

## CLONDARDIS SOLAR FARM, COUNTY WESTMEATH

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### STAGE 1 SCREENING FOR APPROPRIATE ASSESSMENT CLONDARDIS SOLAR FARM GRID CONNECTION

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Prepared for: Harmony Solar Mullingar Ltd.



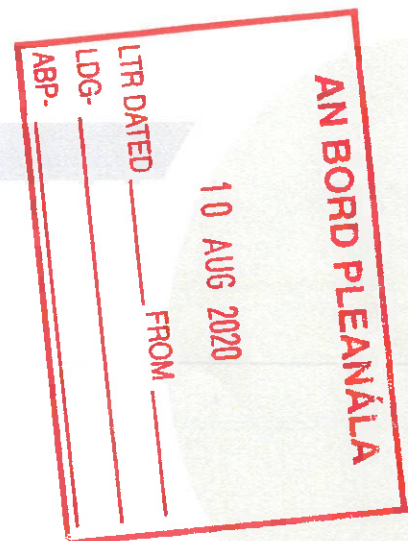
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## STAGE 1 SCREENING FOR APPROPRIATE ASSESSMENT CLONDARDIS SOLAR FARM GRID CONNECTION

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**Keywords:** Grid connection, Screening, Appropriate Assessment, Natura 2000, European Sites, conservation objectives, Westmeath, solar PV, underground cable, substation.

**Abstract:** A Stage 1 Screening for Appropriate Assessment was conducted to determine if there is any potential for significant impacts as a result of installation of proposed underground grid connection cable for Clondardis Solar Farm (Planning Reg. Ref. 176239) and subsequent amendment application on European Sites. The grid proposed grid connection follows the R393 and L1801 between the solar farm site and Mullingar substation





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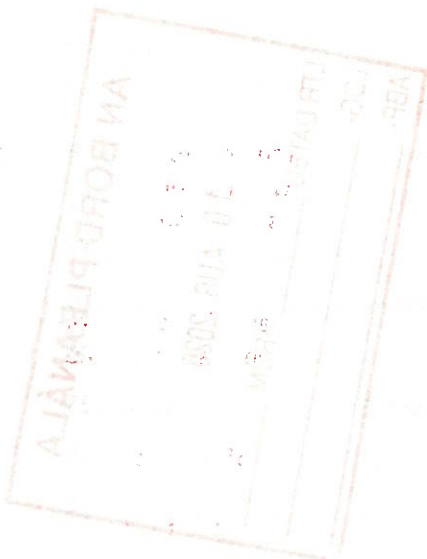
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## 1. INTRODUCTION

Fehily Timoney & Company (FT) were commissioned by Harmony Solar Mullingar Limited. to provide consultancy services in respect of the proposed grid connection for the approved development (Planning Reg. Ref. 176239) Clondardis Solar Farm, Co. Westmeath. A subsequent amendment application is also set to be lodged with the Planning Authority. An Appropriate Assessment Screening Report has been prepared in respect of the proposed project, as required by Article 6 of Council Directive 92/43/EEC (Habitats Directive).

In compliance with the provisions of Article 6 of the Habitats Directive, as implemented by Part XAB of the Planning and Development Act 2000, as amended, in circumstances where a proposed plan or project is likely to have a significant effect on a European (Natura 2000) site, either individually or in combination with other plans or projects, an Appropriate Assessment (AA) must be undertaken by the competent authority, of the implications for the site in view of the site's conservation objectives.

European sites comprise both Special Protection Areas (SPAs) for birds and Special Areas of Conservation (SACs) for habitats and species. The Habitats Directive formed a basis for the designation of SACs. Similarly, SPAs are legislated for under the Birds Directive (Council Directive 79/409/EEC on the Conservation of Wild Birds). In general terms, European sites are considered to be of exceptional importance in terms of rare, endangered or vulnerable habitats and species within the European Community.

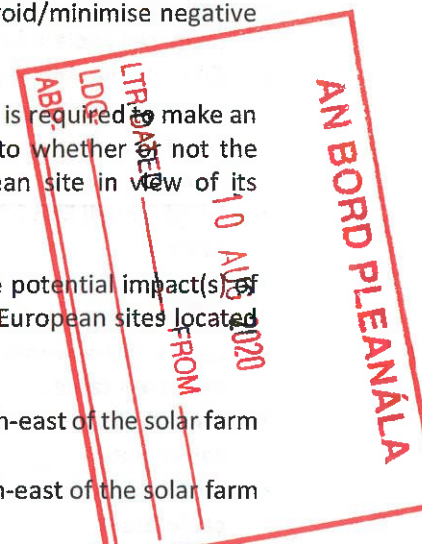
Article 6 of the Habitats Directive envisages a two-stage process, which is implemented in some detail by the provisions of sections 177U and 177V of the Planning and Development Act. Screening for appropriate assessment in accordance with section 177U is the first stage of the AA process (Stage One), in which the possibility of there being a significant effect on a European site is considered. Plans or projects that have no appreciable effect on a European site are thereby excluded, or screened out, at this stage of the process. Where screening concludes that there is the potential for significant effects, then it is necessary to carry out an AA (Stage Two) for the purposes of Article 6(3), and a Natura Impact Statement (NIS) is produced. The NIS, which forms the basis of the AA, considers the impact of a project or plan on the integrity of a European site and on its conservation objectives, and where necessary, draws up mitigation measures to avoid/minimise negative impacts.

The competent authority, in this case Westmeath County Council, in carrying out an AA, is required to make an examination, analysis, evaluation, findings, conclusions and a final determination as to whether or not the proposed development would adversely affect the integrity of the relevant European site in view of its conservation objectives.

This report comprises of the Stage One Screening Report (in Section 3) to evaluate the potential impact(s) of the proposed Clondardis Solar Farm, Co. Westmeath and proposed grid route on the European sites located within a 15 km radius.

- Lough Owel SAC<sup>1</sup> (site code 000688) is located approximately 1.9 km to the north-east of the solar farm site.
- Scragh Bog SAC (site code 000692) is located approximately 5.6 km to the north-east of the solar farm site.
- Lough Ennell SAC (site code 000685) is located approximately 5.1 km to the south-east of the solar farm site.

<sup>1</sup> At present many SACs in Ireland are currently 'candidate' SACs, and referred to as cSACs. The relevant Statutory Instruments for the cSACs in Ireland have not yet been made, however, these "candidate" sites must still be afforded the same level of protection as if they were SACs as designated in accordance with the EU Habitats Directive.





- Garriskil Bog SAC (site code 000679) is located approximately 11.4 km to the north of the solar farm site.
- Ballymore Fen SAC (site code 002313) is located approximately 13.7 km to the south-east of the solar farm site.
- Lough Owel SPA (site code 004047) is located approximately 1.9 km to the north-east of the solar farm site.
- Lough Ennell SPA (site code 004044) is located approximately 5 km to the south-east of the solar farm site.
- Lough Iron SPA (site code 004046) is located approximately 4.8 km to the north-west of the solar farm site.
- Lough Derravarragh SPA (site code 004043) is located approximately 11 km to the north of the solar farm site.
- Garriskil Bog SPA (site code 004102) is located approximately 11.4 km to the north of the solar farm site.
- Glen Lough SPA (site code 004045) is located approximately 14 km to the north-west of the solar farm site.

The report also evaluates the potential impact(s) of the proposed cable route on European sites located within a 15 km radius:

- Lough Owel SAC (site code 000688) is located approximately 0.6 km to the north of the proposed cable route.
- Scragh Bog SAC (site code 000692) is located approximately 4.2 km to the north-east of the proposed cable route.
- Lough Ennell SAC (site code 000685) is located approximately 3.7 km to the south of the proposed cable route.
- Garriskil Bog SAC (site code 000679) is located approximately 11.3 km to the north of the proposed cable route.
- Ballymore Fen SAC (site code 002313) is located approximately 14.9 km to the south-west of the proposed cable route.
- River Boyne And River Blackwater SAC (002299) is located approximately 13.9 km to the east of the proposed cable route.
- Lough Owel SPA (site code 004047) is located approximately 0.6 km to the north of the proposed cable route.
- Lough Ennell SPA (site code 004044) is located approximately 4 km to the south of the proposed cable route.
- Lough Iron SPA (site code 004046) is located approximately 5.1 km to the north-west of the proposed cable route.
- Lough Derravarragh SPA (site code 004043) is located approximately 9.3 km to the north of the proposed cable route.
- Garriskil Bog SPA (site code 004102) is located approximately 11.3 km to the north of the proposed cable route.
- Glen Lough SPA (site code 004045) is located approximately 14.4 km to the north-west of the proposed cable route.

The proposed cable route does not cross any rivers or streams; as such, it is not hydrologically connected to any European sites.





## 1.1 Legislative Requirements and Guidance

The requirements for an AA are set out in the Habitats Directive 92/43/EEC. Articles 6(3) and 6(4) of this Directive state:

*6(3) Any plan or project not directly connected with or necessary to the management of the site (Natura 2000 sites) but likely to have significant effect thereon, either individually or in combination with other plans or projects, shall be subject to Appropriate Assessment of its implications for the site in view of the sites conservation objectives.*

*In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.*

*6(4) If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of social or economic nature, the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted.*

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

The statutory agency responsible for European sites is the National Parks and Wildlife Service (NPWS) of the Department of Arts, Heritage and the Gaeltacht (DAHG). In December 2009 'Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities, Department of the Environment, Heritage and Local Government' was published (DoEHLG, 2009). This guidance document was prepared jointly by the NPWS and Planning Divisions of DoEHLG (now DAHG), with input from local authorities. Previously, in 2001, the European Commission issued a guidance document. This Appropriate Assessment Screening Report has been prepared in accordance with the relevant Irish and European Commission Guidance.

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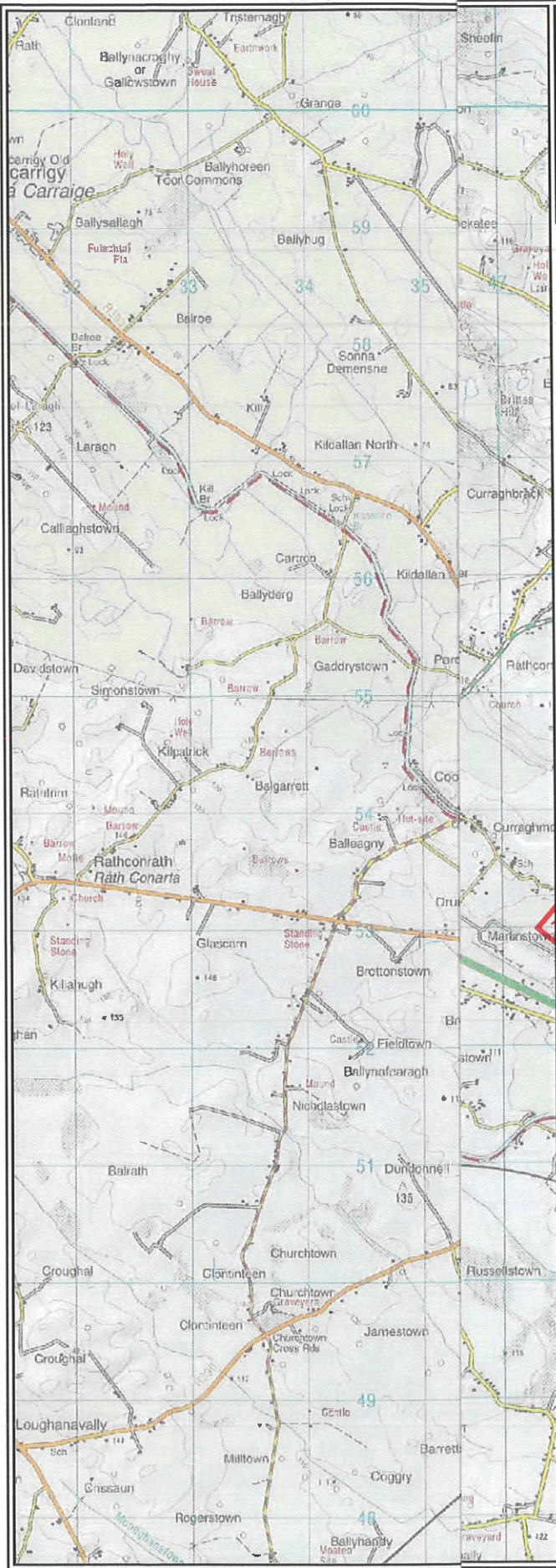
### 1.1.1 Regulatory Context

In 1997, the Habitats Directive was transposed into Irish National Law by the European Communities (Natural Habitats) Regulations, SI 94/1997 (as amended by S.I. 233/1998 & S.I. 378/2005). The European Communities (Birds and Natural Habitats) Regulations, 2011 (S.I. 477/2011) revoked the 1997 Regulations (and amendments) as well as the European Communities (Birds and Natural Habitats) (Control of Recreational Activities) Regulations 2010. The purpose of the 2011 Regulations was to address transposition failures identified in the Court of Justice of the European Union (CJEU) judgements.

Following additional amendments in 2013 (S.I. 499/2013) and 2015 (S.I. 355/2015) the regulations are now cited as the European Communities (Birds and Natural Habitats) Regulations 2011 to 2015.

The Regulations have been prepared to address several judgments of the CJEU against Ireland, notably cases C-418/04 (*Commission v Ireland*) and C-183/05 (*Commission v Ireland*), in respect of failure to transpose elements of the Birds Directive and the Habitats Directive into Irish law.



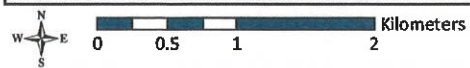


- Substations (110-220kV)
- Planning Boundary
- Grid Connection Route

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<b>TITLE:</b>	
Site Location	
<b>PROJECT:</b>	
Clondardis Solar Farm, Co. Westmeath	
<b>FIGURE NO:</b>	3.1
<b>CLIENT:</b>	Harmony Solar Ireland Ltd.
<b>SCALE:</b> 1:50000	<b>REVISION:</b> 0
<b>DATE:</b> 22/05/2020	<b>PAGE SIZE:</b> A3

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## 2. METHODOLOGY

### 2.1 Appropriate Assessment Methodology

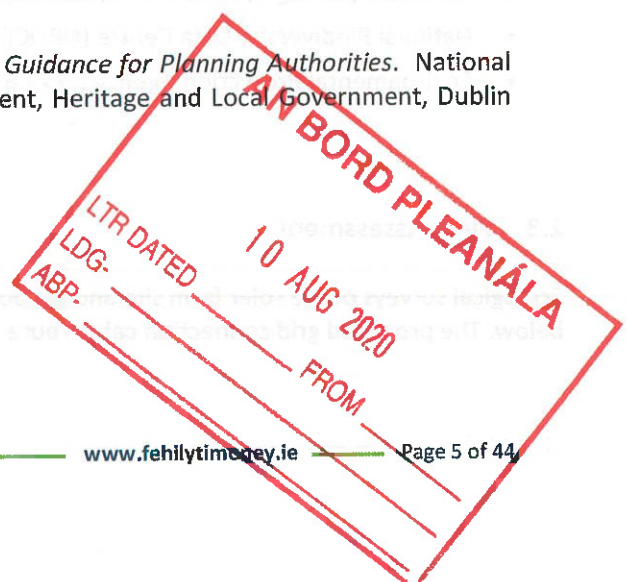
The Habitats Directive promotes a hierarchy of avoidance, mitigation and compensatory measures to be addressed in the AA process. Firstly, a project should aim to avoid any negative impacts on European sites by identifying possible impacts early in the project and should design the project in order to avoid such impacts.

There are four stages in an AA, as outlined in the European Commission Guidance document (2001). The following is a summary of these steps.

- **Stage One - Screening:** This stage examines the likely effects of a project either alone or in combination with other projects upon a European Site and considers whether it can be objectively concluded that these effects will not be significant.
- **Stage Two - Appropriate Assessment:** In this stage, the impact of the project on the integrity of the European site is considered with respect to the conservation objectives of the site and to its structure and function. Mitigation measures should be applied to the point where no adverse impacts on the site(s) remain.
- **Stage Three - Assessment of Alternative Solutions:** Should the Appropriate Assessment determine that adverse impacts are likely upon a European site, this stage examines alternative ways of implementing the project that, where possible, avoid these adverse impacts.
- **Stage Four - Assessment where no alternative solutions exist and where adverse impacts remain:** Where imperative reasons of overriding public interest (IROPI) exist, an assessment to consider whether compensatory measures will or will not effectively offset the damage to the Natura site will be necessary. European case law highlights that consideration must be given to alternatives outside the project area in carrying out the IROPI test. It is a rigorous test which projects are generally considered unlikely to pass.

In the preparation of this assessment therefore regard has been given to the Habitats Directive and the European Communities (Birds and Natural Habitats) Regulations 2011, and with reference to the relevant guidance, in particular:

- *Assessment of Plans and Projects significantly affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC*, European Commission 2001.
- *Managing Natura 2000 Sites: The Provisions of Article 6 of the 'Habitats Directive' 92/43/EEC*, European Commission, 2000.
- *Managing Natura 2000 Sites: The Provisions of Article 6 of the 'Habitats Directive' 92/43/EEC*, European Commission, 2018.
- *Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities*. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin 2010.





### 2.1.1 Impact Assessment

The first step in the screening process is to develop a list of European sites potentially affected by the proposed development. Each European site is reviewed to establish whether or not the proposed development is likely to have a significant effect on the integrity of the site, as defined by its structure and function, and its conservation objectives.

The qualifying interests of each European site are identified and the potential threats are summarised into the following categories for the screening process, and described within the screening matrix as follows:

- Direct impacts refer to habitat loss or fragmentation arising from land-take requirements for development or agricultural purposes. Direct impacts can be as a result of a change in land use or management, such as the removal of agricultural practices that prevent scrub encroachment.
- Indirect and secondary impacts do not have a straight-line route between cause and effect, and it is potentially more challenging to ensure that all the possible indirect impacts of the plan (or project) – in combination with other plans and projects - have been established.

These can arise when a development alters the hydrology of a catchment area, which in turn affects the movement of groundwater to a site, and the qualifying interests that rely on the maintenance of water levels. Deterioration in water quality can occur as both an indirect or direct consequence of development, which in turn changes the aquatic environment and reduces its capacity to support certain plants and animals. The introduction of invasive species can also be defined as an indirect impact, which results in increased movement of vectors (humans, fauna, surface water), and consequently the transfer of alien species from one area to another.

- Disturbance to fauna can arise directly through the loss of habitat (e.g. bat roosts) or indirectly through noise, vibration and increased activity associated with construction and operation.

## 2.2 Desktop Study

In order to complete the Screening for Appropriate Assessment certain information on the existing environment is required. A desk study was carried out to collate available information on the site's natural environment. This comprised a review of the following publications, data and datasets:

- Westmeath County Development Plan 2014 – 2020
- Westmeath Biodiversity Action Plan 2014 – 2020
- Westmeath County Council Planning Enquiry System
- National Parks and Wildlife Service (NPWS) website and metadata available ([www.npws.ie](http://www.npws.ie))
- OSI Aerial photography and 1:50,000 mapping
- National Biodiversity Data Centre (NBDC) (on-line map-viewer)
- Environmental Protection Agency (EPA) water quality data.

## 2.3 Field Assessment

Ecological surveys of the solar farm site and proposed grid connection cable route were undertaken as detailed below. The proposed grid connection cable route was re-surveyed in May 2020.



Table 2-1: Ecological Survey Details

Date	Time	Weather	Ecologist
12.06.17	10.00 - 14.30	Dry, Cloud 8/8, Wind F2-3, Visibility; Good	Michelle O'Neill
13.06.17	10.00 - 15.45	Dry, Cloud 5/8 - 8/8, Wind F2-3, Visibility; Good	Michelle O'Neill
12.05.20	12.00 - 14.00	Dry, Cloud 5/8, Wind F1, Visibility; Excellent	Ben O'Dwyer

The purpose of these ecology surveys was:

- To identify the habitat types present on the site;
- To identify flora and fauna onsite; and
- To assess the potential effects of the proposed project on the ecology of the site and surrounding areas.

### 2.3.1 Habitats and Flora Investigation

Habitat surveys were carried out to categorise the habitats within the site according to Fossitt (2000) *A Guide to the Habitats in Ireland*. The results of the habitat surveys are described in Section 3.1.1.

### 2.3.2 Hydrology Survey

A hydrological survey of the site was carried out by Ross O'Sullivan Hydrologist with Fehily Timoney and Company on 12<sup>th</sup> June 2017. The drainage network within the proposed development and local hydrological conditions were surveyed; in addition, local knowledge of the hydrological conditions in the area were obtained from the landowner.







### 3. PROJECT DESCRIPTION

#### 3.1 Proposed Grid Connection

This development seeks to obtain consent for installation of a connection between the approved development Clondardis Solar Farm (Planning Reg. Ref. 176239) and the national electricity grid.

The proposed grid connection is via an underground cable (UGC) from the site substation to Mullingar ESBN 110kv Substation at Irishtown, Mullingar. The proposed UGC will consist of 3 no. 110mm diameter HDPE power cable ducts and 1 no. 110mm diameter HDPE communications duct to be installed in an excavated trench, typically 600mm wide by 1,220mm deep, with variations on this design to adapt to service crossings and drain crossings. The power cable ducts will accommodate 3 no. power cables. The communications duct will accommodate a fibre cable to allow communications between the Clondardis Solar Farm substation and Mullingar 110kV substation.

This will comprise an underground cable connection from the substation to the main site access, and traversing the local road to the R393, until meeting the L1801 Local road at Irishtown on the western outskirts of Mullingar. This cable length from the site substation to Mullingar Substation is approximately 5.1 km. Standard underground cabling and trenching techniques in accordance with ESBN specifications will be deployed. It is proposed to install the cable within the road carriageway. This route has been considered within the context of the Appropriate Assessment Screening report undertaken for the design amendment application and was re-surveyed to confirm the existing environment as previously described.

#### 3.2 Amendment Application

An application to amend the design of the approved Clondardis Solar Farm (Westmeath County Council Planning Reg. Ref. 176239 & An Bord Pleanála Reg. Ref. PL25M.301116) which is also being submitted concurrently to the Planning Authority.

The amendments proposed are:

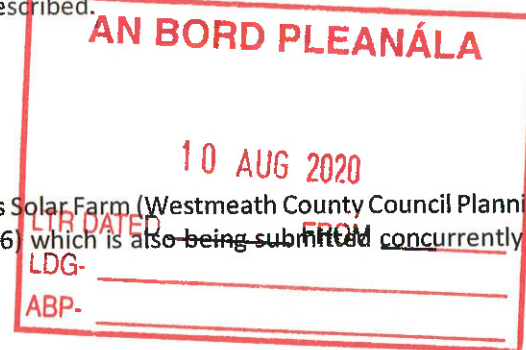
Optimised Solar PV panel configuration located within the same areas of the site as previously permitted with the exception of a reduced buffer distance under the existing 110kV lines from c. 56m to c. 46m, to comprise up to 252,000 sqm of solar panels to allow for solar panel array height increase from up to 2.8m to up to 3.2m;

Modifications and enlargement to the on-site substation and substation compound. The substation will increase in size from c. 55 sqm as permitted to c. 150 sqm and the substation compound will increase in size from c. 700 sqm as permitted to c. 1081 sqm;

Omission of 2 no inverter/transformer hardstanding areas and minor changes of position of hardstanding from the permitted solar development to allow for a total of 10 hardstanding areas which will provide the base for 20 no. inverter and transformer units housed in sound suppression containers;

Permission is also sought to amend the lifespan of the consented development from 25 years to 30 years.

The planning application may be inspected, or purchased at a fee not exceeding the reasonable cost of









## 4. STAGE 1 SCREENING FOR APPROPRIATE ASSESSMENT

### 4.1 Brief Description of Proposed Cable Route

The proposed cable route is shown in figure 1; the route begins at the onsite substation and travels along the local access road and L-5802 local road which joins the R393 opposite Walshestown Graveyard. The route then follows the R393 in an easterly direction travelling towards Mullingar for 3.2 km, after which it turns north-east at a crossroad and follows the L-1801 local road along which Mullingar 110kV substation is situated for a further 0.7 km before terminating at the substation. The grid connection cable is proposed to be installed within the road carriageway.

The landscape through which the proposed cable route passes is rural in character, being dominated by agricultural fields and hedgerows. Residential dwellings and farms are frequent along the route and throughout the surrounding land. The proposed cable route does not cross any watercourses.

#### 4.1.1 Habitats Along the Proposed Cable Route

There are no habitats within the proposed grid connection route that conform to those listed under Annex I of the EU Habitats Directive. Buildings and artificial surfaces (BL3) (i.e. tarmac roads) is the dominant habitat present within the proposed grid connection route works footprint. Buildings and artificial surfaces (BL3) is a highly modified habitat comprised of man-made material which is subjected to regular, ongoing disturbance and is of low ecological value overall. Other modified habitats present within the proposed grid connection route study area included residential properties (buildings and artificial surfaces BL3) with amenity grassland (GA2) and ornamental shrubs (WS3).

Semi-natural habitat present within the proposed grid connection route study area includes hedgerows (WL1), dry meadow and grassy verge (GS2) and stone wall (BL1), which due to their semi-natural state and importance to local biodiversity are considered to be of moderate ecological value and locally important.

No botanical species protected under the Flora (Protection) Order 2015, listed in Annex II or IV of the EU Habitats Directive (92/43/EEC), or Red listed in Ireland were recorded. All species recorded during the botanical survey are considered common for similar habitats in the general area.

#### 4.1.2 Invasive Non-Native Species Along the Proposed Cable Route

Japanese Knotweed *Fallopia japonica*, was recorded at 3 no. separate locations on the proposed grid connection route (Grid references; N 41320 53898, N 41255 53869 and N 38455 54949). The first location has 2-3 small stems growing within the grassy verge/bank edge along the L-1801, indicating recent spread from a nearby area. The second and third locations are substantial growths (up to 3m width and 5m length) which correspond to previously recorded growths along the cable route. The second is within private property (derelict house) at the R393/L-1801 crossroads, set back from the road with the closest point of the growth located c. 5m from the road verge. The third growth is within the hedgerow/grassy verge along L-5802 local road between the R393 and solar farm site; some of the smaller peripheral stems are immediately adjacent to the road verge. It is noted that this growth is currently being treated and is marked clearly with signage.

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This species is on Invasive Species Ireland's 'most-unwanted list' as species at high risk of having damaging effects on native species<sup>2</sup>. Japanese Knotweed is also listed on the Third Schedule of Regulation 49 & 50 of the 2011 European Communities (Birds and Natural Habitats) Regulations (*i.e.* species of which it is an offense to disperse, spread or otherwise cause to grow in any place).

Spanish and hybrid bluebells *Hyacinthoides hispanica* and *Hyacinthoides x massartiana* are present at 7 No. locations along the proposed grid connection route: N 38482 54566 along the local access road, and N 38535 54990, N 40039 54587, N 40045 54589, N 40109 54589, N 39950 54623 and N 40390 54569 along the R393.

Spanish/hybrid bluebell is classified as having a low risk of impact by the National Biodiversity Data Centre (NBDC). It is also listed on the Third Schedule of Regulation 49 & 50 of the 2011 European Communities (Birds and Natural Habitats) Regulations (*i.e.* species which it is an offense to disperse, spread or otherwise cause to grow in any place).

In addition, 2 No. linear growths (up to 5m length) of Snowberry *Symphoricarpos albus* are present within hedgerows along the R393, at N 39996 54596 and N 40538 54553. This species is classified as having a low risk of impact by the NBDC. It is not legally restricted.

## 4.2 Brief Description of the Existing Solar Farm Site

The consented solar farm is located in the townlands of Clondardis and Sianemore in Co. Westmeath; the site consists of one contiguous land parcel made up of 16 individual fields, roughly L-shaped with a northwest-southeast axis of approximately 1.3km and a northeast-southwest axis of approximately 1.2km. The area of the proposed development is approximately 46 hectares in area. The site is accessed to the west via an unnamed local road which connects with the L5802 and R393.

The existing land use is pasture and arable crop cultivation; hedgerows, and in some instances, drainage ditches separate individual fields. A number of residential dwellings (7) are in close proximity to the north-eastern section of the site, and there are also several agricultural buildings to the west and east of the site. Walshestown Fen, a proposed Natural Heritage Area (pNHA) lies approximately 0.2 km to the east of the site. A 110kv electrical transmission line traverses the proposed development site, running generally along an east-west axis through north-eastern portion of the site. The landscape at and in the vicinity of the proposed development is rural in nature. The land use within the site, as defined by the 2018 CORINE landcover dataset, is classified as 'Pasture'.

The Mill [EPA name - Ballincarrigy] River borders a portion of the site to the south-west, and an un-named stream which joins the Mill [Ballincarrigy] approximately 400m to the south-west of the site flows through the north-western portion of the site. Both have been modified and integrated into the drainage network. These streams are the headwaters of the Mill [Ballincarrigy] River, which flows into the River Inny [Shannon] (EPA name) 11.9km downstream of the point where it exits the site. The Inny [Shannon] enters Lough Ree (and also Lough Ree cSAC and SPA) approximately 31km downstream of the point where it is joined by the Mill [Ballincarrigy] river, making the total in-stream distance between the proposed development site and Lough Ree cSAC/SPA approximately 43km.

<sup>2</sup> [www.invasivespeciesireland.ie/most-unwanted-species/](http://www.invasivespeciesireland.ie/most-unwanted-species/)





The Grange\_South (EPA name) stream rises within Walshestown Fen approximately 200m to the south-east of the proposed development site and flows for approximately 5.9km from this point in a south-easterly direction before entering Lough Ennell cSAC/SPA. The stream is not mapped as being connected to the proposed development site; however, the downhill flow in this area passes through the site (which in this area is a narrow ribbon encompassing the access road) and travels in a north-west to south-east direction towards the headwaters of the stream.

The site lies within the Shannon River Basin District, and straddles both the Lower and Upper Shannon WFD catchments. The majority of the site lies within the Upper Shannon catchment however; only half of the easternmost field and the access track lie within the Lower Shannon catchment. It is apparent both from the topography of the site, and from the hydrological information gathered that the majority of the proposed development site (the south-western portion) drains into The Mill [Ballincarrigy] catchment, and thus also the Inny [Shannon]. The smaller portion of the site to the north-east straddles a ridge, with the south-eastern half draining towards the Mill/Ballincarrigy, while the north-eastern half, which includes part of the access route, drains towards the Grange South catchment and thus towards Lough Ennell. Significant flows of water downhill towards the junction where the access route leaves the un-named local road, and impeded drainage at this point were observed during the hydrology survey, and also highlighted by the landowner. No evidence of water draining along this route was observed during the survey on May 12<sup>th</sup>, 2020; however it is noted that this area lies along the preferential flow path formed by the local topography.

#### 4.2.1 Habitats Within the Existing Site

The main habitat types (according to the Fossitt, 2000 classification system) identified during the ecological surveys conducted at the site on the 12<sup>th</sup> and 13<sup>th</sup> of June 2017 are outlined below. A brief observation of the site on May 12<sup>th</sup>, 2020 confirmed the habitats and land use on site have not changed substantially.

The following habitats were recorded within the proposed development site boundary:

- Semi-improved Neutral Grassland (GS1)
- Improved Agricultural Grassland (GA1)
- Arable Crop (BC1)
- Hedgerow (WL1)
- Treeline (WL2)
- Drainage Ditch (FW4) - Modified Semi-natural Watercourse
- Stone Walls and Other Stone Work (BL1)

#### Semi-improved Neutral Grassland (GS1)

Semi-improved neutral grassland (GS1) is present at several areas within the proposed development site boundary. The areas of neutral grassland (GS1) within the study area are considered to be semi-improved grassland, where the grassland sward is comprised of more diverse plant communities than that of improved grassland (GA1) that is associated with more intensive agricultural practices. This neutral grassland (GS1) community is comprised predominantly of grasses; including abundant Meadow Foxtail *Alopecurus pratensis*, Yorkshire Fog *Holcus lanatus*, Crested Dog's-tail *Cynosurus cristatus*, Red Fescue *Festuca rubra*, Common Bent *Agrostis capillaris*, Creeping Bent *A. stolonifera*, Sweet Vernal Grass *Anthoxanthum odoratum* and Cock's-foot *Dactylis glomerata*. Perennial Rye-grass *Lolium perenne* is present but does not dominant the sward.



Herb cover is lower overall but includes indicative species such as White Clover *Trifolium repens*, Self-heal *Prunella vulgaris*, Ribwort Plantain *Plantago lanceolata*, Common Knapweed *Centaurea nigra*, Common Sorrel *Rumex acetosa* and Marsh Thistle *Cirsium palustre*. The neutral grassland (GS1) fields are grazed by cattle, ponies and sheep or are grazed less frequently and may be cut for silage. The neutral grassland field (GS1) along the western boundary of the proposed development site has small areas that appear damper and where additional species such as Soft Rush *Juncus effesus* and Creeping Buttercup *Ranunculus repens* were recorded; however overall the dominant grassland habitat is neutral grassland (GS1). Towards the northern edge of the field, along the watercourse (drainage ditch FW4), the field is fenced from livestock (c. 1m verge) and the neutral grassland here is more diverse with additional species noted including Quaking Grass *Briza media*, Bird's-foot trefoil *Lotus corniculatus* and Common Spotted Orchid *Dactylorhiza fuchsia*. A wider neutral grassland (GS1) (c. 6-7m) verge bank is present on the northern bank of this watercourse, but this area of neutral grassland (GS1) is less diverse and comprised predominately of grasses as described above. Neutral grassland (GS1) is also present on the southern bank of the watercourse flowing along the northern boundary of the proposed development site boundary.

### Improved Agricultural Grassland (GA1)

Improved agricultural grassland (GA1) is present at several locations within the proposed development site boundary. Improved agricultural grassland (GA1) is a modified/improved grassland habitat type which is generally species poor, dominated by a typical improved agricultural species assemblage including abundant Perennial Rye-grass *Lolium perenne*, White Clover *Trifolium repens*, Broad-leaved Dock *Rumex obtusifolius*, Spear Thistle *Cirsium vulgare*, Meadow Thistle *C. arvensis*, Meadow Buttercup *Ranunculus repens* and Common Mouse-ear *Cerastium fontanum*. The improved agricultural fields (GA1) towards the southern boundary are grazed by a suckler herd - within the field system there are small localised areas, that appear slightly damp, where some additional grassland species recorded included; Yorkshire Fog, Creeping Bent, Marsh Foxtail *Alopecurus geniculatus*, Soft Rush, Crested Dog's-tail and Common Nettle *Urtica dioica*; however overall the dominant habitat is improved agricultural grassland (GA1). Similarly, towards the north and north-east of the proposed development site, the agricultural fields are more heavily grazed/disturbed by livestock and as such have a lower grassland species diversity and a higher abundance of improved agricultural species overall.

### Arable Crop (BC1)

Arable crops (BC1) within the proposed development site are made up of rapeseed *Brassica napus* and legumes; no cereals were being cultivated within the site at the time of survey.

### Hedgerows (WL1)

Hedgerows (WL1) recorded within the proposed development site are associated with the neutral grassland (GS1), arable crop (BC1) and improved agricultural grassland (GA1) field boundaries as well as the proposed development site boundary itself. These hedgerows (WL1) are dominated by native species, including abundant Hawthorn *Crataegus monogyna* and Ash *Fraxinus excelsior* with occasional Gorse *Ulex europaeus*, Bramble *Rubus fruticosus* agg., Ivy *Hedera helix*, Blackthorn *Prunus spinosa*, Elder *Sambucus nigra* and Dog Rose *Rosa canina*. Mature, semi-mature and maturing trees comprised of native Ash and non-native Sycamore *Acer pseudoplatanus* are common, particularly along hedgerows (WL1) towards the south and east of the proposed development site. Mature non-native European Beech *Fagus sylvatica* are present along a section of hedgerow (WL1) on the northern boundary of the proposed development site. The hedgerows (WL1) are associated with low to medium height earthen banks with occasional dry-stone walls (BL1).



Livestock have, or have had access to the areas around the bases of the hedgerows (WL1) and regular trampling/grazing has resulted in a loss of a typical understory with bare soil common and only occasional vegetation such as Herb Robert *Geranium robertianum*, Bush Vetch *Vicia sepium*, Ground Ivy *Glechoma hederacea*, Primrose *Primula vulgaris*, Cleavers *Galium aparine*, Common Nettle *Urtica dioica*, Red Fescue, Cock's-foot, Hard Fern *Blechnum spicant* and Hart's-tongue *Phyllitis scolopendrium*. Stock proofing is provided by additional stake and wire fencing in parts. With the exception of one managed hedgerow (WL1) situated along the public road through the site, which is 'grassy' in parts – overall, the hedgerows (WL1) are unmanaged with overgrown Hawthorn trees/shrubs, semi-mature and mature Ash and Sycamore trees and with gaps common. One hedgerow (WL1) along the eastern boundary of the arable crop (BC1) field towards the north has been heavily managed in the past and has no typical hedgerow (WL1) structure - where grasses are common and low growing Bramble and just occasional Hawthorn shrubs are present. Two short sections of hedgerow (WL1) are present in the neutral grassland field (GS1) on the western boundary of the site, with the remaining sections removed historically.

#### Treeline (WL2)

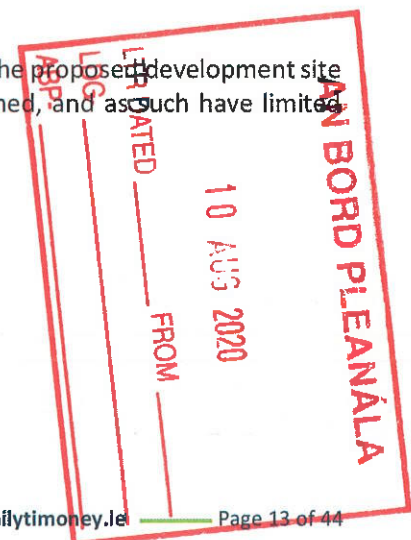
Two treelines (WL2) are present along field boundaries towards the east of the proposed development site. One treeline (WL2) is comprised of a line of mature native Ash trees and a second treeline (WL2) is dominated by a line of non-native Sycamore. The Sycamore treeline also forms a boundary between the agricultural fields and associated farm buildings (stone walls and other stone work BL1). Livestock have access beneath the treelines (WL2) and as such there is no significant understory. Stake and wire fencing is present along the Ash treeline (WL2).

#### Drainage Ditch (FW4) / Sections of Modified Watercourses (FW2)

There are two streams present towards the northern boundary of the proposed development site, which are tributaries of or from the upper reaches of Mill (Ballinacarrigy) River (Lowland River FW2). Both watercourses have been managed/modified (*i.e.* have lost some natural features) and as such were classified as drainage ditches (FW4). Both drainage ditches (FW4) are comprised of shallow, slow moving or stagnant water, flowing over a substrate of small stone and mud. Wetland vegetation is abundant, largely comprised of Watercress *Rorippa nasturtium-aquaticum* and Sweet Floating Grass *Glyceria fluitans* with occasional Duckweed *Lemna* species and Water Mint *Mentha aquatica*. Small sections of drainage ditch (FW4) extend into the agricultural fields here, which were dry at the time of survey but support wetland vegetation indicative of at least occasional water-logging.

#### Stone Walls and Other Stonework (BL1)

Three small dry-stone wall (BL1) outbuildings are present at one location within the proposed development site boundary. The buildings are used for livestock/storage purposes, are maintained, and as such have limited vegetation.





### 4.3 Sites of National Importance within 10km

There are 2 NHAs and 8 pNHAs within 10 km of the solar farm site (see below). The proposed grid connection route does not traverse or lie adjacent to any sites of National importance. The closest is Walshestown Fen pNHA (001731), which is located c.0.2km to the east of the proposed grid connection and solar farm site. Four of the pNHAs are also designated as European sites (see list below). The potential impacts to these sites are considered in the Ecological Appraisal submitted with the original planning application (Planning Reg. Ref. 176239). Four of these sites are also designated as European sites, and as such are considered in this report.

The pNHAs, along with their site codes are listed in Table 3.1, along with a brief description of each site. The full site synopses are available on [www.npws.ie](http://www.npws.ie).

- Wooddown Bog NHA
- Nure Bog NHA
- Lough Iron pNHA (also Lough Iron SPA)
- Lough Owel pNHA (also Lough Owel SPA and cSAC)
- Ballynafid Bog and Fen pNHA
- Scragh Bog pNHA (also Scragh Bog cSAC)
- Lough Sheever Fen/Slevin's Lough Complex pNHA
- Royal Canal pNHA
- Lough Ennell pNHA (also Lough Ennel SPA and cSAC)
- Walshestown Fen pNHA.





Table 4-1: Summary of National Sites within 10km

Site Name	Site Code	Summary Details	Distance
Walshestown Fen pNHA	001731	<p>Walshestown Fen lies in glacial drift and limestone gravels about 4km west of Mullingar. It has developed on the site of an old raised bog that has been long since cut away. Site hydrology is now dominated by mineral flushes and springs, although at least one spring has been diverted out of the site.</p> <p>Contemporary vegetation follows a water gradient - there is a small area of open water marking an old bog hole in the middle of the site, to its north west a 'skin' of vegetation overlies semi-fluid substrate, in places the surface quakes, this is known as a fen. Fen vegetation here is varied and shows the distinct influence of limestone derived calcium:</p> <p>Common reed (<i>Phragmites australis</i>), Black bog-rush (<i>Schoenus nigricans</i>), Meadowsweet (<i>Filipendula ulmaria</i>) and Common sedge (<i>Carex nigra</i>) form a mosaic of dominance with other associated species such as Grass of parnassus (<i>Parnassia palustris</i>) and Blunt-flowered rush (<i>Juncus subnodulosus</i>). Further from the lake, vestiges of the former peatcutting old peat ridges support a different flora including Woodrush (<i>Luzula multiflora</i>), Heath orchid (<i>Dactylorhiza maculata</i>) and Royal fern (<i>Osmunda regalis</i>). An intricate mosaic of freshwater marsh and peaty grassland has developed between the ridges. South of the old bog area, around Slanestown Lough, the habitat is somewhat drier, but still with its complement of marshland species.</p> <p>The importance of this site seems to have been underrated in the past and formulated mainly from the presence of three rare species on the site: Lesser clubmoss (<i>Selaginella selaginoides</i>), Marsh heileborine (<i>Epipactis palustris</i>) and especially Fly orchid (<i>Ophrys insectifera</i>). Despite the loss of a section of the site to afforestation, and attempts at drainage and agricultural intensification, this site remains an important area for the habitats described above and is an important local refuge for fauna.</p>	0.2 km east of proposed grid connection and solar farm site
Royal Canal pNHA	002103	<p>The Royal Canal is a man-made waterway linking the River Liffey at Dublin to the River Shannon near Farmonbarry. The canal NHA comprises the central channel and the banks on either side of it. The main water supply is from Lough Owel (also an NHA) via a feeder channel into the canal at Mullingar. The Royal Canal was closed to navigation in 1961. The section of canal west of Mullingar was allowed to dry out, and the eastern section silted up and became overgrown. Restoration began in 1988 and is still in progress.</p>	2 km southeast of proposed grid connection 1 km south-west of solar farm site

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Site Name	Site Code	Summary Details	Distance
Lough Ennell pNHA (also Lough Ennel SPA and cSAC)	000685	<p>A number of different habitats are found within the canal boundaries - hedgerow, tall herbs, calcareous grassland, reed fringe, open water, scrub and woodland.</p> <p>Otter spraints are found along the towpath, particularly where the canal passes over a river or stream.</p> <p>The Rare and legally protected Opposite-leaved Pondweed (<i>Groenlandia densa</i>) (Flora Protection Order 1987) is present at one site in Dublin, between Locks 4 and 5. <i>Tolypella intricata</i> (a stonewort listed in the Red Data Book as being Vulnerable) is also in the Royal Canal in Dublin, the only site in Ireland where it is now found.</p> <p>The ecological value of the canal lies more in the diversity of species it supports along its linear habitats than in the presence of rare species. It crosses through agricultural land and therefore provides a refuge for species threatened by modern farming methods.</p>	<p>3.7 km south of proposed grid connection</p> <p>5 km south-east of solar farm site</p>
Lough Iron pNHA (also Lough Iron SPA)	000687	<p>Described below in European Sites Section (Section 3.4)</p> <p>Lough Iron is a long narrow midland lake, some 250 hectares in size. It is located 12km. north-west of Mullingar and is surrounded by intensively farmed agricultural land. Drainage of the river Inny in the 1960's has led to a drastic drop in the level of the lake and this in turn has led to the development of freshwater marsh and wet grassland on what was previously lake bed. The dominant marsh species are Canary Reed Grass (<i>Phalaris acuminata</i>) and Purple Moor Grass (<i>Molinia caerulea</i>), the latter species farming large expanses of wet grassland. There are also patches of calcareous fen, wet woodland dominated by Downy Birch (<i>Betula pubescens</i>) and tall sedge fen dominated by Tufted Sedge (<i>Carex elata</i>) and Bottle Sedge (<i>Carex rostrata</i>). Quite a wide band of Common Reed (<i>Phragmites australis</i>) fringes the lake. Large areas of fringing freshwater marsh have been badly damaged by the planting of conifers. This has occurred along the western edge of the lake.</p>	<p>5.1 km north-west of proposed grid connection</p> <p>5.2 km north-west of solar farm site</p>

Site Name	Site Code	Summary Details	Distance
		<p>Despite the spread of fringing marsh and forestry the lake is one of the most important wildfowl sites in the midlands. In addition to supporting large numbers of snipe and duck there are internationally important numbers of Greenland White-fronted Geese and Whooper Swans present during winter. The Greenland White-fronts use pastures surrounding the lake as feeding grounds. The marsh areas contain quite a few rare plant species including Fen Bedstraw (<i>Galium uliginosum</i>), Frogbit (<i>Hydrocharis morsus-ranae</i>), a Duckweed (<i>Lemma polyrrhiza</i>) and Marsh Pea (<i>Lathyrus palustris</i>).</p> <p>Lough Iron is a lake with great ornithological and botanical interest and this combination of interests is unmatched in other large midland lakes.</p>	
Nure Bog NHA	001725	<p>The site comprises a raised bog that includes both areas of high bog and cutover bog and adjoins Lough Ennell to the east. This raised bog was originally part of a larger area that has now been mostly cutover and reclaimed for agriculture. Although this bog has no pools there are hummocks throughout the high bog. Cutover is found all around the high bog and there is an area of coniferous forestry on the cutover in the south of the site.</p> <p>Much of the high bog has vegetation typical of a Midland Raised bog, consisting of Ling Heather (<i>Calluna vulgaris</i>), Cottongrass (<i>Eriophorum</i> sp.), Cranberry (<i>Vaccinium oxycoccos</i>) and Bog-rosemary (<i>Andromeda polifolia</i>). The north of the site is wetter than the south, with the bog mosses <i>Sphagnum capillifolium</i> and <i>S. papillosum</i> forming the majority of the hummocks, but there are also occasional <i>S. imbricatum</i> and <i>S. fuscum</i> hummocks. The bog moss <i>S. subnitens</i> is also a species of note in the north of the site.</p> <p>The site is of considerable conservation interest for the same reasons as Wooddown Bog NHA as outlined above.</p>	<p>9.4 km south of proposed grid connection</p> <p>8.1 km south of solar farm site</p>
Lough Owel pNHA (also Lough Owel SPA and cSAC)	000688	<p>Described below in European Sites (Section 3.4)</p>	<p>0.6 km north of proposed grid connection</p> <p>1.9 km north-east of solar farm site</p>

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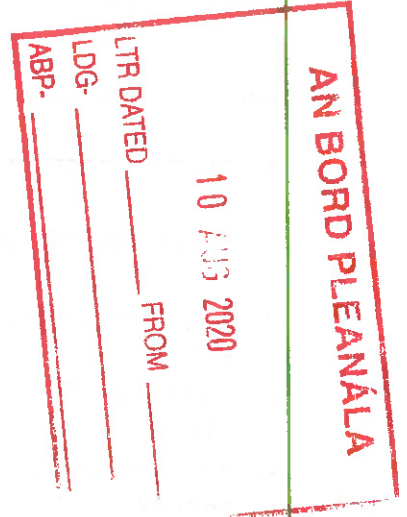




Site Name	Site Code	Summary Details	Distance
Lough Sheever Fen/Slevin's Lough Complex pNHA	000690	Lough Sheever Fen/Slevin's Lake Complex comprises two medium-sized lakes and their associated woodland and grassland habitats. These lakes are situated approximately 3 miles north east of Mullingar, in Co. Westmeath. The site is of high scientific value for a variety of reasons, including the rich diversity of habitats and the rarity of some of the floral and invertebrate species. Habitats of note here include fen vegetation forming on the shores of both Lough Sheever and Slevin's Lake, mixed woodland on Quarry Bog, wet woodland, scrub, drainage ditch vegetation and reed swamp. The north shore of Slevin's Lake is formed by calcareous fen, rich in species and containing Round-leaved Wintergreen ( <i>Pyrola rotundifolia</i> ), which is only found in ten sites in Ireland. There is also a well-developed fen invertebrate community here including species internationally vulnerable within the E.C. the eastern shore of Lough Sheever also has examples of fen vegetation. Quarry Bog is a low-lying peaty area between Lough Drin and Slevin's Lake. At present, it is covered by semi-natural woodland in which a variety of conifers have been planted. <i>Rhododendron ponticum</i> is also present and is spreading. This area seems to be a naturally wooded cutover or partially cutover bog. The woodland at Slevin's Lough is notable for the presence of two rare species of Myxomycete fungus, namely <i>Echinostelium brooksii</i> and <i>Physarum oblatum</i> . Both the woodland and lakes provide a very good habitat for a variety of bird species, badgers, foxes and squirrels and common in the woodland.	3.4 km north-east of proposed grid connection 6.4 km north-east of solar farm site
Scragh Bog pNHA (also Scragh Bog cSAC)	000692	Described below in European Sites Section (Section 3.4)	4.2 km north-east of proposed grid connection 5.6 km north-east of solar farm site
Wooddown Bog NHA	000694	The site consists of a Raised Bog, which has developed in a basin. The bog has good hummock/hollow microtopography but few pools. There is a small soak area situated close to the northern edge of the high bog. This area also supports a low canopy of Downy Birch ( <i>Betula pubescens</i> ) woodland. A small fen is located to the south-west of the bog. The cutover supports humid grassland, Birch and Gorse ( <i>Ulex europaeus</i> ) scrub and woodland. There appears to be a flush on the cutover off the northern margin of the high bog.	5.1 km east of proposed grid connection 8.4 km east of solar farm site



Site Name	Site Code	Summary Details	Distance
Ballynafid Bog and Fen pNHA	000673	<p>The site is of conservation significance comprising as it does a raised bog, a rare habitat in the E.U. and one that is becoming increasingly scarce and under threat in Ireland. This site supports a good diversity of raised bog microhabitats, including hummock/hollow complexes, a soak system and flushes, as well as a number of scarce plant species. Ireland has a high proportion of the total E.U. resource of raised bog (over 50%) and so has a special responsibility for its conservation at an international level.</p> <p>Ballynafid lake is a small midland lake, some 10 hectares in extent, located just north-east of Lough Owel. The lake is fringed by a wide band of reedswamp dominated by common reed (<i>Phragmites australis</i>) and Common Club-Rush (<i>Scirpus lacustris</i>). The reedswamp grades into freshwater marsh containing Bottle Sedge (<i>Carex rostrata</i>) and Grater Spearwort (<i>Ranunculus lingua</i>) with a band of calcareous fen dominated by Tawny Sedge (<i>Carex hostiana</i>) and Purple Moor Grass (<i>Molinia caerulea</i>) behind the freshwater marsh. On the western side of the lake, reedswamp grades into woodland dominated by Birch (<i>Betula pubescens</i>) with some Willows (<i>Salix</i> spp.) and Pine (<i>Pinus</i> sp.). Bramble (<i>Rubus fruticosus</i> agg.) dominates a rather species-poor ground flora. The lake supports a good population of coarse fish (Bream, Rudd etc.) and is a popular angling venue, due mainly to its close proximity to the road.</p> <p>Ballynafid lake is a very important site for rare invertebrates and insects some of which are internationally rare. The lake also displays nice patterns of vegetation zonation which are rarely seen so well-developed in midland lakes. The transition from marsh to calcareous fen, particularly along the south-eastern edge of the lake, is of great interest. Plant species of restricted distribution occurring at the site include Fen bedstraw (<i>Galium uliginosum</i>) and Marsh Pea (<i>Lathyrus palustris</i>) the latter species being only recently removed from the list of protected plant species. Although the lake is too small to have much ornithological interest it does support a large population of Snipe along with some Mallard and Mute Swan.</p>	5.4 km north of proposed grid connection 5.9 km north-east of solar farm site





#### 4.4 Brief Description of the European sites within 15 km of the Development

##### *Proximity of European sites in relation to proposed grid connection cable route:*

- Lough Owel SAC (site code 000688) is located approximately 0.6 km to the north of the proposed cable route.
- Scragh Bog SAC (site code 000692) is located approximately 4.2 km to the north-east of the proposed cable route
- Lough Ennell SAC (site code 000685) is located approximately 3.7 km to the south of the proposed cable route.
- Garriskil Bog SAC (site code 000679) is located approximately 11.3 km to the north of the proposed cable route.
- Ballymore Fen SAC (site code 002313) is located approximately 14.9 km to the south-west of the proposed cable route.
- River Boyne And River Blackwater SAC (002299) is located approximately 13.9 km to the east of the proposed cable route.
- Lough Owel SPA (site code 004047) is located approximately 0.6 km to the north of the proposed cable route.
- Lough Ennell SPA (site code 004044) is located approximately 4 km to the south of the proposed cable route.
- Lough Iron SPA (site code 004046) is located approximately 5.1 km to the north-west of the proposed cable route.
- Lough Derravarragh SPA (site code 004043) is located approximately 9.3 km to the north of the proposed cable route.
- Garriskil Bog SPA (site code 004102) is located approximately 11.3 km to the north of the proposed cable route.
- Glen Lough SPA (site code 004045) is located approximately 14.4 km to the north-west of the proposed cable route.

##### *Proximity of European sites in relation to solar farm site:*

- Lough Owel SAC (site code 000688) is located approximately 1.9 km to the north-east of the solar farm site.
- Scragh Bog SAC (site code 000692) is located approximately 5.6 km to the north-east of the solar farm site.
- Lough Ennell SAC (site code 000685) is located approximately 5.1 km to the south-east of the solar farm site.
- Garriskil Bog SAC (site code 000679) is located approximately 11.4 km to the north of the solar farm site.
- Ballymore Fen SAC (site code 002313) is located approximately 13.7 km to the south-east of the solar farm site.
- Lough Owel SPA (site code 004047) is located approximately 1.9 km to the north-east of the solar farm site.
- Lough Ennell SPA (site code 004044) is located approximately 5 km to the south-east of the solar farm site.



- Lough Iron SPA (site code 004046) is located approximately 4.8 km to the north-west of the solar farm site.
- Lough Derravarragh SPA (site code 004043) is located approximately 11 km to the north of the solar farm site.
- Garriskil Bog SPA (site code 004102) is located approximately 11.4 km to the north of the solar farm site.
- Glen Lough SPA (site code 004045) is located approximately 14 km to the north-west of the solar farm site.

The following summary descriptions are extracted from the NPWS site synopses for each site. Full synopses are in Appendix 2.

#### Lough Owel cSAC (000688)

Lough Owel is a large hard water lake located approximately 4 km north-west of Mullingar in Co. Westmeath. It is a relatively shallow lake with a rocky, marl-covered bottom.

Submerged vegetation at Lough Owel includes a number of stoneworts, notably *Chara rudis* and *C. tomentosa*. The rocky nature of the shoreline has given rise to marginal vegetation which is patchy and sparse. Apart from some reedswamp formed by Common Reed (*Phragmites australis*) and Common Club-rush (*Scirpus lacustris*), shoreline vegetation is dominated by occasional patches of Alder (*Alnus glutinosa*).

Two areas of wetland vegetation of particular interest occur at the north-west (Bunbrosna) and south-west (Tullaghan) of the lake. These areas contain a mosaic of vegetation types of varying degrees of wetness, with quaking bog, alkaline fen, wet grassland and wet woodland all present. In places the quaking mire grades into alkaline fen. Some characteristic species such as Black Bog-rush (*Schoenus nigricans*) and Long-stalked Yellow-sedge (*C. lepidocarpa*) occur, as well as brown fen mosses. Scarce fen species have been recorded here, including Fen Bedstraw (*Galium uliginosum*) and Marsh Fern (*Thelypteris palustris*).

Lough Owel is one of the most important fishing lakes in the midlands and is especially good for Trout. Scharff's Char (*Salvelinus scharffi*), a distinct race of char which was once found only in Lough Owel and Lough Ennell, is now thought to be extinct. Notable invertebrates recorded from the lake include three caddis fly (Order Trichoptera) species: *Tinodes maculicornis*, *Metalype fragilis* and *Limnephilus nigriceps*. White-clawed Crayfish, a species listed in Annex II of the E.U. Habitats Directive, is found at this site.

Potential threats to the conservation interest of Lough Owel include the increasing level of water supply to Mullingar, overfishing, eutrophication caused by local farming practices and pressure from amenity uses such as boating and fishing. With the exception of Lough Carra in Co. Mayo, Lough Owel is the best example of a large, spring-fed calcareous lake in the country.

#### Scragh Bog cSAC (000692)

Scragh Bog lies approximately 10 km north-west of Mullingar, Co. Westmeath. This site comprises a wet transition fen with a floating root mat which has developed in a small oval-shaped depression. The fen is fed by weak surface springs and drains by an artificially defined outlet. The fen becomes open carr in the central area and in places grades into ombrotrophic bog. Most of the fen vegetation at the site belongs to two broad types.





The fen carr is dominated by willows (*Salix* spp.), including the rare Grey Willow (*Salix cinerea* subsp. *cinerea*) and by Downy Birch (*Betula pubescens*). Round-leaved Wintergreen (*Pyrola rotundifolia*), a Red Data Book species, is found in this vegetation type.

Other rare plants found at the site include Slender Green Feather-moss (*Drepanocladus vernicosus*), a moss listed on Annex II of the E.U. Habitats Directive, and the arctic-alpine moss *Tomentypnum nitens*. The embryonic raised bog communities contain species such as Bog-sedge (*Carex limosa*), Slender Sedge, Cross-leaved Heath (*Erica tetralix*), Round-leaved Sundew (*Drosera rotundifolia*), Cranberry (*Vaccinium oxycoccos*), and a number of mosses, such as *Aulacomnium palustre*, *Sphagnum subnitens* and *S. contortum*.

The site also supports a uniquely complete fauna of transition mire invertebrates, including a number of species which are extremely rare in Northern Europe. Marsh Fritillary (*Euphydryas aurinia*, Order Lepidoptera), a butterfly listed on Annex II of the E.U. Habitats Directive, has been recorded from the site, but in its present condition the habitat is only marginally suitable for the species and any populations present are likely to be intermittent, small and short-lived.

Most of the site is managed as a Nature Reserve. The outflow stream is included in the site, since interference with this outflow could damage the site hydrology. A small section at the bottom of a field to the south is also included - this area supports a species-rich marsh/wet grassland vegetation.

Scragh Bog contains excellent examples of two habitats listed on Annex I of the E.U. Habitats Directive - alkaline fen and transition mire.

#### Lough Ennell cSAC (000685)

Lough Ennell is a large, open, steep-sided lake, located 3 km south of Mullingar in Co. Westmeath. The lake bottom is of limestone with a marl deposit. The water is markedly alkaline and mesotrophic, possibly owing to effluents received from Mullingar town and to fertilizer inputs from farmland surrounding the lake.

Lough Ennell supports a diverse aquatic flora. Seven stonewort species have been identified, including two Red Data Book species, *Chara denudata* and *C. tomentosa*.

Alkaline fen is found on the lake shore, with species such as Grass-of-parnassus (*Parnassia palustris*), Marsh Pennywort (*Hydrocotyle vulgaris*) and Bottle Sedge (*Carex rostrata*). In wet marshy patches along the shore Marsh-marigold (*Caltha palustris*), Brookweed (*Samolus valerandi*) and Lesser Water-plantain (*Baldellia ranunculoides*) are common. Reedbeds and species-poor swamp vegetation fringe the lake in places, particularly around the points of inflow and outflow, and on the eastern shore around Tudenham Park. Frogbit (*Hydrocharis morsus-ranae*) and Tufted-sedge (*Carex elata*) occur; these species are of note in that they have restricted distributions in Ireland. The rare Fibrous Tussock-sedge (*Carex appropinquata*) has also been recorded from this site.

Yellow Archangel (*Lamiastrum galeobdolon*), a rare plant listed in the Red Data Book, has been recorded in the woods along the eastern shores of Lough Ennell. This is the only record for this species outside the south-east of Ireland. The rare Myxomycete fungus, *Licea castanea*, has been recorded from woodland in the site. A species of blue-green alga (*Schizothrix fasciculata*), which forms little pebbles of lime that are cast up on the lakeshore, occurs in Lough Ennell and has not been recorded elsewhere in Ireland.

Scharff's Char (*Salvelinus scharffi*), a distinct race of char which was once found only in Lough Owel and Lough Ennell, is now thought to be extinct.



Notable aquatic invertebrates recorded from the lake include *Tinodes maculicornis* (Order Trichoptera), *Metalype fragilis* (Order Trichoptera), *Limnephilus nigriceps* (Order Trichoptera), *Picromerus bidens* (Order Heteroptera), *Monarthia humili* (Order Hemiptera) and *Donacia obscura* (Order Coleoptera).

Lough Ennell is of significance as a highly productive lake which supports a rich variety of lower plant and invertebrate species. Its lakeshore habitats, which include alkaline fen, a habitat listed on Annex I of the E.U. Habitats Directive, support a diverse flora. These habitats also provide important refuges for wildfowl.

#### Garriskil Bog cSAC (000679)

Garriskil Bog SAC consists of two areas of raised bog: Garriskil Bog, which covers 324.8 ha and lies 3 km east of Rathowen in Co. Westmeath; and a small outlier, within the townland of Derrya, which covers 22.9 ha and lies 2.2 km to the east on the northern shore of Lough Derravaragh. Both bogs are remnants of the large river floodplain bogs which developed where the River Inny enters and leaves Lough Derravaragh. Garriskil Bog is bounded to the south-east and south-west by the rivers Inny and Riffey and by the Dublin-Sligo railway line to the north.

It is considered an exceptional example of a midland raised bog and includes 170 ha of uncut raised bog and 154 ha of surrounding areas which includes 109 ha of cutover bog. The section at Derrya (which comprises part of Lough Derravaragh Bog NHA (site code 000684)) has been restored as part of an EU LIFE project. The site consists of 2.55 ha of high bog and 20.35 ha of cutover, all of which, except for a broadleaf woodland fringe along the River Inny, was afforested in the 1970s. All the conifer plantations were recently clear-felled and restored by drain-blocking. It is bordered by open high bog to the north-east, by the River Inny to the west and by cutover bog grading into Lough Derravaragh to the south-east. The bedrock geology of both sites is carboniferous limestone.

Garriskil Bog is a large raised bog with 51.7% of the original bog still present. It contains a large, wet high quality central core of active raised bog which comprises approximately 51 ha (30%) of the uncut high bog area. There are extensive, well developed systems of pools and hummocks present. The bog mosses *Sphagnum imbricatum*, *S. fuscum* and the moss *Leucobryum glaucum* are important components of the hummocks, which are frequently crowned by the moss *Racomitrium lanuginosum* and sometimes colonised by Bilberry (*Vaccinium myrtillus*). The numerous areas of inter-connecting pools are mostly dominated by Rhynchosporion vegetation which forms floating rafts on the water surface. Typical plant species present include the bog mosses *Sphagnum cuspidatum* (generally dominant) and *S. auriculatum*, the liverwort *Cladopodiella fluitans*, White Beak-sedge, Bogbean (*Menyanthes trifoliata*), bladderworts (*Utricularia* spp.), Common Cottongrass (*Eriophorum angustifolium*) and Great Sundew (*Drosera anglica*). Brown Beak-sedge, a sedge species considered to be rare on a national basis, is present in some of the bog pools. The areas between the pools support occasional wet and quaking lawns of White Beak-sedge, as well as Bog Asphodel.

#### Ballymore Fen cSAC (002313)

In the wetter areas towards the centre and south of this site the vegetation is characterised by a scraw (i.e. floating vegetation) typified by patches with an abundance of Bogbean (*Menyanthes trifoliata*) and Water Horsetail (*Equisetum fluviatile*). Other associated plants include Marsh Helleborine (*Epipactis palustris*), Water Mint (*Mentha aquatica*), Marsh Cinquefoil (*Potentilla palustris*), Marsh Bedstraw (*Galium palustre*), Wild Angelica (*Angelica sylvestris*), Lesser Spearwort (*Ranunculus flammula*) and sedges (*Carex* spp.). In slightly drier areas and on old banks are willow (*Salix* sp.) saplings, with occasional Ash (*Fraxinus excelsior*), and ferns such as Regal Fern (*Osmunda regalis*) and Broad Buckler-fern (*Dryopteris dilatata*). Where there is flowing water Lesser Water-parsnip (*Berula erecta*) occurs.



At the edge of the wetter area, particularly at the east of the site, a gradation to Black Bog-rush (*Schoenus nigricans*) dominated fen occurs. Willow saplings with some Purple Moor-grass (*Molinia caerulea*) and bog moss hummocks (*Sphagnum* spp.) are found throughout. Between the hummocks, abundant Round-leaved Wintergreen (*Pyrola rotundifolia*), a Red Data Book species, occurs with species typically found in such conditions. The bryophyte communities are of considerable interest. Associated with drains and flowing streams throughout the site are the 10-spined Stickleback, along with the Common Frog and Smooth Newt. Five species of dragonfly and damselfly were recorded on the wing: Brown Hawker (*Aeshna grandis*), Common Hawker (*Aeshna juncea*), Keeled Skimmer (*Orthethrum coerulescens*), Azure damselfly (*Coenagrion puella*) and Variable damselfly (*Coenagrion pulchellum*).

#### Lough Owel SPA (004047)

This site is described above under its SAC designation; in addition to this, the site is one of the most important Midland lakes for wintering waterfowl, with nationally important populations of Shoveler (142) and Coot (1,825) - figures given are mean peaks for the five seasons 1995/96-1999/00. The populations for both of these species represent a significant proportion (c. 4.7% and 6.5%) of the respective All-Ireland totals. The lake is utilised by Pochard (291), Tufted Duck (227) and Goldeneye (75). The lake has been used as a roost by the internationally important Midland lakes Greenland White-fronted Goose population (200 recorded at the site in 2004/05). The lake also supports populations of Little Grebe (16), Great Crested Grebe (18) and Cormorant (32). Lough Owel is one of the most important fishing lakes in the Midlands and is especially good for Trout. The lake also holds an important population of White-clawed Crayfish (*Austropotamobius pallipes*), a species that is listed on Annex II of the E.U. Habitats Directive.

Lough Owel also supports nationally important populations of Shoveler and Coot. It is also notable as it is used as a roost site on occasion by the internationally important Midlands Greenland White-fronted Goose flock. Greenland White-fronted Goose is listed on Annex I of the E.U. Birds Directive. Lough Owel is also a Ramsar Convention site.

#### Lough Ennell SPA (004044)

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Pochard, Tufted Duck and Coot. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

Lough Ennell is one of the most important Midland lakes for wintering waterfowl, with nationally important populations of Pochard (738), Tufted Duck (1,303) and Coot (433) - all figures are mean peaks for the 5 winters 1995/96-1999/2000. The population of Tufted Duck represents over 3% of the all-Ireland population. The site is also utilised by an internationally important population of non-migratory Mute Swan (340). Other species which occur include Golden Plover (1,000 in 1998/99), Lapwing (673), Mallard (93), Little Grebe (30), Great Crested Grebe (24) and Goldeneye (22).

Lough Ennell is of ornithological significance for wintering waterfowl, with three migratory species having populations of national importance. The occurrence of Golden Plover in the vicinity of the lake is of note as this species is listed on Annex I of the E.U. Birds Directive. Lough Ennell is a Ramsar Convention Site.





#### Lough Iron SPA (004046)

Lough Iron is a small- to moderately-sized midland lake, located some 12 km north-west of Mullingar. It is situated on the Inny River, which flows from Lough Derravaragh approximately 5 km to the north-east. The dominant wetland plant species along the margins of the lake are Canary Reed-grass (*Phalaris arundinacea*) and Purple Moor-grass (*Molinia caerulea*), the latter species forming large expanses of wet grassland.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Whooper Swan, Greenland White-fronted Goose, Wigeon, Teal, Shoveler, Coot and Golden Plover. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

Lough Iron is of international importance as a site for wintering waterfowl. It is a traditional haunt for the internationally important Midland lakes Greenland White-fronted Goose flock (426 - five year mean peak between 1994/95 and 1998/99). The site also supports an internationally important population of Whooper Swan (214) and nationally important numbers of Wigeon (1,229), Teal (759), Shoveler (164), Coot (293) and Golden Plover (2,200) - all figures are five year mean peaks for the period 1995/96 to 1999/2000).

Lough Iron SPA is of high ornithological importance, primarily for supporting internationally important populations of Whooper Swan and Greenland White-fronted Goose. The site also holds a notable diversity of other waterfowl, including dabbling duck, diving duck and waders. It is of note that three of the species which regularly occur, Greenland White-fronted Goose, Whooper Swan and Golden Plover, are listed on Annex I of the E.U. Birds Directive. Lough Iron is a Ramsar Convention site and a Wildfowl Sanctuary.

#### Lough Derravaragh SPA (004043)

Lough Derravaragh is located approximately 12 km north of Mullingar town in Co. Westmeath. It is a medium- to large-sized lake of relatively shallow water (maximum depth 23 m). The lake extends along a south-east/north-west axis for approximately 8 km. The Inny River, a tributary of the River Shannon, is the main inflowing and outflowing river. It is a typical limestone lake with water of high hardness and alkaline pH and is classified as a mesotrophic system.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Whooper Swan, Pochard, Tufted Duck and Coot. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

Lough Derravaragh is of major ornithological importance as it regularly supports nationally important populations of four species, and at times is used by the internationally important population of Greenland White-fronted Goose which is based in the region. Also of note is that three of the species which occur at the site, Greenland White-fronted Goose, Whooper Swan and Golden Plover, are listed on Annex I of the E.U. Birds Directive. Lough Derravaragh is a Ramsar Convention site.



#### Garriskil Bog SPA (004102)

At the time this site (described under its Sac designation above) was designated as a Special Protection Area (SPA) it was known to be utilised by part of an internationally important population of Greenland White-fronted Goose centred around the midland lakes. The geese appear to have abandoned these peatland sites in favour of grassland sites elsewhere. Greenland White-fronted Goose is regarded as a special conservation interest for this SPA. The site is within the range of the midland lakes Greenland White-fronted Goose flock, which is centred on four major lakes (Derravaragh, Iron, Owel and Ennell). The last record of Greenland White-fronted Goose at this site was in 1986/87 (43 individuals).

The site is within the breeding territory of a pair of Merlin. Nesting probably occurs outside of the site boundary, with the bog being used primarily as a foraging area. Several wader species breed within the site – Snipe (an estimated 5 pairs), Curlew (2-3 pairs) and Redshank (2 pairs). Barn Owl has been recorded hunting along the margins of the bog, while Red Grouse is considered to occur occasionally.

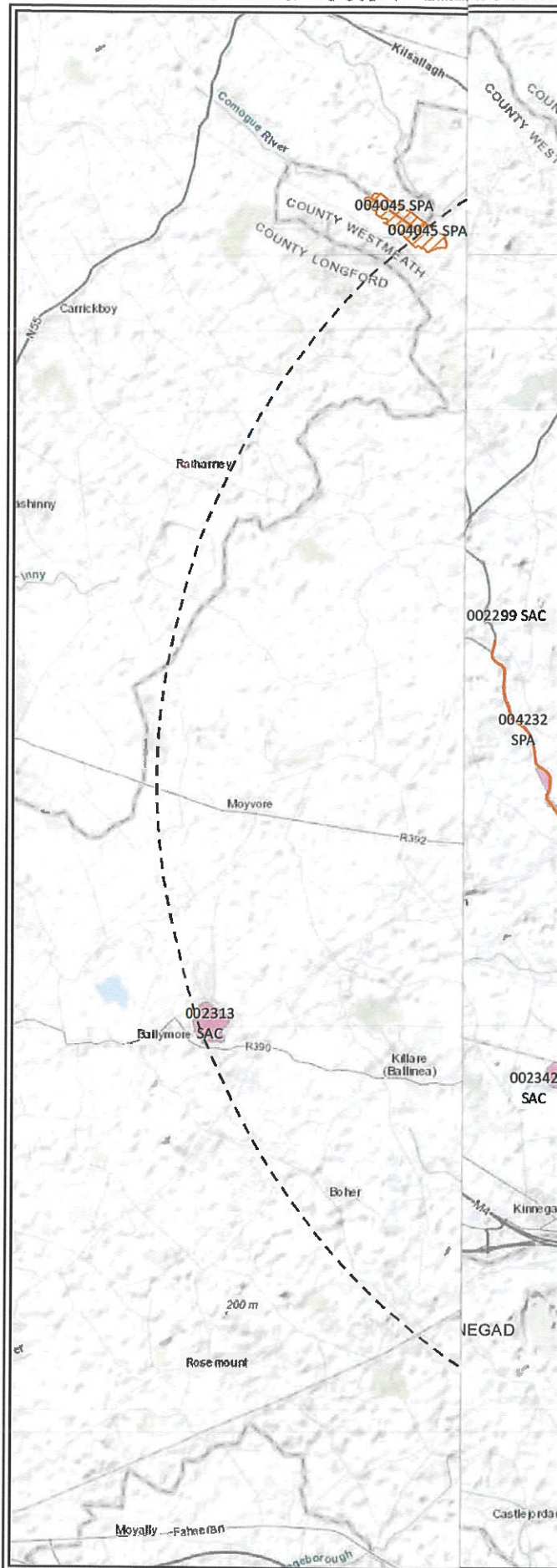
#### Glen Lough SPA (004045)

Glen Lough is situated about 5 km north-west of Lough Iron on the border of Co. Westmeath and Co. Longford. Extensive drainage in the 1960s has resulted in a dramatic drop in the watertable here, with the result that there is now little open water, except during flooding in the winter months. Sedge-dominated freshwater marsh now occupies the majority of what was once open water.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for: Whooper Swan. An internationally important Whooper Swan population uses the site at times. This flock (mean peak of 327 individuals for the 5 seasons 1995/96-1999/2000) also uses Lough Iron and a range of grassland feeding areas in the vicinity. At times, the site is visited by part of the internationally important Midland lakes Greenland White-fronted Goose population, although numbers are low (17). Dabbling ducks are well represented, but in relatively low numbers, and include such species as Wigeon (81), Teal (69), Mallard (46), Pintail (7) and Shoveler (23). Lapwing (189) is also found in the area (all figures are mean peaks for the 5 seasons 1995/96-1999/2000).

Whilst this site attracts a range of wintering waterfowl, the principal ornithological interest lies in the internationally important Whooper Swan population that is based in the area. Whooper Swan is of particular note as it is listed on Annex I of the E.U. Birds Directive. Greenland White-fronted Goose, nowadays an occasional visitor to the site, is also listed on Annex I of this Directive. The site provides useful habitat for Shoveler, which in Ireland is a fairly localised species. Glen Lough is a Ramsar Convention site.





- Substations (110-220KV)
- Grid Connection Route
- Planning Boundary
- 15km Buffer of Grid Connection Route
- Special Protection Area (SPA)

*Site Code, Site Name, Distance (km)*

- 004043, Lough Derravaragh SPA, 9.2
- 004044, Lough Ennell SPA, 4
- 004045, Glen Lough SPA, 14.4
- 004046, Lough Iron SPA, 5.1
- 004047, Lough Owel SPA, 0.7
- 004102, Garriskil Bog SPA, 11.3
- Special Area of Conservation (SAC)
- Site Code, Site Name, Distance (km)*
- 000679, Garriskil Bog SAC, 11.3
- 000685, Lough Ennell SAC, 3.8
- 000688, Lough Owel SAC, 0.7
- 000692, Scragh Bog SAC, 4.2
- 002205, Wooddown Bog SAC, 6.3
- 002299, River Boyne And Blackwater SAC, 13.8
- 002313, Ballymore Fen SAC, 14.3

APP. LG. LR DATED  
 10 AUG 2020  
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<b>TITLE:</b>	European Sites within 15km of the Proposed Development
<b>PROJECT:</b>	Clondardis Solar Farm, Co. Westmeath
<b>FIGURE NO:</b>	2
<b>CLIENT:</b>	Harmony Solar Ireland Ltd.
<b>SCALE:</b>	1:125000
<b>REVISION:</b>	0
<b>DATE:</b>	22/05/2020
<b>PAGE SIZE:</b>	A3







Table 4-2: European Sites within 15km of the Proposed Development and/or cable route

Designated Site	Qualifying Interests	Conservation Objectives	Threats	Distance from Proposed Cable Route/ Solar Farm Site
Lough Owel SAC (000688)	<ul style="list-style-type: none"> <li>Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. [3140]</li> <li>Transition mires and quaking bogs [7140]</li> <li>Alkaline fens [7230]</li> <li><i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092]</li> </ul>	To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the cSAC has been selected	<ul style="list-style-type: none"> <li>G02.10 other sport / leisure complexes (medium, inside)</li> <li>J02.06.02 surface water abstractions for public water supply (low, inside)</li> <li>H01.05 diffuse pollution to surface waters due to agricultural and forestry activities (medium, outside)</li> <li>J02.01 Landfill, land reclamation and drying out, general (low, inside)</li> <li>D03.01.02 piers / tourist harbours or recreational piers (medium, inside)</li> <li>F03.01 Hunting</li> <li>D04 airports, flightpaths (medium, inside)</li> <li>G01 Outdoor sports and leisure activities, recreational activities (medium, inside)</li> </ul>	0.6 km (cable route) 1.9 km (site)
Scragh Bog SAC (000692)	<ul style="list-style-type: none"> <li>Transition mires and quaking bogs [7140]</li> <li>Alkaline fens [7230]</li> <li><i>Drepanocladus vernicosus</i> (Slender Green Feather-moss) [3193]</li> </ul>	To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the cSAC has been selected	<ul style="list-style-type: none"> <li>H01.08 diffuse pollution to surface waters due to household sewage and waste waters (medium, outside)</li> <li>D01.01 paths, tracks, cycling tracks (medium, inside)</li> <li>A08 Fertilisation (medium, outside)</li> <li>A11 Agriculture activities not referred to above (low, inside)</li> </ul>	4.2 km (cable route) 5.6 km (site)
Lough Annell SAC (000685)	<ul style="list-style-type: none"> <li>Alkaline fens [7230]</li> </ul>	To maintain or restore the favourable conservation	<ul style="list-style-type: none"> <li>B02.02 forestry clearance (low, outside)</li> <li>J02.05.02 modifying structures of inland water courses (low, inside)</li> </ul>	3.7 km (cable route) 5.1 km (site)

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Designated Site	Qualifying Interests	Conservation Objectives	Threats	Distance from Proposed Cable Route/ Solar Farm Site
<p>Garriskil Bog SAC (000679)</p>	<ul style="list-style-type: none"> <li>Active raised bogs [7110]</li> <li>Degraded raised bogs still capable of natural regeneration [7120]</li> <li>Depressions on peat substrates of the Rhynchosporion [7150]</li> </ul>	<p>condition of the Annex I habitat(s) and/or the Annex II species for which the cSAC has been selected</p>	<ul style="list-style-type: none"> <li>H06.01.01 point source or irregular noise pollution (medium, outside)</li> <li>F03.01 Hunting (low, inside)</li> <li>H01.08 diffuse pollution to surface waters due to household sewage and waste waters (low, inside)</li> <li>D01.01 paths, tracks, cycling tracks (low, inside)</li> <li>A04.03 abandonment of pastoral systems, lack of grazing (low, both)</li> <li>F02.03.02 pole fishing (low, inside)</li> <li>H01.05 diffuse pollution to surface waters due to agricultural and forestry activities (low, inside)</li> <li>J02.01 Landfill, land reclamation and drying out, general (low, inside)</li> <li>K03.01 competition (low, inside)</li> <li>A04.01.01 intensive cattle grazing (low, both)</li> <li>H06.02 Light pollution (low, inside)</li> </ul>	<p>11.3 km (cable route) 11.4 km (site)</p>
<p>Ballymore Fen SAC (002313)</p>	<ul style="list-style-type: none"> <li>Transition mires and quaking bogs [7140]</li> </ul>	<p>To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the cSAC has been selected</p>	<ul style="list-style-type: none"> <li>B02.02 forestry clearance (low, inside)</li> <li>G05.07 missing or wrongly directed conservation measures (medium, inside)</li> <li>J02.01 Landfill, land reclamation and drying out, general (low, outside)</li> <li>A10.01 removal of hedges and copses or scrub (medium, inside)</li> <li>A04.03 abandonment of pastoral systems, lack of grazing (low, inside)</li> <li>A10.01 removal of hedges and copses or scrub (low, inside)</li> <li>A08 Fertilisation (low, inside)</li> <li>H01.03 other point source pollution to surface water (medium, inside)</li> <li>H04.03 other air pollution (low, inside)</li> </ul>	<p>14.9 km (cable route) 13.7 km (site)</p>



Designated Site	Qualifying Interests	Conservation Objectives	Threats	Distance from Proposed Cable Route/ Solar Farm Site
River Boyne and River Blackwater SAC (002299)	<ul style="list-style-type: none"> <li>• Alkaline fens [7230]</li> <li>• Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</li> <li>• <i>Lampetra fluviatilis</i> (River Lamprey) [1099]</li> <li>• <i>Salmo salar</i> (Salmon) [1106]</li> <li>• <i>Lutra lutra</i> (Otter) [1355]</li> </ul>	condition of the Annex I habitat(s) and/or the Annex II species for which the cSAC has been selected  To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the cSAC has been selected	<ul style="list-style-type: none"> <li>• I02 problematic native species (medium, inside)</li> <li>• G02.10 other sport / leisure complexes (medium, inside)</li> <li>• J02 human induced changes in hydraulic conditions (medium, inside)</li> <li>• G05.06 tree surgery, felling for public safety, removal of roadside trees (low, inside)</li> <li>• E03.02 disposal of industrial waste (medium, inside)</li> <li>• E02 Industrial or commercial areas (high, inside)</li> <li>• D01.02 roads, motorways (medium, inside)</li> <li>• E03.04 Other discharges (high, inside)</li> <li>• I01 invasive non-native species (high, inside)</li> <li>• G05 Other human intrusions and disturbances (low, inside)</li> <li>• J02.10 management of aquatic and bank vegetation for drainage purposes (medium, inside)</li> <li>• D01.05 bridge, viaduct (low, inside)</li> <li>• J02.15 Other human induced changes in hydraulic conditions (high, inside)</li> <li>• H01 Pollution to surface waters (limnic, terrestrial, marine &amp; brackish) (high, inside)</li> <li>• A10.01 removal of hedges and copses or scrub (medium, inside)</li> <li>• A07 use of biocides, hormones and chemicals (Medium, inside)</li> </ul>	13.9 km (cable route) 17 km (site)



Designated Site	Qualifying Interests	Conservation Objectives	Threats	Distance from Proposed Cable Route/ Solar Farm Site
Lough Owel SPA (004047)	<ul style="list-style-type: none"> <li>Shoveler (<i>Anas clypeata</i>) [A056]</li> <li>Coot (<i>Fulica atra</i>) [A125]</li> <li>Wetland and Waterbirds [A999]</li> </ul>	To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for the SPA	<ul style="list-style-type: none"> <li>A01 Cultivation (medium, inside)</li> <li>G01 Outdoor sports and leisure activities, recreational activities (low, inside)</li> <li>A05.02 stock feeding (medium, outside)</li> <li>J02.11 Siltation rate changes, dumping, depositing of dredged deposits (medium, inside)</li> <li>B01.02 artificial planting on open ground (non-native trees) (medium, inside)</li> <li>C01.01 Sand and gravel extraction (medium, inside)</li> <li>E01.04 other patterns of habitation (medium, inside)</li> <li>A08 Fertilisation (medium, inside)</li> <li>E05 Storage of materials (medium, inside)</li> <li>A08 Fertilisation (medium, outside)</li> <li>J02 human induced changes in hydraulic conditions (low, inside)</li> <li>F02.03 Leisure fishing (medium, inside)</li> <li>B Sylviculture, forestry (medium, outside)</li> <li>F03.01 Hunting (low, inside)</li> </ul>	0.6 km (cable route) 1.9 km (site)
Lough Ennell SPA (004044)	<ul style="list-style-type: none"> <li>Pochard (<i>Aythya ferina</i>) [A059]</li> <li>Tufted Duck (<i>Aythya fuligula</i>) [A061]</li> <li>Coot (<i>Fulica atra</i>) [A125]</li> <li>Wetland and Waterbirds [A999]</li> </ul>	To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for the SPA	<ul style="list-style-type: none"> <li>A08 Fertilisation (high, outside)</li> <li>E01 Urbanised areas, human habitation (high, outside)</li> <li>G01.02 (medium, outside)</li> <li>B Sylviculture, forestry (medium, outside)</li> <li>G.01.01 nautical sports (medium, inside)</li> <li>F02.03 Leisure fishing (medium, inside)</li> <li>G05.01 Tramping, overuse (low, inside)</li> <li>F03.01 Hunting (low, inside)</li> </ul>	4 km (cable route) 5 km (site)

Designated Site	Qualifying Interests	Conservation Objectives	Threats	Distance from Proposed Cable Route/ Solar Farm Site
Lough Iron SPA (004046)	<ul style="list-style-type: none"> <li>Whooper Swan (<i>Cygnus cygnus</i>) [A038]</li> <li>Wigeon (<i>Anas penelope</i>) [A050]</li> <li>Teal (<i>Anas crecca</i>) [A052]</li> <li>Shoveler (<i>Anas clypeata</i>) [A056]</li> <li>Coot (<i>Fulica atra</i>) [A125]</li> <li>Golden Plover (<i>Pluvialis apricaria</i>) [A140]</li> <li>Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395]</li> <li>Wetland and Waterbirds [A999]</li> </ul>	To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for the SPA	<ul style="list-style-type: none"> <li>A08 Fertilisation (high, outside)</li> <li>A08 Fertilisation (medium, inside)</li> <li>A04 grazing (medium, inside)</li> <li>B Sylviculture, forestry (medium, outside)</li> <li>B Sylviculture, forestry (high, inside)</li> </ul>	5.1 km (cable route) 4.8 km (site)
Lough Derravarragh SPA (004043)	<ul style="list-style-type: none"> <li>Whooper Swan (<i>Cygnus cygnus</i>) [A038]</li> <li>Pochard (<i>Aythya ferina</i>) [A059]</li> <li>Tufted Duck (<i>Aythya fuligula</i>) [A061]</li> <li>Coot (<i>Fulica atra</i>) [A125]</li> <li>Wetland and Waterbirds [A999]</li> </ul>	To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for the SPA	<ul style="list-style-type: none"> <li>B Sylviculture, forestry (medium, outside)</li> <li>F03.01 Hunting (medium, inside)</li> <li>A05.01 Animal breeding (high, outside)</li> <li>F02.03 Leisure fishing (medium, inside)</li> <li>A08 Fertilisation (high, outside)</li> </ul>	9.3 km (cable route) 11 km (site)
Garriskil Bog SPA (004102)	<ul style="list-style-type: none"> <li>Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395]</li> </ul>	To maintain or restore the favourable conservation	<ul style="list-style-type: none"> <li>B01 forest planting on open ground (low, outside)</li> <li>D01.04 railway lines, TGV (low, inside)</li> <li>J01 fire and fire suppression (low, inside)</li> </ul>	11.3 km (cable route) 11.4 km (site)

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Designated Site	Qualifying Interests	Conservation Objectives	Threats	Distance from Proposed Cable Route/ Solar Farm Site
Glen Lough SPA (004045)	<ul style="list-style-type: none"> <li>Whooper Swan (<i>Cygnus cygnus</i>) [A038]</li> </ul>	condition of the bird species listed as Special Conservation Interests for the SPA	<ul style="list-style-type: none"> <li>J02.05.02 modifying structures of inland water courses (medium, outside)</li> <li>A04 grazing (low, outside)</li> <li>J02.05.02 modifying structures of inland water courses (low, inside)</li> <li>D01.04 railway lines, TGV (low, outside)</li> <li>A04 grazing (low, inside)</li> <li>A10 Restructuring agricultural land holding (low, outside)</li> <li>B01 forest planting on open ground (medium, outside)</li> <li>A08 Fertilisation (high, outside)</li> </ul>	14.4 km (cable route) 14km (site)





## 4.5 Conservation Status

According to the Habitats Directive, the *conservation status of a natural habitat* will be taken as 'favourable' within its biogeographic range when:

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

According to the Habitats Directive, the conservation status of a species means the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations. The conservation status will be taken as 'favourable' within its biogeographic range when:

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

The conservation objectives for each site are available on [www.npws.ie](http://www.npws.ie). These have been accessed for the sites listed in table 3-2 above on the 13<sup>th</sup> of May 2020.

The conservation objectives for these sites should be used in conjunction with those for the overlapping sites as appropriate.

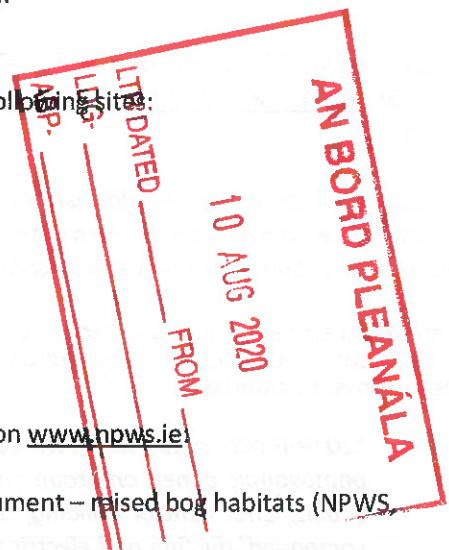
- Lough Owel SAC (000688) overlaps with Lough Owel SPA (004047);
- Lough Ennell SAC (000685) overlaps with Lough Ennell SPA (004044), and
- Garriskil Bog SAC (000679) overlaps with Garriskil Bog SPA (004102).

Detailed site-specific conservation objectives have been produced for the following sites:

- Lough Owel SAC (000688)
- Scragh Bog SAC (000692)
- Lough Ennell SAC (000685)
- Garriskil Bog SAC (000679)
- Ballymore Fen SAC (002313)

The following conservation objectives supporting documents are available on [www.npws.ie](http://www.npws.ie)

- Garriskil Bog SAC (000679) Conservation objectives supporting document – raised bog habitats (NPWS, 2015)
- Raised Bog Monitoring Project 2011 Vol. 1: Main Report (NPWS, 2012)





- Raised Bog Monitoring and assessment Survey 2013 Site Report (NPWS, 2015)
- A Survey of the Benthic Macrophytes of Three Hard-water Lakes: Lough Bunny, Lough Carra and Lough Owel

Generic conservation objectives only were available for:

- Lough Owel SPA (004047)
- Lough Ennell SPA (004044)
- Lough Iron SPA (004046)
- Lough Derravarragh SPA (004043)
- Garriskil Bog SPA (004102)
- Glen Lough SPA (004045)

Management plans were not available for any sites.

All conservation objectives together with other designated site information are available on <http://www.npws.ie/protectedsites>.

#### 4.6 Permitted/Proposed Projects in the Vicinity of the Proposed Development

In considering whether the grid connection and proposed design amendments, either on their own or in combination with other plans and projects, have the potential to affect the conservation objectives of the designated sites within 15 km of the proposed development, the following were considered:

- Previously permitted projects in the vicinity of the development
- Proposed projects in the vicinity of the development

A planning search was carried out on 13<sup>th</sup> May 2020 using the Westmeath Co. Council online planning enquiry system: (<http://www.westmeathcoco.ie/en/ourservices/planning/planningapplications/viewaplanningapplication/>).

A number of small-scale residential and agricultural developments are proposed and/or permitted within the townlands abutting the solar farm site; these projects are of a scale and nature which are highly unlikely to contribute to cumulative impacts in conjunction with the proposed development.

Ten-year permission was granted by Westmeath County Council on the 23<sup>rd</sup> of May 2017 to Grian PV Ltd. for a solar energy development located directly adjacent to the north west of the proposed site. This permitted development comprises:

*“10 year permission which will consist of a solar farm with an export capacity of 12.458MW comprising photovoltaic panels on ground mounted frames with associated infrastructure including 7no. inverter cabins, 1no. control building, 1no. customer cabin, 1no. DNO substation, temporary construction compound, ducting and electrical cabling, perimeter agricultural fencing, Mounted CCTV cameras and internal access tracks”.*



An application for ten-year permission to extend this development was approved on 26<sup>th</sup> February 2018. The extension comprises the following:

*"4.392MW extension to a planning approval solar farm (ref 17/6028). The proposed extension will comprise of photovoltaic panels on ground mounted frames with associated infrastructure including 2 no inverter cabins, temporary construction compound, ducting and electrical cabling, perimeter agricultural fencing, mounted CCTV cameras and internal access tracks."*

A direct connection to the 110kV power lines which traverse this site was the sole means of grid connection proposed for this project.

An application to fill in a part of Walshestown Fen on which afforestation has previously been attempted is currently on hold pending submission of further information. The development is framed as "restoration of lands for purposes of agricultural gain".

A number of developments characteristic of urban development such as a 28-unit housing development and various domestic and commercial projects are permitted within the townland of Irishtown where Mullingar substation is located.

An energy storage facility located directly north-west of Mullingar substation was conditionally approved on 5<sup>th</sup> February 2019. The development description is as follows:

*"10 year permission for the construction of an energy storage facility within a total site area up to 0.63 ha, to include one single storey electrical substation building, electrical transformer/inverter station modules, containerised battery storage modules on concrete support structures, access tracks, associated electrical ducting, cable racking and cabling, security fencing and CCTV security monitoring system, lightning protection poles, communications equipment and ancillary infrastructure."*

#### 4.7 Relevant European Sites and Assessment

The following sites are not in close proximity to, and not linked hydrologically to the proposed grid connection route or solar farm site, nor are they designated for mobile species which could potentially be affected by activities outside their boundaries; as such, no impacts to these sites in terms of their qualifying interests are envisaged, and therefore they do not require further consideration in relation to the proposed design amendments and grid connection. They *are* considered in terms of their potential to be impacted by the proposed cable route however, as outlined below in 3.10 Screening Matrix and Appendix 1 Finding of no Significant Effects Report.

- Lough Owel SAC (000688)
- Scragh Bog SAC (000692)
- Garriskil Bog SAC (000679)
- Ballymore Fen SAC (002313)

The solar farm site is connected hydrologically to **Lough Ree cSAC (000440)** and **Lough Ree SPA (004064)**. These sites are at a great remove (approximately 43 km downstream of the proposed development site, and outside the recommended 15km buffer radius) however, and as such do not have the potential to be affected and do not require further consideration.

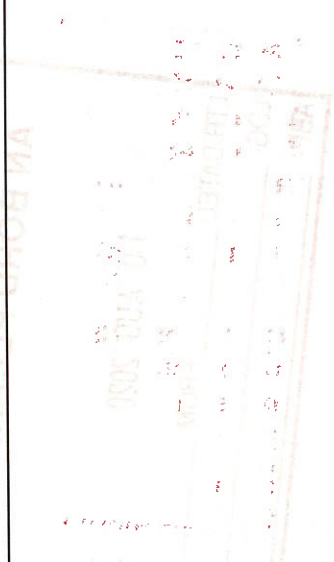
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## 4.8 Screening Assessment Criteria

Throughout this section the line items in *italics* refer to suggested instructions for information to be contained in a screening assessment, and in an appropriate assessment from the guidance document 'Assessment of Plans and Projects significantly affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC', (European Commission, 2001). The standard 'Screening Matrix' and 'Finding of No Significant Effects Report Matrix' in Annex 2 of this guidance document are also followed.

## 4.9 Screening Matrix

Assessment criteria	Discussion of potential impacts
<p><i>Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the Natura 2000 sites.</i></p> 	<p><b>Predicted Impacts:</b> <i>No individual or cumulative impacts have been identified.</i></p> <p>The proposed grid cable route does not traverse any watercourses.</p> <p>The consented solar development site, which is subject to a separate and concurrent revisions application and separate Appropriate Assessment Screening, has a remote potential hydrological connection links to Lough Ennell SAC (000685) and SPA (004044). No effects on these sites due to sedimentation or contamination are envisaged, as detailed below under <b>Emissions</b>.</p> <p>Any potential hydrological alterations, either temporary or long-term created by activities associated with the proposed solar farm development and/or cable route construction are considered to be insignificant in terms of their impact on the hydrology of Lough Ennell cSAC (000685).</p> <p>Lough Owel SPA (004047) and Lough Ennell SPA (004044) are designated for waterfowl species which are dependent on wetland/waterbody habitats and do not occur or have the potential to occur at the proposed development site. In addition, the proposed development site has never been highlighted as a particular point of interest in relation to wintering birds listed as qualifying interests for any of the designated sites under consideration (Birdwatch Ireland, 2017; Crowe, 2005). Lough Iron SPA (004046) and Lough Derravarragh SPA (004043) also include waterfowl species in their lists of qualifying interests, however their qualifying interests are not limited to this group.</p> <p>In addition to waterfowl, Lough Iron SPA (004046) is designated for Whooper Swan (<i>Cygnus cygnus</i>) [A038], Golden Plover (<i>Pluvialis apricaria</i>) [A140], Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395], while Lough Derravarragh SPA (004043) is also is designated for Whooper Swan (<i>Cygnus cygnus</i>) [A038]. Garriskil Bog SPA (004102) is designated solely for Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395], and Glen Lough SPA (site code 004045) is designated solely for Whooper Swan (<i>Cygnus cygnus</i>) [A038].</p>





Assessment criteria	Discussion of potential impacts
	<p>Whooper Swan <i>Cygnus cygnus</i> and Greenland White-fronted Goose <i>Anser albifrons flavirostris</i> are highly mobile waterbird species that could suffer ex-situ disturbance/displacement impacts as a result of the proposed development; this would only be the case if these species regularly use the proposed development site however.</p> <p>Overwintering Whooper Swan have been historically recorded in the wider area surrounding the development site (within the 10km national grid square N35 within which the proposed development lies)<sup>3</sup>, and can use lowland open farmland during winter. Such farmland sites are generally associated with inland wetland habitats that are lacking at the proposed development site however (lakes and larger rivers). While wintering Greenland White-fronted Goose can use intensively managed grassland farmland, it has not been historically recorded at or in the wider area of the development site (within 10km grid square N35)<sup>5</sup>.</p> <p>Golden Plover (<i>Pluvialis apricaria</i>) have not been recorded historically within grid square N35<sup>5</sup> (within which the proposed development site lies). This species can use farmland to forage within, however this habitat is more likely to be used during migration where alternative wetland habitats are not available; the wetland habitats within Lough Iron SPA (004046) would be used in preference.</p> <p>The proposed underground cable connection will not increase the existing collision risk for birds posed by the power lines which traverse the proposed development site as the proposed grid connection cable shall be buried.</p> <p>Japanese knotweed is unlikely be spread to nearby European sites by activities associated with the proposed grid connection installation, due to the proposed installation route being located along the centre of the road corridor. Notwithstanding the above, there is no hydrological links from the cable to nearby European sites.</p> <p>It is also noted that the species is listed on Schedule III of the 2011 European Communities (Birds and Natural Habitats) and as such it is an offense to disperse, spread or otherwise cause to grow the species in any place. And that any contractor undertaking work, in the vicinity of Knotweed will be required to carry out works in a manner which does not cause the spread of this species. The contractor will need to dispose of any soil containing 'F. japonica rhizomes' using strictly controlled methodologies and procedures to a licensed facility.</p> <p>Similarly, Spanish/hybrid bluebell (also legally restricted under Schedule II) and Snowberry will not be spread by underground cable installation activities, due to the proposed installation route being located along the centre of the road corridor.</p> <p>Otter can range over 20km in upland stream systems in search of food (Lundy, 2017); as such, there could be potential for otters residing within River Boyne And River Blackwater SAC (002299) to forage within</p>

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<sup>3</sup> <http://maps.biodiversityireland.ie>



Assessment criteria	Discussion of potential impacts
	<p>watercourses in the vicinity of the proposed underground cable route; however, the river and stream network to the east of the proposed cable route which could potentially be used as corridors by foraging otter residing within the SAC travelling eastwards is not within close proximity (&gt;1km) of the cable route .</p> <p>It is further noted that the proposed design amendments do not represent a material change in terms of potential effects on European sites, and as such the rationale under which the approved planning application (Planning Reg. Ref. 176239) was screened out is still applicable and robust.</p> <p>No impacts to any European Site are envisaged.</p> <p>The adjacent permitted 12.5MW Slanemore solar farm was “screened out” and determined not to have the potential to impact any European sites within 15km (Dunphy and Thompson, 2016).</p> <p>The infilling of a section of Walshestown Fen, if permitted, would not result in a cumulative impact due to the instream distance between Walshestown Fen and Lough Ennell SAC/SPA, the remoteness off the connection between the grid route and Walshestown fen (overland flows rather than watercourses) and the lack of potential for amounts of pollutants or contaminants arising from the proposed grid connection installation which could give rise to significant effects to be transported to Lough Ennell SAC/SPA.</p> <p>The permitted energy storage facility adjacent to Mullingar substation straddles a relatively flat ridge separating lands draining towards Lough Ennell/River Brosna to the south and Lough Owel to the north. The ESB substation and proposed grid connection lie within lands draining toward the River Brosna/Lough Ennell catchment, with c. 4.3 km between the substation/grid connection and Lough Ennell SAC/SPA, and no hydrological connections. While Lough Owel SAC/SPA is closer (1.3 km from substation), it is located in a different sub-basin from the substation, and as such does not receive surface water runoff from the area of Mullingar substation.</p> <p>Therefore, considering the distance and/or lack of hydrological connections between Mullingar substation/proposed grid connection and Lough Owel SAC/SPA and Lough Ennell SAC/SPA, no potential for effects on Lough Owel SAC/SPA and Lough Ennell SAC/SPA exists.</p> <p>Therefore, no cumulative impacts in conjunction with the adjacent permitted 12.5MW solar farm, permitted energy storage facility or proposed fen infilling are envisaged.</p>
<p><i>Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the Natura 2000 site by virtue of:</i></p>	<p><b>Size and scale, land-take and distance from Natura 2000 sites</b></p> <p><b>Predicted Impacts: None</b></p> <p>The development is relatively small-scale (consisting of the installation of solar panels and associated infrastructure within a 46-hectare site, and installation of a 5km underground grid connection cable).</p>



Assessment criteria	Discussion of potential impacts
<ul style="list-style-type: none"> <li>▪ <i>Size and scale;</i></li> <li>▪ <i>Land-take;</i></li> <li>▪ <i>Distance from Natura 2000 site or key features of the site;</i></li> <li>▪ <i>Resource requirements;</i></li> <li>▪ <i>Emissions;</i></li> <li>▪ <i>Excavation requirements;</i></li> <li>▪ <i>Transportation requirements;</i></li> <li>▪ <i>Duration of construction, operation etc.;</i></li> <li>▪ <i>Other.</i></li> </ul>	<p>No land-take from within any designated site will occur.</p> <p>The nearest European (Natura 2000) sites (Lough Owel cSAC and Lough Owel SPA) are located 1.9 km and 0.6 km from the proposed development site and cable route respectively.</p> <p><b>Resource requirements and Excavation requirements</b>  <b>Predicted Impacts: None</b></p> <p>There will be no resource requirements or excavation requirements from any European site as a result of the proposed development.</p> <p><b>Emissions</b>  <b>Potential Impacts: None</b></p> <p>The potential hydrological connection between the proposed development site and Lough Ennell cSAC (000685) and SPA (004044) is not direct (i.e. the drainage network does not connect directly to the Grange South stream (which is c. 200m south-east of the proposed development site), and the in-stream distance (5.9 km) provides adequate buffering capacity for any potential sediment or contaminant inputs.</p> <p>The proposed cable route does not cross any watercourses.</p> <p>There will be no direct emissions from the proposed development site or cable route to any European Site.</p> <p><b>Transportation requirements</b>  <b>Predicted Impacts: None</b></p> <p>There are no transportation requirements within or immediately adjacent to any European Site.</p> <p><b>Duration of Construction and Operation</b>  <b>Predicted Impacts: None.</b></p> <p>Duration of construction is 3-4 months. The duration of the operational phase will be 30 years. No impacts are envisaged on any of the European sites considered during the construction and operational periods.</p> <p><b>Cumulative impacts</b>  <b>Predicted Impacts: None.</b></p> <p>There are no likely impacts to European Sites arising from the proposed development on European Sites and therefore there is no potential for in-combination impacts with other plans and projects.</p>
<p><i>Describe any likely changes to the site arising as a result of:</i></p> <ul style="list-style-type: none"> <li>▪ <i>Reduction of habitat area;</i></li> </ul>	<p>There will be no direct or indirect reduction in habitat area or habitat fragmentation within any European site as a result of the project.</p> <p>There is no predicted impact via disturbance of key species or reduction of key species as a result of the proposed development.</p>





Assessment criteria	Discussion of potential impacts
<ul style="list-style-type: none"> <li>▪ <i>Disturbance of key species;</i></li> <li>▪ <i>Habitat or species fragmentation;</i></li> <li>▪ <i>Reduction in species density;</i></li> <li>▪ <i>Changes in key indicators of conservation value;</i></li> <li>▪ <i>Climate change.</i></li> </ul>	<p>There will be no habitat or species fragmentation as a result of the proposed development.</p> <p>There will be no reduction in species density due to the proposed development.</p> <p>There are no predicted changes in key indicators of conservation value due to the proposed project.</p> <p>The proposed solar farm would ultimately have a positive impact on climate change as it will generate renewable energy.</p>
<p><i>Describe any likely impacts on the Natura 2000 site as a whole in terms of:</i></p> <ul style="list-style-type: none"> <li>▪ <i>Interference with the key relationships that define the structure of the site;</i></li> <li>▪ <i>Interference with key relationships that define the function of the site.</i></li> </ul>	<p>There will be no impacts on the key relationships that define the structure or function of any European sites due to the proposed development.</p>
<p><i>Provide indicators of significance as a result of the identification of effects set out above in terms of:</i></p> <ul style="list-style-type: none"> <li>▪ <i>loss,</i></li> <li>▪ <i>fragmentation,</i></li> <li>▪ <i>disruption,</i></li> <li>▪ <i>disturbance,</i></li> <li>▪ <i>change to key elements of the site (e.g. water quality etc.).</i></li> </ul>	<p>N/A.</p> <p>(No effects are likely to occur; therefore, an indicator of significance is not required).</p>
<p><i>Describe from the above those elements of the project or plan, or combination of elements, where the above impacts are likely to be significant or where the scale of magnitude of impacts is not known.</i></p>	<p>There will be no significant effects on the European sites considered in this screening exercise as a result of the proposed development.</p>

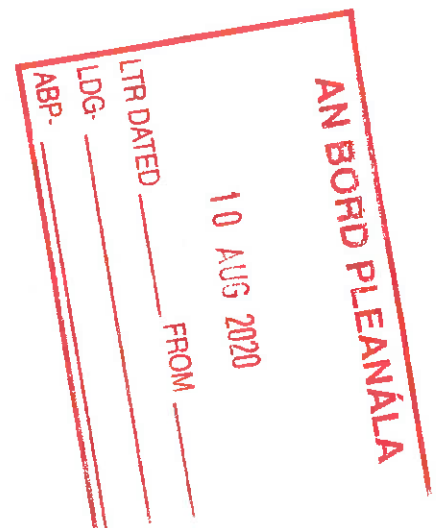




## 4.10 Stage One Screening Conclusion

It is concluded beyond reasonable scientific doubt that there are not likely to be significant effects from the project on the following European sites identified for consideration (or any other European site), either alone or in combination with other plans or projects. Therefore, these 12 European sites have been 'screened out' within the Stage 1: Appropriate Assessment Screening Report and do not require further study within a Stage 2: Natura Impact Statement:

- Lough Owel SAC (site code 000688)
- Scragh Bog SAC (site code 000692)
- Lough Ennell SAC (site code 000685)
- Garriskil Bog SAC (site code 000679)
- Ballymore Fen SAC (site code 002313)
- River Boyne And River Blackwater SAC (site code 002299)
- Lough Owel SPA (site code 004047)
- Lough Ennell SPA (site code 004044)
- Lough Iron SPA (site code 004046)
- Lough Derravarragh SPA (site code 004043)
- Garriskil Bog SPA (site code 004102)
- Glen Lough SPA (site code 004045)







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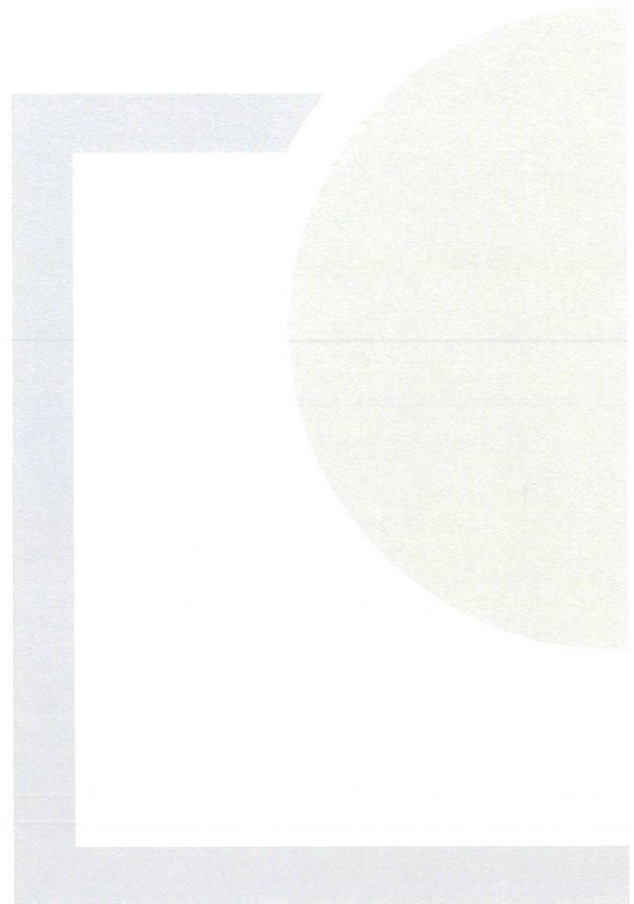


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# APPENDIX 1

Finding of No Significant  
Effects Report

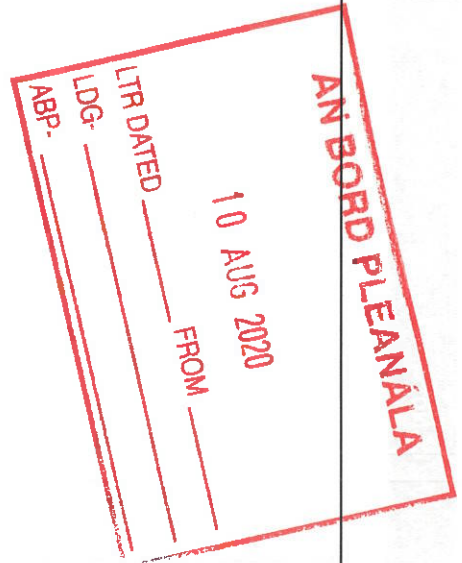




Finding of No Significant Effects Report

- Lough Owel SAC (site code 000688) is located 1.9 km to the north-east of the solar farm site and 0.6 km to the north of the proposed cable route.
- Scragh Bog SAC (site code 000692) is located 5.6 km to the north-east of the solar farm site and 4.2 km to the north-east of the proposed cable route.
- Lough Ennell cSAC (000685) is located 5 km to the south-east of the solar farm site, and approximately 3.7 km to the south of the proposed cable route.
- Garriskil Bog SAC (site code 000679) is located 11.4 km to the north of the solar farm site and 11.3 km to the north of the proposed cable route.
- Ballymore Fen SAC (site code 002313) is located 13.7 km to the south-east of the solar farm site and 14.9 km to the south-west of the proposed cable route.
- River Boyne And River Blackwater cSAC (site code 002299) is located 13.9 km to the east of the proposed cable route (and greater than 15km from the solar farm site).
- Lough Owel SPA (site code 004047) is located 1.9 km to the north-east of the solar farm site, and 0.6 km to the north of the proposed cable route.
- Lough Ennell SPA (site code 004044) is located 5 km to the south-east of the solar farm site, and 4 km to the south of the proposed cable route.
- Lough Iron SPA (site code 004046) is located 4.8 km to the north-west of the solar farm site, and 5.1 km to the north-west of the proposed cable route.
- Lough Derravarragh SPA (site code 004043) is located 11 km to the north of the solar farm site, and 9.3 km to the north of the proposed cable route.
- Garriskil Bog SPA (site code 004102) is located 11.4 km to the north of the solar farm site, and 11.3 km to the north of the proposed cable route.
- Glen Lough SPA (site code 004045) is located 14 km to the north-west of the solar farm site, and 14.4 km to the north-west of the proposed cable route.

Name and location of the Natura 2000 sites



**Design Amendment Application**

The current planning application seeks to amend the design of the approved development (Westmeath County Council Planning Reg. Ref. 176239 & An Bord Pleanála Reg. Ref. PL25M.301116) which comprises consent for the development of a ground mounted solar photovoltaic (PV) farm consisting of the following;

- Up to 139,520 m2 of solar panels on ground mounted steel frames within a site area of 46.3 hectares;
- A fenced electricity substation compound to include 1 no. electricity control building and hardstands for ancillary electrical equipment;
- 12 no. inverter/transformer stations;
- Underground cable and ducts;
- Internal access tracks and hardstanding areas;
- Boundary security fence;
- CCTV and all associated site services and works;
- 2 no. new site access points from the public road, one for construction / decommissioning traffic purposes only, and one for operational traffic;
- Ecological enhancement measures

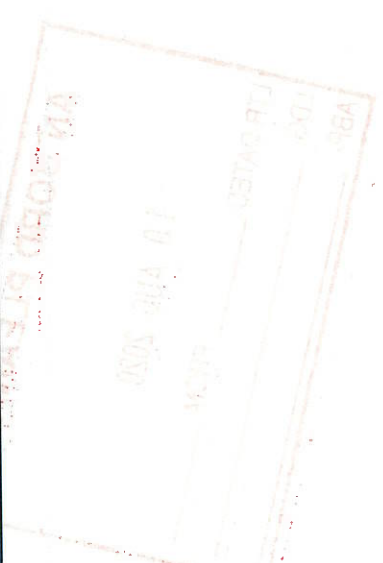
The amendments proposed are:

Optimised Solar PV panel configuration located within the same areas of the site as previously permitted with the exception of a reduced buffer distance under the existing 110kV lines from c. 56m to c. 46m, to comprise up to 252,000 sqm of solar panels to allow for solar panel array height increase from up to 2.8m to up to 3.2m;

Modifications and enlargement to the on-site substation and substation compound. The substation will increase in size from c. 55 sqm as permitted to c. 150 sqm and the substation compound will increase in size from c. 700 sqm as permitted to c. 1081 sqm;

Omission of 2 no inverter/transformer hardstanding areas and minor changes of position of hardstanding from the permitted solar development to allow for a total of 10 hardstanding areas which will provide the base for 20 no. inverter and transformer units housed in sound suppression containers;

*Description of the project or plan*





Finding of No Significant Effects Report

Permission is also sought to amend the lifespan of the consented development from 25 years to 30 years.

**Proposed Grid Connection**

The proposed grid connection is via an underground cable from the site substation to Mullingar ESNB 110kv Substation at Irishtown, Mullingar.

This will comprise an underground cable connection from the substation to the main site access, and traversing the local road to the R393, until meeting the L1801 Local road at Irishtown on the western outskirts of Mullingar. This cable length from the site substation to Mullingar Substation is approximately 5.1 km. Standard underground cabling and trenching techniques in accordance with ESNB specifications will be deployed. It is proposed to install the cable within the road carriageway. This route has been considered within the context of the Appropriate Assessment Screening report undertaken for the design amendment application and was re-surveyed to confirm the existing environment as previously described.

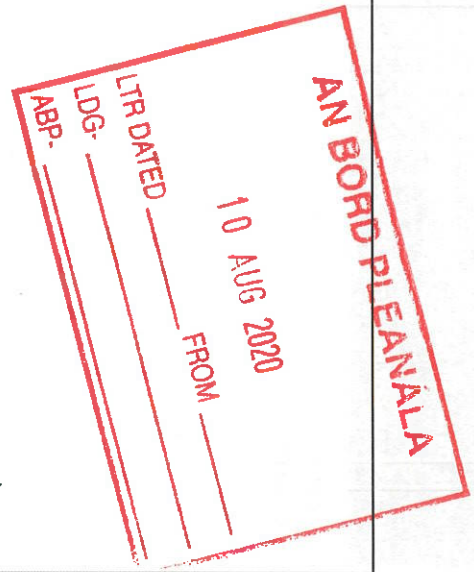
No.

*Is the Project or Plan directly connected with or necessary to the management of the site (provide details)?*

*Are there other projects or plans that together with the project of plan being assessed could affect the site (provide details)?*

The following permitted and proposed projects require consideration in terms of their potential to contribute to cumulative effects in conjunction with the proposed design amendments to Clondardis solar farm and proposed grid connection:

- Permitted 12.5MW Slanemore solar farm (inclusive of design amendments)
- Permitted Energy storage facility adjacent to Mullingar substation
- Proposed land reclamation at Walshestown Fen



Finding of No Significant Effects Report

The Assessment of Significant Effects

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

Lough Ennell SAC (site code 000685) and SPA (site code 004044) require consideration due to the possibility of a hydrological connection with the proposed development site. While no direct connection exists between the proposed development and this European site (the drainage network within the proposed development site does not connect with the Grange\_South stream, which rises 200m from the site and flows into Lough Ennell SAC and SPA 5.9km downstream), an overland downhill flow in the direction of the Grange\_South crosses a part of the access route and the proposed cable route which are within the proposed development site boundary.

Potential negative effects arising from transportation and/or construction at this point on the sole habitat (Alkaline fens [7230]) for which the SAC is designated include alterations to hydrology, sedimentation, and/or input of contaminants such as fuel or oils. The potential input of contaminants such as fuel or oils must be considered in relation to the qualifying interests of the SPA.

Lough Owel SPA (004047), Lough Ennell SPA (004044), Lough Iron SPA (004046), Lough Derravarragh SPA (004043), Garriskil Bog SPA (004102), and Glen Lough SPA (site code 004045) require consideration due to potential ex-situ effects on mobile avian species for which they are designated, primarily their potential to forage within the proposed development site.

None of the European sites under consideration have a direct hydrological connection to the proposed cable route, and the potential connection with Lough Ennell SAC (000685) and SPA (004044) is remote. As such, no impacts in this area are envisaged.

The potential for European sites within 15km of the cable route to be affected by the spread of alien invasive species (Japanese knotweed, Spanish/hybrid bluebell and snowberry) resulting from construction activities associated with the proposed cable route requires consideration.

River Boyne And River Blackwater SAC (002299) is not hydrologically connected to the proposed cable route; as such no impacts on the following qualifying interests: Alkaline fens [7230], Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, *Salicion albae*) [91E0], *Lampetra fluviatilis* (River Lamprey) [1099], or *Salmo salar* (Salmon) [1106] are considered possible.

Finding of No Significant Effects Report

The potential for *Lutra lutra* (Otter) [1355] to be impacted by construction activities associated with the proposed cable route must be considered however, in terms of disturbance.

Explain why these effects are not considered significant

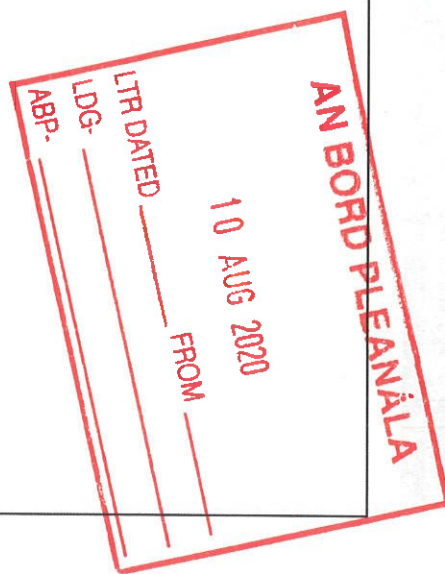
The potential hydrological connection between the proposed development site and Lough Ennell SAC (000685) and SPA (004044) is not direct (i.e. the drainage network does not connect directly to the Grange\_South stream (which is c. 200m south-east of the proposed development site), and the in-stream distance (5.9km) provides adequate buffering capacity for any potential sediment or contaminant inputs.

Any potential hydrological alterations, either temporary or long-term created by activities associated with the proposed solar farm development and/or cable route construction are considered to be insignificant in terms of their impact on the hydrology of Lough Ennell cSAC (000685).

Lough Owel SPA (004047) and Lough Ennell SPA (004044) are designated for waterfowl species which are dependent on wetland/waterbody habitats and do not occur or have the potential to occur at the proposed development site. In addition, the proposed development site has never been highlighted as a particular point of interest in relation to wintering birds that listed as interests for any of the designated sites under consideration (Birdwatch Ireland, 2020; Crowe, 2005). Lough Iron SPA (004046) and Lough Derravarragh SPA (004043) also include waterfowl species in their lists of qualifying interests, however their qualifying interests are not limited to this group.

In addition to waterfowl, Lough Iron SPA (004046) is designated for Whooper Swan (*Cygnus cygnus*) [A038], Golden Plover (*Pluvialis apricaria*) [A140], Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395], while Lough Derravarragh SPA (004043) is also designated for Whooper Swan (*Cygnus cygnus*) [A038]. Garriskil Bog SPA (004102) is designated solely for Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395], and Glen Lough SPA (site code 004045) is designated solely for or Whooper Swan (*Cygnus cygnus*) [A038].

Whooper Swan *Cygnus cygnus* and Greenland White-fronted Goose *Anser albifrons flavirostris* are highly mobile waterbird species that could suffer ex-situ disturbance/displacement impacts as a result of the proposed development; this would only be the case if these species regularly use the proposed development site however.





## Finding of No Significant Effects Report

Overwintering Whooper Swan have been historically recorded in the wider area surrounding the development site (10km national grid square N35 within which the proposed development lies)<sup>4</sup>, and can use lowland open farmland during the winter. Such farmland sites are generally associated with inland wetland habitats such as lakes and larger rivers that are lacking at the proposed development site, however. While wintering Greenland White-fronted Goose can use intensively managed grassland farmland, it has not been historically recorded at or in the wider area of the development site (within grid square N35)<sup>4</sup>.

Golden Plover (*Pluvialis apricaria*) have not been recorded historically within grid square N35<sup>4</sup> (within which the proposed development site lies). This species can use farmland to forage within, however this habitat is more likely to be used during migration where alternative wetland habitats are not available; the wetland habitats within Lough Iron SPA (004046) would be used in preference.

The proposed underground grid connection will not significantly increase the existing collision risk for birds posed by the power lines which traverse the proposed development site as the proposed grid connection cable shall be buried.

While Japanese knotweed could potentially be spread from the proposed underground cable route to nearby European sites, the location of the cable installation within the road carriageway reduces the likelihood of spread.

In addition, the fact that the species is listed on Schedule III of the 2011 European Communities (Birds and Natural Habitats) Regulations means that it is an offense to disperse, spread or otherwise cause to grow the species in any place, and that any contractor undertaking work in the vicinity of knotweed will be required to carry out works in a manner which does not cause the spread of this species, and dispose of any soil containing *F. japonica* rhizomes using strictly controlled methodologies to a licensed facility.

Spanish/hybrid bluebell and Snowberry do not have the potential to be spread by cable installation works since works will be constrained within existing roads and as such will not interact with either of these species.

<sup>4</sup> <http://maps.biodiversityireland.ie>



Otter can range over 20km in upland stream systems in search of food (Lundy, 2017); as such, there could be potential for otters residing within River Boyne And River Blackwater SAC (002299) to forage within watercourses in the vicinity of the proposed underground cable route; however, the river and stream network to the east of the proposed cable route which could potentially be used as corridors by foraging otter residing within the SAC travelling eastwards is not within close proximity (>1km) of the cable route .

No effects on any European Site are envisaged.

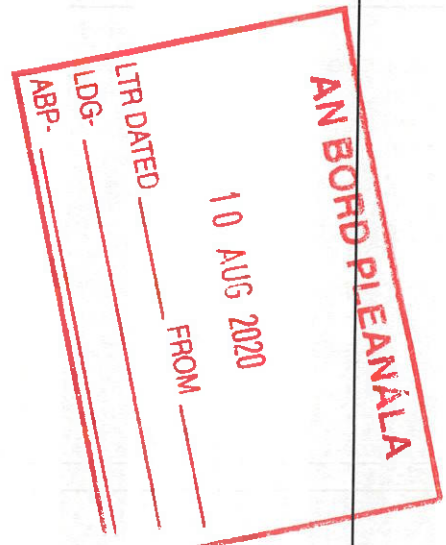
The adjacent permitted 12.5MW Slanemore solar farm was “screened out” and determined not to have the potential to impact any European sites within 15km (Dunphy and Thompson, 2016).

The infilling of a section of Walshestown Fen, if permitted, would not result in a cumulative impact due to the instream distance between Walshestown Fen and Lough Ennell SAC/SPA, the remoteness off the connection between the grid route and Walshestown fen (overland flows rather than watercourses) and the lack of potential for amounts of pollutants or contaminants arising from the proposed grid connection installation which could give rise to significant effects to be transported to Lough Ennell SAC/SPA.

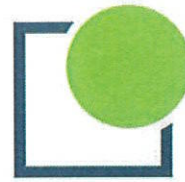
The permitted energy storage facility adjacent to Mullingar substation straddles a flat ridge separating lands draining towards Lough Ennell/River Brosna to the south and Lough Owel to the north. The ESB substation and proposed grid connection lie within lands draining toward the River Brosna/Lough Ennell, with c. 4.3 km between the substation/grid connection and Lough Ennell SAC/SPA, and no hydrological connections. While Lough Owel SAC/SPA is closer (1.3 km from substation), it is located in a different sub-basin from the substation, and as such does not receive surface water runoff from the area of Mullingar substation.

Therefore, considering the distance and/or lack of hydrological connections between Mullingar substation/proposed grid connection and Lough Owel SAC/SPA and Lough Ennell SAC/SPA, no potential for effects on Lough Owel SAC/SPA and Lough Ennell SAC/SPA or any other European site exists.

Therefore, no cumulative impacts in conjunction with the adjacent permitted 12.5MW solar farm, permitted energy storage facility or proposed fen infilling are envisaged.



Finding of No Significant Effects Report		Summary of Response	
Name of Agency or Body Consulted			
National Parks and Wildlife Service (23 <sup>rd</sup> June 2017)		None received to date.	
Inland Fisheries Ireland (23 <sup>rd</sup> June 2017)		None received to date.	
Data Collected to Carry out the Assessment			
Who carried out the assessment	Sources of Data	Level of assessment completed	Where can the full results of the assessment be accessed and viewed
This evaluation was completed by Fehily Timoney and Company	<ul style="list-style-type: none"> <li>Information on the designated nature conservation sites within 15 km of the study area was obtained from the NPWS website and metadata available online from the NPWS mapping system (<a href="http://webgis.npws.ie/npwsviewer/">http://webgis.npws.ie/npwsviewer/</a>).</li> <li>Information on the waterbody catchments in the development area was obtained from the EPA's Water Mapping Information System <a href="https://gis.epa.ie/EPAMaps/">https://gis.epa.ie/EPAMaps/</a></li> <li>OSI Aerial photography and 1:50000 mapping.</li> <li>Westmeath County Council online planning database <a href="http://www.eplanning.ie/WestmeathCC/searchexact">http://www.eplanning.ie/WestmeathCC/searchexact</a></li> <li>Data collected during site visits.</li> </ul>	Appropriate Assessment Screening	Westmeath County Council

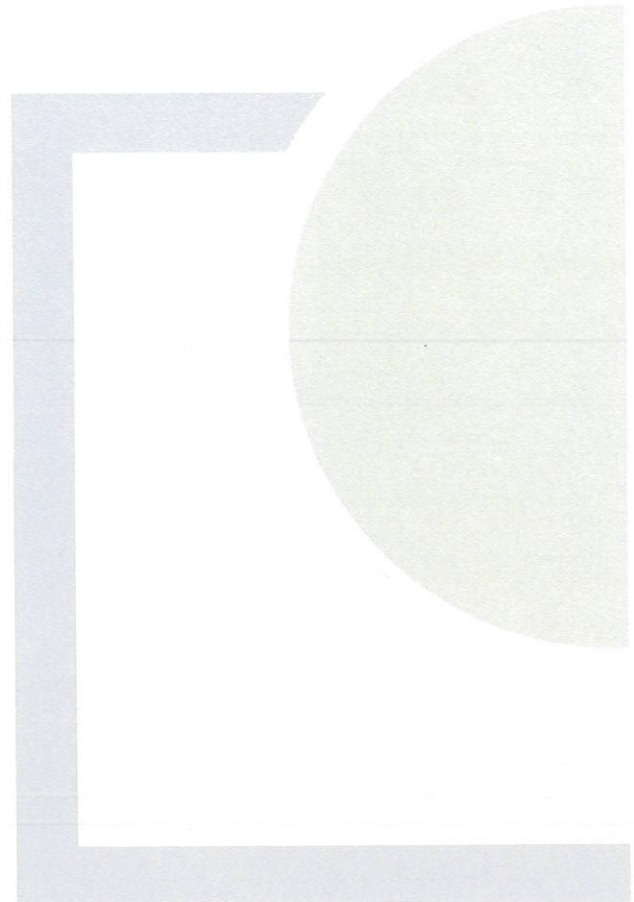


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## **APPENDIX 2**

NPWS Site Synopses for the  
Natura 2000 Sites within  
15km of the Proposed  
Development







## SITE SYNOPSIS

**SITE NAME: GARRISKIL BOG SPA**

**SITE CODE: 004102**

Garriskil Bog SPA, a raised bog, is located 3 km west of Lough Derravaragh and 3 km east of Rathowen in Co. Westmeath. It is bounded to the south-east and south-west by the rivers Inny and Riffey. The bog is underlain by calcareous shales with a low permeability. A substantial area of uncut high bog remains though much of this is classified as degraded raised bog. Old cutaway bog surrounds the high bog and parts of this are dominated by Downy Birch (*Betula pubescens*) scrub.

At the time this site was designated as a Special Protection Area (SPA) it was known to be utilised by part of an internationally important population of Greenland White-fronted Goose centred around the midland lakes. The geese appear to have abandoned these peatland sites in favour of grassland sites elsewhere. Greenland White-fronted Goose is regarded as a special conservation interest for this SPA.

The site is within the range of the midland lakes Greenland White-fronted Goose flock, which is centred on four major lakes (Derravaragh, Iron, Owel and Ennell). The last record of Greenland White-fronted Goose at this site was in 1986/87 (43 individuals).

The site is within the breeding territory of a pair of Merlin. Nesting probably occurs outside of the site boundary, with the bog being used primarily as a foraging area.

Several wader species breed within the site – Snipe (an estimated 5 pairs), Curlew (2-3 pairs) and Redshank (2 pairs). Barn Owl has been recorded hunting along the margins of the bog, while Red Grouse is considered to occur occasionally.



24.4.2012

The first part of the report covers the period from 1997 to 1998. It details the various activities and projects undertaken during this time, including the implementation of the new system and the completion of the major projects. The results of these activities are discussed in detail, and the progress made towards the objectives of the plan is outlined.

The second part of the report covers the period from 1998 to 1999. It details the various activities and projects undertaken during this time, including the implementation of the new system and the completion of the major projects. The results of these activities are discussed in detail, and the progress made towards the objectives of the plan is outlined.

The third part of the report covers the period from 1999 to 2000. It details the various activities and projects undertaken during this time, including the implementation of the new system and the completion of the major projects. The results of these activities are discussed in detail, and the progress made towards the objectives of the plan is outlined.

The fourth part of the report covers the period from 2000 to 2001. It details the various activities and projects undertaken during this time, including the implementation of the new system and the completion of the major projects. The results of these activities are discussed in detail, and the progress made towards the objectives of the plan is outlined.

The fifth part of the report covers the period from 2001 to 2002. It details the various activities and projects undertaken during this time, including the implementation of the new system and the completion of the major projects. The results of these activities are discussed in detail, and the progress made towards the objectives of the plan is outlined.

AN BORD PLEANÁLA

1997-1998

1999-2000

2001-2002

2003-2004

2005-2006

2007-2008

2009-2010

2011-2012

2013-2014

2015-2016

2017-2018

2019-2020

2021-2022

2023-2024

2025-2026

2027-2028

2029-2030

## SITE SYNOPSIS

**SITE NAME: LOUGH OWEL SPA**

**SITE CODE: 004047**

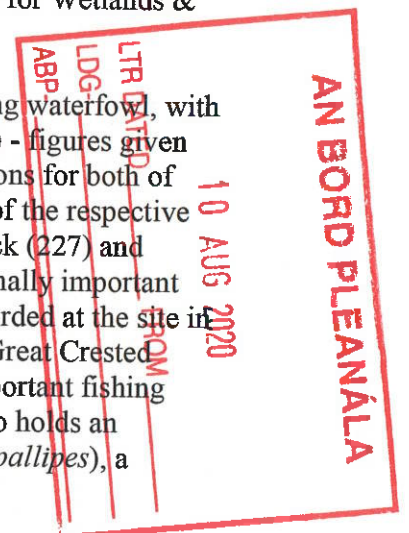
Lough Owel is a medium- to large-sized lake in Co. Westmeath, with a length of *c.* 6 km along its long axis and a maximum width of 3 km. It is fed by a number of small streams and the main outflow is to the Royal Canal. Water is relatively shallow, with a maximum depth of 22 m. Overlying Carboniferous limestone, Lough Owel is one of the most important examples of a limestone lake in the Midlands. The water is moderately hard, alkaline and virtually colourless. The lake appears to be relatively unproductive with low levels of orthophosphate and moderate chlorophyll concentrations. The lake is classified as a mesotrophic system and its status has been stable in recent years.

Aquatic vegetation includes a number of stoneworts (*Chara* spp., notably *C. demodata* and *C. tomentosa* which are Red Data Book species). The rocky nature of the shoreline has given rise to marginal vegetation which is patchy and sparse. Apart from some reedswamp formed by Common Reed (*Phragmites australis*) and Common Clubrush (*Scirpus lacustris*), shoreline vegetation is dominated by occasional patches of Alder (*Alnus glutinosa*). Areas of marsh and fen occur above the shoreline in the northern and south-western corners of the lake. Several small islands occur in the southern sector.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Shoveler and Coot. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetlands & Waterbirds.

Lough Owel is one of the most important Midland lakes for wintering waterfowl, with nationally important populations of Shoveler (142) and Coot (1,825) - figures given are mean peaks for the five seasons 1995/96-1999/00. The populations for both of these species represent a significant proportion (*c.* 4.7% and 6.5%) of the respective All-Ireland totals. The lake is utilised by Pochard (291), Tufted Duck (227) and Goldeneye (75). The lake has been used as a roost by the internationally important Midland lakes Greenland White-fronted Goose population (200 recorded at the site in 2004/05). The lake also supports populations of Little Grebe (16), Great Crested Grebe (18) and Cormorant (32). Lough Owel is one of the most important fishing lakes in the Midlands and is especially good for Trout. The lake also holds an important population of White-clawed Crayfish (*Austropotamobius pallipes*), a species that is listed on Annex II of the E.U. Habitats Directive.

Lough Owel supports nationally important populations of two species, Shoveler and Coot. It is also notable as it is used as a roost site on occasion by the internationally important Midlands Greenland White-fronted Goose flock. Greenland White-fronted



Goose is listed on Annex I of the E.U. Birds Directive. Lough Owel is a Ramsar Convention site.

AN BORD PLEANÁLA
10 AUG 2014
CLP DATED
FROM
TO
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7.7.2014



## SITE SYNOPSIS

**SITE NAME: LOUGH IRON SPA**

**SITE CODE: 004046**

Lough Iron is a small- to moderately-sized midland lake, located some 12 km north-west of Mullingar. It is situated on the Inny River, which flows from Lough Derravaragh approximately 5 km to the north-east. Lough Owel occurs a few kilometres to the south-east and is connected to Lough Iron by a small stream. The underlying geology is limestone and the lake is mesotrophic in character.

The dominant wetland plant species along the margins of the lake are Canary Reed-grass (*Phalaris arundinacea*) and Purple Moor-grass (*Molinia caerulea*), the latter species forming large expanses of wet grassland.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Whooper Swan, Greenland White-fronted Goose, Wigeon, Teal, Shoveler, Coot and Golden Plover. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

Lough Iron is of international importance as a site for wintering waterfowl. It is a traditional haunt for the internationally important Midland lakes Greenland White-fronted Goose flock (426 - five year mean peak between 1994/95 and 1998/99). The site also supports an internationally important population of Whooper Swan (214) and nationally important numbers of Wigeon (1,229), Teal (759), Shoveler (164), Coot (293) and Golden Plover (2,200) - all figures are five year mean peaks for the period 1995/96 to 1999/2000).

Lough Iron SPA is of high ornithological importance, primarily for supporting internationally important populations of Whooper Swan and Greenland White-fronted Goose. The site also holds a notable diversity of other waterfowl, including dabbling duck, diving duck and waders. It is of note that three of the species which regularly occur, Greenland White-fronted Goose, Whooper Swan and Golden Plover, are listed on Annex I of the E.U. Birds Directive. Lough Iron is a Ramsar Convention site and a Wildfowl Sanctuary.

7.7.2014



## SITE SYNOPSIS

**SITE NAME: GLEN LOUGH SPA**

**SITE CODE: 004045**

Glen Lough is situated about 5 km north-west of Lough Iron on the border of Co. Westmeath and Co. Longford. Extensive drainage in the 1960s has resulted in a dramatic drop in the watertable here, with the result that there is now little open water, except during flooding in the winter months. Sedge-dominated freshwater marsh now occupies the majority of what was once open water. Plant species present include Bottle Sedge (*Carex rostrata*), Water Horsetail (*Equisetum fluviatile*) and Canary Reed-grass (*Phalaris arundinacea*). Other habitats present include reedswamp, wet and dry grassland, cutaway bog colonised by heath vegetation, scrub and wet willow (*Salix* spp.) woodland.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Whooper Swan.

An internationally important Whooper Swan population uses the site at times. This flock (mean peak of 327 individuals for the 5 seasons 1995/96-1999/2000) also uses Lough Iron and a range of grassland feeding areas in the vicinity. At times, the site is visited by part of the internationally important Midland lakes Greenland White-fronted Goose population, although numbers are low (17). Dabbling ducks are well represented, but in relatively low numbers, and include such species as Wigeon (81), Teal (69), Mallard (46), Pintail (7) and Shoveler (23). Lapwing (189) is also found in the area (all figures are mean peaks for the 5 seasons 1995/96-1999/2000).

Whilst this site attracts a range of wintering waterfowl, the principal ornithological interest lies in the internationally important Whooper Swan population that is based in the area. Whooper Swan is of particular note as it is listed on Annex I of the E.U. Birds Directive. Greenland White-fronted Goose, nowadays an occasional visitor to the site, is also listed on Annex I of this Directive. The site provides useful habitat for Shoveler, which in Ireland is a fairly localised species. Glen Lough is a Ramsar Convention site.



7.7.2014





## SITE SYNOPSIS

**SITE NAME: LOUGH ENNELL SPA**

**SITE CODE: 004044**

Lough Ennell is a large, limestone lake located south of Mullingar in Co. Westmeath. It has a length of approximately 6.5 km along its long axis and is mostly about 2 km wide. The River Brosna is the principal inflowing and outflowing river. It is a relatively shallow lake, with a maximum depth of c. 30 m. The water is hard, with low colour and markedly alkaline pH. The lake is classified as a mesotrophic system though it has been eutrophic in the past. The lake bottom is of limestone with a marl deposit.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Pochard, Tufted Duck and Coot. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

Lough Ennell is one of the most important Midland lakes for wintering waterfowl, with nationally important populations of Pochard (738), Tufted Duck (1,303) and Coot (433) - all figures are mean peaks for the 5 winters 1995/96-1999/2000. The population of Tufted Duck represents over 3% of the all-Ireland population. The site is also utilised by an internationally important population of non-migratory Mute Swan (340). Other species which occur include Golden Plover (1,000 in 1998/99), Lapwing (673), Mallard (93), Little Grebe (30), Great Crested Grebe (24) and Goldeneye (22).

Lough Ennell is of ornithological significance for wintering waterfowl, with three migratory species having populations of national importance. The occurrence of Golden Plover in the vicinity of the lake is of note as this species is listed on Annex I of the E.U. Birds Directive. Lough Ennell is a Ramsar Convention Site.



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## SITE SYNOPSIS

**SITE NAME: LOUGH DERRAVARAGH SPA**

**SITE CODE: 0004043**

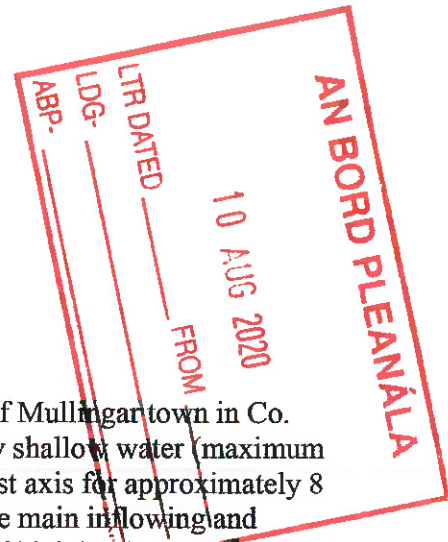
Lough Derravaragh is located approximately 12 km north of Mullingar town in Co. Westmeath. It is a medium- to large-sized lake of relatively shallow water (maximum depth 23 m). The lake extends along a south-east/north-west axis for approximately 8 km. The Inny River, a tributary of the River Shannon, is the main inflowing and outflowing river. It is a typical limestone lake with water of high hardness and alkaline pH, and is classified as a mesotrophic system.

At the western end of the lake are extensive areas of swamp dominated by Common Reed (*Phragmites australis*). Elsewhere along the shore there is freshwater marsh vegetation dominated by sedges (*Carex* spp.) and tussock-forming grasses such as Tufted Hair-grass (*Deschampsia cespitosa*) and fescues (*Festuca* spp.), with a range of flowering herbs. The lakeshore is a mineral-rich substrate and several plant species of fen habitats occur in abundance, such as Black Bog-rush (*Schoenus nigricans*) and Long-stalked Yellow-sedge (*Carex lepidocarpa*). Deciduous woodland fringes the lake in some areas.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Whooper Swan, Pochard, Tufted Duck and Coot. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

Lough Derravaragh is one of the most important midland lakes for wintering waterfowl. It supports nationally important populations of Whooper Swan (102), Pochard (3,129), Tufted Duck (1,073) and Coot (1,358) - all counts are mean peaks for the five winters 1995/96-1999/2000. The Pochard population is of particular note as it represents over 6% of the all-Ireland population total, and at times has exceeded the threshold for international importance (i.e. 3,500). Other species which occur include Mute Swan (159), Little Grebe (42) Great Crested Grebe (34), Cormorant (34), Wigeon (207), Teal (52), Mallard (195), Pintail (6), Shoveler (12), Goldeneye (46), Golden Plover (158) and Lapwing (1,079). The lake is occasionally used as a roost site by small numbers of Greenland White-fronted Goose.

Lough Derravaragh is of major ornithological importance as it regularly supports nationally important populations of four species, and at times is used by the internationally important population of Greenland White-fronted Goose which is based in the region. Also of note is that three of the species which occur at the site, Greenland White-fronted Goose, Whooper Swan and Golden Plover, are listed on Annex I of the E.U. Birds Directive. Lough Derravaragh is a Ramsar Convention site.



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**Site Name: Ballymore Fen SAC**

**Site Code: 002313**

Ballymore Fen lies approximately 17 km west of Mullingar adjacent to the Mullingar to Ballymore road (R390) in Co. Westmeath. The geology of the area is Carboniferous Limestone. The site occupies a relatively wide and deep depression in the surrounding drift which is fed on both the east and west by springs. The area may at one stage have been a lake of some size but at present is occupied by a transition mire complex with a characteristic lagg fen at the edges.

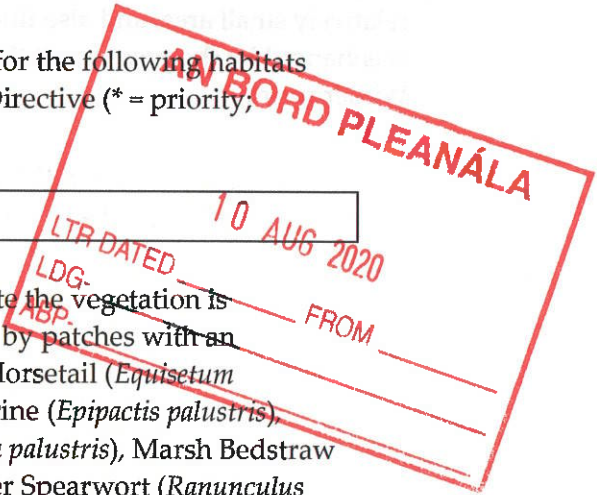
The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (\* = priority; numbers in brackets are Natura 2000 codes):

[7140] Transition Mires

In the wetter areas towards the centre and south of this site the vegetation is characterised by a scraw (i.e. floating vegetation) typified by patches with an abundance of Bogbean (*Menyanthes trifoliata*) and Water Horsetail (*Equisetum fluviatile*). Other associated plants include Marsh Helleborine (*Epipactis palustris*), Water Mint (*Mentha aquatica*), Marsh Cinquefoil (*Potentilla palustris*), Marsh Bedstraw (*Galium palustre*), Wild Angelica (*Angelica sylvestris*), Lesser Spearwort (*Ranunculus flammula*) and sedges (*Carex* spp.). In slightly drier areas and on old banks are willow (*Salix* sp.) saplings, with occasional Ash (*Fraxinus excelsior*), and ferns such as Regal Fern (*Osmunda regalis*) and Broad Buckler-fern (*Dryopteris dilatata*). Where there is flowing water Lesser Water-parsnip (*Berula erecta*) occurs.

At the edge of the wetter area, particularly at the east of the site, a gradation to Black Bog-rush (*Schoenus nigricans*) dominated fen occurs. Willow saplings with some Purple Moor-grass (*Molinia caerulea*) and bog moss hummocks (*Sphagnum* spp.) are found throughout. Between the hummocks, abundant Round-leaved Wintergreen (*Pyrola rotundifolia*), a Red Data Book species, occurs with species typically found in such conditions. The bryophyte communities are of considerable interest.

On the slopes surrounding the fen is a mosaic of improved, semi-improved and species-rich calcareous grasslands lightly grazed by cattle. Plant species present on the slopes at the east include Common Spotted-orchid (*Dactylorhiza fuchsii*), Quaking-grass (*Brizia media*), Common Knapweed (*Centaurea nigra*), Oxeye Daisy (*Leucanthemum vulgare*), Crested Hair-grass (*Koeleria macrantha*), Common Bird's-foot-trefoil (*Lotus corniculatus*), Ribwort Plantain (*Plantago lanceolata*) and Cat's-ear (*Hypochoeris radicata*).



Associated with drains and flowing streams throughout the site are the 10-spined Stickleback, along with the Common Frog and Smooth Newt. Five species of dragonfly and damselfly were recorded on the wing: Brown Hawker (*Aeshna grandis*), Common Hawker (*Aeshna juncea*), Keeled Skimmer (*Orthethrum coerulescens*), Azure damselfly (*Coenagrion puella*) and Variable damselfly (*Coenagrion pulchellum*).

Parts of the site have been cut for turf in the past, as evidenced by parallel heather covered ridges and banks. Peat cutting has not occurred for a long time – confirmed by a local landowner. Regeneration of vegetation is occurring in these areas and the ground underfoot is very wet and soft.

Ballymore Fen is interesting due to the overall variety of habitats and species in a relatively small area, and also due to the richness of the transition mire/scraw which is enhanced by the presence of the Red Data Book species Round-leaved Wintergreen.



**Site Name: River Boyne and River Blackwater SAC**

**Site Code: 002299**

This site comprises the freshwater element of the River Boyne as far as the Boyne Aqueduct, the Blackwater as far as Lough Ramor and the Boyne tributaries including the Deel, Stoneyford and Tremblestown Rivers. These riverine stretches drain a considerable area of Meath and Westmeath, and smaller areas of Cavan and Louth. The underlying geology is Carboniferous Limestone for the most part, with areas of Upper, Lower and Middle well represented. In the vicinity of Kells Silurian Quartzite is present while close to Trim are Carboniferous Shales and Sandstones. There are many large towns adjacent to but not within the site, including Slane, Navan, Kells, Trim, Athboy and Ballivor.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (\* = priority; numbers in brackets are Natura 2000 codes):

[7230] Alkaline Fens
[91E0] Alluvial Forests*
[1099] River Lamprey ( <i>Lampetra fluviatilis</i> )
[1106] Atlantic Salmon ( <i>Salmo salar</i> )
[1355] Otter ( <i>Lutra lutra</i> )

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The main areas of alkaline fen in this site are concentrated in the vicinity of Lough Shesk, Freehan Lough and Newtown Lough. The hummocky nature of the local terrain produces frequent springs and seepages which are rich in lime. A series of base-rich marshes have developed in the poorly-drained hollows, generally linked with these three lakes. Open water is usually fringed by Bulrush (*Typha latifolia*), Common Club-rush (*Scirpus lacustris*) or Common Reed (*Phragmites australis*), and this last species also extends shorewards where a dense stand of Great Fen-sedge (*Cladium mariscus*) frequently occurs. This in turn grades into a sedge and grass community (*Carex* spp. and Purple Moor-grass, *Molinia caerulea*), or one dominated by Black Bog-rush (*Schoenus nigricans*). An alternative aquatic/terrestrial transition is a floating layer of vegetation. This is normally based on Bogbean (*Menyanthes trifoliata*) and Marsh Cinquefoil (*Potentilla palustris*). Other species gradually become established on this cover, especially plants tolerant of low nutrient status e.g. bog mosses (*Sphagnum* spp.). Diversity of plant and animal life is high in the fen and the flora includes many rarities. Plants of interest include Narrow-leaved Marsh-orchid (*Dactylorhiza traunsteineri*), Fen Bedstraw (*Galium uliginosum*), Cowbane (*Cicuta virosa*), Frogbit (*Hydrocharis morsus-ranae*) and Least Bur-reed (*Sparganium minimum*). These species tend to be restricted in their distribution in Ireland. Also notable is the

abundance of aquatic stoneworts (*Chara* spp.) which are characteristic of calcareous wetlands.

The rare plant Round-leaved Wintergreen (*Pyrola rotundifolia*) occurs around Newtown Lough. This species is listed in the Red Data Book and this site represents its only occurrence in Co. Meath.

Wet woodland fringes many stretches of the Boyne. The Boyne River Islands are a small chain of three islands situated 2.5 km west of Drogheda. The islands were formed by the build-up of alluvial sediment in this part of the river where water movement is sluggish. All of the islands are covered by dense thickets of wet, willow (*Salix* spp.) woodland, with the following species occurring: Osier (*S. viminalis*), Crack Willow (*S. fragilis*), White Willow (*S. alba*), Purple Willow (*Salix purpurea*) and Rusty Willow (*S. cinerea* subsp. *oleifolia*). A small area of Alder (*Alnus glutinosa*) woodland is found on soft ground at the edge of the canal in the north-western section of the islands. Along other stretches of the rivers of the site Rusty Willow scrub and pockets of wet woodland dominated by Alder have become established, particularly at the river edge of mature deciduous woodland. Ash (*Fraxinus excelsior*) and Downy Birch (*Betula pubescens*) are common in the latter, and the ground flora is typical of wet woodland with Meadowsweet (*Filipendula ulmaria*), Wild Angelica (*Angelica sylvestris*), Yellow Iris (*Iris pseudacorus*), horsetails (*Equisetum* spp.) and occasional tussocks of Greater Tussock-sedge (*Carex paniculata*).

The dominant habitat along the edges of the river is freshwater marsh, and the following plant species occur commonly in these areas: Yellow Iris, Creeping Bent (*Agrostis stolonifera*), Canary Reed-grass (*Phalaris arundinacea*), Marsh Bedstraw (*Galium palustre*), Water Mint (*Mentha aquatica*) and Water Forget-me-not (*Myosotis scorpioides*). In the wetter areas Common Meadow-rue (*Thalictrum flavum*) is found. In the vicinity of Dowth, Fen Bedstraw (*Galium uliginosum*), a scarce species mainly confined to marshy areas in the midlands, is common in this vegetation. Swamp Meadow-grass (*Poa palustris*) is an introduced plant which has spread into the wild (naturalised) along the Boyne approximately 5 km south-west of Slane. It is a rare species which is listed in the Red Data Book and has been recorded among freshwater marsh vegetation on the banks of the Boyne in this site. The only other record for this species in the Republic of Ireland is from a site in Co. Monaghan.

The secondary habitat associated with the marsh is wet grassland and species such as Tall Fescue (*Festuca arundinacea*), Silverweed (*Potentilla anserina*), Creeping Buttercup (*Ranunculus repens*), Meadowsweet and Meadow Vetchling (*Lathyrus pratensis*) are well represented. Strawberry Clover (*Trifolium fragiferum*), a plant generally restricted to coastal locations in Ireland, has been recorded from wet grassland vegetation at Trim. At Rosnaree river bank on the River Boyne, Round-Fruited Rush (*Juncus compressus*) is found in alluvial pasture, which is generally periodically flooded during the winter months. This rare plant is only found in three counties in Ireland.

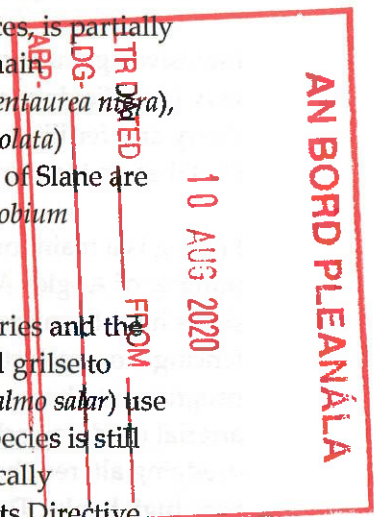


Along much of the Boyne and along tributary stretches are found areas of mature deciduous woodland on the steeper slopes above the floodplain marsh or wet woodland vegetation. Many of these are planted in origin. However the steeper areas of King Williams Glen and Townley Hall wood have been left unmanaged and now have a more natural character. East of Curley Hole the woodland has a natural appearance with few conifers. Broadleaved species include oaks (*Quercus* spp.), Ash, willows, Hazel (*Corylus avellana*), Sycamore (*Acer pseudoplatanus*), Holly (*Ilex aquifolium*), Horse-chestnut (*Aesculus hippocastanum*) and the shrubs Hawthorn (*Crataegus monogyna*), Blackthorn (*Prunus spinosa*) and Elder (*Sambucus nigra*). South-west of Slane and in Dowth, some more exotic tree species such as Beech (*Fagus sylvatica*), and occasionally Lime (*Tilia cordata*), are seen. The coniferous trees Larch (*Larix* sp.) and Scots Pine (*Pinus sylvestris*) also occur. The woodland ground flora includes Barren Strawberry (*Potentilla sterilis*), Enchanter's-nightshade (*Circaea lutetiana*) and Ground-ivy (*Glechoma hederacea*), along with a range of ferns. Variation occurs in the composition of the canopy - for example, in wet patches alongside the river, White Willow and Alder form the canopy.

Other habitats present along the Boyne and Blackwater include lowland dry grassland, improved grassland, reedswamp, weedy waste ground, scrub, hedge, drainage ditch and canal. In the vicinity of Lough Shesk, the dry slopes of the morainic hummocks support grassland vegetation which, in some places, is partially colonised by Gorse (*Ulex europaeus*) scrub. Those grasslands which remain unimproved for pasture are species-rich, with Common Knapweed (*Centaurea nigra*), Creeping Thistle (*Cirsium arvense*) and Ribwort Plantain (*Plantago lanceolata*) commonly present. Fringing the canal alongside the Boyne south-west of Slane are areas with Reed Sweet-grass (*Glyceria maxima*), Great Willowherb (*Epilobium hirsutum*) and Meadowsweet.

The Boyne and its tributaries form one of Ireland's premier game fisheries and the area offers a wide range of angling, from fishing for spring salmon and grilse to seatrout fishing and extensive brown trout fishing. Atlantic Salmon (*Salmo salar*) use the tributaries and headwaters as spawning grounds. Although this species is still fished commercially in Ireland, it is considered to be endangered or locally threatened elsewhere in Europe and is listed on Annex II of the Habitats Directive. Atlantic Salmon run the Boyne almost every month of the year. The Boyne is most important as it represents an eastern river which holds large three-sea-winter fish from 20-30 lb. These fish generally arrive in February, with smaller spring fish (10 lb) arriving in April/May. The grilse come in July, water permitting. The river gets a further run of fish in late August and this run would appear to last well after the fishing season. The salmon fishing season lasts from 1<sup>st</sup> March to 30<sup>th</sup> September.

The Blackwater is a medium sized limestone river which is still recovering from the effects of the arterial drainage scheme of the 1970s. Salmon stocks have not recovered to the numbers that existed pre-drainage. The Deel, Riverstown, Stoneyford and Tremblestown Rivers are all spring-fed, with a continuous high volume of water. They are difficult to fish because some areas are overgrown, while others have been affected by drainage with resultant high banks.



This site is also important for the populations of two other species listed on Annex II of the E.U. Habitats Directive which it supports, namely River Lamprey (*Lampetra fluviatilis*), which is present in the lower reaches of the Boyne River, and Otter (*Lutra lutra*), which can be found throughout the site. In addition, the site also supports many more of the mammal species occurring in Ireland. Those which are listed in the Irish Red Data Book include Pine Marten, Badger and Irish Hare. Common Frog, another Red Data Book species, also occurs within the site. All of these animals, with the addition of the Stoat and Red Squirrel, which also occur within the site, are protected under the Wildlife Act, 1976.

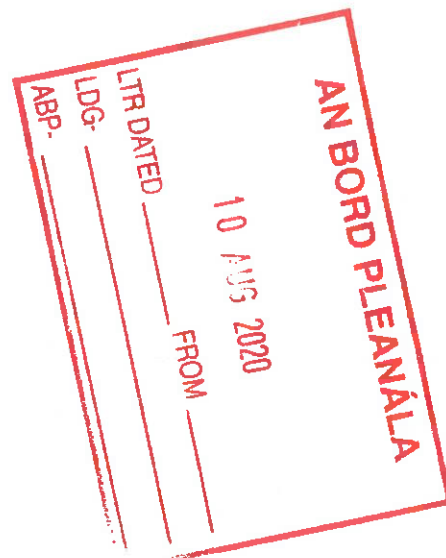
Whooper Swans winter regularly at several locations along the Boyne and Blackwater Rivers. Known sites are at Newgrange (approx. 20 in recent winters), near Slane (20+ in recent winters), Wilkinstown (several records of 100+) and River Blackwater from Kells to Navan (104 at Kells in winter 1996/97, 182 at Headfort in winter 1997/98, 200-300 in winter 1999/00). The available information indicates that there is a regular wintering population of Whooper Swans based along the Boyne and Blackwater River valleys. The birds use a range of feeding sites but roosting sites are not well known. The population is substantial, certainly of national, and at times international, importance. Numbers are probably in the low hundreds.

Intensive agriculture is the main land use along the site. Much of the grassland is in very large fields and is improved. Silage harvesting is carried out. The spreading of slurry and fertiliser poses a threat to the water quality of this salmonid river and to the lakes. In the more extensive agricultural areas sheep grazing is carried out.

Fishing is a main tourist attraction on the Boyne and Blackwater and there are a number of Angler Associations, some with a number of beats. Fishing stands and styles have been erected in places. The Eastern Regional Fishery Board have erected fencing along selected stretches of the river as part of their salmonid enhancement programme. Parts of the river system have been arterially dredged. In 1969 an arterial dredging scheme commenced and disrupted angling for 18 years. The dredging altered the character of the river completely and resulted in many areas in very high banks. The main channel from Drogheda upstream to Navan was left untouched, as were a few stretches on the Blackwater. Ongoing maintenance dredging is carried out along stretches of the river system where the gradient is low. This is extremely destructive to salmonid habitat in the area. Drainage of the adjacent river systems also impacts on the many small wetland areas throughout the site. The River Boyne is a designated Salmonid Water under the E.U. Freshwater Fish Directive.

The site supports populations of several species listed on Annex II of the E.U. Habitats Directive, and habitats listed on Annex I of this Directive, as well as examples of other important habitat types. Although the wet woodland areas appear small there are few similar examples of this type of alluvial wet woodland remaining in the country, particularly in the north-east. The semi-natural habitats, particularly the strips of woodland which extend along the river banks, and the marsh and wet

grasslands, increase the overall habitat diversity and add to the ecological value of the site, as does the presence of a range of Red Data Book plant and animal species and the presence of nationally rare plant species.









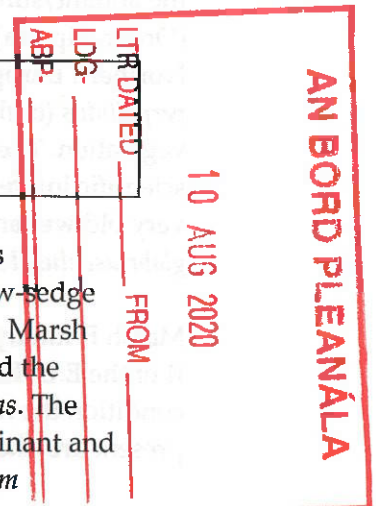
**Site Name: Scragh Bog SAC**

**Site Code: 000692**

Scragh Bog lies approximately 10 km north-west of Mullingar, Co. Westmeath. This site comprises a wet transition fen with a floating root mat which has developed in a small oval-shaped depression. The fen is fed by weak surface springs and drains by an artificially defined outlet. The fen becomes open carr in the central area and in places grades into ombrotrophic bog.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (\* = priority; numbers in brackets are Natura 2000 codes):

[7140] Transition Mires
[7230] Alkaline Fens
[1393] Slender Green Feather-moss ( <i>Drepanocladus vernicosus</i> )



Most of the fen vegetation at the site belongs to two broad types. The first is dominated by Black Bog-rush (*Schoenus nigricans*), with Long-stalked Yellow-sedge (*Carex lepidocarpa*), Narrow-leaved Marsh-orchid (*Dactylorhiza traunsteineri*), Marsh Arrowgrass (*Triglochin palustris*), Grass-of-parnassus (*Parnassia palustris*) and the following mosses: *Campyllum stellatum*, *Scorpidium scorpioides* and *S. revolvens*. The second type is quaking fen in which Slender Sedge (*Carex lasiocarpa*) is dominant and is associated with Bogbean (*Menyanthes trifoliata*), Water Horsetail (*Equisetum fluviatile*), Long-stalked Yellow-sedge and the moss species *Scorpidium revolvens*, *Bryum pseudotriquetrum* and *Cinclidium stygium*. Slender Cottongrass (*Eriophorum gracile*), a protected species which is also rare in Europe, occurs in this vegetation type. It is listed in the Flora (Protection) Order, 2015. A third category of fen vegetation is dominated by large sedges, such as Fibrous Tussock-sedge (*Carex appropinquata*).

The fen carr is dominated by willows (*Salix* spp.), including the rare Grey Willow (*Salix cinerea* subsp. *cinerea*) and by Downy Birch (*Betula pubescens*). Round-leaved Wintergreen (*Pyrola rotundifolia*), a Red Data Book species, is found in this vegetation type.

Other rare plants found at the site include Slender Green Feather-moss (*Drepanocladus vernicosus*), a moss listed on Annex II of the E.U. Habitats Directive, and the arctic-alpine moss *Tomentypnum nitens*.

The embryonic raised bog communities contain species such as Bog-sedge (*Carex limosa*), Slender Sedge, Cross-leaved Heath (*Erica tetralix*), Round-leaved Sundew

(*Drosera rotundifolia*), Cranberry (*Vaccinium oxycoccos*), and a number of mosses, such as *Aulacomnium palustre*, *Sphagnum subnitens* and *S. contortum*.

The remaining terrestrial vegetation types (apart from some planted coniferous forestry at the southern end) are two grassland communities: the first is a tall meadow community in which Meadowsweet (*Filipendula ulmaria*) is dominant; the second is characterised by Purple Moor-grass (*Molinia caerulea*) and Devil's-bit Scabious (*Succisa pratensis*).

Two aquatic communities are also found: one is free-floating, in which Common Duckweed (*Lemna minor*) is prominent; and the other is a submerged community of stoneworts (*Chara* spp.).

The site also supports a uniquely complete fauna of transition mire invertebrates, including a number of species which are extremely rare in Northern Europe. Among the aquatic/subaquatic insects, *Chrysops sepulchralis* (Order Diptera), *Tetanocera freyi* (Order Diptera) and *Coenagrion lunulatum* (Order Odonata) provide examples of rare Northern European species. Two other flies *Acrometopia wahlbergi* and *Platycheirus perpallidus* (both Order Diptera) are rare species more closely associated with mire vegetation. The fen carr also has its own complement of associated invertebrates of scientific interest. Three flightless beetles (Order Coleoptera), which are indicative of very old wetlands, have also been identified from Scragh Bog - *Hydroporus glabriusculus*, *H. scalesianus* and *Laccornis oblongus*.

Marsh Fritillary (*Euphydryas aurinia*, Order Lepidoptera), a butterfly listed on Annex II of the E.U. Habitats Directive, has been recorded from the site, but in its present condition the habitat is only marginally suitable for the species and any populations present are likely to be intermittent, small and short-lived.

Most of the site is managed as a Nature Reserve. The outflow stream is included in the site, since interference with this outflow could damage the site hydrology. A small section at the bottom of a field to the south is also included - this area supports a species-rich marsh/wet grassland vegetation. As well as being vulnerable to interference with its hydrology, Scragh Bog is also susceptible to eutrophication as a result of agricultural run-off from the surrounding land.

Scragh Bog contains excellent examples of two habitats listed on Annex I of the E.U. Habitats Directive - alkaline fen and transition mire. These habitats support a number of rare plants, notably *Drepanocladus vernicosus*, and also play host to a well developed invertebrate fauna.



Site Name: Lough Owel SAC

Site Code: 000688

Lough Owel is a large hard water lake located approximately 4 km north-west of Mullingar in Co. Westmeath. It is a relatively shallow lake with a rocky, marl-covered bottom.

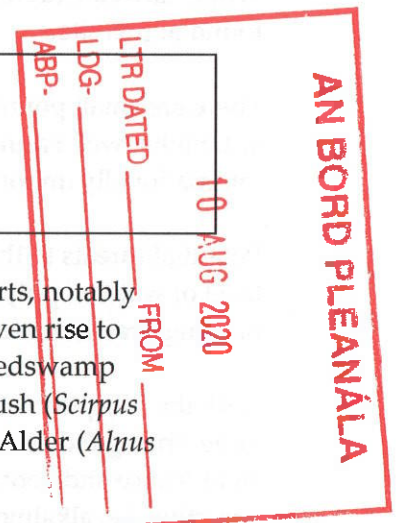
The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (\* = priority; numbers in brackets are Natura 2000 codes):

[3140] Hard Water Lakes
[7140] Transition Mires
[7230] Alkaline Fens
[1092] White-clawed Crayfish ( <i>Austropotamobius pallipes</i> )

Submerged vegetation at Lough Owel includes a number of stoneworts, notably *Chara rudis* and *C. tomentosa*. The rocky nature of the shoreline has given rise to marginal vegetation which is patchy and sparse. Apart from some reeds/wamp formed by Common Reed (*Phragmites australis*) and Common Club-rush (*Scirpus lacustris*), shoreline vegetation is dominated by occasional patches of Alder (*Alnus glutinosa*).

Two areas of wetland vegetation of particular interest occur at the north-west (Bunbrosna) and south-west (Tullaghan) of the lake. These areas contain a mosaic of vegetation types of varying degrees of wetness, with quaking bog, alkaline fen, wet grassland and wet woodland all present. At the waters edge there is often a fringe of vegetation dominated by Bottle Sedge (*Carex rostrata*) and Lesser Water-parsnip (*Berula erecta*), and at times, Common Spike-rush (*Eleocharis palustris*). Common Reed also occurs. This vegetation type grades into areas dominated by Lesser Tussock-sedge (*C. diandra*), and in places Common Cottongrass (*Eriophorum angustifolium*) and Purple Moor-grass (*Molinia caerulea*) also occur. Downy Birch (*Betula pubescens*), Rusty Willow (*Salix cinerea* subsp. *oleifolia*) and Alder are common invading tree species in the quaking areas. Some of the so-called brown mosses, indicative of alkaline conditions, such as *Drepanocladus revolvens*, have been recorded at this site.

In places the quaking mire grades into alkaline fen. Some characteristic species such as Black Bog-rush (*Schoenus nigricans*) and Long-stalked Yellow-sedge (*C. lepidocarpa*) occur, as well as brown fen mosses. Scarce fen species have been recorded here, including Fen Bedstraw (*Galium uliginosum*) and Marsh Fern (*Thelypteris palustris*).



The Bunbrosna wetland area contains a number of rare plant species, namely Marsh Pea (*Lathyrus palustris*), Marsh Fern and Round-leaved Wintergreen (*Pyrola rotundifolia*). In addition, four other rare plant species are found along the lake margins - White Sedge (*C. curta*), Fibrous Tussock-sedge (*C. appropinquata*), Marsh Stitchwort (*Stellaria palustris*) and Frogbit (*Hydrocharis morsus-ranae*). Tullaghan fen hosts the uncommon Bog-sedge (*C. limosa*), Fibrous Tussock-sedge and Marsh Fern.

Lough Owel is one of the most important fishing lakes in the midlands and is especially good for Trout. Scharff's Char (*Salvelinus scharffi*), a distinct race of char which was once found only in Lough Owel and Lough Ennell, is now thought to be extinct. Notable invertebrates recorded from the lake include three caddis fly (Order Trichoptera) species: *Tinodes maculicornis*, *Metatype fragilis* and *Limnephilus nigriceps*.

White-clawed Crayfish, a species listed in Annex II of the E.U. Habitats Directive, is found at this site.

There are small populations of Mallard, Shoveler, Pochard and Tufted Duck present at Lough Owel. Farmland adjacent to the lake provides feeding grounds for internationally important numbers of Greenland White-fronted Goose.

Potential threats to the conservation interest of Lough Owel include the increasing level of water supply to Mullingar, overfishing, eutrophication caused by local farming practices and pressure from amenity uses such as boating and fishing.

With the exception of Lough Carra in Co. Mayo, Lough Owel is the best example of a large, spring-fed calcareous lake in the country. The site is of major conservation significance and contains three habitats that are listed on Annex I of the E.U. Habitats Directive, i.e. alkaline fens, transition mires and hard water lakes. Additionally, the site supports bird populations of conservation significance.





**Site Name: Lough Ennell SAC**

**Site Code: 000685**

Lough Ennell is a large, open, steep-sided lake, located 3 km south of Mullingar in Co. Westmeath. The lake bottom is of limestone with a marl deposit. The water is markedly alkaline and mesotrophic, possibly owing to effluents received from Mullingar town and to fertilizer inputs from farmland surrounding the lake. The River Brosna flows into the lake from the north at Butler's Bridge, and out from the south.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (\* = priority; numbers in brackets are Natura 2000 codes):

[7230] Alkaline Fens
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Lough Ennell supports a diverse aquatic flora. Seven stonewort species have been identified, including two Red Data Book species, *Chara denudata* and *C. tomentosa*.

Much of the lakeshore consists of dry, stony ground colonised by calcareous grassland. These areas were formerly part of the lake bed but are now exposed as a consequence of drainage. Species such as Mountain Everlasting (*Antennaria dioica*), Hairy Lady's-mantle (*Alchemilla filicaulis* subsp. *vestita*), Frog Orchid (*Coeloglossum viride*), Fairy Flax (*Linum catharticum*) and Yellow-wort (*Blackstonia perfoliata*) occur here.

Alkaline fen is also found on the lake shore, with species such as Grass-of-parnassus (*Parnassia palustris*), Marsh Pennywort (*Hydrocotyle vulgaris*) and Bottle Sedge (*Carex rostrata*). In wet marshy patches along the shore Marsh-marigold (*Caltha palustris*), Brookweed (*Samolus valerandi*) and Lesser Water-plantain (*Baldellia ranunculoides*) are common.

Reedbeds and species-poor swamp vegetation fringe the lake in places, particularly around the points of inflow and outflow, and on the eastern shore around Tudenham Park. Common Reed (*Phragmites australis*) is abundant here. Water-plantain (*Alisma plantago-aquatica*), Cowbane (*Cicuta virosa*), Frogbit (*Hydrocharis morsus-ranae*) and Tufted-sedge (*Carex elata*) also occur. The latter two species are of note in that they have restricted distributions in Ireland. The rare Fibrous Tussock-sedge (*Carex appropinquata*) has also been recorded from this site.

Mixed woodland of Beech (*Fagus sylvatica*), Ash (*Fraxinus excelsior*) and Downy Birch (*Betula pubescens*) fringes the lakeshore to the north-west. Bluebell (*Hyacinthoides non-*

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*scripta*) and Lords-and-ladies (*Arum maculatum*) are among the woodland ground flora.

Yellow Archangel (*Lamiastrum galeobdolon*), a rare plant listed in the Red Data Book, has been recorded in the woods along the eastern shores of Lough Ennell. This is the only record for this species outside the south-east of Ireland.

The rare Myxomycete fungus, *Licea castanea*, has been recorded from woodland in the site. A species of blue-green alga (*Schizothrix fasciculata*), which forms little pebbles of lime that are cast up on the lakeshore, occurs in Lough Ennell and has not been recorded elsewhere in Ireland.

Scharff's Char (*Salvelinus scharffi*), a distinct race of char which was once found only in Lough Owel and Lough Ennell, is now thought to be extinct. Notable aquatic invertebrates recorded from the lake include *Tinodes maculicornis* (Order Trichoptera), *Metalyte fragilis* (Order Trichoptera), *Limnephilus nigriceps* (Order Trichoptera), *Picromerus bidens* (Order Heteroptera), *Monarthia humili* (Order Hemiptera) and *Donacia obscura* (Order Coleoptera).

This site shares an internationally important Greenland White-fronted Goose flock with Loughs Iron, Glen and Owel. The numbers of geese which visit Lough Ennell are lower than for the other lakes: 91 birds (3 year average peak). Nationally important bird populations which have been recorded on Lough Ennell are: Cormorant (average peak 149; absolute maximum 448); Mute Swan (average peak 424); Pochard (average peak 889; maximum 2,600 on 8/11/85); Tufted Duck (average peak 720) and Coot (average peak 639). All of these data were compiled from counts made over 3 seasons, 1984/85 - 1986/87. A single count of 522 Golden Plover was obtained in that period, constituting a regionally important population.

Lough Ennell is an important amenity area, much used for fishing, boating and camping. Sections of the shoreline are managed for visitor access and amenity. The chemical composition of effluent from the Mullingar sewage treatment plant has a significant impact on the water quality of Lough Ennell. The mid-1970s saw the introduction of treatment of the sewage to reduce phosphates, with a resulting improvement in water quality (according to data compiled during 1987-90). However, levels of planktonic algal growth in the lake water continue to fluctuate, in response to the variable efficiency of the phosphate removal facility at the sewage treatment plant and the re-mobilization of phosphate from the lake sediments.

Lough Ennell is of significance as a highly productive lake which supports a rich variety of lower plant and invertebrate species. Its lakeshore habitats, which include alkaline fen, a habitat listed on Annex I of the E.U. Habitats Directive, support a diverse flora. These habitats also provide important refuges for wildfowl.



**Site Name: Garriskil Bog SAC**

**Site Code: 000679**

Garriskil Bog SAC consists of two areas of raised bog: Garriskil Bog, which covers 324.81 ha and lies 3 km east of Rathowen in Co. Westmeath; and a small outlier, within the townland of Derrya, which covers 22.9 ha and lies 2.2 km to the east on the northern shore of Lough Derravaragh. Both bogs are remnants of the large river floodplain bogs which developed where the River Inny enters and leaves Lough Derravaragh. Garriskil Bog is bounded to the south-east and south-west by the rivers Inny and Riffey and by the Dublin-Sligo railway line to the north. It is considered an exceptional example of a midland raised bog and includes 170.26 ha of uncut raised bog and 154.55 ha of surrounding areas which includes 109 ha of cutover bog. The section at Derrya (which comprises part of Lough Derravaragh Bog NHA (site code 000684)) has been restored as part of an EU LIFE project. The site consists of 2.5 ha of high bog and 20.4 ha of cutover, all of which, except for a broadleaf woodland fringe along the River Inny, was afforested in the 1970s. All the conifer plantations were recently clear-felled and restored by drain-blocking. It is bordered by open high bog to the north-east, by the River Inny to the west and by cutover bog grading into Lough Derravaragh to the south-east. The bedrock geology of both sites is carboniferous limestone.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (\* = priority; numbers in brackets are Natura 2000 codes):

[7110] Raised Bog (Active)*
[7120] Degraded Raised Bog
[7150] Rhynchosporion Vegetation

Active Raised Bog (ARB) habitat comprises areas of high bog that are wet and actively peat-forming, where the percentage cover of bog mosses (*Sphagnum* spp.) is high, and where some or all of the following features occur: hummocks, pools, wet flats, *Sphagnum* lawns, flushes and soaks. Degraded Raised Bog (DRB) habitat corresponds to those areas of high bog whose hydrology has been adversely affected by peat cutting, drainage and other land use activities, but which are capable of regeneration to ARB within 30 years. The Rhynchosporion habitat occurs in wet depressions, pool edges and erosion channels where the vegetation includes White Beak-sedge (*Rhynchospora alba*) and/or Brown Beak-sedge (*R. fusca*), and at least some of the following associated species, Bog Asphodel (*Narthecium ossifragum*), sundews (*Drosera* spp.), Deergrass (*Scirpus cespitosus*) and Carnation Sedge (*Carex panicea*).



Garriskil Bog is a large raised bog with 51.7% of the original bog still present. It contains a large, wet high quality central core of active raised bog which comprises approximately 50.87 ha (30%) of the uncut high bog area. There are extensive, well developed systems of pools and hummocks present. The bog mosses *Sphagnum imbricatum*, *S. fuscum* and the moss *Leucobryum glaucum* are important components of the hummocks, which are frequently crowned by the moss *Racomitrium lanuginosum* and sometimes colonised by Bilberry (*Vaccinium myrtillus*). The numerous areas of inter-connecting pools are mostly dominated by Rhynchosporion vegetation which forms floating rafts on the water surface. Typical plant species present include the bog mosses *Sphagnum cuspidatum* (generally dominant) and *S. auriculatum*, the liverwort *Cladopodiella fluitans*, White Beak-sedge, Bogbean (*Menyanthes trifoliata*), bladderworts (*Utricularia* spp.), Common Cottongrass (*Eriophorum angustifolium*) and Great Sundew (*Drosera anglica*). Brown Beak-sedge, a sedge species considered to be rare on a national basis, is present in some of the bog pools. The areas between the pools support occasional wet and quaking lawns of White Beak-sedge, as well as Bog Asphodel.

The vegetation of the rest of the high bog, including the DRB, tends to be dominated by Heather (*Calluna vulgaris*), Deergrass, Bog Asphodel, cottongrasses (*Eriophorum vaginatum* and *E. angustifolium*) and Cross-leaved Heath (*Erica tetralix*). The distribution and relative abundance of these species varies with peat wetness. *Sphagnum* cover is generally less than 30%. In these drier areas the cover of the lichen *Cladonia portentosa* can be locally high. Outside the ARB area, pool complexes are rare and where they do occur they tend to be dominated by shallow open water or algal mats. Small areas of Rhynchosporion vegetation also occur here, however the habitat is, in general, not well developed outside the ARB area. In a number of places the high bog is being invaded by Downy Birch (*Betula pubescens*) and pines. Often the pines are associated with small flushes dominated by species such as Purple Moor-grass (*Molinia caerulea*), Soft Rush (*Juncus effusus*), Bramble (*Rubus fruticosus* agg.) and Heather.

The large areas of old cutover bog provides an additional habitat where Purple Moor-grass and Heather dominate, along with cottongrasses, while in some parts Downy Birch woodland is developing. Along the north-east margin of the high bog a narrow band of fen-grassland occurs.

Past drainage of the bog, associated with arterial drainage of the Inny and Riffey rivers and peat cutting, has unfavourably impacted on the site and led to widespread subsidence and drying out. The northern area of the site was also affected in the 1990s by intensive surface drainage which directly affected the area of ARB reducing it from 71.23 ha to 45.12 ha. Those drains were blocked by NPWS in the late 1990s and by 2014 the area of ARB had increased by 5.75 ha to 50.87 ha. There has been no turf cutting since the 1990s and though burning has caused damage in the past, there has been no severe fire in recent years.

The outlier bog at Derrya comprises a part of Lough Derravaragh Bog NHA. Lough Derravaragh Bog is a remnant of a larger area of bog much of which has now been



cutover and reclaimed for forestry and agriculture with only 48 ha (approximately 40%) of high bog remaining. A small area of Active Raised Bog habitat is present and, based on hydrological modelling, an area of 2.1 ha is considered to be Degraded Raised Bog habitat. In Derrya Bog both the high bog and cutover were planted with a closed canopy plantation of Sitka Spruce (*Picea sitchensis*) in the 1970s. This conifer plantation was clear-felled in 2011 and the drains were blocked with peat dams in 2013. As a consequence, water-levels have risen and some raised bog vegetation has returned to the wetter areas of the high bog. These areas contain Ling Heather, Hare's-tail Cottongrass (*Eriophorum vaginatum*), Bilberry, Purple Moor-grass and Tormentil (*Potentilla erecta*) with the bog moss *Sphagnum palustre* and, in the wet drains, *Sphagnum fallax*. There is some scattered Birch and Sitka Spruce regenerating and these are being controlled. On the cutover bog, once the plantations were clear-felled, the ground layer became dominated by the moss *Hypnum jutlandicum*, with Bracken, Bramble, Holly (*Ilex aquifolium*), Ivy (*Herdera helix*), Bilberry, Creeping Bent-grass (*Agrostis stolonifera*), Tufted Hair-grass (*Deschampsia cespitosa*), Creeping Buttercup (*Ranunculus repens*), Meadow-sweet (*Filipendula ulmaria*), Soft Rush, Honeysuckle (*Lonicera periclymenum*) and scattered Birch. There is some Lodgepole Pine (*Pinus contorta*) regeneration, which is being controlled. Most of this area will develop into dry native broadleaf woodland but 4.5 ha may be wet enough to support wet woodland conditions.

A draft restoration plan has been developed for Garriskil Bog to help meet the national conservation objectives for raised bogs. One of the key objectives of that plan is to restore the area of ARB to 84.9 ha. The area of ARB was reported as 50.9 ha during the latest monitoring survey (2014) and it has been concluded that there is 31.6 ha of Degraded Raised Bog (DRB) on the high bog which can be restored to ARB with the appropriate restoration measures. There is also long-term potential for 2.4 ha of bog peat-forming habitats (BPFH) to develop if restoration measures are undertaken on cutover areas. Such detailed objectives have yet to be developed for the Derrya Bog subsite of the SAC but will be produced as part of the restoration plan for the Lough Derravaragh Bog NHA site. Current information suggests that up to 4.5 ha of cutaway could rewet sufficiently to support wet native woodland. Derrya Bog is being actively managed for conservation by the landowner, Coillte, as part of an EU LIFE Project and most of the required restoration measures have already been carried out. An After LIFE management plan is being developed by Coillte for the future conservation management of that part of the SAC and its conservation management should support the retention and redevelopment of Active Raised Bog habitat within Lough Derravaragh Bog NHA.

Garriskil Bog SAC is a site of considerable conservation significance comprising two subsites, Garriskil Bog and Derrya Bog which contain raised bog, a rare habitat in the E.U. and one that is becoming increasingly scarce and under threat in Ireland. It contains good examples, covering significant areas, of the E.U. Habitats Directive Annex I habitats Active Raised Bog, Degraded Raised Bog (which is being restored to the priority Annex 1 habitat Active raised bog), and Depressions on peat substrates (Rhynchosporion). The site already supports a large area of high quality raised bog microhabitats, which is unusual for a site in the east Midlands, including some very

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well developed hummock/hollow complexes and has a large area with the potential for restoration to ARB. Although the Derrya Bog subsite of the SAC is small (22.3 ha) and lacks annex habitats it has been restored and has the potential to support the retention of ARB and the restoration of DRB to ARB in Lough Derravaragh Bog NHA. Ireland has a high proportion of the total E.U. resource of Atlantic raised bog (over 50%) and so has a special responsibility for its conservation at an international level.



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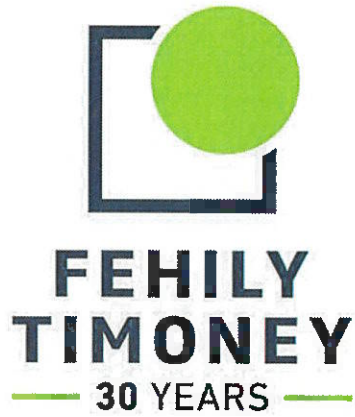
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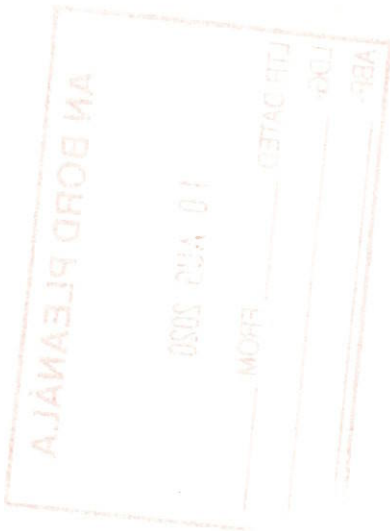
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