blackwater SAC

The regulation of peat extraction activities and all ancillary works under IPC licence predates the designation of the River Boyne and River Blackwater SAC which was designated in 2003. Since the regulation of peat extraction and all ancillary works at Ballivor Bog under IPC licence, and the broad compliance with the licence conditions by the Applicant over a 20 year monitoring period, there is no potential for significant effects on water quality to have occurred and therefore no potential for adverse effects on the SPA and its SCI species to have occurred in this regard as a result of peat extraction activities and all ancillary works.

Following an examination, evaluation and analysis, in light of best scientific knowledge, and, on the basis of objective information, it can be concluded that there is no potential for adverse effects on the River Boyne and River Blackwater SAC to have occurred as a result of peat extraction activities and all ancillary works at the Application Site.

There is no potential for adverse effects on the SAC as a result of the implementation of the proposed rehabilitation plans for Ballivor Bog.

6.2 River Boyne and River Blackwater SPA

The potential for adverse effects on the SCI species, kingfisher, that was identified as being at risk of potential effects in the AA Screening Report is assessed in this section. No detailed conservation objectives are available for the River Boyne and River Blackwater SPA.

6.2.1 Kingfisher [A229]

The Site specific conservation objectives for this QI is:

> '*To maintain the favourable conservation condition of kingfisher in River Boyne and River Blackwater SPA*,

The attributes and targets for this habitat as per the Site-Specific Conservation Objectives (SSCOs) (NPWS Version 1, 2024) were reviewed and an assessment of peat extraction activities and all ancillary works at the Application Site against the attributes and targets is provided in Table 6-6 below.

Table 6-6 Targets and attributes associated with nominated site-specific conservation objectives for Kingfisher [A229]

Attribute	Target	Assessment
Population size	No significant decline in the long term	Although kingfisher are likely to utilise the site for commuting and foraging, the site does not provide optimal habitat for this species. Since the regulation of peat extraction activities and all ancillary works at the Application Site under IPC licence in April 2000, which predates the designation of the SPA, a range of measures have been in place to ensure there is no deterioration of water quality. There is no potential for adverse effects on kingfisher to have occurred in respect population size, productivity rate, or Spatial distribution.
Productivity rate	Sufficient productivity to maintain the population trend as stable or increasing	
Spatial distribution of territories	No significant loss of distribution in the long term, other than that occurring due to natural patterns of variation	
Extent and quality of nesting banks and other suitable nesting features	Sufficient area of high quality nesting habitat to support the population target	Although kingfisher are likely to utilise the site for commuting and foraging, the site does not provide optimal habitat for this species. Therefore, there is no potential for adverse effects on kingfisher to have occurred in respect of foraging, commuting, or breeding habitat.
Forage spatial distribution, extent, abundance and availability	Sufficient number of locations, area of suitable forage habitat and available forage biomass to support the population target	
Water quality	Both biotic (i.e. Q-value) and abiotic indices reflect overall good-high quality status	Since the regulation of peat extraction activities and all ancillary works at the Application Site under IPC licence in April 2000, which predates the designation of the SPA, a range of measures have been in place to ensure there is no deterioration of water quality. There is no potential for adverse effects on kingfisher to have occurred in respect of water quality.
Barriers to connectivity	No significant increase	Since the regulation of peat extraction activities and all ancillary works at Ballivor Bog under IPC licence in April 2000, which predates the

		designation of the SPA, there is no potential for adverse effects on kingfisher, in respect of barriers to connectivity, to have occurred. There is no potential for adverse effects on kingfisher in respect of barriers to connectivity as a result of the implementation of the proposed rehabilitation plans for the Application Site.
Disturbance to breeding sites	Disturbance occurs at levels that do not significantly impact upon breeding Kingfisher	Although kingfisher are likely to utilise the Application Site for commuting and foraging, the site does not provide optimal breeding habitat for this species. Therefore, there is no potential for adverse effects on kingfisher to have occurred in respect of disturbance to breeding sites.

The Application Site does not provide optimal habitat for kingfisher. Although kingfisher were observed flying through the site during site visits undertaken, no kingfisher nesting sites were identified within or adjacent to the site during the walkover surveys or bird surveys undertaken in 2020 and 2021. There is no potential for adverse effects on this species to have occurred as a result of disturbance due to peat extraction activities and all ancillary works.

The regulation of peat extraction activities and all ancillary works under IPC licence since April 2020 predates the designation of the River Boyne and River Blackwater SPA which was first put forward for designation in 2010 (formally designated by Statutory Instrument in 2012). Since the regulation of peat extraction activities and all ancillary works at the Application Site under IPC licence, which includes a range of measures to ensure protection of water quality, and the broad compliance with the licence conditions by BnM over a 20-year monitoring period, there is no potential for significant effects on water quality to have occurred and therefore no potential for adverse effects on kingfisher in terms of deterioration of water quality and prey availability. There is no potential for adverse effects on the integrity of the SPA and its SCI species to have occurred in this regard as a result of peat extraction activities and all ancillary works.

During the implementation of the proposed rehabilitation plans for the Application Site, the existing silt control measures will continue to operate during the early stages of the rehabilitation plans when there is potential for the entrainment of suspended solids in surface waters during drain blocking. During this time no remedial works will be completed during periods of prolonged rainfall. Silt ponds will continue to be in use and will be regularly inspected and maintained as per IPC licence requirements. During the implementation of the proposed rehabilitation plans for the Application Site, the mitigation measures for fertiliser application will be implemented. There is no potential for adverse effects on kingfisher as a result of the implementation of the proposed rehabilitation plans for the Application Site.

6.2.1.1 Determination

Following an examination, evaluation and analysis, in light of best scientific knowledge, and, on the basis of objective information, it can be concluded that there is no potential for adverse effects on the integrity of the River Boyne and River Blackwater SPA to have occurred as a result of peat extraction activities and all ancillary works at the Application Site.

Following an examination, evaluation and analysis, in light of best scientific knowledge, and, on the basis of objective information, it can be concluded that there is no potential for adverse effects on the integrity of the SPA as a result of the implementation of the proposed rehabilitation plans for the Application Site.

6.3 Conclusion of Impact Assessment

Following an examination, evaluation and analysis, in light of best scientific knowledge and the conservation objectives of the site, and, on the basis of objective information, it can be concluded that there is no potential for adverse effects on the integrity of any European Site to have occurred as a result of peat extraction activities and all ancillary works at the Application Site. The regulation of peat extraction activities and all ancillary works at the Application Site under IPC licence predates the designation of the River Boyne and River Blackwater SAC (put forward as a candidate SAC in 2003) and the River Boyne and River Blackwater SPA (put forward as a candidate SPA in 2010 and formally designated in 2012). As part of the IPC Licence, there is a limit of 35mg/l for suspended solids. Quarterly monitoring of water quality has only recorded 3 no. exceedances of this threshold during the monitoring period (2000–2020). The concentrations of suspended solids typically ranged from 5-10mg/l (refer to Chapter 8 'Hydrology & Hydrogeology' of the accompanying rEIAR, which is included as **Appendix 6** of this rNIS).

The conditions within the IPC licence, and broad compliance with the conditions over a 20 year period, ensure that there is no potential for significant effects on water quality to have occurred and no potential for adverse effects on the integrity of the above European Sites, in light of their conservation objectives, to have occurred in this regard as a result of peat extraction activities and all ancillary works. There is no potential for peat extraction activities and all ancillary works to have had a significant effect on otter and kingfisher as a result of disturbance for the reasons outlined in the sections above.

There is no potential for adverse effects on the integrity of any European Site as a result of the implementation of the proposed rehabilitation plans for the Application Site.

Following an examination, evaluation and analysis, in light of best scientific knowledge, and, on the basis of objective information, it can be concluded that there is no potential for adverse effects on the integrity of any European Site to have occurred or to occur as a result of the Project at the Application Site.

7. IN COMBINATION EFFECTS

A search and review in relation to plans and projects that may have the potential to result in cumulative and/or in-combination impacts on European Sites was conducted. This assessment focuses on the potential for cumulative in-combination effects on the European Sites where potential for adverse effects was identified at the screening stage (**Appendix 1**). This included a review of online Planning Registers, development plans and other available information and served to identify past and future plans and projects, their activities and their predicted environmental effects.

7.1 Development context – Ecological Plans and Policies

The following development plans have been reviewed and taken into consideration as part of this assessment:

- Westmeath County Development Plan 2021 – 2027
- Westmeath County Development Plan 2014 – 2020
- Westmeath County Development Plan 2008 – 2014
- Westmeath County Development Plan 2002 – 2008
- Meath County Development Plan 2021-2027
- Meath County Development Plan 2013-2019
- Meath County Development Plan 2007-2013
- National Biodiversity Action Plan 2017-2021
- Ireland 4th National Biodiversity Action plan 2023-2030.

The review focused on policies and objectives that relate to designated sites for nature conservation from 2003 (when the River Boyne and River Blackwater SAC was first put forward as a cSAC). An overview of the search results with regard to plans is provided in Table 7-1 below. .

Table 7-1 Assessment of plans

Plans	Key Policies and Objectives directly related to European Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on European Sites
Westmeath County Development Plan 2021-2027	The overall objective of the Development Plan has been identified: *Continue to protect and enhance the County's natural heritage and biodiversity and ensure that networks of green infrastructure are identified, created, protected and enhanced to provide a wide range of environmental, social and economic benefits to communities.* **Policies: Natural Heritage** It is the policy of the Council to: **CPO 12.1** › Contribute as appropriate towards the protection of designated sites in compliance with relevant EU Directives and applicable national legislation **Policies: Natura 2000** It is a policy of the Council to: **CPO 12.4** › Protect and conserve Special Areas of Conservation, candidate Special Areas of Conservation, Special Protection Areas and candidate Special Protection Areas, designated under the EU Birds and Habitats Directives respectively. **CPO 12.5** › Ensure that no plans, programmes, etc. or projects giving rise to significant cumulative, direct, indirect or secondary impacts on European Sites arising from their size or scale, land take,	The Plans were comprehensively reviewed, with particular reference to Policies and Objectives that relate to European Designated Sites. The potential for peat extraction activities and all ancillary works, which were undertaken at different times and at different levels of intensity throughout the bog between 2003 (when the River Boyne and River Blackwater SAC was first put forward as a cSAC) and 2020, to result in adverse effects on European Sites was assessed. No potential for adverse effects on the integrity of any European Site in light of their conservation objectives was identified, and therefore historic peat extraction activities and all ancillary works are not considered to be in contravention of the policies and objectives within the development plans. The ongoing operations since the original drainage and peat extraction activities and all ancillary works, which were undertaken at different times and at different levels of intensity throughout the bog, are unlikely to have resulted in adverse effects on the integrity of any European Site and are therefore not considered to be in contravention of the policies and objectives within the plan. The implementation of the rehabilitation plan for the Application Site will not have an adverse effect

	proximity, resource requirements, emissions (disposal to land, water or air), transportation requirements, duration of construction, operation, decommissioning or from any other effects shall be permitted on the basis of this Plan (either individually or in combination with other plans, programmes, etc. or projects).* **CPO 12.6** › Ensure that any plan or project that could have a significant adverse impact (either by themselves or in combination with other plans and projects) upon the conservation objectives of any Natura 2000 Site or would result in the deterioration of any habitat or any species reliant on that habitat will not be permitted.* ** Except as provided for in Article 6(4) of the Habitats Directive, viz. There must be a) no alternative solution available, b) imperative reasons of overriding public interest for the project to proceed; and c) Adequate compensatory measures in place.* **Policies: Rare and Protected Sites** **CPO 12.18** › Consult with the National Parks and Wildlife Service (NPWS) in regard to any developments (those requiring permission and those not requiring planning permission) which the Council proposes to carry out within pNHAs, NHAs, SACs, SPAs, and other important ecological sites. **Policies: Invasive species** It is a policy of the Council to: **CPO 12.27** › Prevent the spread of invasive species within the plan area, including requiring landowners and developers to adhere to best practice guidance in relation to the control of invasive species **CPO 12.29**	on the integrity of any European Site and is in compliance with the policies and objectives outlined within the plan.

	› Support, as appropriate, the National Parks and Wildlife Service's efforts to seek to control and manage the spread of non-native invasive species on land and water. Where the presence of non-native invasive species is identified at the site of any proposed development or where the proposed activity has an elevated risk of resulting in the presence of these species, details of how these species will be managed and controlled will be required.	
Meath County Development Plan 2021-2027	**Policies and Objectives : Biodiversity** **HER POL 27** › To protect, conserve and enhance the County's biodiversity where appropriate **HER POL 28** › To integrate in the development management process the protection and enhancement of biodiversity and landscape features wherever possible, by minimising adverse impacts on existing habitats (whether designated or not) and by including mitigation and/or compensation measures, as appropriate. **HER POL 31** › To ensure that the ecological impact of all development proposals on habitats and species are appropriately assessed by suitably qualified professional(s) in accordance with best practice guidelines – e.g. the preparation of an Ecological Impact Assessment (EcIA), Screening Statement for Appropriate Assessment, Environmental Impact Assessment, Natura Impact Statement (NIS), species surveys etc. (as appropriate). **HER OBJ 31** › To implement, in partnership with the Department of Culture, Heritage and the Gaeltacht, relevant stakeholders and the community, the objectives and actions of the County Meath Biodiversity Plan 2015-2020 and any revisions thereof **Policies and Objectives : Sites Designated for Nature Conservation**	

	HER POL 32 › To permit development on or adjacent to designated Special Areas of Conservation, Special Protection Areas, Natural Heritage Areas, Statutory Nature Reserves or those proposed to be designated over the period of the Plan, only where the development has been subject to the outcome of the Appropriate Assessment process and has been carried out to the satisfaction of the Planning Authority, in consultation with National Parks and Wildlife. **HER POL 33** › To have regard to the views and guidance of the National Parks and Wildlife Service in respect of proposed development where there is a possibility that such development may have an impact on a designated European or National site or a site proposed for such designation. **HER POL 34** › To undertake appropriate surveys and collect data to provide an evidence-base to assist the Council in meeting its obligations under Article 6 of the Habitats Directives (92/43/EEC) as transposed into Irish Law, subject to available resources. It is an objective of the Council: **HER OBJ 33** › To ensure an Appropriate Assessment in accordance with Article 6(3) and Article 6(4) of the Habitats Directives (92/43/EEC) and in accordance with the Department of Environment, Heritage and Local Government Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities, 2009 and relevant EPA and European Commission guidance documents, is Meath County Development Plan 2021-2027 Chapter 8 carried out in respect of any plan or project not directly connected with or necessary for the management of the site but likely to have a significant effect on a Natura 2000 site(s), either individually or in-combination with other plans or projects, in view of the site's conservation objectives. **HER OBJ 34**	

	› To protect and conserve the conservation value of candidate Special Areas of Conservation, Special Protection Areas, Natural Heritage Areas and proposed Natural Heritage Areas as identified by the Minister for the Department of Culture, Heritage and the Gaeltacht and any other sites that may be proposed for designation during the lifetime of this Plan in accordance with the provisions of the Habitats and Birds Directives and to permit development in or affecting same only in accordance with the provisions of those Directives as transposed into Irish Law. **Policies and Objectives: Protected Species** **HER POL 36** › To consult with the National Parks and Wildlife Service and take account of their views and any licensing requirements, when undertaking, approving or authorising development which is likely to affect plant, animal or bird species protected by law. **HER OBJ 35** › To ensure that development does not have a significant adverse impact, incapable of satisfactory avoidance or mitigation, on plant, animal or bird species protected by law. **Policies and Objectives: Peatlands** **HER POL 45** › To ensure that peatland areas which are designated (or proposed for designation) as NHAs, SACs or SPAs are conserved for their ecological, climate regulation, archaeological, cultural and educational significance. **HER OBJ 39**	

	➢ To work in partnership with relevant stakeholders on a suitable peatland site(s) to demonstrate best practice in sustainable peatland conservation, management and restoration techniques and to promote their heritage and educational value subject to Ecological Impact Assessment and Appropriate Assessment Screening, as appropriate, having regard to local and residential amenities.	
Westmeath County Development Plan 2014-2020	**Policies** **P-PTL1**: To protect the county's designated peatland areas and landscapes, including any historical walkways through bogs and to conserve their ecological, archaeological, cultural, and educational heritage. **P-PTL4:** To plan and prepare for the future sustainable and environmentally sensitive use of large industrial bog sites when peat harvesting finishes and to encourage a balanced approach to the redevelopment of cutaway bogs, including habitat creation, in conjunction with adjacent Local Authorities. This plan will have regard to both National and Regional frameworks with regard to the future use of peatlands, including cutaway bogs. **P-PTL5:** To exercise control of peat extraction, both individually and cumulatively, which would have significant impacts on the environment. **Objectives** **O-PTL3:** To work with other bodies such as the NPWS and Coillte to support the conservation of peatlands. **O-PTL5:** To work in partnership with relevant stakeholders on suitable peatland site(s) to demonstrate best practice in sustainable peatland conservation, management and restoration techniques and to promote their heritage and educational value subject to Ecological Impact Assessment and Appropriate Assessment, as appropriate. **O-PTL6:** To support the preparation of a Sustainable Holistic Management Plan for the future use of the Industrial Peatlands in the county, which recognises the role of peatlands in carbon sequestration.	
Westmeath County Development Plan 2008 - 2014	**Policies & Objectives** **Natural heritage**	

	O-EH2: To protect, manage and enhance the natural heritage, biodiversity, landscape and environment of County Westmeath in recognition of its importance as a non-renewable resource, unique identifier and character of the county and as a natural resource asset. **O-EH3**: It is a key objective to ensure as far as possible that development does not impact adversely on wildlife habitats and species. In the interests of sustainability, b **P-EH19:** It is the policy of Westmeath County Council to ensure the conservation of the county's peatlands in order to minimise the negative impact on natural diversity and the archaeological and cultural heritage of the county. **O-EH14:** To conserve peatlands and protect peatland landscapes within the county. O-**EH15:** To continue to identify and map peatland sites of high local ecological value and protect them for their biodiversity. **O-EH16**: To exercise control of peat extraction both individually and cumulatively which would have significant impacts on the environment as provided for under SI 364 of 2005. **O-EH18** :To seek hydrological reports for significant developments within and in close proximity to peatlands so as to assess impacts on integrity of peatland ecosystems. **O-EH19**: To plan and prepare for the future use of large industrial bog sites when peat harvesting finishes and to encourage a balanced approach to the redevelopment of cutaway bogs. There is potential for habitat creation such as woodlands, grasslands, and wetlands. There is also potential for amenity value with development of parklands and economic uses such as agricultural grasslands, forestry and wind energy. **O-EH20** To work with other bodies such as NPWS and Coillte to support the conservation of Peatlands. **Future of Cutaway Peatland** **P-EH32** Within the next 20–30 years large areas of peatland will be exhausted and provide tracts of land that have potential for agriculture, habitat and amenity. The Council, in consultation with relevant agencies, will explore future potential of cut away peatlands that may offer opportunities for habitat creation or amenity and recreation areas such as community woodlands or parklands.	
Meath County Development 2013-2019	It was an objective of this Plan for Meath County Council to "*investigate the potential of renewable energy identified in the initial assessment areas with a view to developing a renewable energy strategy for the County.*"	
Meath County Development 2007 - 2013	**Policies**	

	HER POL 18: To ensure that peatland areas which are designated (or proposed for designation) as NHAs or SACs are conserved and managed appropriately to conserve their ecological, archaeological, cultural and educational significance.	
National Biodiversity Action Plan 2017-2021	› **Objective 1: Adopt a Whole-of Government, Whole of-Society Approach to Biodiversity**. Proposed actions include capacity and resource reviews across Government; determining responsibilities for the expanding biodiversity agenda providing support for communities, citizen scientists and business; and mechanisms for the governance and review of this National Biodiversity Action Plan. › **Objective 2: Meet Urgent Conservation and Restoration Needs.** Supporting actions will build on existing conservation measures. Efforts to tackle Invasive Alien Species will be elevated. The protected area network will be expanded to include the Marine Protected Areas. The ambition of the EU Biodiversity Strategy will be considered as part of an evolving work programme across Government. › **Objective 3: Secure Nature's Contribution to People**. Actions highlight the relationship between nature and people in Ireland. These include recognising the tangible and intangible values of biodiversity, promoting nature's importance to our culture and heritage and recognising how biodiversity supports our society and our economy. › **Objective 4: Enhance the Evidence Base for Action on Biodiversity.** This objective focuses on biodiversity research needs, as well as the development and strengthening of long-term monitoring programmes that will underpin and strengthen future decision-making. Action will also focus on collaboration to advance ecosystem accounting that will contribute towards natural capital accounts. › **Objective 5: Strengthen Ireland's Contribution to International Biodiversity Initiatives**. Collaboration with other countries and across the island of Ireland will play a key role in the realisation of this Objective. Ireland will strengthen its contribution to international biodiversity initiatives and international governance processes, such as the United Nations Convention on Biological Diversity.	The Plan was comprehensively reviewed, with particular reference to Policies and Objectives that relate to biodiversity and Designated Sites. The potential for peat extraction activities and all ancillary works which were undertaken at different times and at different levels of intensity throughout the bog between 2003 (when the River Boyne and River Blackwater SAC was first put forward as a cSAC) and 2020, to result in adverse effects on European Sites was assessed. No potential for adverse effects on the integrity of any European Site in light of their conservation objectives was identified, and therefore historic peat extractions activities and all ancillary works are not considered to be in contravention of the policies and objectives within the development plans. The implementation of the rehabilitation plan for the Application Site will not have an adverse effect on the integrity of any European Site and is in compliance with the policies and objectives outlined within the plan.
Ireland 4th National Biodiversity Action plan 2023-2030.	› **Objective 1: Adopt a Whole-of Government, Whole of-Society Approach to Biodiversity.** Proposed actions include capacity and resource reviews across Government; determining responsibilities for the expanding biodiversity agenda providing support for communities, citizen scientists and business; and mechanisms for the governance and review of this National Biodiversity Action Plan. › **Objective 2: Meet Urgent Conservation and Restoration Needs.**	The Biodiversity Action Plan was comprehensively reviewed for targets and objectives relating to the Natura 2000 network and other natural heritage interests. The original drainage and peat extraction activities and all ancillary works had the potential to result in

	Supporting actions will build on existing conservation measures. Efforts to tackle Invasive Alien Species will be elevated. The protected area network will be expanded to include the Marine Protected Areas. The ambition of the EU Biodiversity Strategy will be considered as part of an evolving work programme across Government. › **Objective 3: Secure Nature's Contribution to People.** Actions highlight the relationship between nature and people in Ireland. These include recognising the tangible and intangible values of biodiversity, promoting nature's importance to our culture and heritage and recognising how biodiversity supports our society and our economy. › **Objective 4: Enhance the Evidence Base for Action on Biodiversity.** This objective focuses on biodiversity research needs, as well as the development and strengthening of long-term monitoring programmes that will underpin and strengthen future decision-making. Action will also focus on collaboration to advance ecosystem accounting that will contribute towards natural capital accounts. › **Objective 5: Strengthen Ireland's Contribution to International Biodiversity Initiatives.** Collaboration with other countries and across the island of Ireland will play a key role in the realisation of this Objective. Ireland will strengthen its contribution to international biodiversity initiatives and international governance processes, such as the United Nations Convention on Biological Diversity. ›	significant negative effects on biodiversity which would have been in contravention of the policies and objectives within the plan. The ongoing peat extraction activities and all ancillary works since the original drainage and peat extraction activities, which were undertaken at different times and at different levels of intensity throughout the bog, are unlikely to have resulted in a significant effects on biodiversity and are therefore not considered to be in contravention of the policies and objectives within the plan. The implementation of the rehabilitation plan for the Application Site will have a slight positive effect on biodiversity and is in compliance with the policies and objectives outlined within the plan.

7.2 Bord na Mona Developments

The developments listed in Table 7-2 below were considered in the cumulative impacts assessment for this Project and relate to infrastructure within the Application Site constructed between 1994 and 2020, when cessation of extraction commenced within the Application Site.

Table 7-2 Bord na Mona developments considered in the cumulative impact assessment.

Year	Description	Planning Reference	Location in relation to Application Site
2005	10/20kV ESB Substation to service Ballivor Horticultural Factory	52348 Westmeath Co. Co.	Ballivor Works, outside Application Site
2013	Laying two intersecting grass strips, 150m x 7m and 75m x 7m, for use as a take-off and landing area for model aircraft and a grass area, 10m x 30m for car parking	12/2067 Westmeath Co. Co.	Lisclogher West, outside Application Site
2015; 2016;	Erect a guyed wind monitoring mast	156135; 166259 Westmeath Co. Co.	Lisclogher Bog
2021	Retention of guyed wind monitoring mast	21620 Westmeath Co. Co.	Lisclogher Bog

7.3 Other Projects

The majority of planning applications in the vicinity relate to one-off rural dwelling houses, residential development (i.e. modification and/or re-development of existing dwellings) and agricultural development, including new entrances, sheds and ancillary plant and infrastructure. Lands immediately adjacent to, or within near proximity of, Delvin, Raharney and Ballivor settlements and the public road network (e.g. R156, L5513, L1509, L1504, L5507, L8012 and others) have experienced a higher and sustained concentration of development compared to more rural locations along the perimeter of the Application Site. Relevant projects in the area include:

- Meath Pl Ref. **96/418**: A two storey dwelling house, septic tank and percolation area (Final Grant – 12th November 1996)
- Westmeath Pl Ref. **98/250**: Erect dormer bungalow and septic tank (Final Grant – 23rd December 1998)
- Westmeath Pl Ref. **00/900**: Construction of house and septic tank (Final Grant – 14th December 2000)
- Westmeath Pl Ref. **01/792**: Dormer bungalow, septic tank and percolation areas [outline] (Final Grant – 19th July 2002)
- Westmeath Pl Ref. **04/2084**: New dwelling house, 'septech 2000' treatment system, percolation area and domestic garage (Final Grant – 15th September 2004)
- Westmeath Pl Ref. **04/2126**: Construct a bungalow with a proprietary wastewater treatment system (Final Grant – 15th October 2004)
- Westmeath Pl Ref. **06/2025**: Construct a new bungalow, domestic garage, septic tank and percolation area (Final Grant – 19th May 2006)
- Westmeath Pl Ref. **06/2236**: Erect a new dwelling house, septic tank, treatment system, percolation area and ancillary site works (Final Grant – 13th October 2006)

- Westmeath Pl Ref. **08/2101**: Demolish existing dwelling house and planning permission to erect a new replacement dwelling house, septic tank, treatment system and ancillary site works (Final Grant – 2nd February 2009)
- Westmeath Pl Ref. **15/6142**: Single storey dwelling, septic tank, sewage treatment system, percolation area, domestic garage, new entrance and all ancillary site works (Final Grant – 13th January 2016)
- Westmeath Pl Ref. **15/6135**: To erect a guyed wind monitoring mast, with instruments, up to 100m in height, at Lisclogher Bog, Lisclogher Great, Co Westmeath. The purpose of the proposed mast is to assess the suitability of the company's adjacent lands for wind farm development (Final Grant – 15th October 2015)
- Westmeath Pl Ref. **15/6143**: To Renovate and extend existing semi-detached dwelling. One and a half storey extension to the side & rear of existing dwelling, construction of a domestic garage/store, horse stable and tack room, relocate existing entrance & install proprietary wastewater treatment system & percolation area (Final Grant - 15th October 2015)
- Meath Pl Ref. **TA150349**: development will consist of a storey and a half type dwelling, domestic garage, proprietary wasterwater treatment system with associated polishing filter and open new entrance to site (Granted - July 2, 2015)
- Meath Pl Ref. **TA150738**: retention permission for essential structural repairs to date including roof & porch replacements and foundations to future extension, planning permission to complete general building upgrade with minor elevational changes and planning permission for a 2 storey extension to south west side, domestic waste treatment unit & new percolation area and removal of existing septic tank, replacement road access vehicular gate and rebuild piers & flanking walls, replacement road access pedestrian gate, extended & repaired/rebuilt stepped road frontage walls, walls & hedges to new site's other boundaries and reusing existing sheds as domestic garage and storage facilities (Granted - October 7, 2015)
- Meath Pl Ref. **TA151297**: to retain existing dog kennels, enclosures & associated structures. The Rescue Centre contains (a) 4 no. timber kennels, (b) 2 no. concrete structure kennels, (c) 2 no. prefabricated structure incorporation office, store & grooming room. Significant further information/revised plans submitted on this application (Granted - March 8, 2017)
- Westmeath Pl Ref. **17/6274**: Retention of existing dwelling house and ancillary site works (Final Grant – 10th July 2018)
- Meath Pl Ref. **TA170047**: a single storey dwelling, a detached domestic garage, a proprietary domestic effluent treatment system, shared site entrance previously granted under Ref. TA/130317 and all associated site works. Significant further information/revised plans submitted on this application (Granted - September 1, 2017)
- Meath Pl Ref. **TA180421**: a single storey dwelling, a detached domestic garage, wastewater disposal system, site entrance and all associated site works (Granted - August 9, 2018)
- Meath Pl Ref. **TA180485**: extension of duration of planning permission ta130317 - single storey dwelling, detached domestic garage, proprietary domestic effluent treatment system, site entrance and all associated site works (Granted - July 5, 2018)
- Meath Pl Ref. **TA201217**: change of house type from a single storey type dwelling to a storey and a half type dwelling and revisions to the site layout plan as previously granted under planning ref TA170047 and all associated site works (Granted - December 8, 2020)
- Westmeath Pl Ref. **19/6104**: Construction of a new two storey type dwelling, domestic garage, installation of a new septic tank & percolation area, new vehicular entrance and all ancillary site services (Final Grant – 13th August 2019)
- Meath Pl Ref. **21/1274**: The construction of 4 bay slatted shed for agricultural use and all associated site works (Final Grant – 7th October 2021);

- Westmeath Pl Ref. **21/380**: Single storey dwelling & install a proprietary wastewater treatment system and all associated site development works (Notification of Grant - 29.10.2021);
- Westmeath Pl Ref. **21/401**: Extension of Duration - Erection of a slatted shed, roofed dungstead, silage slab and ancillary site works (Final Grant – 3rd September 2021)
- Meath Pl Ref. **21/1324**: An extension to the existing dwelling to include a part single storey / part dormer extension to rear, single storey extension to front / side, new front porch together with modifications to the existing elevations and internal plan layout (Notification of Grant – 18th October 2021)
- Westmeath Pl Ref. **21/506**: Retain existing conservatory to south (Notification of Grant – 2nd November 2021)
- Westmeath Pl Ref. **20/6054**: Construction of a 83.9 sq.m extension to existing storey and a half type dwelling and all ancillary site services. (Final Grant - July 30, 2020)
- Meath Pl Ref. **21/1324**: an extension to the existing dwelling to include a part single storey / part dormer extension to rear, single storey extension to front / side, new front porch together with modifications to the existing elevations and internal plan layout. The development also includes construction of detached domestic garage, de-commissioning of the existing septic tank and percolation area, and installation of a new septic tank and percolation area, modifications and upgrade works to existing domestic entrance together with all associated site works (Granted - November 29, 2021)
- Westmeath Pl Ref. **20/6221**: Retention permission and permission for development at this site as follows: (i) retention of existing 80 metre meteorological mast which was erected as exempted development in accordance with Class 20A, Schedule 2 of the planning and development regulations 2001 (as amended) and all ancillary infrastructure and associated site development and reinstatement works and (ii) the increase in height of the existing meterological mast from 80 metres to a maximum height of up to 100 metres. Existing access arrangements using agricultural access tracks, will remain unaltered. The operational lifetime of the proposed development will be up to five years (Retention)
- Westmeath Pl Ref. **20/6226**: Retention permission for external milk tank adjacent to existing milking parlour and all associated site works (Granted - November 24, 2020)
- Westmeath Pl Ref. **20/6242**: One number residential dwelling consisting of two part single, one part two storey house, associated garage/shed/workshop, approved wastewater treatment system and percolation area to EPA standard and new vehicular entrance (Granted - February 24, 2021)
- Meath Pl Ref. **21/2428**: renovation of the existing dwelling and the construction of a new connecting two storey dwelling, upgrading of the existing entrance to facilitate entrance piers and gates, the installation of a packaged wastewater treatment system and polishing filter, and associated site works (Granted - April 7, 2022)
- Meath Pl Ref. **21/281**: development consists of a Sheep Shed with Sheep Handling Yard, Meal Storage Bin, Concrete Apron, Farm Access Road, Agricultural Entrance and all site works (Granted - May 19, 2021)
- Westmeath Pl Ref. **21/620**: Retention permission for continued use of an existing Guyed Wind Monitoring Mast with instruments, 100m in height on its lands at Lisclogher Bog, Lisclogher Great, Co. Westmeath for a further period of three years. The purpose of the mast is to assess the suitability of the company's adjacent lands for wind farm development. Previous planning application reference number 16/6259 refers. (Granted - February 23, 2022)
- Westmeath Pl Ref. **21/659**: for a private dwelling house, proprietary effluent treatment system and percolation area, domestic garage, entrance onto public road and all ancillary site services (Granted - April 13, 2022)
- Meath Pl Ref. **22/1656**: amendments to planning register no. 21/2428. The amendments include the increase in footprint and height of the new connecting dwelling (Granted - March 28, 2023)

- Westmeath Pl Ref. **22/245**: construction of agricultural shed consisting of cubicles, feeding area and underground slatted slurry storage tanks and all associated site works (Granted - August 15, 2022)
- Westmeath Pl Ref. **22/550**: to construct one number detached single storey dwelling, one number detached single storey garage, to create new entrance to public road, to connect to public watermain, to install a septic tank and percolation area and all associated site works (Granted - May 3, 2023)
- Meath Pl Ref. **23/1042**: the construction of a two storey style dwelling, detached domestic garage, a domestic wastewater disposal system, new site entrance and all associated site works (Granted - February 29, 2024)
- Meath Pl Ref. **23/254**: detached domestic store shed/garage incorporating plant room area and home office with non-habitable loft storage space overhead. The development also includes p.v. solar panels on north east ans south west elevations together with all associated site works (Granted - June 12, 2023)
- Meath Pl Ref. **23/297**: the construction of a one and a half storey, 4 bedroom dwelling, a domestic garage, use existing site access, new percolation area and treatment system and all associated site works. Significant further information/revised plans submitted on this application (Granted - January 22, 2024)
- Meath Pl Ref. **23/60242**: The development will consist of the renovation and extension to an existing detached bungalow and outbuildings, the installation of a wastewater treatment system and polishing filter, upgrading of existing entrance off the public road and all ancillary site works. (Granted - January 4, 2024)
- Meath Pl Ref. **23/60401**: construction of a new bungalow type dwelling house, domestic garage, new vehicular entrance, septic tank and percolation area and all associated ancillary site works (Granted – not yet granted)

The consented Bracklyn Wind Farm (PL25M.311565), comprising 9 no. wind turbines with an overall tip height of 185m, immediately south of Lisclogher West Bog and immediately north and west of Bracklin Bog. By virtue of its proximity to the Application Site, the proposed Bracklyn Wind Farm has been considered as part of this rNIS (and accompanying rEIAR) where relevant. Other infrastructural developments, including but not limited to the below, have been assessed on a pre-cautionary basis and considered, where deemed appropriate, within the supporting environmental cumulative assessments.

- Drehid Wind Farm (Kildare County Council Ref. 18/1534): The development will consist of the following: up to 12 no. wind turbines with a tip height of up to 169 meters and all associated foundations and hardstanding areas and all associated site and ancillary works (Refusal – 1st Party Appeal (PL09.306500) – Grant (7th September 2020);
- N51 Higginstown to Earlsmeadow pavement works[2];
- N51 Dunmoe Phase 2 Realignment Scheme

The proposed Ballivor Wind Farm planning application was lodged in 2023. The proposed development was subject to Appropriate Assessment and Environmental Impact Assessment and was designed and included mitigation to ensure that there will be no significant impacts on biodiversity, water quality or Designated Sites. The AA Screening for the proposed Ballivor Wind Farm identified potential for likely significant effects on the River Boyne and River Blackwater SAC and the River Boyne and River Blackwater SPA. As such the potential for in-combination effects with the Project specifically in relation to the River Boyne and River Blackwater SAC and the River Boyne and River Blackwater SPA were initially identified. However, with the implementation of the control measures and mitigation measures outlined within this rNIS and the mitigation measures outlined within the NIS for the proposed Ballivor Wind Farm, no potential for in-combination effects were identified.

[2] *TII - 2021 Grant Allocation to Local Authorities for National Roads;*

7.4 Conclusion of In Combination Impact Assessment

Following the assessment provided in the preceding sections, it is concluded that, the Project has not and will not result in any adverse effects on the integrity of any European Sites. Having considered other projects in the area as listed above, no potential for the Project to contribute or have contributed to any adverse cumulative effects on any European Sites was identified when considered in-combination with other plans and projects.

In the review of the projects that was undertaken, no connection, that could potentially result in additional or negative cumulative impacts was identified. Neither was any potential for different (new) impacts resulting from the combination of the various projects and plans in association with the Project.

The implementation of the proposed rehabilitation plans will have a positive long-term impact on biodiversity within the Application Site as well as on downstream water quality and therefore will not contribute to any negative effects on water quality of European Sites when considered cumulatively with other projects and plans.

The proposed Ballivor Wind Farm planning application was lodged in 2023 and formed part of this cumulative assessment. With the implementation of the control measures and mitigation measures outlined within this rNIS and the mitigation measures outlined within the NIS for the proposed Ballivor Wind Farm, no potential for in-combination effects were identified.

8. CONCLUDING STATEMENT

This rNIS has provided an assessment of all potential direct or indirect adverse effects on European Sites

By 1997, when the River Boyne and River Blackwater SAC was first put forward as a candidate SAC, peat extraction activities and all ancillary works at the Application Site were well established. Drainage had been inserted on all 5 no. bogs within the Application Site and the site consisted predominantly of a large area of cutover bog, comprising bare peat and smaller areas of revegetating scrub, woodland and pioneer habitats of open cutaway bog. Activities between 2003 and 2020 largely comprised peat extraction, creation and removal of stockpiles and drain maintenance. Since the year 2000, which pre-dates the designation of both the River Boyne and River Blackwater SAC and the River Boyne and River Blackwater SPA which took place in 2003, peat extraction activities and all ancillary works at the Application Site have been regulated under IPC licence. The licence conditions include a range of measures to ensure the protection of water quality. During this time, given the regulation of activities under IPC licence, there is no potential for the peat extraction activities and all ancillary works at the Application Site to have had an adverse effect on the integrity of any European Site in light of their conservation objectives.

Since the cessation of peat extraction at the Application Site in June 2020, activities have been confined to removal of stockpiles from the Application Site. These activities have continued to be regulated under IPC licence and therefore there is no potential for these activities to have resulted in adverse effects on the integrity of any European Site. During the implementation of the proposed rehabilitation plans for the Application Site during both the Current Phase and Remedial Phase, the existing silt control measures will continue to operate during the early stages of the rehabilitation plans when there is potential for the entrainment of suspended solids in surface waters during drain blocking. During this time no remedial works will be completed during periods of prolonged rainfall. Silt ponds will continue to be in use and will be regularly inspected and maintained as per IPC licence requirements.
There is no potential for adverse effects on the integrity of any European Site as a result of the implementation of the proposed rehabilitation plans for the Application Site.

Following an examination, evaluation and analysis, in light of best scientific knowledge and the conservation objectives of the European Sites, and, on the basis of objective information, it can be concluded that the peat extraction and all ancillary works at the Application Site and the implementation of the proposed rehabilitation plans for the Application Site have not and will not have any adverse effect on the integrity of any European Site, either alone or in combination with other plans or projects.

9. BIBLIOGRAPHY

Aquafact, (2010a) Reef Investigations in Galway Bay cSAC. Subtidal Benthic Investigations in Galway Bay Complex cSAC (0268) and Inner Galway Bay SPA (4031).

Bailey, M. and Rochford J. (2006) Otter Survey of Ireland 2004/2005. Irish Wildlife Manuals, No. 23. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

Balmer, D.E., Gillings, S., Caffrey, B.J., Swann, R.L., Downie, I.S. and Fuller, R.J. (2013). Bird Atlas 2007-11: the breeding and wintering birds of Britain and Ireland. BTO Books, Thetford, UK.

Birds Directive (2009/47/EC) – http://ec.europa.eu/environment/nature /legislation/birdsdirective /index _en.htm

Blumstein DT, Anthony LL, Harcourt R, Ross G. 2003. Testing a key assumption of wildlife buffer zones: is flight initiation distance a species-specific trait? Biological Conservation 110:97–100.

Blumstein DT, Fernández-Juricic E, Zollner PA, Garity SC. 2005. Inter-specific variation in avian responses to human disturbance. Journal of Applied Ecology 42:943–953. Blumstein DT 2006b. The multi-predator hypothesis and the evolutionary persistence of antipredator behavior. Ethology 112: 209–217.

Bowers Marriott, B. (1997) Practical Guide to Environmental Impact Assessment: A Practical Guide. Published by McGraw-Hill Professional, 1997, 320 pp.

Chandler, J.R. (1970) A Biological Approach to water Quality Management. Water Poll. Cont. 69:415-421.

Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (Habitats Directive) and Directive 2009/147/EC (codified version of Directive 79/409/EEC as amended) (Birds Directive) – transposed into Irish law as European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477/2011).

CIEEM (2018) Institute of Ecology and Environmental Management Draft Guidelines for Ecological Impact Assessment.

Crowe, O., Wilson, J., Aznar, I. and More, S.J. (2009). A review of Ireland's waterbirds, with emphasis on wintering migrants and reference to H5N1 avian influenza. Irish Veterinary Journal 62, 800–811.

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

Cummins et al. (2010). Assessment of the distribution and abundance of Kingfisher Alcedo atthis and other riparian birds on six SAC river systems in Ireland. A report commissioned by the National Parks and Wildlife Service and prepared by BirdWatch Ireland

Del Hoyo, J., Elliott, A., and Sargatal, J. 1996. Handbook of the Birds of the World, vol. 3: Hoatzin to Auks. Lynx Edicions, Barcelona, Spain

DEHLG (2009) Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities. DEHLG, Dublin.

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

Doherty Environmental (2012). Oranmore Local Area Plan 2012 – 2018. Natura Impact Report. November 2012.

EC (2018) Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg. European Commission.

EC (2001) Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Articles 6(3) and (4) of the Habitats Directive 92/43/EEC.

EC (2002) 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, Office for Official Publications of the European Communities, Luxembourg. European Commission.

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

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

EC (2007b) Interpretation Manual of European Union Habitats. Version EUR 27. European Commission, DG Environment.

EPA (2002) Guidelines on the information to be contained in Environmental Impact Statements. Environmental Protection Agency.

EPA (2003) Advice Notes on current practice in the preparation of Environmental Impact Statements. Environmental Protection Agency.

EPA website: http://www.epa.ie.

European Communities (Conservation of Wild Birds) Regulations, 1985, SI 291/1985 & amendments – http://www.irishstatutebook.ie.

European Communities (Environmental Impact Assessment) Regulations, 1989 to 2001.

European Communities (Natural Habitats) Regulations, SI 94/1997, SI 233/1998 & SI 378/2005 – http://www.irishstatutebook.ie.

Fossitt, J. A. (2000). A Guide to Habitats in Ireland. Dublin: The Heritage Council.

Gittings, T., Peppiatt, C. and Troake, P., 2015. Disturbance response of Great Northern Divers Gavia immer to boat traffic in Inner Galway Bay. Irish Birds, 10(2), pp.163-166.

Glover HK, Weston MA, Maguire GS, Miller KK, Christie BA. 2011. Towards ecologically meaningful and socially acceptable buffers: Response distances of shorebirds in Victoria, Australia, to human disturbance. Landscape and Urban Planning 103:326–334.

Guay P-J, McLeod EM, Taysom AJ, Weston MA. 2014. Are vehicles 'mobile bird hides'? A test of the hypothesis that 'cars cause less disturbance' The Victorian Naturalist 131:150–155.

Habitats Directive (92/43/EEC).

Holloway, Steve. "Winter distribution and disturbance of wildfowl and waders on Findhorn Bay." BTO Research Report (1997).

Hydro-Environmental Services (2018). Flood Risk Assessment report - Proposed housing development at Moneyduff, Oranmore, Co. Galway.

Jiang, Y. and Møller, A.P., 2017. Antipredator escape distances of common and threatened birds. Behavioral Ecology, 28(6), pp.1498-1503.

Knapton, R. W., Petrie, S. A. & Herring, G. Human disturbance of diving ducks on Long Point Bay, Lake Erie. Wildlife Society Bulletin28, 923-930 (2000).

Livezey, K.B., Fernández-Juricic, E. and Blumstein, D.T., 2016. Database and metadata of bird flight initiation distances worldwide to assist in estimating human disturbance effects and delineating buffer areas. Journal of Fish and Wildlife Management 7, pp.1-11

McCorry, M. (2007) The Saltmarsh Monitoring Project 2006. Unpublished Report to NPWS.

McCorry, M. and Ryle, T. (2009). Coastal Monitoring Project 2004 – 2006. Unpublished Report to NPWS.

McGuinness, D., Muldoon, C., Tierney, N., Cummins, S., Murray, A., Egan, S. & Crowe, O. (2015). Bird Sensitivity Mapping for Wind Energy Developments and Associated Infrastructure in the Republic of Ireland. Guidance Document. Birdwatch Ireland.

Møller AP. 2008b. Flight distance and blood parasites in birds. Behavioural Ecology 19:1305–1313.

Møller AP. 2008c. Flight distance and population trends in European birds. Behavioural Ecology 19:1095–1102.

Møller AP, Erritzøe J. 2010. Flight distance and eye size in birds. Ethology 116:458–465.

Murphy, D.F. (2004) Requirements for the Protection of Fisheries Habitat During Construction and Development Works at River Sites. Eastern Regional Fisheries Board, Dublin.

NPWS (2008) The Status of EU Protected Habitats and Species in Ireland. Conservation Status in Ireland of Habitats and Species listed in the European Council Directive on the Conservation of Habitats, Flora and Fauna 92/43/EEC.

NPWS of the DEHLG (2008) The Report on Status of Habitats and Species in Ireland: Technical Reports and Forms.

NPWS (2010) Harbour Seal Population Monitoring 2009-2012: Report No. 1

NPWS (2011) Harbour Seal Population Monitoring 2009-2012: Report No. 2

NPWS (2018) Conservation objectives for Rahasane Turlough SPA [004089]. Generic Version 6.0. Department of Culture, Heritage and the Gaeltacht.

NPWS (2018) Conservation objectives for Cregganna Marsh SPA [004142]. Generic Version 6.0. Department of Culture, Heritage and the Gaeltacht.

NPWS (2013) Conservation Objectives: Galway Bay Complex SAC 000268. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS Protected Areas Site Synopses and maps available on http://www.npws.ie/en/ProtectedSites/.

NRA (2004) Environmental Impact Assessment of National Road Schemes – A Practical Guide, National Roads Authority, Dublin.

NRA (2004) Guidelines for the Treatment of Noise and Vibration in National Road Schemes (1 ed.). Dublin: National Roads Authority.

NRA (2005) Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes. Dublin: National Roads Authority.

NRA (2006) A Guide to Landscape Treatments for National Road Schemes in Ireland. Dublin: National Roads Authority.

NRA (2006) Guidelines for the Protection and Preservation of Trees, Hedgerows and Scrub Prior to, During and Post-Construction of National Road Schemes. Dublin: National Roads Authority.

NRA (2009). Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes. Dublin: National Roads Authority.

Oliver, G. (2007). Inventory of Irish coastal lagoons (version 2). Unpublished Report to NPWS.

O'Neill, F.H., Martin, J.R., Devaney, F.M. & Perrin, P.M. (2013) The Irish semi-natural grasslands survey 2007-2012. Irish Wildlife Manuals, No. 78. National Parks and Wildlife Service, Department of Arts,Heritage and the Gaeltacht, Ireland.

Pease, M. L., Rose, R. K. & Butler, M. J. Effects of human disturbances on the behavior of wintering ducks. Wildlife Society Bulletin33, 103-112 (2005).

Richards, A. 1990. Seabirds of the northern hemisphere. Dragon's World Ltd, Limpsfield, U.K.

Rodgers Jr, J.A. and Smith, H.T., 1995. Set-back distances to protect nesting bird colonies from human disturbance in Florida. Conservation Biology, 9(1), pp.89-99.

RPS, 2012. Benthic Survey Services Framework. Galway Bay Intertidal Surveys 2009 & 2010. Unpublished report to NPWS & Marine Institute.

Scottish Natural Heritage (SNH) (July 2013) Assessing Connectivity with Special Protection Areas (SPA)

Scottish Natural Heritage (SNH) (2011) The Fen Management Handbook, A. McBride, I. Diack, N Droy, B. Hamill, P.Jones, J. Schutten, A. Skinner, and M. Street. Scottish Natural Heritage, Perth.

Shannon Regional Fisheries Board (2009). Protection and Conservation of Fisheries Habitat with Particular reference to Road Construction (2009)

Smit CJ, Visser GJM. 1993. Effects of disturbance on shorebirds: a summary of existing knowledge from the Dutch Wadden Sea and Delta area. Wader Study Group Bulletin 68:6–19.

Snow, D.W. and Perrins, C.M. 1998. The Birds of the Western Palearctic, Volume 1: Non-Passerines. Oxford University Press, Oxford.

Therivel R. (2009) Workshop Material on the Habitats Directive Assessment of Plans Levett-Therivel Sustainability Consultants on behalf of the Heritage Council, Kilkenny.

Water status data available on http://www.epa.ie and http://www.wfdireland.ie

Wildlife Act 1976 and Wildlife (Amendment) Act 2000.

Weston MA, McLeod EM, Blumstein DT, Guay P-J. 2012. A review of flight-initiation distances and their application to managing disturbance to Australian birds. Emu 112:269–286.