Derryadd, Derryarogue and Lough Bannow Bogs – Application for Substitute Consent Flood Risk Assessment

Bord na Móna

**BUILT ON KNOWLEDGE** 

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### 1. INTRODUCTION

TOBIN was appointed by Bord Na Móna to undertake a Stage 1 Flood Risk Assessment (FRA) as part of the remedial Environmental Impact Assessment Report (rEIAR) for a planning application for Substitute Consent, regarding historical peat extraction that occurred at the Derryadd, Derryaroge and Lough Bannow bogs (herein known as 'the Application Site') within the Mountdillon Bog Group in Co. Longford. The Application Site is located approximately 1 km east of Lanesborough in County Longford as shown in Figure 1.1 and comprises an area of approximately 2,244 ha.

There are a number of watercourses in the vicinity of the Application Site. The Ballynakill Stream flows along the eastern Derryadd and Lough Bannow Bog boundaries, and the Rappareehill stream flows along the western boundary of Derryadd bog. The Derrygeel stream flows through Derryadd bog and the Kilnacarrow stream flows through the Derryaroge bog. The River Shannon is located to the northeast of the Derryaroge site.

Referring to Section 2.21 of '*The Planning System and Flood Risk Management Guidelines*', in reference to the flood risk assessment process:

"A staged approach should be adopted, carrying out only such appraisal and or assessment as is needed for the purposes of decision-making at the regional, development and local area plan levels, and also at the site-specific level."

This report comprises a Stage 1 'Flood risk identification' whereby the purpose of this report is to " *to identify whether there may be any flooding or surface water management issues related to a development site that may warrant further investigation at the planning application level.*"



#### Figure 1-1: Site Location



### 1.1 PROJECT PHASES

### 1.1.1 Peat Extraction Phase (1988 – July 2019)

During the Peat Extraction Phase, the deepening and maintenance of drainage channels continued beyond 1988, up until the cessation of peat extraction in 2019. As the areas subject to peat extraction from 1988 to 2019 reduced in their extent (refer to Figures 4-13 to 4-18 of Chapter 4 (Project Description), rEIAR) and the depth of peat available was subsequently reducing, the extent and number of drains requiring deepening and maintenance reduced accordingly.

Machinery used for drainage works would have been largely the same as that described in Section 4.4.2 with ever-improving engine efficiency in tractors and excavators.

Drainage construction methodologies are described in Chapter 4, Sections 4.4.2, 4.4.3.1 and 4.4.3.2 of the rEIAR.

#### Derryaroge Bog\_

In 1988 milled peat extraction was continuing in northern and western sections of Derryaroge Bog. As previously discussed, Derryaroge Bog was the only bog unit within the Application Site which was subject to sod peat extraction. Sod peat extraction ceased in 1984, and works to convert the drainage infrastructure from sod peat drainage (as described in Section 4.4.3.1 of the rEIAR) to milled peat drainage (as described in Section 4.4.3.2 of the rEIAR) commenced. It is not clear from records or aerial imagery when milled peat extraction commenced in the former sod peat extraction areas of Derryaroge, but aerial imagery indicates that by 1995, milled peat drainage had replaced sod peat drainage in Derryaroge, with milled peat extraction underway by that time. It is assumed that areas of sod peat drainage in Derryaroge Bog had been fully converted to milled peat drainage, with milled peat extraction underway in those areas by 1988. By 2004, only the northern and western side of Derryaroge remained subject to peat extraction. At the point of the cessation of peat extraction 2019, only a part of the southern extent of the bog was subject to peat extraction. By the end of the Peat Extraction Phase in July 2019, 12 no. pumps (with 4 no. decommissioned), 9 no. silt ponds and 10 no. surface water emission points were in place, all of which remain in situ today. Of the 12 no. pumps, 11 no. were installed pre-1988 (4 no. of these are now decommissioned), with 1 no. pump installed between 1988 and 1995. Of the 9 no. silt ponds installed at Derryaroge Bog, 6 no. were installed pre-1988, and 3 no. installed between 1988 and 1995. All 10 no. surface water emission points were in place pre-1988.

#### Derryadd Bog

Drainage was fully inserted in Derryadd Bog by 1988, with the full extent of the drained area subject to milled peat extraction. Between 1995 and 2004, peat extraction ceased in some areas in the centre of the bog and revegetation began to occur. At the point of the cessation of peat extraction in July 2019, peat extraction was occurring near the east and west boundaries, with extraction also occurring a in portion of northeast corner of Derryadd bog. There are 6 no. pumps located in Derryadd Bog; at least 3 no. of which were installed and operational pre-1988, with the installation of the remaining 3 no. pumps unknown. There are 5 no. silt ponds, 2 no. of which were installed pre-1988, were installed pre-1988, were installed pre-1988, which were installed pre-1988, were installed p



with the remaining 3 no. installed between 1988 and 1995. There are 5 no. surface water emission points, all of which were in place pre-1988.

### Lough Bannow Bog

Drainage was fully inserted in Lough Bannow bog by 1988, with the full extent of the drained area subject to milled peat extraction. By 1995, peat extraction had ceased on the western side of the bog, and by 2004, extraction had also ceased on the eastern side of the bog. The areas subject to peat extraction gradually reduced in Lough Bannow bog between 2004 and 2019, and at the point of the cessation of peat extraction in July 2019, only areas on the northeastern southern boundaries were subject to peat extraction. There are 3 no. pumps on Lough Bannow Bog; the installation dates of these pumps are unknown. There are 5 no. silt ponds, 3 no. of which were installed between 1988 and 1995. The installation date of the remaining 2 no. silt ponds is unknown. There are 4 no. surface water emission points in place on Lough Bannow bog, all of which were in place pre-1988.

### Silt Ponds

Upgrades to silt ponds were undertaken at the Application Site following a 1990 survey undertaken by Bord na Móna which involved a daily sampling and analysis programme at different locations in the Bord na Móna landholdings (including the Mountdillon Bog Group) over a full calendar year to determine the quantity of silt within the run-off from bogs. The study (a copy of which is included in Appendix 4.7 of the rEIAR) determined that an average of 50m3 of sludge per hectare (20m3 per acre) was typically discharged. Following this, the silt ponds were designed to cater for the settling of sufficient amounts of silt providing the ponds were de-sludged at least twice per annum. A second pond was installed adjacent to the first to facilitate de-sludging (i.e., used as a backup when the first pond reached silt storage capacity and underwent de-sludging).

Condition 6 of the IPC Licence (which is included in Appendix 4.1 of the rEIAR) details the requirements for Bord na Móna to implement a programme to ensure all drainage water from all boglands is discharged via an appropriately designed silt pond treatment arrangement, that an operational procedure for de-silting was prepared and that desilting is carried out twice per year. The silt arising from the de-silting operations was either stockpiled a distance from drains and the silt pond or placed back out onto the extraction fields. Up until the cessation of peat extraction, this material would then have been incorporated into the subsequent harvests.

### 1.1.2 Current Phase (July 2019 to Present Day)

In January 2021, Bord na Móna formally announced that peat extraction across all bogs within its landholding had ceased, although peat extraction at the Application Site had ceased prior to this in July 2019. The Application Site still operates under the requirements of IPC Licence P0504-01, and any decommissioning works undertaken with respect to peat extraction activities and all ancillary works are in accordance with Condition 10 of the IPC Licence, which states that that:

*"10.1: Following termination of use or involvement of all or part of the site in the licensed activity, the licensee shall:* 



10.1.1: Decommission, render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution."

In compliance with Condition 10.1 of the IPC Licence, it is a requirement of the licensee to decommission the Application Site by removing/disposing/recovering buildings, equipment, waste etc. from the Application Site. The main criteria pertaining to successfully complying with this condition is ensuring that the Application Site is not causing or likely to cause environmental pollution and the site of the activity is in a satisfactory state such that licenced lands can be deemed suitable for surrender of the IPC License under Section 95 of the EPA Acts. This is achieved by Bord na Móna identifying and quantifying any mechanical and infrastructural resources that were installed in the bog to enable the development and extraction operation at the Application Site. This list is then refined to identify any items that would be deemed as possibly resulting in environmental pollution, should they not be removed.

Typically, these items/infrastructures would be any remaining, unconsolidated plant, equipment and attachments, waste materials, unused raw materials such as land drainage pipes, remaining peat stockpiles, stockpile covering, pumps, septic tanks and fuel tanks. Ongoing decommissioning at the Application Site included removal of peat stockpiles which was completed in November 2022, as well as decommissioning of other infrastructure, which is to follow at a later date, outlined in Chapter 4, Table 4-5 of the rEIAR. As outlined in Chapter 4 Section 4.4.5.7 of the rEIAR, approximately 37 km of permanent rail track was located within the Application Site boundary. To date 1 km of permanent rail has been decommissioned and removed in the south of Lough Bannow Bog. The remaining 36 km of rail track will be decommissioning activities are detailed for each of the three bogs within the Application Site in Appendix 4.3 of the rEIAR.

### 1.1.3 Remedial Phase

Following the conclusion of the decommissioning activities, Bord na Móna are required under Condition 10.2 of the IPC Licence to prepare (to the satisfaction of the EPA) and implement, a Cutaway Bog Rehabilitation Plan. Condition 10.2 of the Licence states:

"Condition 10.2: Cutaway Bog Rehabilitation Plan:

- 10.2.1: The licensee shall prepare, to the satisfaction of the Agency, a fully detailed and costed plan for permanent rehabilitation of the cutaway boglands within the licensed area. This plan shall be submitted to the Agency for agreement within eighteen months of the date of grant of this licence.
- 10.2.2: The plan shall be reviewed every two years and proposed amendments thereto notified to the Agency for agreement as part of the AER. No amendments may be implemented without the written agreement of the Agency.

Condition 10.3: The Rehabilitation Plan shall include as a minimum, the following:

- 10.3.1: A scope statement for the plan, to include outcome of consultations with relevant Agencies, Authorities and affected parties (to be identified by the licensee).
- 10.3.2: The criteria which define the successful rehabilitation of the activity or part thereof, which ensures minimum impact to the environment.
- 10.3.3: A programme to achieve the stated criteria.
- 10.3.4: Where relevant, a test programme to demonstrate the successful implementation of the rehabilitation plan.



• 10.3.5: A programme for aftercare and maintenance.

Condition 10.4: A final validation report to include a certificate of completion for the Rehabilitation Plan, for all or part of the site as necessary, shall be submitted to the Agency within six months of execution of the plan. The licensee shall carry out such tests, investigations or submit certification, as requested by the Agency, to confirm that there is no continuing risk to the environment.

The Applicant has produced a draft Cutaway Bog Decommissioning and Rehabilitation Plan for each of the three bogs within the Application Site (i.e., Derryaroge Bog, Derryadd Bog, and Lough Bannow Bog). Please see Appendix 4-3 of the rEIAR for details. Bord na Móna has finalised the rehabilitation plan for part of Derryaroge Bog (see Derryaroge Cutaway Bog and Decommissioning and Rehabilitation Plan 2023, included in Appendix 4-3 of the rEIAR) and this area is currently being rehabilitated. It is the intention of the Applicant to rehabilitate the bogs in a phased approach under the requirements of the IPC Licence.

Some rehabilitation works have commenced on the Application Site already in the form of natural revegetation and re-colonisation (as described in the Cutaway Bog Decommissioning and Rehabilitation Plans (Appendix 4.3)) and in Chapter 4 Table 4-7 of the rEIAR. Further rehabilitation work will commence immediately following the full decommissioning of the Application Site. The Cutaway Bog Decommissioning and Rehabilitation Plans provide a description of the three bogs and their ecology. They also provide a framework and outline the typical works that will be undertaken to achieve the aims of successful rehabilitation (the criteria for which are defined in the plan) and a timescale for when the various elements of the plan will likely be implemented.

The details necessary to achieve the aims set out in the Cutaway Bog Decommissioning and Rehabilitation Plans (and shown on the potential Future Habitats Map) will include the exact locations of the drains to be blocked and any bunds to be constructed etc. These details are based on the existing habitats present and the topography of the Application Site. This level of detail will only be available once the rehabilitation plan is finalised. The remedial measures to be undertaken will follow proven and standard procedures that have been successfully applied by Bord na Móna and are known to be effective as detailed below.

### 1.1.4 Potential Future Land Use

In line with the Applicant's vision to assist in achieving a climate neutral Ireland by 2050, it is intended to utilise the Application Site for both peatland remediation and wind energy infrastructure and to facilitate environmental stabilisation of the Application Site and the optimisation of climate action benefits.

The overall permanent footprint of the proposed wind farm will be less than 4% of the total area of the Application Site, and therefore does not impact or change the overall goals and outcomes of the proposed rehabilitation plans. As such, it is the intention of the Applicant to integrate the peatland rehabilitation measures with the proposed future wind farm. The key objectives of environmental stabilisation and re-wetting of the cutaway areas will occur between and surrounding the proposed windfarm infrastructure.

A separate planning application for the proposed Derryadd Wind Farm will be submitted directly to An Bord Pleanála through the Strategic Infrastructure Development planning process. As mentioned, the wind farm footprint comprises approximately 4% of the total area of



the Application Site and the wind farm application includes proposals to rehabilitation the site to support wetland habitats. The 132 MW windfarm development, if constructed, will generate 404,712 MWh of renewable energy annually, based on a 35% capacity factor.

Both the remedial measures and the proposed Derryadd Wind Farm are cumulatively assessed with the future remedial measures that will be carried at the Substitute Consent Application Site.

### 1.2 SITE CONTEXT AND HISTORY

### 1.2.1 Site Location

The subject lands of the Application Site are located on three bogs namely, Derryaroge, Derryadd and Lough Bannow bogs in County Longford within the Mountdillon Bog Group (which is subject to IPC Licence Ref. P0504-01). The three bogs have an area of approximately 2,244 ha in total and lie directly to the east of the town of Lanesborough, and the R392 Regional Road, which runs from Lanesborough in the north to Ballymahon in the south. Initial drainage works were carried out in the 1960s.

While peat extraction ceased in July 2019, the Application Site is currently undergoing decommissioning of peat extraction activities including maintenance and monitoring works in compliance with its IPC Licence (P0504-01). Subsequent to the completion of decommissioning activities, rehabilitation works will commence at the Application Site. Other existing land use at the site include small areas of cutaway bog, intact raised bog remnants, bog woodlands and revegetation of bare peat.

Under the Water Framework Directive (WFD; Directive 2000/60/EC), the site is located within the Upper River Shannon catchments (Catchment IDs 26C and 26E) and the Shannon [Upper]\_SC\_080, Shannon [Upper]\_SC\_060, and Bilberry\_SC\_010 sub-catchments. The current main access points to the Application Site are located off the N63, which provides access to Derryaroge and Derryadd bogs, and via the R398 which provides access to Derryadd and Lough Bannow bogs.

The landcover and uses surrounding the Application Site comprises a mixture of forestry, agricultural land, cutover and cutaway peatland, one-off rural housing and small rural settlements. Cutaway peatlands are those areas where all commercially viable volumes of peat have been extracted. Cutover peatlands are those areas where peat extraction has occurred, and commercially viable peat volumes remain. Lough Ree SAC/SPA and the River Shannon define the wider landscape to the west and north.

### 1.2.2 Topography

The current topography of the Application Site is relatively flat and low lying with an elevation range between approximately 35m to 58m OD (meters above Ordnance Datum), with higher elevation areas located in the Lough Bannow Bog in the south, and lower areas in Derryaroge Bog in the north.

Topography at the site has been modified through the peat extraction activities, and all ancillary works and associated drainage works. Today the highest elevations are found at headlands and remnant peat banks around the perimeter of the Application Site, which create a boundary berm, forming a basin effect within the former extraction areas in the middle of the bogs. These



remnant peat banks and headlands provide an approximation (albeit drained and subsided) of the original ground elevations which existed across the site prior to the commencement of any peat extraction related activities.

The Bord na Móna lidar map for Derryaroge Bog shows the current topography at the Application Site. Currently the highest elevations at Derryaroge Bog are found along its southern margins where the topography ranges from 45-46 mOD. Ground elevations in the interior of the bog, which have been subject to historic peat extraction, range from 38-42 mOD.

The Bord na Móna lidar map for Derryadd, shows the current topography at Derryadd Bog. Currently the highest elevations at Derryadd Bog are found in the west and centre of the site, with maximum elevations ranging from 46-48 mOD along the boundary with the mineral islands (drumlins). The topography slopes gently to the east and north, with the lowest elevations recorded in the northeast of Derryadd Bog (39mOD).

The Bord na Móna lidar map for Lough Bannow Bog, shows the current topography at Lough Bannow Bog. Currently the highest elevations at Lough Bannow Bog are located in the southeast, where ground elevations range from 56-58m OD where a number of rock outcrops and drumlins occur. Ground elevations are lower in the northwest of Lough Bannow Bog where the topography ranges between 44-45 mOD.

### 1.2.3 Site History

The Application Site has been subject to drainage and peat extraction activities from 1949. Peat extraction ceased in July 2019 across the entire Application Site.

The primary hydrological and hydrogeological changes associated with the peat extraction process occurs during the initial drainage of the bog in advance of peat extraction. Constructed drainage ditches drain the upper surface of the bog by lowering the local peat water table. At this time, ancillary features were constructed such as railway lines, machine passes, works sites, canteens, welfare facilities, mobile and fixed fuel tanks and peat loading facilities. After the Application Site was drained, vegetation was removed from the bog surface, leaving only bare peat fields between the drains. During the peat extraction phase, only minimal landuse change occurs which predominantly relates to minor annual topographic changes (i.e. lower ground levels) cause by ongoing peat extraction.

The timing of the installation of drainage and initiation of peat extraction varied across the Application Site. Derryaroge Bog was the first bog to commence clearance and drainage in 1949 and would have experienced a relatively abrupt change in land cover with the commencement of peat extraction in 1952. Sod peat extraction commenced in Derryaroge in 1952, which, according to annual reports from the time, assisted with the overall drainage of the bog by removing the acrotelm. Clearance and drainage works on Derryadd and Lough Bannow Bogs commenced in 1960.

Peat extraction within the Application Site has been regulated by the EPA under IPC Licence Registration No. P504-01 since 2000. Prior to this date, the Bord Na Móna had been completing environmental monitoring and control measures at the Application Site. These control measures were upgraded and enhanced in accordance with IPC Licence conditions from May 2000. The Application Site also have Surface Water Management Plans which define how compliance with the IPC Licence is achieved.



Peat extraction at the Application Site ceased in July 2019. Following cessation of peat extraction, the site drainage system has continued to operate under the same drainage systems as during the peat extraction phase i.e. field drains, main drains, silt ponds and discharge outlets etc. During decommissioning and rehabilitation activities continue to be monitored in accordance with IPC Licence conditions.

Drainage from the bogs is regulated by the shallow (low gradient) nature of the drainage, and by routing all bog drainage via field drains, main drains, headland drains, then from silt ponds to outfalls, with final discharge to natural watercourses. Therefore, existing discharge volumes from the Application Site to nearby surface watercourses will be comparable to surface water discharges during the Peat Extraction Phase (1988-2019).



# 2. FLOOD RISK MANAGEMENT GUIDANCE

This Stage 1 Flood Risk Assessment was carried out in accordance with the following flood risk management guidance documents:

- The Planning System and Flood Risk Management Guidelines for Planning Authorities
- Flood Risk Management Climate Change Sectoral Adaptation Plan
- Longford County Development Plan (2021 2027)

### 2.1 THE PLANNING SYSTEM AND FLOOD RISK MANAGEMENT GUIDELINES

The Planning System and Flood Risk Management Guidelines for Planning Authorities (PSFRM Guidelines) were published in 2009 by the Office of Public Works (OPW) and Department of the Environment, Heritage, and Local Government (DoEHLG). Their aim is to ensure that flood risk is considered in development proposals and the assessment of planning applications.

### 2.1.1 Flood Zones and Vulnerability Classes

The PSFRM Guidelines discuss flood risk in terms of three flood zones (A, B, and C), which correspond to areas of high, medium, or low probability of flooding, respectively. The extents of each flood zone are based on the Annual Exceedance Probability (AEP) of various flood events.

The PSFRM Guidelines also categorise different types of development into three vulnerability classes based on their sensitivity to flooding. The PSFRM guidelines state that the wind farm is classified as "essential infrastructure". The development is therefore appropriate in Flood Zone C (low probability of flooding i.e., less frequently than 0.1% AEP event).

Table 2.1 shows a decision matrix that indicates which types of development are appropriate in each flood zone and when the Justification Test (see Section 2.1.2) must be satisfied. The annual exceedance probabilities used to define each flood zone are also provided.

Flood Zone: (Probability)	Annual Exceedance Probability (AEP)	Highly Vulnerable	Less Vulnerable	Water Compatible
A (High)	<u>Fluvial &amp; Pluvial Flooding</u> More frequent than 1% AEP	Justification Test Required	Justification Test Required	Appropriate
В	Coastal Flooding			
(Medium)	More frequent than 0.5% AEP	Justification	Appropriate	Appropriate
	Fluvial & Pluvial Flooding	Required		
	0.1% to 1% AEP			
С	Coastal Flooding	Appropriate	Appropriate	Appropriate
(Low)	0.1% to 0.5% AEP			
	<u>Fluvial, Pluvial &amp; Coastal</u> <u>Flooding</u>	•		
	Less frequent than 0.1% AEP			

 Table 2.1: Decision Matrix for Determining the Appropriateness of a Development



### 2.1.2 Justification Test

Any development being considered in an inappropriate flood zone (as determined by Table 2.1) must satisfy the criteria of the Justification Test outlined in Figure 2-1(taken from the PSFRM Guidelines).

Box 5.1 Justification Test for development management (to be submitted by the applicant)

When considering proposals for development, which may be vulnerable to flooding, and that would generally be inappropriate as set out in Table 3.2, the following criteria must be satisfied:

- 1. The subject lands have been zoned or otherwise designated for the particular use or form of development in an operative development plan, which has been adopted or varied taking account of these Guidelines.
- 2. The proposal has been subject to an appropriate flood risk assessment that demonstrates:
  - (i) The development proposed will not increase flood risk elsewhere and, if practicable, will reduce overall flood risk;
  - (ii) The development proposal includes measures to minimise flood risk to people, property, the economy and the environment as far as reasonably possible;
  - (iii) The development proposed includes measures to ensure that residual risks to the area and/or development can be managed to an acceptable level as regards the adequacy of existing flood protection measures or the design, implementation and funding of any future flood risk management measures and provisions for emergency services access; and
  - (iv) The development proposed addresses the above in a manner that is also compatible with the achievement of wider planning objectives in relation to development of good urban design and vibrant and active streetscapes.

The acceptability or otherwise of levels of residual risk should be made with consideration of the type and foreseen use of the development and the local development context.

Note: See section 5.27 in relation to major development on zoned lands where sequential approach has not been applied in the operative development plan.

Refer to section 5.28 in relation to minor and infill developments.

#### Figure 2-1: Criteria of the Justification Test



### 2.2 THE FLOOD RISK MANAGEMENT CLIMATE ADAPTION PLAN

The Flood Risk Management Climate Change Sectoral Adaptation Plan was published in 2019 under the National Adaptation Framework and Climate Action Plan. This plan outlines the OPW's approach to climate change adaptation in terms of flood risk management.

This approach is based on a current understanding of the potential impacts of climate change on flooding and flood risk. Research has shown that climate change is likely to worsen flooding through more extreme rainfall patterns, more severe river flows, and rising mean sea levels.

To account for these changes, the Adaptation Plan presents two future flood risk scenarios to consider when assessing flood risk:

- Mid-Range Future Scenario (MRFS)
- High-End Future Scenario (HEFS)

Table 2.2 indicates the allowances that should be added to estimates of extreme rainfall depths, peak flood flows, and mean sea levels for the future scenarios.

Parameter	Mid-Range Future Scenario (MRFS)	High-End Future Scenario (HEFS)
Extreme Rainfall Depths	+ 20%	+ 30%
Peak River Flood Flows	+ 20%	+ 30%
Mean Sea Level Rise	+ 0.5 m	+1m

#### Table 2.2: Climate Change Adaptation Allowances for Future Flood Risk Scenarios

For the purpose of this flood risk assessment, the development has been assessed against the Mid-Range Future Scenario as it represents a likely future scenario.



### 2.3 LONGFORD COUNTY DEVELOPMENT PLAN (2021 – 2027)

The Longford County Development Plan sets out an overall strategy for the proper planning and sustainable development of Longford County and consists of a written statement and supporting maps and appendices, indicating the development objectives for the County in order to facilitate and achieve balanced and sustainable growth in the county over the plan period of 2021 – 2027. The plan came into effect on 30<sup>th</sup> November 2021.

Volume 4 of the plan consists of a Strategic Environmental Assessment (SEA) Environmental Report, Natura Impact Report and Strategic Flood Risk Assessment.

The Flood Risk Management County Policy Objectives (CPO) are outlined below:

- *CPO 5.106* Support the implementation of recommendations in the CFRAM Programme to ensure that flood risk management policies and infrastructure are progressively implemented.
- *CPO 5.107* Support the implementation of recommendations in the Flood Risk Management Plans (FRMP's), including planned investment measures for managing and reducing flood risk.
- CPO 5.108 Support, in co-operation with the OPW, the implementation of the EU Flood Risk Directive (2007/60/EC), the Flood Risk Regulations (SI No. 122 of 2010) and the DEHLG/OPW publication The Planning System and Flood Risk Management Guidelines for Planning Authorities (2009) and Departmental Circular PL2/2014 (or any updated/superseding versions). This will include the following;
  - Avoid, reduce and/or mitigate, as appropriate in accordance with the Guidelines, the risk of flooding within the flood risk areas indicated in the accompanying Strategic Flood Risk Assessment report, including fluvial, pluvial and groundwater flooding, and any other flood risk areas that may be identified during the period of the plan or in relation to a planning application.
  - Development proposals in areas where there is an identified or potential risk of flooding or that could give rise to a risk of flooding elsewhere will be required to carry out a site-specific Flood Risk Assessment, and Justification Test where appropriate, in accordance with the provisions of The Planning System and Flood Risk Management Guidelines for Planning Authorities 2009, (or any PL2/2014 superseding document) and Circular las updated/superseded). Any flood risk assessment should include an assessment of the potential impacts of climate change, such as an increase in the extent or probability of flooding, and any associated measures necessary to address these impacts.
  - Development that would be subject to an inappropriate risk of flooding or that would cause or exacerbate such a risk at other locations shall not normally be permitted.
  - Where certain measures proposed to mitigate or manage the risk of flooding associated with new developments are likely to result in significant effects to the environment or European sites downstream, such measures will undergo environmental assessment and Appropriate Assessment, as appropriate.



- CPO 5.109 Protect Flood Zone A and Flood Zone B from inappropriate development and direct developments/land uses into the appropriate Flood Zone in accordance with The Planning System and Flood Risk Management Guidelines for Planning Authorities 2009 (or any superseding document) and the guidance contained in DMS 16.205. Where a development/land use is proposed that is inappropriate within the Flood Zone, then the development proposal will need to be accompanied by a Development Management Justification Test and site-specific Flood Risk Assessment in accordance with the criteria set out under with The Planning System and Flood Risk Management Guidelines for Planning Authorities 2009 and Circular PL2/2014 (as updated/superseded). In Flood Zone C, (Please also refer to Development Management Standard, Development Management Standard, DMS 16.205, where the probability of flooding is low (less than 0.1%, Flood Zone C), site-specific Flood Risk Assessment may be required the developer should satisfy themselves that the probability of flooding is appropriate to the development being proposed. The County Plan SFRA datasets and the most up to date CFRAM Programme climate scenario mapping should be consulted by prospective applicants for developments in this regard and will be made available to lower-tier Development Management processes in the Council. Flood Zone maps should not be used to suggest that any areas are free from flood risk as they do not include groundwater or artificial drainage system flood risk. Applications for development on land identified as Benefitting Land (under Arterial Drainage Schemes /Drainage Districts) may be prone to flooding, and as such site-specific flood risk assessments may be required in these areas. The Council will ensure that new developments proposed in Arterial Drainage Schemes and Drainage Districts do not result in a significant negative impact on the integrity, function and management of these areas.
- CPO 5.110 Site-specific Flood Risk Assessment (FRA) is required for all planning applications in areas at risk of flooding (fluvial, pluvial or groundwater), even for developments appropriate to the particular Flood Zone. The detail of these site-specific FRAs will depend on the level of risk and scale of development. A detailed site-specific FRA should quantify the risks, the effects of selected mitigation and the management of any residual risks. The assessments shall consider and provide information on the implications of climate change with regard to flood risk in relevant locations. The 2009 OPW Draft Guidance on Assessment of Potential Future Scenarios for Flood Risk Management (or any superseding document) and available information from the CFRAM Studies shall be consulted with to this effect. It is an objective of the Council to support and facilitate the development of Flood Relief Schemes as identified in the CFRAM 10 Year Investment Programme.
- CPO 5.111 Require all applications in areas prone to flooding to be subject to the Justification Test set out in the Planning System and Flood Risk Management Guidelines for Planning Authorities. Compensatory flood storage provision or the provision of flood defences will not override the need for completion of the justification test.
- *CPO 5.112 Consult with the OPW in relation to proposed developments in the vicinity of drainage channels and rivers for which the OPW are responsible, and to retain a strip*



on either side of such channels where required, to facilitate maintenance access thereto.

- CPO 5.113 Actively work with the CFRAM Programmes and catchment-based Flood Planning Groups, including where catchments go beyond the Council's administrative boundary, in the development and implementation of catchment-based strategies for the management of flood risk - including those relating to storage and conveyance.
- *CPO 5.114 Protect the integrity of any formal (OPW or Longford County Council) flood risk management infrastructure, thereby ensuring that any new development does not negatively impact any existing defence infrastructure or compromise any proposed new infrastructure.*
- *CPO 5.115 Ensure that the reasonable requirements of Inland Fisheries Ireland are adhered to in the construction of flood alleviation measures in the county.*
- CPO 5.116 Protect water bodies and watercourses within the County from inappropriate development, including rivers, streams, associated undeveloped riparian strips, wetlands and natural floodplains. This will include protection buffers in riverine and wetland areas as appropriate. In addition, promote the sustainable management and uses of water bodies and avoid culverting or realignment of these features.
- *CPO 5.117 Recognise the important role of peatland and other wetland areas in flooding patterns. Development in these areas shall therefore be subject to a Flood Risk Assessment in accordance with the relevant guidance.*
- CPO 5.118 Ensure each flood risk management activity is examined to determine actions required to embed and provide for effective climate change adaptation as set out in the OPW Climate Change Sectoral Adaptation Plan Flood Risk Management applicable at the time.
- CPO 5.119 Facilitate the appropriate management and sustainable use of flood risk areas designated as 'Constrained Land Use' on Settlement Plan zoning maps. Future development on these lands is limited to minor development where plan-making Justification Tests have not been undertaken and the Constrained Land Use applies. SFRA datasets will be made available to the lower tier forward planning and Development Management and associated SFRA/FRA processes in the Council. These processes may lead to the identification of areas where the Constrained Land Use Zoning provisions contained within this Plan may apply. In this regard, prospective applicants for developments in areas that have been previously developed and are at elevated levels of flood risk are encouraged to consult with the Planning Department at the earliest opportunity. Appendix II of the SFRA that accompanies the Plan includes mapping at a County level of historic (page 2) and predictive (page 3) flood risk indicators.
- CPO 5.120 Ensure that applications to existing developments in flood vulnerable zones shall provide details of structural and non-structural risk management measures to include, but not be limited to specifications of the following - floor levels, internal layout, flood resilient construction, flood resistant construction, emergency response planning, access and egress during flood events.



The Longford County Development Plan (2021 – 2027) supersedes all previous development plans for county Longford, ensuring that the assessment is based on the most up-to-date and relevant information.

While the current plan incorporates and builds upon previous plans, it is designed to provide continuity and improvement in flood risk management. This approach ensures that past considerations have been integrated into the current framework, enhancing the overall effectiveness of flood risk mitigation strategies.

### 2.4 LONGFORD STRATEGIC FLOOD RISK ASSESSMENT (SFRA) 2021-2027

A Strategic Flood Risk Assessment (SFRA) was completed in November 2021 by CAAS Ltd. in accordance with the Planning System and Flood Risk Management - Guidelines for Planning Authorities (Department of the Environment, Heritage and Local Government and Office of Public Works, 2009) and Department of the Environment, Community and Local Government Circular PL 2/2014 as part of the Longford CDP.

The SFRA outlines the both the historical and predictive flood risk indicators. The historical flood risk indicators are outlined in Figure 2-2. The predictive flood risk indicators are outlined in Figure 2-3.



Figure 2-2: Longford SFRA Historical Indicators





Figure 2-3: Longford SFRA Predictive Indicators





### 3. INITIAL FLOOD RISK ASSESSMENT

### 3.1 PAST FLOOD EVENTS

The Preliminary Flood Risk Assessment (PFRA) is a national screening exercise, based on available and readily derivable information, to identify areas where there may be a significant risk associated with flooding.

The PFRA has been undertaken by:

- Reviewing records of floods that have happened in the past
- Undertaking analysis to determine which areas might flood in the future, and what the impacts might be
- Consulting with the Local Authorities and other Government departments and agencies

The OPW's National Flood Information Portal<sup>1</sup> provides past flood event mapping with records of flooding reports, meeting minutes, photos, and/or hydrometric data. Based on the flood map shown in Figure 3-1, there are two recurring flood events of interest to the Application Site and there are flood extents shown along the northwestern boundary of the Derryaroge bog.

The two flood events in the vicinity of the Application Site are:

- Flood ID-3504, located along the site boundary. The event is a recurring event as a result of river flooding from the River Grillagh (Ballynakill on mapping). The meeting minutes state that the "river overflows its banks every year after heavy rain".
- Flood ID-3505, located 400m east of the Derryadd site. The event is recurring and as a result of low-lying land. The meeting minutes state that "low lying area floods after heavy rain".

The information on the recurring flood event comes from meeting minutes from a meeting from a meeting with the local Area Engineer that was held in 2005.<sup>2</sup>

The flood extents along the northwestern boundary of the Derryaroge bog are as a result of flooding from the River Shannon and is a recuring event.



<sup>&</sup>lt;sup>1</sup> floodinfo.ie

<sup>&</sup>lt;sup>2</sup><u>https://static-floodinfo.s3-eu-west-</u>

<sup>&</sup>lt;u>1.amazonaws.com/media/reports/F310%20Data%20Collection/022%20Longford%20County%20Council/004%20Minutes%20Verbal%20Report/lon mm ab 0000002518.pdf</u>



Figure 3-1: OPW National Flood Information Portal Recorded Past Flood Events



### 3.2 OPW PRELIMINARY FLOOD RISK ASSESSMENT (PFRA) STUDY

In 2009, the OPW produced a series of maps to assist in the development of a broad-scale FRA throughout Ireland. These maps were produced from several sources.

The OPW's National Preliminary Flood Risk Assessment (PFRA) Overview Report from March 2012 noted that *"the flood extents shown on these maps are based on broad-scale simple analysis and may not be accurate for a specific location".* 

Figure 3-2 provides an overview of the fluvial, coastal, pluvial, and groundwater indicative flood extents in the vicinity of the subject site.





The PFRA mapping shows two areas of fluvial flooding within the Application Site, one to the south of the Derryadd bog and one to the north of the Lough Bannow bog.

There are large amounts of pluvial flooding noted in all 3 bogs within the Application Site.

In 2020, the OPW produced the second-generation indicative fluvial flood mapping, improving upon the first generation PFRA and producing higher quality flood maps (See Section 3.3).



### 3.3 NATIONAL INDICATIVE FLUVIAL MAPPING (NIFM) 2020

In 2020, the OPW produced the second-generation indicative fluvial flood mapping, improving upon the first generation PFRA and producing higher quality flood maps<sup>3</sup>.

The NIFM Flood Mapping Technical Data notes that *"Cross sectional surveys have not been used to define the dimensions of river channels and structures within the 2D model. Channels have been represented in the 2D model by assuming their channel capacity is equivalent to the estimation of [the index flood flow]"<sup>4</sup>. The 2D model uses a Digital Terrain Model with a grid scale of 5m.* 

Figure 3-3 provides an overview of the 1 in 100-year (1% AEP) and 1 in 1000-year (0.1% AEP) indicative fluvial flood mapping of the rivers in the vicinity of the subject sites.

The lough Bannow site shows no fluvial flooding.

There are two areas of fluvial flooding noted within the Derryadd site, one to the south and one to the northeast of the site. Both areas flood in a 1 in 100-year (1% AEP) event. Slightly larger extents are noted in the same areas in 1 in 1000-year (0.1% AEP) events

There is one area of fluvial flooding noted in the Derryaroge site, located along the eastern boundary the area is liable to flooding in a 1 in 1000-year (0.1% AEP) event.



Figure 3-3: National Indicative Fluvial Mapping 2020- Existing Scenario

 <sup>&</sup>lt;sup>3</sup> National Indicative Fluvial Mapping; Applying and Updating FSU Data to Support Revised Flood Risk Mapping for Ireland, Brown et al., Irish National Hydrology Conference 2019
 <sup>4</sup> https://www.floodinfo.ie/map/nifm\_user\_guidance\_notes/





The NIFM update also included an assessment of the likely impact of climate change on flood risk in the area. The flood extents for the 1 in 100-year (1% AEP) and 1 in 1000-year (0.1% AEP) MRFS events are shown in Figure 3-3.

The mapping is similar to the current scenario with slightly larger areas shown as liable to flooding in the Derryadd site in the 1 in 100-year (1% AEP) MRFS event. The Derryaroge site is liable to flooding in a 1 in 100-year (1% AEP) MRFS event.



Figure 3-4: National Indicative Fluvial Mapping 2020- Mid-Range Future Scenario



### 3.4 CATCHMENT FLOOD RISK ASSESSMENT AND MANAGEMENT STUDY

In 2015, the OPW produced flood maps as part of the Catchment Flood Risk Assessment and Management (CFRAM) Study. The flood extents in these maps are based on detailed modelling of Areas for Further Assessment identified by the National Preliminary Flood Risk Assessment.<sup>5</sup>.

The River Shannon, which is located adjacent to the Derryaroge bog, was modelled as part of the CFRAM study. CFRAM mapping of the 1 in 100-year (1% AEP) and 1 in 1000-year (0.1% AEP) predicted fluvial flood extents is presented in Figure 3-5. The predicted flood mapping produced as part of the CFRAM study indicates that only a small area to the northwest of the Derryaroge bog is liable to fluvial flooding during a 1 in 1000-year (0.1% AEP) event.



#### Figure 3-5: CFRAM Existing Fluvial Flood Extents

Figure 3-6 shows the MRFS fluvial flood extents produced as part of the CFRAM Study during the 100-year and 1000-year MRFS flood events. The area shown as flooding in a 1 in 1000-year (0.1% AEP) Current event is liable to fluvial flooding in a 1 in 100-year (1% AEP) MRFS event. Further areas to the north of the Derryaroge site are seen as liable to fluvial flooding in a 1 in 1000-year (0.1% AEP) MRFS event.



<sup>&</sup>lt;sup>5</sup> <u>https://www.floodinfo.ie/about\_frm/</u>



Figure 3-6: CFRAM MRFS Fluvial Flood Extents



### 3.5 OPW DRAINAGE DISTRICTS AND ARTERIAL DRAINAGE SCHEMES

The OPW Drainage Districts were carried out by the commissioners of Public Works under a number of drainage and navigation acts from 1842 to the 1930s to improve land for agriculture and to mitigate flooding.<sup>6</sup> The local authorities are charged with the responsibility to maintain Drainage Districts.

Benefited lands are areas that were previously subject to poor drainage and/or flooding but that have benefited from the implementation of Arterial Drainage Schemes carried out under the Arterial Drainage Act 1945.

The subject site has not benefited from any arterial drainage scheme and is not located in a Drainage District (Figure 3-7).



Figure 3-7: Arterial Drainage



<sup>&</sup>lt;sup>6</sup> www.floodinfo.ie

### 3.6 GEOLOGICAL SURVEY IRELAND MAPPING

Based on a review of the OPW's Preliminary Flood Risk Assessment (PFRA) mapping (see Figure 3-2) there is no noted risk of groundwater flooding to the subject site.

GSI Groundwater Flooding Probability Maps<sup>7</sup> for the Application Site were reviewed (Figure 3-8). An area of GSI historic groundwater flood extents is noted in the vicinity of the Application Site. The closest groundwater feature to the Derryaroge site is 1.1km southwest of the Application Site, the closest groundwater feature to the Derryadd bog is 2.6km west of the Application Site, and the closest groundwater flood extent is 2.2km north of the Lough Bannow bog.

GSI Surface Water Flood mapping from 2015/2016 was reviewed. This showed that all three sites have surface water flood extents within their boundaries, with the largest areas seen in the Derryaroge site.



#### Figure 3-8: GSI Mapping of Historic Surface and Groundwater Flood Extents

Geological Survey Ireland (GSI) subsurface mapping of karst features<sup>8</sup> (Figure 3-9) in the area show that there are no karst features located in the vicinity of the subject site. There are no karst features within the boundaries of the Application Site. There are a large number of localised topographical depressions noted in the vicinity of the Application Site as a result of historical peat extraction.

<sup>8</sup>GSI Groundwater Data Viewer, Available at: <u>https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=7e8a202301594687ab14629a10b748ef</u>



<sup>&</sup>lt;sup>7</sup>FloodInfo.ie | National Flood Information Portal, Available at: <u>https://www.floodinfo.ie/map/floodmaps/</u>



Figure 3-9: GSI Mapping of Karst Features



### 3.7 EXISTING SITE DRAINAGE

When peat extraction activities commenced at the Application Site in 1949, in order to dry the top surface of the bog for extraction, a series of parallel open field drains approximately 1.5m deep and oriented in a south-southeast to north-northwest direction with approximately 15m spacing between drains. The fields are connected together at their low points with pipes or open drains which lead towards external discharge points. Sod peat was extracted in Derryaroge from 1952 to 1984, and the drainage assisted with the overall drying of the bog by removing the acrotelm.

Following the cessation of sod peat extraction in 1984, the drainage infrastructure was reinserted and adapted for milled peat extraction. As the top surface of the working bog was harvested over time, the bog's elevation decreased below that of the surrounding land, necessitating the pumping of much of the bog's drainage up to the level of the surrounding streams. Pumping was undertaken since the 1960s/1970s. Nicholas O'Dwyer Ltd. assessed the drainage on the site when it was bogland through walkover surveys. Currently, there are 18 pumping stations across the three bogs. These stations transfer water between internal drainage systems and external streams. As required by IPC License REF P0504-1, settlement ponds are positioned either upstream or downstream of the external pumping stations. These ponds allow sediment to settle out of the water before it is discharged into the external streams.

Pump capacities at pumping stations were designed based on a runoff rate of 1.7 l/s/Ha, which is less than the greenfield runoff rates. Runoff rates for the peatlands are greater than 5 l/s/Ha therefore surface water tends to accumulate on site during the winter providing additional flood storage on site and reducing the potential for flooding off site (compared to pre-1988).

Derryaroge bog features deep collector drains spaced approximately every 300 meters in a north-south direction. While these are relic peat drains; we classify them as main drains for the milled peat today. Smaller field drains run parallel at approximately 15-meter intervals. These field drains connect via pipes at their low points, which are in turn connected to the deep collector drains. Pumps (P07, P08, & P09) transfer water from the central collector drains to those closer to the bog's periphery, as shown in Figure 3-10. Additionally, pumps along the peripheral drains (P01-P06) lift the water for discharge into surrounding watercourses.





Figure 3-10: Derryaroge Bog Existing Drainage Catchments (Nicholas O'Dwyer Ltd., 2024)

Derryadd Bog (see Figure 3-11) and Lough Bannow Bog (see Figure 3-12) have field drains spaced at 15-meter intervals, but they lack the extensive deep drains found in Derryaroge bog. These field drains connect via pipes at their low points, which are then linked to the external drainage systems.

Derryadd Bog has six pump station locations (P10-P15), while pump station P13 remains decommissioned, and discharge occurs via a gravity outfall north of the pump station site. Lough Bannow Bog, on the other hand, has three pump station locations (P16-P18).





Figure 3-11: Derryadd Bog Existing Drainage Catchments (Nicholas O'Dwyer Ltd., 2024)





Figure 3-12: Lough Bannow Bog Existing Drainage Catchments (Nicholas O'Dwyer Ltd., 2024)



### 4. CONCLUSIONS

TOBIN was appointed by Bord Na Mona to undertake a Stage 1 Flood Risk Assessment (FRA) for the former peat extraction sites at the Application Site. The Application Site consists of three bogs, all of which are included in the Substitute Consent application. The three bog sites included in this report are:

- Derryaroge
- Derryadd
- Lough Bannow

With reference to the PSFRM guidelines, the development is comprised of "highly vulnerable" essential infrastructure (wind farm). As such this must be located in Flood Zone C. The proposed remedial phase works which included the rewetting of the bogs and returning them to their natural state would be classified as "water compatible" development. Therefore are appropriate in any flood zone.

#### Fluvial Flooding

Based on a review of available information, it was estimated that areas of the subject site are liable to fluvial flooding. The NIFM mapping shows two areas of the Derryadd Site flooding in a 1 in 100-year (1% AEP) event and one area of the Derryaroge Site flooding in a 1 in 1000-year (0.1% AEP) event. MRFS mapping shows that the same area in the Derryaroge site is liable to fluvial flooding in a 1 in 100-year (1% AEP) event.

CFRAM mapping is only available along the River Shannon and shows fluvial flooding to the northwest of the Derryaroge site in a 1 in 1000-year (0.1% AEP) event. In a MRFS event, a further area to the north of the Derryaroge site is liable to fluvial flooding in a 1 in 1000-year (0.1% AEP) event, with an area to the northwest of the site liable to fluvial flooding in a 1 in 1000-year event.

PFRA mapping shows fluvial flooding to the north of the Lough Bannow site.

The areas of the Application Site where there are fluvial extents shown are within Flood Zone A and Flood Zone B. As a result "highly vulnerable" essential infrastructure (wind farm), is not permitted in these areas.

#### Coastal Flooding

The subject site is not at risk of coastal flooding due to its distance inland from coastal waters.

#### Pluvial Flooding

PFRA mapping indicates large areas of pluvial flooding within the subject site. The subject site is in low-lying land as the ground level was lowered as the bog was harvested over time.

There are 18 pumping stations located across the site which manage the surface water build up on the site. Heavy rainfall will contribute to the surface water build up and is expected to be managed by the pumping stations, provided they remain in use.



#### Groundwater Flooding

While there are no recorded groundwater flood extents within the subject site, large areas of surface water flooding have been observed. These floods are currently managed by a series of pumps across the site. However, if these pumps are not utilized as they are currently, surface water flooding will occur due to the site's lower ground levels compared to the surrounding lands.

The proposed remedial works for the Application Site are classified as "water compatible" and therefore are suitable in any flood zone. Therefore, the flood risk in this phase is minimal.



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