

Bord na Móna

Bracklin West Bog

**Cutaway Bog Decommissioning and
Rehabilitation Plan**

2023

This document seeks to address the requirements of Condition 10.2 of IPC License Ref. P0501-01:

“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 licence condition requires Bord na Móna agree with the EPA the measures that will provide for rehabilitation, i.e. stabilisation of Bracklin West bog upon cessation of peat production and compliments the licence requirement to decommission the site.

Rehabilitation generally comprises site stabilisation with natural colonisation with or without targeted management.

Industrial peat production has now fully ceased at Bracklin West bog.

In addition, to preparing this document to comply with Condition 10 of IPC Licence Ref. P0501-01, due regard was also given to the Peatlands Climate Action Scheme (PCAS) announced by the Minister. This Scheme will see the Minister support, via the Climate Action Fund and Ireland’s National Recovery and Resilience Plan, Bord na Móna in developing a package of measures, ‘the Scheme’, for enhanced decommissioning, rehabilitation and restoration of cutaway peatlands referred to as, the Peatlands Climate Action Scheme’. However, only the additional costs associated with the additional and enhanced rehabilitation, i.e., measures which go beyond the existing standard mandatory decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support. The additional costs of the Scheme will be supported by Government, administered by the Department of Environment, Climate and Communications (DECC), while the National Parks and Wildlife Service (NPWS) will act as the Scheme regulator.

While this document outlines the enhanced rehabilitation measures planned for Bracklin West bog, activities which goes beyond that required by Condition 10 in the Licence, rehabilitation necessary to comply with the ‘standard’ requirement of Condition 10 (in the absence of the Scheme) is also included, to estimate costs. The inclusion of the ‘standard’ rehabilitation together with the enhanced rehabilitation in this document allows the Scheme Regulator to distinguish and objectively determine the specific activities (and their associated costs) eligible for support under the Scheme.

Bord na Móna have defined the key rehabilitation outcome at Bracklin West bog as environmental stabilisation, re-wetting and setting the bog on a trajectory towards development of naturally functioning peatland and wetland habitats.

Any consideration of any other future after-uses for Bracklin West bog will be conducted in adherence to the relevant planning guidelines and consultation with relevant authorities and will be considered within the framework of this rehabilitation plan.

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Note: This finalised version of the Rehabilitation Plan has been updated to take account that several planning actions listed in Section 8.1 have been completed and have been incorporated into the plan. This includes an Appropriate Assessment of the rehabilitation plan. See Bracklin West Decommissioning and Rehabilitation Plan – Addendum 1 for more details.

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NON-TECHNICAL SUMMARY

- Industrial peat harvesting is now finished at Bracklin West Bog.
- Bord na Móna is planning to rehabilitate Bracklin West Bog, located in Co. Westmeath in 2023.
- This is happening as Bord na Móna are obliged to carry out peatland rehabilitation via an IPC License issued by the Environmental Protection Agency. In addition, the Government has agreed to support peatland rehabilitation via the establishment of the Peatland Climate Action Scheme (PCAS). This is funded via the Government and by Bord na Móna.
- The key objective of peatland rehabilitation is environmental stabilisation. This means developing habitats and vegetation back onto the bare peat (putting a “skin” back onto the peat), and minimising effects to downstream waterbodies. Bracklin West was drained in the past to allow peat production. Better results for water quality improvements, climate action, the reduction of carbon emissions and biodiversity are achieved when the remaining peat is re-wetted. This means drain-blocking and other measures to raise water levels to the surface of the bog and to encourage the natural colonisation of vegetation.
- In general, soggy ground conditions are preferred. This means the remaining peat is wet and that plants that prefer wetter conditions, like Bog Cotton will thrive.
- Some sections with deeper residual peat have the capacity to regrow *Sphagnum* moss again, where there are suitable hydrological conditions. *Sphagnum* is a key species for restoring naturally functioning raised bog conditions.
- Many parts of Bord na Móna bogs cannot be restored back to raised bog in the short-term, as so much peat has been removed and the environmental conditions have been modified. However other peatland habitats with Heather, Bog Cotton, Rushes, Purple Moor-grass, Bog-mosses and scattered trees will develop, and in time a naturalised peatland can be restored.
- The development of a range of habitats in Bracklin West Bog will support biodiversity including plants, insects, birds and mammals. This includes some species that are rare and protected in the wider landscape. It will increase the national area of native woodland. Many wetland habitats in the wider landscape have been reclaimed for agriculture and other uses and peatland rehabilitation is an opportunity to create new peatland and wetland habitats.
- Bracklin West Bog was utilised for industrial peat production from the 1970’s until 2020. Much of the former cutaway area currently comprises bare peat.
- Measures proposed for Bracklin West Bog include drain blocking and additional measures required to raise water levels to the surface of the peat (cell bunding for example). Some fertiliser will be spread on headlands and other areas (a small part of the overall area) to encourage vegetation growth.
- These rehabilitation measures will be planned by a team consisting of expert ecologists, hydrologists and engineers. It is a guiding principle of Bord na Móna rehabilitation planning that no actions or activities will be undertaken that would negatively impact on adjacent land. No boundary drains will be blocked. Water will still leave the bog via the existing outlets.
- It will take some time for vegetation and habitats to fully develop at Bracklin West Bog, and a peatland ecosystem to be restored. However, it is expected that most of the bog will be developing pioneer habitats after 5-10 years.
- This is a peatland rehabilitation plan. This plan does not consider future after-use or development. Bord na Móna continually reviews its land-bank to consider future commercial or industrial developments,

such as renewable energy. Any other proposed development will be planned in adherence to relevant planning guidelines and will consider the rehabilitation and the condition of the bog.

- Peatland rehabilitation of this bog will bring a range of benefits to the local community via improvements to the local landscape and is also important for supporting national policies and strategies in relation to reduction of carbon emissions from these peatlands, supporting biodiversity and improvements to water quality.

1. INTRODUCTION

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Ballivor-Derrygreenagh bog group (Ref. P0501-01). As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. Bracklin West bog is part of the Ballivor-Derrygreenagh bog group (see Appendix I for details of the bog areas within the Ballivor-Derrygreenagh bog group). Bracklin West bog is located in Co. Westmeath.

This plan is a specific rehabilitation plan for the bog and outlines:

- Description of site management and status.
- Main issues and approaches to rehabilitation.
- Consultation to date with interested parties.
- Interaction with other policy and legislative frameworks (Appendix VI).
- The planned rehabilitation goals and outcomes.
- The scope of the rehabilitation plan.
- Criteria which define the successful rehabilitation and key targets to validate rehabilitation.
- Proposed rehabilitation actions.
- Proposed timeframe to implement these measures.
- Budget and Costings.
- Associated aftercare, maintenance and monitoring.

Note: This plan should be read in conjunction with the accompanying Map book.

It is proposed by Government that Bord na Móna carry out a Peatlands Enhanced Decommissioning, Rehabilitation and Restoration Scheme on its peatlands. Note this proposal is also known colloquially as the 'Peatlands Climate Action Scheme' (PCAS). The additional costs of the Scheme will be supported by Government through the Climate Action Fund, and Ireland's National Recovery and Resilience Plan administered by the Department of Environment, Climate and Communications (DECC), while the National Parks and Wildlife Service (NPWS) will act as the Scheme regulator. Bord na Móna have previously identified a footprint of 33,000 ha as peatlands suitable for this scheme. This Scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations (Appendix VII & IX) under existing EPA IPC licence conditions. Improvements supported by the Scheme will ensure that environmental stabilisation is achieved (meaning IPC obligations are met), and importantly, significant additional benefits, particularly relating to climate action and other ecosystem services, will also be delivered. The Scheme commenced in 2021.

Only the costs associated with the additional, enhanced, and accelerated rehabilitation, i.e. those measures which go beyond the existing decommissioning and rehabilitation requirements arising from Condition 10, will be eligible for support under the Scheme. Bord na Móna have now announced the complete cessation of industrial peat production across its estate (January 2021).

It is expected that the Scheme (PCAS) will have benefits accruing from biodiversity provision, water quality and storage attenuation as well as increased carbon storage, reduced carbon emissions and acceleration towards carbon sequestration. The Scheme will also facilitate monitoring of carbon fluxes (Greenhouse Gases and fluvial carbon) in selected areas (in addition to other established Research programmes), to monitor changes in where the interventions will accelerate the trajectory towards a naturally functioning peatland ecosystem.

It is envisaged that the Rehabilitation Scheme will support activities, interventions, or measures across the Bord na Móna cutaway peatlands which accelerate the original timelines. Selected rehabilitation measures will take account of site environmental conditions, which can vary significantly. These measures potentially include:

- more intensive management of water levels through pump management, drain-blocking and cell bunding,
- re-profiling that will deliver suitable conditions for development of wetlands, fens and bog habitats,
- targeted fertiliser applications,
- seeding of targeted vegetation, and
- proactive inoculation of suitable peatland areas with *Sphagnum*.

These are collectively designed to optimise hydrological conditions (ideally and where possible water-levels <10 cm) for climate action benefits and to accelerate the trajectory of the site towards a naturally functioning ecosystem, and eventually a reduced carbon source/carbon sink again. (In some areas of dry cutaway this trajectory will be significantly longer, and it is not feasible in the short-term to re-wet some areas. These areas will develop other habitats. The key to optimising climate action benefits is the restoration of suitable hydrological conditions and more intensive intervention means that the extent of suitable hydrological conditions can be optimised.

These measures are designed to encourage the development of peat-forming habitats, where possible. They are also designed to further slow the movement of water across the site (with the site acting similarly to a constructed wetland), slowing the release of water (improving local water attenuation) and water quality is also expected to improve as the site returns to a naturally functioning peatland ecosystem. The measures will also accelerate the development of new habitats for a range of species under pressure in the wider landscape and will have the potential to develop habitats (e.g. Annex I raised bog, wetlands that support wader water birds of conservation interest) that will contribute towards the delivery of national biodiversity objectives.

Bracklin West bog is proposed to be part of this Scheme (PCAS), which commenced in 2021 and this rehabilitation plan outlines the approach to be taken.

1.1 Constraints and Limitations

This document covers the area of **Bracklin West bog**.

Industrial peat extraction at Bracklin West bog permanently ceased in 2020 (having commenced in the 1970's). Currently the cutaway area comprises largely bare peat along with some small areas of pioneering cutaway habitats to the south east and north west, in addition to marginal¹ habitats.

Bord na Móna are currently developing a renewable energy project called Ballivor Wind Farm. Bracklin West is outside the development boundary of the proposed Ballivor Wind Farm and no turbines or wind farm infrastructure overlaps the currently proposed PCAS extent at Bracklin West (nearest is ca.600m to the east). This project is currently at the pre-planning stage. The potential impact of this infrastructure on the rehabilitated area is expected to be negligible and it does not change the overall goals and outcomes of the proposed rehabilitation (re-wetting residual peat) for Bracklin West.

¹ Marginal land is defined as land around the margin of the industrial peat production area. This margin generally contains a range of habitats including scrub, Birch woodland, cutover bog and raised bog remnants.

2. METHODOLOGY

This rehabilitation plan was developed with a combination of desktop and field surveys, consultations with internal and external stakeholders. The development of this rehabilitation plan considered **recently published** guidance issued by the EPA in 2020 – **Guidance on the process of preparing and implementing a bog rehabilitation plan**.

The ecological information and site information collected during the Bord na Móna ecological baseline surveys, additional confirmatory site visits (covering the period 2012 to 2023 inclusive) and monitoring and desktop analysis, forms the basis for the development of this rehabilitation plan for the bog along with:

- Experience of 40 years of research on the after-use development and rehabilitation of the Bord na Móna cutaway bogs (Clarke, 2010; Bord na Móna, 2016);
- Significant international engagement during this period with other counties in relation to best-practice regarding peatland rehabilitation and after-use through the International Peat Society and the Society for Ecological Restoration (Joosten & Clarke, 2002; Clarke & Rieley, 2010; Gann *et al.*, 2019);
- Consultation and engagement with internal and external stakeholders;
- GIS Mapping;
- BNM drainage surveys;
- Bog topography and peat depth data;
- Hydrological modelling;
- The development of a Methodology Paper outlining the Scheme (PCAS). This rehabilitation includes enhanced measures defined in the Methodology Paper which are designed to exceed the standard stabilisation requirements as defined by the IPC Licence and to enhance the ecosystem services of Bracklin West bog, in particular, optimising climate action benefits.

2.1 Desk Study

The desk study involved collecting all relevant environmental and ecological data for the study area. The development of the rehabilitation plan also takes account of research, experience and engagement with other peatland restoration and rehabilitation projects and peatland research including Irish, UK, European and International best practice guidance (full citations are in the References Section):

- Anderson *et al.* (2017). An overview of the progress and challenges of peatland restoration in Western Europe.
- Barry, T.A. et al (1973). A survey of cutover peats and underlying mineral soils. Soil Survey Bulletin No. 30. Dublin, Bord na Móna and An Foras Taluntais.
- Bonn *et al.* (2017). Peatland restoration and ecosystem services- science, policy and practice.
- Carroll *et al.* (2009). *Sphagnum* in the Peak District. Current Status and Potential for Restoration. Moors for the Future Report No 16.
- Clark & Rieley (2010). Strategy for responsible peatland management.
- Eades *et al.* (2003). The Wetland Restoration Manual.
- Farrell & Doyle (2003). Rehabilitation of Industrial Cutaway Atlantic Blanket Bog, NW Mayo, Ireland.
- Gann *et al.* (2019). International Principles and Standards for the practice of Ecological Restoration.
- Hinde *et al.* (2010). *Sphagnum* re-introduction project: A report on research into the re-introduction of *Sphagnum* mosses to degraded moorland. Moors for the Future Research Report 18.

- Joosten & Clarke (2002). Wise Use of mires and peatlands – Background and Principles including a framework for Decision-making.
- Lindsay (2010). Peatbogs and Carbon: a Critical Synthesis to Inform Policy Development in Oceanic Peat Bog Conservation and Restoration in the Context of Climate Change.
- Mackin *et al.* (2017). Best practice in raised bog restoration in Ireland. Irish Wildlife Manuals, No. 99. National Parks and Wildlife Service,
- McBride *et al.* (2011). The Fen Management Handbook (2011), Scottish Natural Heritage.
- McDonagh (1996). Drain blocking by machines on Raised Bogs. Unpublished report for National Parks and Wildlife Service.
- NPWS (2017a). National Raised Bog Special Areas of Conservation management plan. Department of Arts, Heritage and the Gaeltacht.
- Pschenyckj *et al.*, 2021, Optimising Water Quality Returns from Peatland Management while Delivering Co-Benefits for Climate and Biodiversity. An Fóram Uisce.
- Quinty & Rochefort (2003). Peatland Restoration Guide, second edition. Canadian *Sphagnum* Peat Moss Association and New Brunswick Department of Natural Resources and Energy.
- Regan, *et al.* (2020). Ecohydrology, Greenhouse Gas Dynamics and Restoration Guidelines for Degraded Raised Bogs. EPA Research Report. Prepared for the Environmental Protection Agency by Trinity College Dublin.
- Renou-Wilson *et al.* (2011). BOGLAND - Sustainable Management of Peatlands in Ireland. STRIVE Report No 75 prepared for the Environmental Protection Agency.
- Schouten (2002). Conservation and Restoration of Raised Bogs: Geological, Hydrological and Ecological Studies. Dúchas - The Heritage Service of the Department of the Environment and Local Government, Ireland;
- Thom (2019). Conserving Bogs – Management Handbook.
- Wheeler & Shaw (1995). Restoration of Damaged Peatlands – with Particular Reference to Lowland Raised Bogs Affected by Peat Extraction.
- Wittram *et al.* (2015). A Practitioners Guide to Sphagnum Reintroduction. Moors for the Future Partnership.

Additional on-line resources were also incorporated into the desk study, including:

- Ballivor-Derrygreenagh Integrated Pollution Control Licence;
- Ballivor-Derrygreenagh Annual Environmental Reports;
- Review of the National Biodiversity Data Centre (NBDC) webmapper;
- Inland Fisheries Ireland (IFI) Reports;
- Environmental Protection Agency database (www.epa.ie);
- EPA Guidance on Requests for Alterations to a Licensed Industrial or Waste Activity;
- BirdWatch Ireland online data (including I-WeBS and CBS datasets; www.birdwatchireland.ie);
- Geological Survey of Ireland - National Draft Bedrock Aquifer map;
- Geological Survey of Ireland - Groundwater Database (www.gsi.ie);
- Historic Environment Viewer at <https://webgis.archaeology.ie/historicenvironment/>
- National Parks & Wildlife Services Public Map Viewer (www.npws.ie);
- Water Framework Directive catchments.ie/maps/ Map Viewer (www.catchments.ie);
- OPW Indicative Flood Maps (www.floodmaps.ie);

- CFRAM Preliminary Flood Risk Assessment (PFRA) maps (www.cfram.ie);
- River Basin Management Plan for Ireland 2022-2027
- Bord na Móna Annual Report 2020.
- Spatial data in respect of Article 17 reporting, available online at <https://www.npws.ie/maps-and-data/habitat-and-species-data/article-17>.

2.2 Consultation

A number of stakeholders have been identified during the course of Bord na Móna's rehabilitation and Biodiversity Action Plan activities and are contacted during the rehabilitation planning process for their views. See Section 4.

2.3 Field Surveys

Bord na Móna carried out a baseline ecological survey of all of its properties in 2009-2012 and developed habitat maps. As part of this exercise, Bracklin West bog was surveyed in July of 2012. Additional ecological walk-over surveys and visits have taken place at Bracklin West Bog between 2015-2023. Habitat maps have been updated, where required. This rehabilitation plan is informed by the original baseline survey as well as subsequent confirmatory site walk-over surveys and visits, and updates to baseline data.

Habitat mapping followed best practice guidance from Smith *et al.* (2011). Map outputs including all habitat maps and target notes were produced using GIS software application packages (ArcGIS). General marginal habitats and other habitats that had not been modified significantly by industrial peat extraction were classified using Fossitt *et al.* (2000). Plant nomenclature for vascular plants follows Stace (2010), while mosses and liverworts nomenclature follows identification keys published by the British Bryological Society (2010). A more detailed Bord na Móna classification system was previously developed for classifying pioneer cutaway habitats as Fossitt categories were deemed not to be detailed enough for cutaway bog (much of cutaway bog could be classified as Cutover Bog - PB4).

A detailed ecological survey report for Bracklin Bog is contained in Appendix II. This report includes a larger area referred to as Bracklin Bog that was surveyed in 2012 and 2016. The current Bracklin West Bog extent is included within the larger bog area described in the ecological report provided in Appendix II.

3. SITE DESCRIPTION

Bracklin West Bog is located in Co. Westmeath, approximately 16km east of Mullingar (Grid reference: N 62310 57200). Bracklin Bog West is located close to the villages of Raharney and Ballivor. This bog is part of the Ballivor-Derrygreenagh group of bogs, with Lisclagher East and Lisclagher West located to the north and Carranstown Bog located to the south of the site.

Bracklin West Bog was a relatively young production bog with Industrial peat production having commenced in the late 1970s and ceased in 2020. Bracklin West Bog is considered a deep peat cutaway bog with large areas of deep peat remaining. The wider Bracklin Bog area to the east comprises a large area that was formerly a sod peat production bog and was never converted to milled peat production. This area has revegetated and stabilised, and there is extensive development of mature cutaway vegetation communities across the majority of the former production area.

Bracklin West Bog had been developed into milled peat production and the former production area now comprises bare peat. This remained in production up until 2020. Bracklin West Bog has a gravity drainage regime.

See Drawing number BNM-DR-24-15-01 titled **Bracklin West Bog: Bog Site Location**, included in the accompanying Mapbook², which illustrates the location of Bracklin West Bog in context to the surrounding area.

3.1 Status and Situation

3.1.1 Site history

Industrial peat production commenced at Bracklin West in the 1970s and ceased in 2020. Bracklin West Bog formerly supplied a range of commercial functions including the supply of horticultural peat.

Bracklin West Bog had been developed into milled peat production and is now predominantly bare peat. Peat harvesting is now finished at Bracklin West Bog, having ceased in 2020.

3.1.2 Current land-use

Industrial peat production has now permanently ceased at Bracklin West Bog which comprises predominantly bare peat.

Various different habitats including Birch woodland (WN7) and agricultural grassland (GA1) and scrub (WS1) are located along the margins of the site.

3.1.3 Socio-Economic conditions

Bord na Móna has historically been a vital employer for the rural community of the Midlands of Ireland. Bord na Móna compiled a report on the role of peat extraction in the midlands historically in which they report that in 1986, by the end of Bord na Móna's Third Development Programme, a total of twenty-three work locations had been established around the country. The company had an average employment of approximately 4,688 in the mid 1980's, with a peak employment of 6,100 during the production season, which placed it among the country's

² Cutaway Bog Decommissioning and Rehabilitation Plan – Bracklin Bog Map Book

largest commercial employers. The importance of such levels of employment were largely due to its regional concentration in the Midlands and the lack of alternative employment opportunities at the time.

According to the Energy Crop Socio-Economic Study undertaken by Fitzpatrick Associates in 2011, there were an estimated 1,443 jobs supported by the peat-to-power industry in Ireland at the time, some 81% of which were located in the catchment areas of the three peat-fired generating stations (Lough Ree, West Offaly, and Edenderry Power Stations). These constituted jobs in the plants and in peat extraction, jobs indirectly supported in upstream supply industries and jobs induced through the trickle-down effects of the wages and salaries of those supported directly or indirectly.

According to the Energy Crop Socio-Economic Study undertaken by Fitzpatrick Associates in 2011, there were an estimated 1,443 jobs supported by the peat-to-power industry in Ireland at the time, some 81% of which were located in the catchment areas of the three peat-fired generating stations (Lough Ree, West Offaly, and Edenderry Power Stations). These constituted jobs in the plants and in peat extraction, jobs indirectly supported in upstream supply industries and jobs induced through the trickle-down effects of the wages and salaries of those supported directly or indirectly.

In respect of Bracklin West Bog, jobs included in the above study would have included those to facilitate peat extraction for the supply of horticultural peat.

As the primary employer in many Midland counties, Bord na Móna played a central role in building communities through several initiatives, including Education bursaries, support of local sporting clubs, the provision of community gain funds, charity programmes and the provision and building of amenity areas.

These job numbers have now declined with the cessation of peat extraction at this bog. It is anticipated that the scheme (PCAS) will provide some employment for a team of workers at this site for a period of time (> 1 year). There are approximately 1400 people working in Bord na Móna at present. There are approximately 255 roles directly involved in PCAS.

3.2 Geology and Peat Depths

3.2.1 Sub-soil geology

The underlying geology³ of Bracklin West bog is Ballysteen Formation.

3.2.2 Peat type and depths

Bracklin West bog has been developed into milled peat production and is now predominantly bare peat. Peat depths vary between 1 – 5+ metres, with some pockets of shallower peats also present.

³ <https://dcnr.maps.arcgis.com/apps/webappviewer/index.html?id=de7012a99d2748ea9106e7ee1b6ab8d5&scale=0>

3.3 Key Biodiversity Features of Interest

A detailed ecological report in relation to the wider area known as Bracklin Bog is provided in Appendix II. The current Bracklin West Bog proposed PCAS extent is included within the larger bog area described.

Due to the recent cessation of peat production, there has been little opportunity for post-production habitats to develop, and habitats of biodiversity interest are therefore largely confined to the marginal habitats fringing the cutaway.

3.3.1 Current habitats

The most common vegetation communities present include (Categories in brackets refer to the current BnM classification system for vegetation communities, along with an equivalent Heritage Council habitat classification or Fossitt Code):

- Bare peat (community 'Bare peat (0-50% cover)' or BP) (Fossitt ED2);
- Birch woodland (community '*Betula/Salix*-dominated woodland' (Fossitt WN7);
- Remnant bog (community 'Embryonic bog') (Fossitt PB1)
- Mosaic of pioneer Heather-dominated vegetation (community 'Dry *Calluna* community' or dHeath) (Fossitt HH1) and Purple Moorgrass-dominated grassland (community '*Molinia caerulea*-dominated community' or gMol).
- Pioneer poor fen communities dominated by pioneer *Juncus effusus* community and pioneer *Eriophorum angustifolium* community (poor fen).
- Silt ponds (community 'Silt') (Fossitt Code FL8) with Gorse/Birch scrub (community '*Ulex*-dominated community') (Fossitt Code WS1) and Birch scrub (eBir or oBir as above) (Fossitt Code WS1).
- Riparian zones (community 'Riparian areas -stream or drain with associated edge habitats' or Rip) (Fossitt Code FW2/4);
- Access routes (rail lines and tracks including gravel embankments and associated habitats such as dry grassland communities (GS2) and scrub)

The most common habitats (Codes refer to Fossitt 2000) found around the margins of Bracklin West bog include:

- Birch woodland (WN7)
- Scrub (WS1)
- Cutover Bog (PB4)
- Improved grassland (GA1) around the boundary where the GIS boundary extends into adjacent fields
- Wet grassland (GS4)
- Riparian/drainage ditches (FW4)
- Silt ponds
- Access tracks (bare peat)

The former sod peat production area of Bracklin West is dominated by bare peat. The margins of the site are dominated by Birch woodland. An area of remnant bog is located to the south, south east and north with the additional habitats of scrub and pioneer heath and grassland in the south eastern corner of the site. Bracklin West Bog is predominantly bordered by woodland with the exception of the south-eastern boundary which is bordered by heath. .

See Drawing number BNM-DR-24-15-17 titled **Bracklin West Bog: Current Habitat Map**, included in the accompanying Mapbook, which illustrates the habitats at Bracklin West Bog. Note: this is an aggregated general habitat map based on the detailed BnM habitat survey of Bracklin West. Similar vegetation communities have been aggregated.





Table 1: Photos of Habitats at Bracklin West Bog (2023).

3.3.2 Species of conservation interest

A number of species of conservation concern have been recorded at Bracklin West Bog. The following is a summary of the records of these species available within both BnM records and those of the National Biodiversity Data Centre (NBDC).

Multiple mammal species have been recorded on or within 1 Km of the bog; Irish Hare (*Lepus timidus subsp. Hibernicus*), Eurasian Badger (*Meles meles*) and European Otter (*Lutra lutra*).

Regarding lepidopteran species, records exist for Marsh Fritillary (*Euphydryas aurinia*), Meadow Brown (*Maniola jurtinal*), Small Heath (*Coenonympha pamphilus*), Ringlet (*Aphantopus hyperantus*) and Wood White (*Leptidea* sp.).

Numerous bird species are known to use the cutover bogs in Ireland's midlands as breeding grounds, wintering grounds or both. Kestrel (*Falco tinnunculus*), Meadow Pipit (*Anthus pratensis*), as well as other common bird species including Blackcap (*Sylvia atricapilla*), Song Thrush (*Turdus philomelos*), Wood Pigeon (*Columba palumbus*), Whitethroat (*Sylvia communis*), Blue Tit (*Cyanistes caeruleus*), Blackbird (*Turdus merula*), Redpoll (*Carduelis flammea cabaret*), Rook (*Corvus frugilegus*), Hooded Crow (*Corvus cornix*) and Wren (*Troglodytes troglodytes*) have all been recorded during BNM ecology surveys.

NBDC records for red-listed⁴ bird species of conservation concern recorded in the 10km squares (N55 and N65) which Bracklin West bog intersects include the species Kestrel (*Falco tinnunculus*), Grey Wagtail (*Motacilla cinerea*), Corncrake (*Crex crex*), Curlew (*Numenius arquata*), Red Grouse (*Lagopus lagopus*), Golden Plover (*Pluvialis apricaria*), Woodcock (*Scolopax rusticola*), Redwing (*Turdus iliacus*), Lapwing (*Vanellus vanellus*), Meadow Pipit (*Anthus pratensis*) and Black-headed Gull (*Larus ridibundus*). There is potential (habitat availability) for some of these bird species to utilise Bracklin West Bog with the exception of Corncrake which is associated with hay meadows; breeding opportunities for Curlew are also limited.

3.3.3 Invasive species

A single Third Schedule invasive plant species, Rhododendron *Rhododendron ponticum* has been recorded in Bracklin West bog. A broad range of common garden escapes are occasionally present around the margins of Bord na Móna bogs. Although spatial overlap with the rehabilitation work is expected to be limited, these are, where necessary, to be treated in line with best practice during rehabilitation.

3.4 Statutory Nature Conservation Designations

There are a number of European Sites (SAC's or SPA's) in close proximity (i.e. within a 5km radius at minimum) to Bracklin West Bog. Bracklin West Bog has no overlapping designated sites. The nearest EU Designated sites to Bracklin Bog are as follows:

- River Boyne And River Blackwater SAC (site code: 002299) located approx. 760 m west
- River Boyne And River Blackwater SPA (site code: 004232) located approx. 770 m west
- Mount Hevey Bog SAC (site code: 002342) (also a pNHA) located approx. 7km south

⁴ Gilbert G, Stanbury A and Lewis L (2021), "Birds of Conservation Concern in Ireland 2020 –2026". Irish Birds 9: 523–544

The nearest nationally designated sites to Bracklin West Bog are the Royal Canal pNHA (site code: 002103) located approximately 6.5km south of the site and Mount Hevey Bog pNHA (site code: 001584) located 7km south.

See drawing *BNM-DR-24-15-23: Bracklin West Bog: Proximity to Designated Sites* in the accompanying map book.

3.4.1 Other Nature Conservation Designations

The Ramsar Convention entered into force in Ireland on 15th March 1985. Ireland currently has 45 sites/wetlands designated as Wetlands of International Importance (Ramsar Sites). These cover a surface area of 66,994ha. There are no Ramsar site in close proximity to Bracklin West bog. The closest Ramsar Sites to Bracklin West bog are Lough Owel and Lough Iron, located 17km west and 12km northwest respectively.

3.5 Hydrology and Hydrogeology

Bracklin West forms part of the Boyne Catchment (Catchment ID : 07) as defined by the EPA under the Water Framework Directive (WFD) and is primarily situated within the Deel [Raharney]_SC_010 and Boyne_SC_040 sub-catchments. The bog is located approximately 16km East of Mullingar, in County Westmeath. The bog contains several drainage pathways and discharge locations, with the majority of the bog discharging to the Deel (Raharney) River to the West of the bog.

GSI data indicates that Bracklin West Bog is underlain by the Ballysteen Formation, which is a dark muddy limestone with shale. This unit is classified as locally important aquifer as they are moderately productive in local zones only. Geological Survey of Ireland (GSI) mapping does not identify any karst feature in close proximity to the bog, with the nearest feature (a spring) located >2.5km to the north-west of the bog. No data exists concerning depth to bedrock and there are no mapped features of exposed bedrock in close proximity to the bog.

Locally important aquifers that are Moderately Productive only in Local Zones are defined as having a limited and relatively poor connected network of fractures, fissures and joints, giving a *low* fissure permeability which tends to decrease further with depth. A shallow zone of higher permeability may exist within the top few metres of more fractured/weathered rock, and higher permeability may also occur along fault zones. These zones may be able to provide larger 'locally important' supplies of water. In general, the lack of connection between the limited fissures results in relatively poor aquifer storage and flow paths that may only extend a few hundred metres.

Bracklin West Bog is located in an area mapped by GSI as of low groundwater vulnerability, with the area of bog to the east of the site lying in an area of moderate groundwater vulnerability (GSI Map viewer). Groundwater Vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. Groundwater vulnerability maps are based on the type and thicknesses of subsoils (sands, gravels, glacial tills (or boulder clays), peat, lake and alluvial silts and clays), and the presence of karst features. Groundwater is most at risk where the subsoils are absent or thin and, in areas of karstic limestone, where surface streams sink underground at swallow holes. These data indicate there is generally low risk of any groundwater contamination occurring at this site.

Quaternary Sediment maps show Bracklin West to be underlain by peat, yet surrounded by inorganic deposits, predominately till derived from limestone, with a pocket of alluvium mapped north of the bog. Groundwater Vulnerability is typically used to indicate the susceptibility to groundwater pollution; however, it can provide a useful proxy indication of likely groundwater flow rates in the surrounding area. Groundwater vulnerability for

the surrounding areas is generally low to moderate, with some areas of higher vulnerability mapped in areas where till sequences are suspected to be thinner.

3.6 Emissions to surface-water and watercourses

Drainage is an important feature of industrial peat production and there were extensive field drains maintained throughout bog areas to facilitate industrial peat production annually, each of which eventually drains into a terminal silt pond that allows for settlement of suspended solids before entering the main river systems. In accordance with the existing Integrated Pollution Control licence, all drainage water from boglands in a licensed area is discharged via an appropriately designed silt pond treatment arrangement as required in Condition 6.6. of the licence. Industrial peat production has now permanently ceased at Bracklin West Bog.

Silt ponds are the key silt control infrastructure to control potential emissions from industrial peat production sites. As required under licence, BNM have a number of procedures for how it manages and maintains its silt pond network. The silt that builds up in silt ponds is excavated on a regular basis by Bord na Móna to facilitate an efficient level of silt control. Silt ponds will continue to be maintained during the rehabilitation and decommissioning. Silt pond decommissioning will be considered when sites are deemed to be on a trajectory of environmental stability and peatland rehabilitation has been completed.

Bracklin West bog has 3 treated surface water outlets from previously active peat extraction catchments. Two of the treated outlets discharge to the River Deel (IE_EA_07D010200 DEEL (RAHARNEY)_030) & (IE_EA_07D010300 DEEL (RAHARNEY)_040) with the remaining one discharging to the Craddanstown River (IE_EA_07D010600 DEEL (RAHARNEY)_060).

Details of silt ponds, associated surface water emission points and those being monitored and sampled as part of the PCAS scheme are detailed on the accompanying structures map along with water quality map. See Drawing number BNM-DR-24-15-SP01 titled Peatlands and Climate Action Scheme Bracklin West: Sampling Points, along with Drawing number BNM-DR-24-15-WQ01 titled Peatlands and Climate Action Scheme Bracklin West Bog: Water Quality Map.

There is a robust monitoring program to track and verify any changes in baseline water quality conditions pre and post decommissioning and rehabilitation so that the success or otherwise can be tracked and verified for the National Parks & Wildlife Service, Environmental Protection Agency and Local Authority Water Program, amongst a range of stakeholders.

The Deel or Craddanstown Rivers were not listed as being under pressure from peat extraction in the 2nd cycle of the River Basin Management Plan for Ireland and is indicated as remaining so in the third cycle, which is currently in preparation.

The main emission limit value associated with this bog is 35mg/l suspended solids, with trigger levels for ammonia of 2.78 mg/l and COD 100mg/l.

From an analysis of any results over previous five years of the IPC licence environmental monitoring of some of the discharges from this bog, these indicate that results were under the Emission Limit Value for Suspended Solids and Ammonia and broadly under the trigger level for COD.

Ammonia averaged 1.17mg/l and ranged from 0.022 to 2.6 mg/l with Suspended Solids ranging from 2 to 14 mg/l and averaging 5.13 mg/l.

Bog	SW	Monitoring	pH	SS	TS	Ammonia	TP	COD	Colour
Bracklin	SW-29	Q3 22	NO FLOW						
Bracklin	SW-30	Q3 22	6.6	11	211	0.025	0.12	117	680
Bracklin	SW-26	Q3 21	7.1	5	235	0.968	0.05	61	394
Bracklin	SW-27	Q3 21	7.6	3	249	0.022	0.05	56	396
Bracklin	SW-29	Q 2 21	7.2	10	386	1.51	0.06	69	257
Bracklin	SW-30	Q 2 21	7.1	10	366	1.22	0.07	65	246
Bracklin	SW-29	Q3 20	6.7	3	178	0.14	0.05	91	440
Bracklin	SW-30	Q3 20	7.1	3	221	0.163	0.05	76	326
Bracklin	SW-29	Q 2 19	7.4	5	305	1.4	0.05	60	166
Bracklin	SW-30	Q 2 19	7.5	6	328	1.6	0.05	60	177
Bracklin	SW-26	Q3 19	6.6	2	211	1.38	0.05	82	307
Bracklin	SW-27	Q3 19	7.4	2	306	1.9	0.05	76	247
Bracklin	SW-29	Q4 18	7	5	164	2.6	0.28	91	345
Bracklin	SW-30	Q4 18	6.6	5	136	2.4	0.05	95	90
Bracklin	SW-26	Q1 18	6.4	5	96	0.71	0.06	57	191
Bracklin	SW-27	Q1 18	7.1	5	224	1.6	0.05	72	326

Decommissioning and Rehabilitation Programme Water Quality Monitoring

The licence obligation of quarterly sampling regime on a selected number of ponds to be sampled over a 3 year cycle would not be sufficient to be able to appropriately track the changing water chemistry that will occur as part of this enhanced rehabilitation programme, so this sampling regime will occur on a monthly basis.

To assist in monitoring surface water quality from this bog, it was agreed to increase the existing licence monitoring requirements of the IPC Licence, to sampling for the same parameters every month.

This new sampling programme commenced in November 2020 and is enabling a baseline to be established, with sampling to progress during the scheduled works, and for a period of up to 2 years post rehabilitation. Depending on the period required to confirm that the main two parameters, suspended solids and ammonia as remaining compliant with the licence emission and trigger limit values and there is an improving trajectory in these two parameters i.e. reduction in concentration, the monitoring programme and intensity will be periodically reviewed and amended.

Initial monthly results are included in Appendix XIII for Bracklin West. These results cover the period from November 2020 to November 2022 and are from 2 the main surface water outlets from the sections of bog to be rehabilitated in 2023. Peat extraction ceased in these bogs in 2020 and as expected some of the key water quality parameters that can impact water quality from peat extraction activities, remain on a relatively static trajectory, with suspended solids indicating a flat trend. During this period, ammonia did indicate an increase in trend during the 24 months of sampling, with all other parameters fluctuated slightly, most likely influenced by normal weather patterns, especially rainfall.

Monthly ammonia concentrations from both bogs from November 202 to November 2022 had a range of 0.019 to 2.24 mg/l with an average of 0.750 mg/l.

Results for suspended solids for the same period indicate a range of 2 to 11 mg/l with an average of 3.06 mg/l.

In the preparation of this monitoring programme, Bord na Mona have been providing the Local Authority Water Programme (LAWPRO) with details of the surface water emissions points associated with this bog and will be amending some of the proposed monitoring locations on foot of this engagement. LAWPRO have in turn provided details of their 2021 monitoring programme and these are included in the Water Quality Map.

This is necessary to ensure that there is alignment with the WFD monitoring programme and that where possible, the monitoring programme will enable any improvements in water quality or establishing trends to be quantified against any available WFD monitoring data. It will also enable the periodic sharing of data which will inform the monitoring reports, success criteria and enable LAWPRO under the Water Framework Directive to track any changes in pressures and be aware of changes in water chemistry.

Monitoring results will be maintained, trended every six months and reported on each year and as required, as part of the requirement to report on Condition 10.1 of the IPC Licence on Bog Rehabilitation in the Annual Environmental Report, and will be provided to LAWPRO and the EPA as required to inform progress and national monitoring requirements under the WFD.

These results will also be available in April each year as a requirement of the Annual Environmental Report at www.epa.ie.

The parameters to include as per condition 6.2 of the IPC Licence include monthly monitoring for pH, Flow, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour & COD. In addition, DOC has been included as a parameter to try and identify any changes in carbon in the surface water, and where required by LAWPRO, to assist in investigating other changes in water chemistry, the series of parameters can be reviewed and amended.

Rehabilitation of cutaway peatland is closely linked with control of emissions. One of the criteria for successful rehabilitation is stabilisation through re-vegetation, which will stabilise all substrates and in turn remove the need for further silt control measures. This site is already largely vegetated. Re-wetted peat also aids the primary objective of stabilizing peat, as when peat is re-wetted it is not vulnerable to wind erosion. Re-wetted peat and the development of wet peatland habitats can also act as sinks for silt and mobile peat, and increases additional retention time for solids, and the peatland vegetation can quickly stabilise this material within blocked drains on site (by acting like constructed wetlands).

Water quality of water discharges from restored peatlands normally improves as a result of bog restoration measures and the restoration of natural peatland processes (Bonn *et al.*, 20017). Bog restoration is also expected to improve water attenuation of the site as the drains are blocked, slowing water movement and water release from the site. Restored peatlands help slow the release of water and aid the natural regulation of floods downstream (Minayeva *et al.*, 2017). The National River Basin Management Plan (NRBMP) 2018-2021 (DHPCLG, 2017) is the key national plan for Ireland to achieve the objectives of the Water Framework Directive (WFD). The NRBMP outlines how key actions such as the Bord na Móna peatland rehabilitation is expected to have a positive impact on water quality and help the NRBMP deliver its objectives in relation to the WFD.

Water will still discharge from designated emission points when rehabilitation at Bracklin West has been completed. This discharge will have improved water quality and there will be increased wetland attenuation, meaning slower release of water. This is expected to have a positive impact on status of the key waterbody receptors: River Deel (IE_EA_07D010200 DEEL (RAHARNEY)_030) & (IE_EA_07D010300 DEEL (RAHARNEY)_040) and Craddanstown River (IE_EA_07D010600 DEEL (RAHARNEY)_060), and will support the future status of the waterbodies achieving Good Status.

3.7 Fugitive Emissions to air

None.

The bog is no longer in industrial peat production. Rehabilitation of the peatland will seek to re-wet the dry peat where possible and re-vegetate all areas (whether wet or dry). Collectively, ceasing industrial peat production, re-wetting and re-vegetating will minimise any risk of emission to air from dust.

3.8 Carbon emissions

Irish peatlands are a huge carbon store, containing more than 75% of the national soil organic carbon (Renou-Wilson et al. 2012). Peatland drainage and extraction transforms a natural peatland which acts as a modest carbon sink into a carbon source (Waddington & McNeil, 2002; Alm *et al.*, 2007; Wilson *et al.*, 2007, Wilson *et al.*, 2015). A natural peatland can take in 0.1 to 1.1 t of carbon as CO₂-C /ha/yr while drainage and extraction can create large source of carbon dioxide releasing 1.3 to 2.2 t of carbon as CO₂-C /ha/yr (based on Tier 1 Emission factors, Evans et al. 2017). Renou-Wilson et al. (2018) reported losses of between 0.81 – 1.51 CO₂-C /ha/yr from drained peatlands located in Ireland.

Re-wetting of dry peatlands will increase methane emissions (Gunther et al. 2020) as a consequence of the anoxic conditions within the peat body that provide a suitable environment for the microbial breakdown of plant litter and root exudates. Tanneberger et al. (2021) describes how peatland management has to choose between CO₂ emissions from drained peatlands or increased methane (CH₄) emissions from rewetted industrial peatlands. However, when radiative effects and atmospheric lifetimes of both GHG gases are considered and modelled, postponing rewetting increases the longterm warming effect of continued CO₂ emissions (Gunther et al. 2020). This means the increase in methane due to rewetting of dry peatlands is still negated by the CO₂ emissions reductions. Further, Wilson et al. (2022) confirmed the benefit of rapid rewetting to achieve strong carbon reductions and potentially altering the warming dynamics from warming to cooling depending upon the climate scenario.

It is expected that Bracklin West Bog will become a reduced carbon source following rehabilitation. The potential of any cutaway site to develop as a carbon sink in the longer-term depends on the success of the rehabilitation measures, the extent of development of *Sphagnum*-rich or other peat-forming habitats, the balance of carbon fluxes from different cutaway habitats and future climatic conditions. Much of this bog is expected to develop embryonic bog on deep peat areas, and wetland habitats on shallow peat with open water, reed swamp and fen habitats with alkaline emission factors. Birch woodland is expected to develop on the drier mounds and peripheral headlands.

3.9 Current ecological rating

(Following NRA (2009) Evaluation Criteria)

The habitats of Bracklin West Bog can be rated as **Local Importance; lower value to Local Importance; higher value**. Bare peat and in the former production area of Bracklin West Bog are assessed as **local importance (lower value)**. The remaining habitats recorded; woodland, scrub, dry heath, remnant bog, wetland and riparian habitats may act as a refuge and as ecological corridors for wildlife and are therefore deemed to be **locally important (higher value)**.

4. CONSULTATION

4.1 Consultation to date

Consultation seeks to engage an audience of relevant stakeholders at both a national and local level. National stakeholders have been identified from varied bog restoration and rehabilitation efforts undertaken by Bord na Móna over the past 40 years, with particular emphasis on engagement with stakeholders during their Biodiversity Action Plan programme, since 2010. National Stakeholders includes relevant government departments and agencies, relevant semi-state bodies, NGOs and other environmentally focused groups with a national remit.

There has been ongoing consultation about rehabilitation, biodiversity, and other general issues over the years about Ballivor-Derrygreenagh bog group, including Bracklin West Bog, with various stakeholders in relation to:

- General consultation with range of stakeholders at annual Bord na Mona Biodiversity Action Plan review days 2010-2018,
- Meetings and site visit with local community group - Meath-Westmeath Bog Group regarding rehabilitation of Bracklin Bog between 2013 - 2016.
- Meeting with Westmeath County Council regarding general rehabilitation plans for BnM bogs and BnM BAP (2016)
- Midlands & East Regional WFD Operational Committee (River Basin Management Plans),
- The proposed development of the nearby Ballivor wind farm,
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).

There has been ongoing consultation about the planning and construction of Ballivor Wind Farm ([Bord na Móna Wind Farm | Ballivor Wind Farm](#)) as part of planning for that particular proposed development. This website describes the project and has up to date project newsletters.

To inform the current Plan, both national and local stakeholders, including neighbours whose land adjoins Bracklin West Bog and local representatives of national bodies (such as Regional National Parks and Wildlife Service staff) and relevant offices in County Councils (such as the Heritage or Environmental Offices) will be contacted. Any identified local interest groups will be sought and informed of the opportunity to engage with this rehabilitation plan, and when identified invited to submit their comments or observations in relation to the proposed rehabilitation at Bracklin West Bog.

All correspondence received has been acknowledged and evaluated against the rehabilitation work proposed here.

4.2 Issues raised by Consultees

To date, a number of issues have been raised by consultees during the consultation process for both the current and previous drafts of the rehabilitation plan for Bracklin West Bogs – these are summarised below.

4.2.1 Assessments of rehabilitation

During the initial commencement of PCAS, a number of consultees including: the Irish Farmers Association (IFA), the Irish Creamery Milk Suppliers Association (ICMSA) and Trinity College Dublin have raised concerns regarding the duration and scope of consultation period. Stakeholders suggested that the consultation period should be extended to allow all potential stakeholders to make submissions where required.

Queries on pre-rehabilitation assessments were raised by NPWS and the National Museum of Ireland relating to the finalisation of several bog rehab plans in 2021 in relation to Appropriate Assessment, Environmental Impact Assessment and Strategic Environmental Assessment.

4.2.2 *Restoration scope*

Restoration/rehabilitation of marginal habitats was raised by the Irish Peatland Conservation Council (IPCC) and Butterfly Conservation Ireland (BCI) relating to the finalisation of several bog rehab plans in 2021 as worthy of consideration within the rehabilitation measures to support carbon sequestration and biodiversity objectives.

4.2.3 *Monitoring*

Further details on monitoring of ecological metrics, and how and where reporting on this monitoring would take place, was raised by the IPCC, University College Dublin and Trinity College researchers in their respective submissions relating to the finalisation of several bog rehab plans in 2021. Uisce Éireann (formerly Irish Water) reiterated the requirement of a strong monitoring program with respect to water quality during and post rehabilitation.

4.2.4 *Flooding and drainage*

The IFA, The Department of Agriculture Food and the Marine, individual local residents and ICMSA queried likely impacts relating to the finalisation of several bog rehab plans in 2021 arising from the proposed re-wetting associated with the rehabilitation in relation to flooding on adjoining lands and, specifically, with regards to the maintenance of drains. The IFA also raised the issue of Health and Safety in relation to raising water levels as well as possible impacts on land and property prices.

4.2.5 *Future management*

The IFA expressed concerns regarding the future ownership of the BnM bogs subject to rehabilitation. They expressed a desire for contingency planning for potential future ownership of designated bogs so as to ensure no negative impacts arise on adjacent properties from any new ownership.

4.2.6 *Other issues*

Other issues (raised by IPCC) during the finalisation of several bog rehab plans in 2021 and in 2023 for Bracklin West Bogs included after use of the bog and turf cutting on the margins of the bog (outside of the area owned by Bord na Móna).

Archaeological end of life survey of all the bogs were requested by National Museum of Ireland and National Monuments Unit.

For a complete summary of submissions received and replies, see Appendix XI.

4.3 Bord na Móna response to issues raised during consultation

4.3.1. Consultation

BnM are carrying out ongoing consultation as part of the process of developing the rehabilitation plan for Bracklin West Bog. This is ongoing with a dedicated Community Liaison Officer communicating to affected and interested parties. A website has been developed to make information available. This will be continually updated. Some PCAS Bogs have been used as demonstration sites so that interested stakeholders can come to visit and observe the measures on the ground.

4.3.2 Assessments of rehabilitation

Appropriate Assessment screening will be undertaken on all the bogs as part of PCAS and this is currently being undertaken by external consultants for Bracklin West Bogs. Where required, Natura Impact Statements shall be completed and submitted to the Minister in accordance with 42(9) and 42(10) of the Habitats Regulation, noting that Bord na Móna is prescribed as a 'public authority' under this legislation. In relation to the SEA Directive and EIA Directive, this has been considered and the legal advice to date is that the scheme does not come under these Directives.

An Archaeological Impact Assessment (AIA) has been undertaken on all the bogs in PCAS (Appendix XII). The aim for known archaeology on these bogs is to accomplish preservation in situ and we are taking steps to identify and avoid all known archaeology. It is anticipated that any archaeology will benefit from the ultimate remit of the rehabilitation, in that water tables will be raised thereby preserving in-situ. There is also an identified procedure for managing reports of stray finds that may arise during rehabilitation works.

4.3.3 Restoration scope

As part of the PCAS, all restoration/rehabilitation options have been developed to support climate action and biodiversity objectives. Other issues such as existing amenity, social impacts, industrial history, archaeology were not part of the direct scope of PCAS but were considered when developing the rehabilitation plan. After use of the bog is outside the scope of PCAS. Rehabilitation will lead to the development of a stable diverse re-wetted cutaway landscape that will have added benefits for amenity in the future.

4.3.4 Monitoring

As part of the PCAS, a monitoring and verification plan has been developed to support climate action and biodiversity objectives. This will include stratified monitoring of bog condition, habitats and biodiversity at several different scales. It is proposed to monitor the improvement of some biodiversity ecosystem services. The appearance of key species such as *Sphagnum* moss will be monitored during walk-over surveys and general monitoring visits. It is not proposed to carry out any additional monitoring of biodiversity ecosystem services at this site. This site is not expected to attract significant numbers of wetland birds as it is a relatively deep peat bog. Biodiversity monitoring for PCAS planned for a stratified approach with different targeted monitoring at different sites based on the site characteristics.

4.3.5 *Flooding, drainage or other impacts on adjacent land.*

It is the intention of Bord na Móna that the re-wetting of the bogs will be carried out in such a manner that does not impact on third party lands. Where it is deemed that blocking of a shared drain would cause any adjoining lands to be adversely affected, this will be avoided, and alterations made to the rehabilitation plan. In general, drains around the margins of the bog will not be blocked.

External consultants have been appointed to carry a hydrological assessment to identify any potential impacts to neighbouring lands and to mitigate against any such impacts. No issues were identified. There is no potential for direct impacts on arterial drainage downstream.

The rehabilitation measures proposed at Bracklin West Bogs will generally result in reduced runoff and drainage from the existing peat fields through a mixture of techniques including drain blocking, cell bunding and re-profiling. It is intended that these measures will not significantly alter the existing topographical catchments and that the spine of the drainage networks, those which the upstream catchments drain through, will be retained by Bord na Móna. Based on evidence from other bogs, rehabilitation measures will reduce the run-off from the bog by returning the peatlands towards its natural water retention function.

4.3.6 *Amenity*

Creating amenity such as walking tracks is not part of the direct scope of PCAS. There is no current amenity planned for Bracklin West under this scheme. However, PCAS will enable and support any future amenity development. There can be further opportunities to develop amenity at this site. Any future amenity can be positively aligned and integrated to after-use plans following the completion of the proposed rehabilitation at Bracklin West Bog. Rehabilitation measures proposed for Bracklin West Bog do not need to be amended to integrate any future amenity projects positioned along the margin of the former production bog or along the former bog railways.

4.3.7 *Water quality*

It is the expectation of BnM that rehabilitation measures should positively impact the water quality in receiving water bodies through enhancing the water attenuation across rehabilitated sites. The robust water monitoring programme implemented as part of PCAS will be used to assess water quality leaving rehabilitated sites at designated points.

4.3.8 *Future management*

Bord na Móna will continue to manage their land bank into the future. As peat production has now ceased on Bord na Móna lands and rehabilitation measures will be carried out, a regular drainage maintenance programme will not be required or carried out as would have been the case in the past. However, if issues arise with the Bord na Móna internal drainage system that affects upstream or downstream landowners, then these issues will be addressed by Bord na Móna.

Bord na Móna considers issues regarding estate security, fire risk, invasive species and water pollution of utmost importance. BnM intends to maintain security and manage fire risk over the entirety of the estate. In this regard, PCAS activities, should have no detrimental impact on these issues. Regarding water pollution, BnM is regulated by the EPA and as such adheres to the strict water pollution measures laid out by the same.

4.3.9 *Other issues*

Other issues, including after-use and management issues outside the boundary of Bracklin West Bogs, are acknowledged but are specifically outside the scope of this rehabilitation plan.

Security: It is the intention of Bord na Móna to keep secure the estate and ensure that any anti-social behaviour that occurs within the estate is reported and dealt with by the appropriate authorities.

4.3.10 *Concluding statement.*

- Some parts of Bracklin West Bog includes large areas of bare peat following the cessation of peat production, with some areas that were out of peat production earlier beginning to develop a mosaic of habitats already. This will not be radically changed.
- No specific issues were raised during consultation that required significant changes to the substance of the rehabilitation plan.
- Several marginal drains will not be blocked to avoid impacts on adjacent lands, rights of way or turf-banks. This does not change the overall rehabilitation goals and outcomes and can be integrated with the other rehabilitation measures to allow cutaway re-wetting.
- No changes were required to the rehabilitation plan to enable any future potential amenity.

5. REHABILITATION GOALS AND OUTCOMES

The rehabilitation goals and outcomes outline what Bord na Móna want to achieve by implementing the rehabilitation. These include:

- Meeting conditions of IPC Licence.
- Stabilisation or reduction in water quality parameters of water discharging from the site (e.g. suspended solids).
- Reducing pressure on receiving waterbodies that have been classified as At Risk from peatlands and from peat extraction, via stabilization or improving water-quality from this bog, and therefore, reducing pressures.
- Optimising hydrological conditions for **climate action benefits as part of PCAS**.
- Optimising hydrological conditions for the development of embryonic *Sphagnum*-rich vegetation communities on deep peat, or reed swamp and fen on shallow more alkaline peat and other subsoils, where present.
- Optimising hydrological conditions for the development of active raised bog on extant high bog.
- Optimising hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future.
- Supporting expected future land-uses.
- The main goal and outcome of this plan is the successful rehabilitation (environmental stabilisation) of peatlands used for industrial peat production at the bog in a manner that is acceptable to both external stakeholders and to Bord na Móna and which optimise climate action and other ecosystem service benefits.

The rehabilitation goals and outcomes take account of the following issues.

- It will take some time for stable naturally functioning habitats to fully develop at Bracklin West Bog. This will happen over a longer timeframe than the implementation of this rehabilitation plan.
- Re-wetting residual peat will initially maintain and enhance the carbon storage capacity of the bog. There is scientific consensus that restoration of hydrology in damaged bog can improve carbon storage, water storage and attenuation and help support biodiversity both on the site and in the catchment (See Section 3.8). This will reduce carbon emissions from the site from a larger carbon source to a smaller carbon source. In time, the site has the capacity to develop in part as a carbon sink. PCAS is expected to deliver significant contributions to Ireland's climate action.
- It is not expected that the site has the potential to develop active raised bog (ARB) analogous to the priority EU Habitats Directive Annex I habitat within the foreseeable future (c.50 years). Furthermore, only a proportion of the bog has potential to develop *Sphagnum*-rich habitats in this timeframe. Nevertheless, re-wetting across the entire bog, as part of the scheme, will improve habitat conditions of the whole bog. Other peatland habitats will develop in a wider mosaic that reflects underlying conditions.
- Rehabilitating former industrial peat production bog will also in the longer-term support other ecosystem services such as such the development of new habitat to support biodiversity and local attenuation of water flows from the bog.
- WFD status in receiving water bodies can be affected by peatlands and peat extraction but is also affected by other sources such as agriculture. In addition, receiving water bodies that are assessed as At Risk from peatlands and from peat extraction are likely to have several contributory sources of impacts (private peat extraction and Bord na Mona). Reducing pressures due to former peat extraction activities at

Bracklin West bog will contribute to stabilising or improving water quality status of receiving water bodies in general. Ultimately, improving the WFD status of the receiving water body will depend on reducing pressure from a range of different sources, including peatlands in general (private and Bord na Móna).

- The proposed development of the nearby Ballivor wind farm.
- Re-wetting in general will benefit the future preservation of most known and unknown archaeological features. An Archaeological Impact Assessment (AIA) is to be carried out under the PCAS scheme.

6. SCOPE OF REHABILITATION

The principal scope of this enhanced rehabilitation plan is to rehabilitate the bog. This is defined by:

- The area of Bracklin West bog.
- EPA IPC Licence - Ref. P0501-01. As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. Bracklin West bog is part of the Ballivor-Derrygreenagh bog group.
- The Scheme is designed to exceed the stabilisation requirements as defined by the IPC Licence. This scheme is designed to enhance the ecosystem services of Bracklin West bog, in particular, optimising **climate action benefits**. The proposed interventions will mean that environmental stabilization is achieved (meaning IPC obligations are met) and, in addition, significant other ecosystem service benefits particularly for climate action will be accrued.
- The local environmental conditions of Bracklin West Bog mean that intensive drain blocking and cell creation are the most suitable rehabilitation approach for this site.
- Bracklin West Bog has a gravity drainage regime.
- Proposed land-use. Bord na Móna are currently developing a renewable energy project called Ballivor Wind Farm. Bracklin West is outside the development boundary of the proposed Ballivor Wind Farm and no turbines or wind farm infrastructure overlaps the currently proposed PCAS extent at Bracklin West (nearest is ca.600m to the east).
- Bord na Móna have defined the key goal and outcome of rehabilitation at Bracklin West Bog as **environmental stabilisation** of the site via **optimising climate action benefits, where possible**. The re-wetting of residual peat in the area recently out of peat extraction will be optimised, **setting the site on a trajectory towards the development of peat-forming communities on residual deep peat, and the development of wetlands/Reed Swamp and fen on shallow more alkaline peat and other subsoils**.
- Rehabilitation of Bracklin West bogs will support multiple national strategies of climate action, biodiversity action and other key environmental strategies such as the Water Framework Directive.
- The time frame for the delivery of the planned rehabilitation will be undertaken according to available resources and appropriate constraints.
- It is not proposed to carry out rehabilitation on all marginal or peripheral cutover bog zones. Generally, these bog remnants are narrow, or are subject to turbary, and do not have positive bog restoration prospects.

6.1 Key constraints

- **Bog conditions.** Rehabilitation outcomes of sites are constrained by the environmental characteristics of these particular areas. Drain blocking can be widespread in scale with each field drain being blocked (e.g. Kellysgrove) or more localised with targeted drain-blocking (e.g. Mountlucas Wind Farm) and both can be very effective. This can be used in conjunction with local topographical features like natural hollows to manage water levels or with other typical features of cutaway peatlands like high peat fields, which act as berms to hold water to some extent. Active management to create low berms to manage water-levels and create shallow wetland habitats dominated by emergent vegetation has also been successfully developed (e.g. Mountlucas Wind Farm, Bruckana Wind Farm, Oweninny, Lough Boora Discovery Park, Ballycon). Overflow pipes will be used to maintain maximum water levels across the cutaway and allow excess surface water to flow into the drainage channels beside the roads and other infrastructure.

Managing the cutaway in this way means that the cutaway can stay wet, while excess surface water can drain away through the drainage infrastructure.

- **Future land-use.** Planned renewable energy development. Bracklin West is outside the development boundary of the proposed Ballivor Wind Farm and no turbines or wind farm infrastructure overlaps the currently proposed PCAS extent at Bracklin West (nearest is ca.600m to the east). The wind farm project is currently at the pre-planning stage. The potential impact of the wind farm infrastructure on the rehabilitated area is expected to be negligible and it does not change the overall goals and outcomes of the proposed rehabilitation (re-wetting residual peat) for Bracklin West. The key objective of this rehabilitation plan will be environmental stabilisation and re-wetting of the cutaway areas in the selected extent, which are removed and separated from the proposed Ballivor Wind Farm infrastructure.
- **Surrounding landscape and neighbours.** Another key constraint is the interaction between the Bord na Móna sites and the surrounding landscape. Care has to be taken that no active rehabilitation management is carried out that could negatively and knowingly impact on surrounding land. This includes any hydrological management on neighbouring farmland. It is anticipated that the work proposed here (blocking drains and re-wetting cutaway peatlands) will not have any flooding impacts on adjacent land.
- **Archaeology.** Should any previously unknown archaeological material be uncovered during the rehabilitation works, it will be avoided and reported to Bord na Móna Archaeological Liaison Officer and the National Museum of Ireland.
- **Public Rights of Way.** Where a public right of way or similar burden exists on Bord na Móna property, consideration will be given to ensuring that this remain intact where possible. In some instances, depending upon previous land uses and management, alternative solutions may be required. These will be explored in consultation with local communities and statutory bodies during the consultation work associated with the decommissioning and rehabilitation work described here. No known Rights of Way exist at or around the margin of Bracklin West Bog, most of which lead to known turbary areas.

6.2 Key Assumptions

- It is assumed that Bord na Móna will have all resources required to deliver this project.
- It is expected that weather conditions will be within normal limits over the rehabilitation plan timeframe. Long periods of wet weather have the capacity to significantly affect ground conditions and constrain drain blocking and other ground activities.

6.3 Key Exclusions

The scope of this rehabilitation plan does not cover:

- The longer-term development of stable naturally functioning habitats to fully develop at Bracklin West Bog. The plan covers the short-term rehabilitation **actions** and **an additional monitoring and after-care programme** to monitor the rehabilitation and to respond to any needs.
- The currently proposed Ballivor Wind Farm footprint.
- This plan is not intended to be an after-use or future land-use plan for Bracklin West Bog.
- The longer-term management of this site, potentially as a nature conservation site, or for amenity, or for other uses in the future.

7. CRITERIA FOR SUCCESSFUL REHABILITATION

This section outlines what criteria will be used to indicate successful rehabilitation and what critical success factors are needed to achieve successful rehabilitation. All criteria used to indicate successful rehabilitation will be measured to validate the achievement of the rehabilitation goals and outcomes and validate the completion of the rehabilitation.

The key objective of this enhanced rehabilitation plan is **environmental stabilisation** and the stabilisation of any emissions from the site that related to the former industrial peat extraction activities.

Rehabilitation is generally defined by Bord na Móna as:

- stabilisation of bare peat areas via targeted active management (e.g. drain-blocking/re-wetting) slowing movement of water across the site and encouraging natural colonisation; and
- mitigation of key emissions (e.g. potential run-off of suspended solids).

In addition, Bord na Móna wish to optimise climate action and other ecosystem service benefits via enhanced rehabilitation measures.

7.1. Criteria for successful rehabilitation to meet EPA IPC licence conditions:

- Rewetting of residual peat in the area originally drained for industrial peat production to offset potential run off of suspended solids and to encourage and accelerate development of vegetation cover via natural colonisation, and increase in the area of potentially peat forming habitats. See Table 7.1 for a summary of the criteria for successful rehabilitation and associated monitoring. The target will be the delivery of measures and this will be measured by an aerial survey after rehabilitation is completed.
- That there is a stabilizing/improving concentration of suspended solids and ammonia in discharges from Bord na Móna sites, associated with the measures undertaken to stabilize the peat surface by the blocking of the internal drainage system and the maximized rewetting of the peat surface. This will be demonstrated by developing a stable or downward trajectory of water quality indicators (suspended solids and ammonia) towards what would be typical of a re-wetted cutaway bog. This will be measured via water quality monitoring (suspended solids and ammonia) for at least 2 years after the rehabilitation has been completed.
- Receiving water bodies have been classified under the River Basin Management Plan and this classification includes waters that are At-Risk from peatlands and peat extraction. The success criteria will be that the At-Risk classification will see improvements in the associated pressures from this peatland or if remaining At-Risk, that there is an improving trajectory in the pressure from this peatland.

With regard to predicting and estimating likely trends that might materialize or could be considered as a target, monitoring of surface water ammonia emissions from Longfordpass bog in Littleton over 3 yrs., post cessation of peat extraction with ongoing rehabilitation, were considered. These are indicating a downward trend in Ammonia concentrations (Figure 7.1).

Similarly monitoring of surface water ammonia emissions from a Corlea bog in Mountdillon over the past 4 yrs. post cessation of peat extraction with ongoing rehabilitation, indicate downward trends.

As the monthly monitoring program at Bracklin West Bog continues in 2022/2023 during the rehabilitation works planned for 2023, and data from the 2022 monitoring program is compiled, further trending will be produced to verify any ongoing trends.

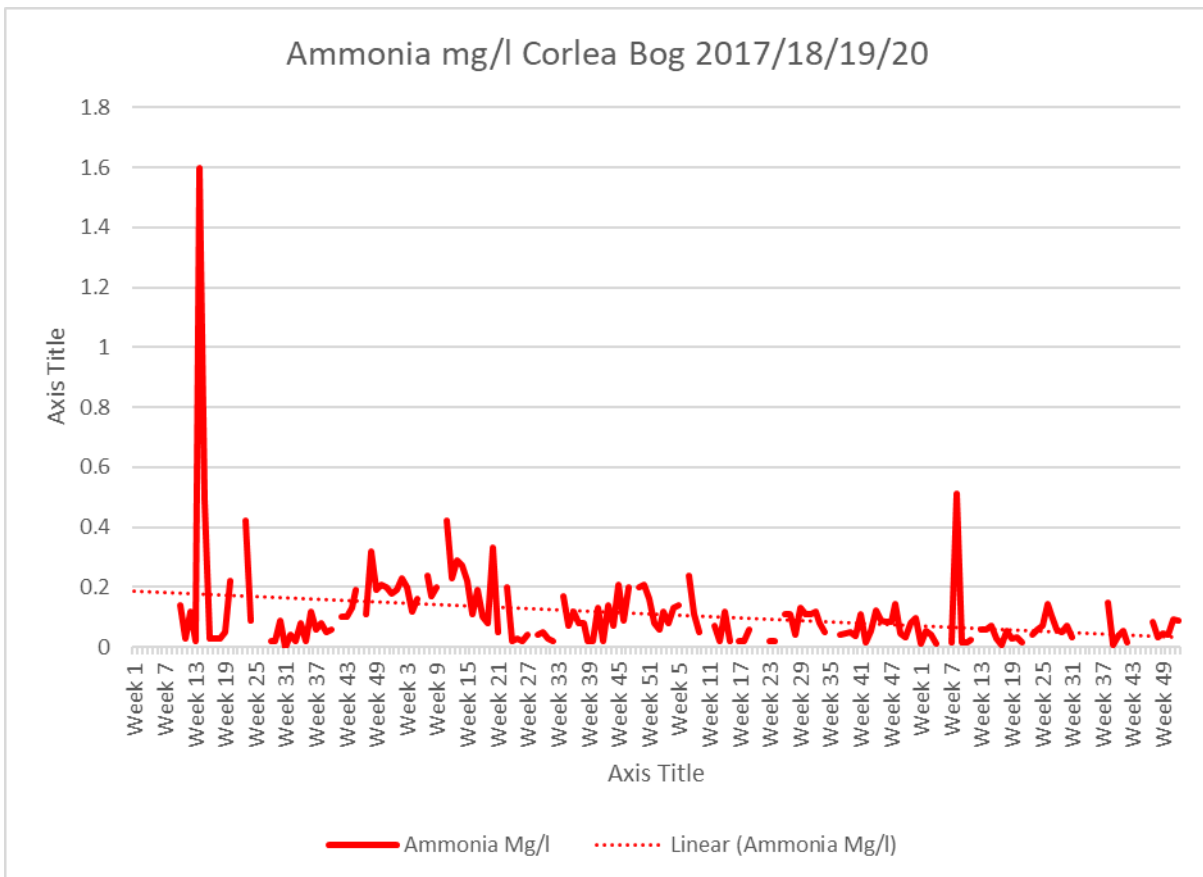
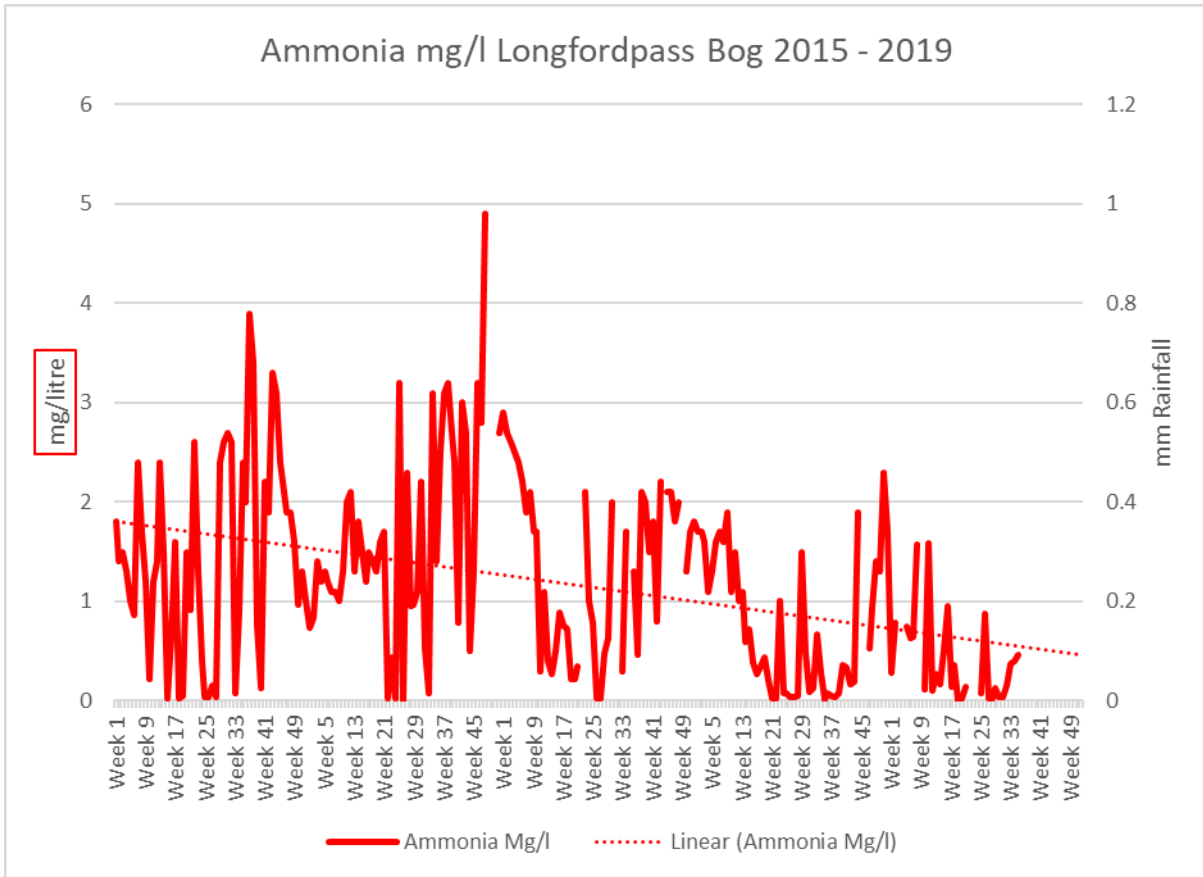


Figure 7.1. Ammonia levels over the period 2015-2019 at Longfordpass and the period 2017-2020 at Corlea.

Additional criteria for successful rehabilitation to optimise climate action and other ecosystem service benefits:

- Optimising the extent of suitable hydrological conditions to optimise climate action and other ecosystem service benefits (optimising and maximising residual peat re-wetting). This will be measured by an aerial survey after rehabilitation has been completed.
- Accelerating the trajectory of the bog towards becoming a reduced carbon source/carbon sink. This will be measured through habitat mapping and the development of cutaway bog condition assessment. This cutaway bog condition assessment will include assessment of environmental and ecological indicators such as vegetation cover, vegetation communities, presence of key species, *Sphagnum* cover, bare peat cover and water levels (similar to ecotope mapping). Baseline monitoring will be carried out after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.
- Reduction in carbon emissions. This will be estimated via a combination of habitat condition assessment and application of appropriate carbon emission factors derived from other sites. Baseline monitoring (habitat condition) will be carried out after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.
- Setting the site on a trajectory towards establishment of a mosaic of compatible habitats including embryonic *Sphagnum*-rich peatland communities, wetland, fen, Reed swamp, heath, scrub, poor fen, and Birch woodland, where conditions are suitable. It will take some time for stable naturally functioning habitats to fully develop at Bracklin West Bog. This will be demonstrated and measured via aerial photography, habitat mapping and cutaway/habitat condition assessment. Baseline monitoring will be carried out after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.
- Improvement in biodiversity and ecosystem services. This will be demonstrated by metrics outlined in Section 9.1 that can be used to measure changes in ecosystem services (e.g. water quality parameters, development of pioneer habitats, breeding bird monitoring). This will be measured by collecting a range of scientific data that can then quickly be adapted and into metrics that can be used to measure changes in various ecosystem services. Baseline monitoring will be carried out after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.

Table 7.1. Summary of Success criteria, targets, how various success criteria will be measured and expected timeframes.

Criteria type	Criteria	Target	Measured by	Expected Timeframe
IPC validation	Rewetting in the former area of industrial peat production	Delivery of rehabilitation measures Reduction in bare peat.	Aerial photography after rehabilitation has been completed – to demonstrate measures (drain-blocking) Establishment of a baseline for future monitoring of bare peat, vegetation establishment and habitat condition.	2023-2025
IPC validation	Key water quality parameters Ammonia, Phosphorous, Suspended solids, pH and conductivity	Reduction or stabilisation of key water quality parameters associated with this bog	Water quality monitoring for a period after rehabilitation has been completed	2022-2024
IPC validation	Reducing pressure from peat production on the local water body catchment (WFD)	Where this section of the water body, that this bog drains to, has not been identified as under pressure from peat extraction, that the intervening EPA monitoring programme associated with its Programme of Measures for this water body, confirms that its classification remains at not being at risk from peat extraction associated with activities at this bog.	EPA WFD monitoring programme	WFD schedule
Climate action verification	Optimising the extent of suitable hydrological conditions to optimise climate action	Optimal extent of suitable hydrological conditions	Aerial photography and Habitat mapping to map extent of suitable hydrological conditions. Baseline monitoring to be carried out during the scheme when rehabilitation is complete. Sites can be re-	2023-2025

Criteria type	Criteria	Target	Measured by	Expected Timeframe
			monitored in the future and compared against this baseline.	
Climate action verification	Reduction in carbon emissions.	Reduction in carbon emissions	Carbon emissions – estimated using a bog condition assessment and appropriate carbon emission factors.	2023-2025
Climate action verification	Setting the site on a trajectory towards establishment of a mosaic of compatible habitats	Establishment of compatible cutaway habitats	Habitat map, Cutaway bog condition map Baseline monitoring to be carried out during the scheme when rehabilitation is complete. Sites can be re-monitored in the future and compared against this baseline.	2023-2025

Meeting climate action verification criteria and monitoring of these criteria after the scheme has been completed is dependent on support from the Climate Action Fund or other sources of funding. Note that monitoring and verification of the overall scheme will be stratified – not all these criteria will be measured at each individual site. Baseline monitoring to be carried out during the scheme when rehabilitation is complete. Sites can be re-monitored in the future and compared against this baseline.

7.2. Critical success factors needed to achieve successful rehabilitation as outlined in the plan

The achievement of successful rehabilitation as outlined in the plan requires:

- **Funding to pay for resources required to deliver the planned rehabilitation (Bord na Móna and external).** Bord na Móna maintains a provision on its balance sheet to pay for these future costs when industrial peat extraction ceases. Bord na Móna is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence. It is expected that additional costs of enhanced rehabilitation will be supported by Government through the Climate Action Fund and Ireland’s National Recovery and Resilience Plan.
- **Bord na Móna to have sufficient resources (staff and training) to deliver the planned rehabilitation with required associated skills and competencies.**
- **Bord na Móna to have sufficient resources (suitable machinery) and staff to maintain this machinery.**
- **Weather conditions to be within normal limits over the rehabilitation plan timeframe.** Long periods of wet weather have the capacity to significantly affect ground conditions and constrain the delivery of rehabilitation. The potential impact of wet weather on ground conditions can be reduced by appropriate planning and management. Bord na Móna have significant experience of managing these issues through 70 years of working in these peatland environments.

- **Rehabilitation measures to be effective.** The rehabilitation measures proposed in this plan are based on 40 years of Bord na Móna experience of peatland management and best practice applied internationally in peatland management. Measures proposed in this plan have already been shown to be effective at other sites. Bord na Móna will apply a flexible and adaptable approach to the more innovative rehabilitation measures proposed in this plan. If measures are not initially effective, Bord na Móna will review any requirement for additional practical rehabilitation.
- **Natural colonisation of vegetation to develop semi-natural habitats at a rate within the normal limits.** The development of naturally functioning semi-natural habitats on degraded bog takes time. It may take 30-50 years for active raised bog vegetation to re-develop on suitable cutaway that was previously bare peat. However, Bord na Móna experience has demonstrated the effectiveness of these type of measures for re-wetting bog and creating carbon sinks (Renou-Wilson et al. 2018).
- Rehabilitation measures have been designed to accelerate and work with natural colonisation and other natural processes. Bord na Móna experience of rehabilitation has shown that re-wetting improves conditions for natural colonisation and that natural colonisation is accelerated where the environmental conditions are most suitable. Rehabilitation measures have been designed to modify the conditions of areas within sites where conditions are less suitable for natural colonisation (modifying hydrology, topography, nutrient status or availability of potential seed sources).
- **Monitoring to be robust and effective.** Rehabilitation Monitoring will be established to validate the success of rehabilitation as required by Condition 10 of the IPC Licence and to verify the benefits of the proposed enhanced measures to optimise climate action. This will focus on collecting a range of scientific data that can then quickly be adapted into metrics that can be used to measure changes in various ecosystem services.

8. REHABILITATION ACTIONS AND TIME FRAME

Peatland rehabilitation requires detailed planning and the use of data from desktop surveys and field surveys. This data in association with topographical and hydrological modelling will be important in planning the future peatland landscapes and planning the use of the most appropriate rehabilitation methodologies to maximise climate action benefits. Hydrological modelling indicates those areas that are likely to re-wet when drains are blocked, based on the current topography, and areas where water levels may have to be modified, where needed. Enhanced rehabilitation measures will look to optimise hydrological conditions for re-wetting peat in other areas. This planning is also essential for matching the most sustainable rehabilitation methodology to the most suitable cutaway environment to maximise the benefits of the resource outlay (maximising cost/benefit).

A number of illustrative figures have been produced to inform Rehab Planning and Design, including Aerial Photography, Peat Depths, LiDar Surface Maps, and Depression Analysis modelling; these are included in the accompanying Mapbook as the drawings referenced below:

BNM-DR-15-22 titled ***Bracklin West Bog: Aerial Imagery2020***

BNM-DR-15-04 titled ***Bracklin West Bog: Peat Depths***

BNM-DR-15-03 titled ***Bracklin West Bog: LiDAR Map***

The rehabilitation actions themselves will be a combination of PCAS measures to re-wet peat. The distribution of these measures is provisionally outlined in drawing titled BNM-DR-15-20 ***Bracklin West Bog: Standard Rehabilitation Measures*** in the accompanying Mapbook (note that the actual distribution of these measures may be subject to change in response to stakeholder consultation and refinement of the enhanced rehabilitation measures.)

These enhanced measures for Bracklin West bog will include (see Table 8.1):

- A widespread drain-blocking programme will be implemented across the cutaway bog, where possible. In general, field drains will be blocked where possible to re-wet cutaway and re-wet to the optimum water-level. More intensive measures will be targeted towards the bare peat.
- In areas of deeper peat, berms and field reprofiling will be carried out to create 45m x 60m cells. These will be carried out in deep peat areas where water has potential to be retained within the cell. Measures will also entail blocking outfalls, managing overflows, creating drainage channels for excess water and carrying out *Sphagnum* inoculation.
- Less intensive measures (targeted drain-blocking) will be used in areas where habitats have already established.
- Measures will include drain blocking (3/100 m), modifying outfalls and managing water levels with overflow pipes;
- Wetland measures including drain blocking, blocking outfalls and managing water levels with overflow pipes.

Table 8.1: Types of and areas for enhanced rehabilitation measures at Bracklin West bog. Note that the types of rehab and areas of rehab may change in response to stakeholder consultation and refinement of the enhanced rehabilitation measures.

Type	Code	Description	Extent (Ha)
Deep Peat	DPT 2	More intensive drain blocking (max 7/100m) + blocking outfalls and managing water levels with overflow pipes	41.27
	DPT 3	More intensive drain blocking (max 7/100m) + field reprofiling + blocking outfalls and managing overflows	3.14
	DPT 4	Berms and field reprofiling (45m x 60m cell) + blocking outfalls and managing overflows + drainage channels for excess water + <i>Sphagnum</i> inoculation	50.57
Dry Cutaway	DCT2	Regular drain blocking (3/100m) + blocking outfalls and managing water levels with overflow pipes + targeted fertiliser treatment	30.74
Wetland Cutaway	WLT4	More intensive drain blocking (max 7/100m) + blocking outfalls and managing overflows + transplanting reeds and other rhizomes	3.62
Additional Works	AW2	Targeted drain blocking	5.4
Marginal land	MLT1	No work required	15.8
Constrained Area	Constraint	Constraint – agricultural field to west and railway line.	1.77
Silt Ponds	Silt Pond		0.33
Total Area			152.6

8.1 Short-term planning actions (0-1 years)

- Seek formal approval of the rehabilitation plan from the EPA.
- Develop a detailed site plan outlining how the various rehabilitation methods will be applied to Bracklin West Bog. This will take account of peat depths, topography, drainage and hydrological modelling (see rehabilitation map for an indicative view of the application of different rehabilitation methodologies).
- A drainage management assessment of the proposed rehabilitation measures will be carried out and any issues identified resolved and the rehabilitation plan adapted.
- A review of issues that may constrain rehabilitation such as known rights of way, turbary and existing land agreements is to be carried out

- An ecological appraisal of the potential impacts of the planned rehabilitation on the presence of sensitive ground-nesting bird breeding species (e.g. breeding waders) is to be carried out. The scheduling of rehabilitation operations will be adapted, where required.
- Ensure all activities comply with the environmental protection requirements of the IPC Licence.
- Carry out Appropriate Assessment (AA) of the Rehabilitation Plan. Incorporate any required mitigation measures from the AA in the plan for the delivery of rehabilitation and decommissioning across the site.
- Track implementation and enforcement of the relevant IPC Licence conditions, the mitigation measures (AA) and other environmental control measures during the implantation of the rehabilitation plan.

8.2 Short-term practical actions (0-2 years)

- Carry out proposed measures as per the detailed site plan. This will include a combination of drain blocking, and fertiliser applications targeting bare peat areas of headlands, high fields and other areas (where required) in addition to wetland creation and management prescriptions. All rehabilitation will be carried out with regard to best practice environmental control measures (Appendix III).
- Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions.
- Carry out the proposed monitoring, as outlined in section 9.
- Silt ponds will be monitored during this period and there will be continued maintenance and cleaning to prevent potential suspended solids run-off from the site during the rehabilitation phase.

8.3 Long-term (>3 years)

- Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- Delivery of a monitoring, aftercare and maintenance programme (See section 10.2 below).
- Decommissioning of silt-ponds will be assessed and carried out, where required.
- Reporting to the EPA will continue until the IPC License is surrendered.

8.4 Timeframe

- **2022-2023:** Short-term planning actions.
- **2023-2024:** Short-term practical actions.
- **2024-2025:** Long term practical actions. Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- **2025:** Decommission silt-ponds, if necessary.

8.5 Budget and costing

Bord na Móna (BnM) appreciates the Minister's intention to support Bord na Móna in developing a package of measures, 'the Scheme', for enhanced decommissioning, rehabilitation and restoration of cutaway peatlands referred to as, the Peatlands Climate Action Scheme'. *However, only the additional costs associated with the additional and enhanced rehabilitation, i.e., measures which go beyond the existing standard mandatory decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support.*

The enhanced decommissioning, rehabilitation and restoration of the peatlands funded by the Scheme will deliver benefits across climate action (GHG mitigation through reduced carbon emissions and acceleration towards carbon sequestration), enrich the State's natural capital, increase eco-system services, strengthen biodiversity, improve water quality and storage attenuation as well as developing the amenity potential of the peatlands.

Bord na Móna maintains a provision on its balance sheet to pay for the future costs of **standard** rehabilitation and decommissioning when industrial peat extraction ceases. This is updated every year - for more information see the Bord na Móna Annual Report (Bord na Móna, 2022). Bord na Móna is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

At this time, a 'standard' rehabilitation provision (sufficient to discharge the requirement of Condition 10 in the licence) has been allocated to the site based on the area of different cutaway types across the site (See Appendix I).

9. AFTERCARE AND MAINTENANCE

9.1 Programme for monitoring, aftercare and maintenance

This programme for monitoring, aftercare and maintenance has been designed to meet the Conditions of the IPC Licence. This is defined as:

- There will be **initial quarterly monitoring assessments** of the site to determine the general status of the site, the condition of the silt ponds, assess the condition of the rehabilitation work, monitoring of any potential impacts on neighbours land, general land security, boundary management, dumping and littering.
- The number of these site visits will reduce after 2 years to bi-annually and then after 5 years to annual visits.
- These monitoring visits will also consider any requirements for further practical rehabilitation measures.
- The **baseline condition of the site will be established** post-rehabilitation implementation by using an aerial survey to take an up to date aerial photo, when rehabilitation is completed. This will be used to verify completion of rehabilitation measures. The extent of bare peat will be assessed using this baseline data, and habitat maps will be updated, if needed. It is proposed that sites can be monitored against this baseline in the future.
- **Water quality monitoring** at the bog will be established. The main objective of this water quality monitoring will be to establish a baseline and then monitor the impact of peatland rehabilitation on water quality from the bog.
- In order to assist in monitoring surface water quality from this bog, it is planned to increase the existing licence monitoring requirements to sampling for the same parameters to every month during the scheduled activities and for a period up to two years post rehabilitation, depending on the period required to confirm that the main two parameters, suspended solids and ammonia are remaining compliant with the licence emission and trigger limit values and there is an improving trajectory in these two parameters i.e. reduction in concentration.
- Enhanced water quality monitoring will aim to include up to 70% of a bogs drainage catchments.
- Monitoring results will be maintained, trended and reported on each year as part of the requirement to report on Condition 10.1 of the IPC Licence on Bog Rehabilitation in the Annual Environmental Report, which will be available in April each year at www.epa.ie.
- The parameters to be included (as per condition 6.2 of the IPC Licence) include monthly monitoring for pH, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD and DOC.
- This monthly sampling regime on a selected number of silt ponds will be carried out over a two-year cycle. The original (licence) requirement was for a quarterly sampling regime, but this has been increased to a monthly regime to appropriately track the changing water chemistry that will occur as part of this enhanced rehabilitation. In addition, DOC will be included as a parameter to try and identify any changes in carbon in the surface water.
- If, after two years, key criteria for successful rehabilitation are being achieved and key targets are being met, then the water quality monitoring will be reviewed, with consideration of potential ongoing research on site. The water quality data, the aerial surveys and the habitat mapping will be collated and will be submitted to the EPA as part of the final validation report.
- If, after two years, key criteria for successful rehabilitation have **not** been achieved and key targets have **not** been met, then the rehabilitation measures and status of the site will be evaluated and enhanced, where required. This evaluation may indicate no requirement for additional enhancement of

rehabilitation measures, but may demonstrate that more time is required before key criteria for rehabilitation has been achieved. Monitoring of water quality will then also continue for another period to be defined.

- Where other uses are proposed for the site that are compatible the provision of biodiversity and ecosystem services, these will be assessed by Bord na Móna in consultation with interested parties. Other after-uses can be proposed for licensed areas and must go through the required assessment process and planning procedures.

Additional monitoring measures are also proposed to monitor ecosystem service benefits that have been derived by enhanced rehabilitation. These proposed monitoring measures will be funded by the proposed Climate Action Fund Scheme or additional other funding. Monitoring of climate action and other ecosystem service benefits will be designed to take account of the requirements of monitoring benefits of the overall Scheme and will be stratified; that is not all monitoring will be carried out in each site. These are defined as:

- Vegetation and habitat monitoring after rehabilitation is completed using a cutaway bog condition assessment (Similar to ecotope mapping). This assessment will include assessment of on environmental and ecological indicators such as vegetation cover, vegetation communities, presence of key species, *Sphagnum* cover, bare peat cover and water levels. It is proposed that sites can be monitored against this baseline in the future.
- The condition of the bog can be assessed using the condition assessment and suitable Greenhouse Gas (GHG) emission factors can be assigned to different habitats. GHG emission factors have been determined for various peatland habitats in Ireland (Wilson *et al.*, 2015) and are constantly being refined with more and more research. BnM is actively supporting research into GHG fluxes in different rehabilitated peatland habitats. This means that potential GHG emissions can be estimated from the site, as the site continues along its trajectory towards a naturally functioning peatland ecosystem.

9.2 Rehabilitation plan validation and licence surrender – report as required under condition 10.4

IPC License 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.*

Reporting to the EPA will continue until the IPC License is surrendered. The bog will be included in the full licence surrender process as per the Guidance to Licensees on Surrender, Cessation and Closure of Licensed Sites EPA, 2012, when:

- The planned rehabilitation has been completed.
- The key criteria for successful rehabilitation has been achieved and key targets have been met;
- Water quality monitoring demonstrates that water quality of discharge is stabilising or improving; and
- The site has been environmentally stabilised.

10. REFERENCES

- Atherton, I, Bosanquet, SDS & Lawley, M (2010). Mosses and liverworts of Britain and Ireland - a field guide. British Bryological Society.
- Anderson, R., Farrell, C., Graf, M., Muller, F., Calvar, E., Frankard, P., Caporn, S., Anderson, P. (2017). An overview of the progress and challenges of peatland restoration in Western Europe. *Restoration Ecology*, Issue 2 Pages 271-282.
- Barry, T.A. et al (1973). A survey of cutover peats and underlying mineral soils. *Soil Survey Bulletin No. 30*. Dublin, Bord na Móna and An Foras Taluntais.
- Bord na Móna 2014. Blocking Drains in Irish raised bogs. The Bord na Móna Raised Bog Restoration Project. Cris, R. Buckmaster, S. Bain, C. Reed, M. (Eds) (2014) *Global Peatland Restoration demonstrating SUCCESS*. IUCN UK National Committee Peatland Programme, Edinburgh. <http://www.iucn-uk-peatlandprogramme.org/sites/www.iucn-peatlandprogramme.org/files/IUCNGlobalSuccessApril2014.pdf>
- Bord na Móna. 2016. Bord na Móna Biodiversity Action Plan 2016-2021. Brosna Press, Fermanagh. <http://www.bordnamona.ie/wp-content/uploads/2016/04/Biodiversity-Action-Plan-2016-2021.pdf>.
- Bord na Móna (2020). Bord na Móna Annual Report 2020. https://www.bordnamona.ie/wp-content/uploads/2020/07/M12822-BORD-NA-MONA_Annual-Report-2020_WEB2.pdf
- Bord na Móna (2022). *Methodology Paper for the Enhanced Decommissioning, Rehabilitation and Restoration on Bord na Móna Peatlands – Preliminary Study Nov 2022 Version 19*. Bord na Móna. Available online at : <https://www.bnmpcas.ie/supporting-material/>
- Bonn, A., Allott, T., Evans, M., Joosten, H. & Stoneman, R. (2017) *Peatland restoration and ecosystem Services- science, policy and practice*. Cambridge University Press.
- Carroll, J., Anderson, P., Caporn, S., Eades, P., O'Reilly C. & Bonn, A. 2009. Sphagnum in the Peak District. Current Status and Potential for Restoration. *Moors for the Future Report No 16*. Moors for the Future Partnership.
- Clark, D. and Rieley, J. 2010. *Strategy for responsible peatland management*. International Peat Society, Finland.
- Clark, D. (2010). *Brown Gold. A history of Bord na Móna and the Irish peat industry*. Gill Books.
- Cross, J.R. (2006). The Potential Natural Vegetation of Ireland. *Biology and Environment: Proceeding of the Royal Irish Academy*, Vol. 106B, No. 2, 65-116 (2006).
- Department of Communications, Climate Action and Environment 2019. *National Climate Action Plan 2019*. <https://www.dccae.gov.ie/en-ie/climate-action/publications/Pages/Climate-Action-Plan.aspx>
- Department of Housing, Planning, Community and Local Government 2017. *Public consultation on the River Basin Management Plan for Ireland*. Department of Housing, Planning, Community and Local Government. https://www.housing.gov.ie/sites/default/files/public-consultation/files/draft_river_basin_management_plan_1.pdf
- Department of Arts, Heritage and the Gaeltacht 2015. *National Peatland Strategy*. Department of Arts, Heritage and the Gaeltacht. <http://www.npws.ie/sites/default/files/general/Final%20National%20Peatlands%20Strategy.pdf>

- Eades, P., Bardsley, L., Giles, N. & Crofts, A. (2003). *The Wetland Restoration Manual*. The Wildlife Trusts, Newark.
- Environment Agency (2013). *The Knotweed code of practice. Managing Japanese Knotweed on development sites*. Environment Agency, Bristol, UK.
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/536762/LIT_2695.pdf
- European Commission (2013). *Interpretation manual of European Union Habitats*. European Commission DG Environment Nature ENV B.3.
- EPA (2019). <http://gis.epa.ie/Envision>. EPA Envision Map Viewer. (Last Viewed: 31/12/2019).
- EPA (2020). *Guidance on the process of preparing and implementing a bog rehabilitation plan*.
<http://www.epa.ie/pubs/reports/enforcement/guidanceontheprocessofpreparingandimplementingabogrehabilitationplan.html>.
- Farrell, C. A. and Doyle, G. J. 2003. Rehabilitation of Industrial Cutaway Atlantic Blanket Bog, NW Mayo, Ireland. *Wetlands Ecology and Management*, 11, 21-35.
- Fernandez, F., Connolly K., Crowley W., Denyer J., Duff K. & Smith G. (2014) *Raised Bog Monitoring and Assessment Survey (2013)*. Irish Wildlife Manuals, No. 81. National Parks and Wildlife Service, Department of Arts, Heritage and Gaeltacht, Dublin, Ireland.
- Fossitt, J. (2000). *A guide to habitats in Ireland*. Kilkenny. The Heritage Council.
- Gann, G.D., McDonald, T., Walder, B., Aronson, J., Nelson, C.R., Jonson, J., Hallett, J.G., Eisenberg, C., Guariguata, M.R., Liu, J., Hua, F., Echeverría, C., Gonzales, E., Shaw, N., Decler, K. & Dixon, K.W. (2019). *International Principles and Standards for the practice of Ecological Restoration*. *Restoration Ecology* 27(S1): S1–S46.
- Grand-Clement, E., Anderson, K., Smith D., Angus, M., Luscombe D.J., Gatis, N., Bray L.S., Brazier R.E. (2015). *New approaches to the restoration of shallow marginal peatlands* *Journal of Environmental Management* 161.
- Hinde, S., Rosenburgh, A., Wright, N., Buckler, M. and Caporn, S. 2010. *Sphagnum re-introduction project: A report on research into the re-introduction of Sphagnum mosses to degraded moorland*. *Moors for the Future Research Report 18*. Moors For The Future Partnership.
- Holden, J., Walker, J., Evans, M.G., Worrall, F., Bonn, A., 2008. In: DEFRA (Ed.), *A Compendium of Peat Restoration and Management Projects*.
- Joosten, H. and Clarke, D. 2002. *Wise Use of mires and peatlands – Background and Principles including a framework for Decision-making*. I.M.C.G. – I.P.S., Jyväskylä, Finland.
- Lindsay, R., 2010. *Peatbogs and Carbon: a Critical Synthesis to Inform Policy Development in Oceanic Peat Bog Conservation and Restoration in the Context of Climate Change (Report to RSPB Scotland, Edinburgh)*.
- Mackin, F., Barr, A., Rath, P., Eakin, M., Ryan, J., Jeffrey, R. & Fernandez Valverde, F. (2017) *Best practice in raised bog restoration in Ireland*. Irish Wildlife Manuals, No. 99. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.

- McBride, A., Diack, I., Droy, N., Hamill, B., Jones, P., Schutten, J., Skinner, A. and Street, M. 2011. The Fen Management Handbook, (2011), Scottish Natural Heritage, Perth.
- Minayeva, T. et al. (2017). Towards ecosystem-based restoration of peatland biodiversity. *Mires and Peat*, Volume 19 (2017), Article 01, 1–36, <http://www.mires-and-peat.net>
- McDonagh, E. (1996). Drain blocking by machines on Raised Bogs. Unpublished report for National Parks and Wildlife Service. https://www.npws.ie/sites/default/files/publications/pdf/McDonagh_1996_Drain_Blocking_Raised_Bogs.pdf.
- NPWS. (2014). Review of the raised bog Natural Heritage Area network. Department of Arts, Heritage and the Gaeltacht.
- NPWS. (2017a). National Raised bog Special Areas of Conservation management plan. Department of Arts, Heritage and the Gaeltacht.
[https://www.npws.ie/sites/default/files/files/FOR%20UPLOAD%20Plan\(WEB_English\)_05_02_18%20\(1\).pdf](https://www.npws.ie/sites/default/files/files/FOR%20UPLOAD%20Plan(WEB_English)_05_02_18%20(1).pdf)
- NPWS. (2017b). Actions for biodiversity 2017-2021. Ireland's 3rd national biodiversity plan. Department of Arts, Heritage and the Gaeltacht.
<https://www.npws.ie/sites/default/files/publications/pdf/National%20Biodiversity%20Action%20Plan%20English.pdf>
- NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill.
https://www.npws.ie/sites/default/files/publications/pdf/NPWS_2019_Vol2_Habitats_Article17.pdf
- NRA (2009). Guidelines for Assessment of Ecological Impacts of National Road Schemes (Revision 2). National Roads Authority.
- NRA (2010). Guidelines on The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads. National Roads Authority.<https://www.tii.ie/technical-services/environment/construction/Management-of-Noxious-Weeds-and-Non-Native-Invasive-Plant-Species-on-National-Road-Schemes.pdf>.
- Pschenyckyj, C., Riondata, E., Wilson, D., Flood, K., O'Driscoll, C., Renou-Wilson, F. (2021). Optimising Water Quality Returns from Peatland Management while Delivering Co-Benefits for Climate and Biodiversity, Report produced for An Fóram Uisce, Online, Available at:
https://thewaterforum.ie/app/uploads/2021/04/Peatlands_Full_Report_Final_March2021b.pdf, Accessed 17.08.2021
- Quinty, F. and L. Rochefort, 2003. Peatland Restoration Guide, second edition. Canadian Sphagnum Peat Moss Association and New Brunswick Department of Natural Resources and Energy. Québec, Québec.
- Regan, S., Swenson, M., O'Connor, M. & Gill, L. (2020). Ecohydrology, Greenhouse Gas Dynamics and Restoration Guidelines for Degraded Raised Bogs. EPA RESEARCH PROGRAMME 2014–2020. Report No.342. (2014-NC-MS-2). EPA Research Report. Prepared for the Environmental Protection Agency by Trinity College Dublin. www.epa.ie.
- Renou-Wilson F., Bolger T., Bullock C., Convery F., Curry J. P., Ward S., Wilson D. & Müller C. (2011). BOGLAND - Sustainable Management of Peatlands in Ireland. STRIVE Report No 75 prepared for the Environmental Protection Agency. Johnstown Castle, Co. Wexford.

- Renou-Wilson, F., Wilson, D., Rigney, D., Byrne, K., Farrell, C. and Müller C. (2018). Network Monitoring Rewetted and Restored Peatlands/Organic Soils for Climate and Biodiversity Benefits (NEROS). Report No. 238. Report prepared for the Environmental Protection Agency. Johnstown Castle, Co. Wexford.
- Schouten, M.G.C. 2002. Conservation and Restoration of Raised Bogs: Geological, Hydrological and Ecological Studies. Dúchas - The Heritage Service of the Department of the Environment and Local Government, Ireland; Staatsbosbeheer, the Netherlands; Geological Survey of Ireland; Dublin.
- Smith, G., O'Donoghue, P., O'Hora, K. & Delaney, E. (2011). Best Practice Guidance for Habitat Survey and Mapping. The Heritage Council.
- Stace, C. A. (1997). New Flora of the British Isles. Cambridge: Cambridge University Press.
- Thom, T., Hanlon, A., Lindsay, R., Richards, J., Stoneman R. & Brooks, S. (2019). Conserving Bogs – Management Handbook. <https://www.iucn-uk-peatlandprogramme.org/sites/default/files/header-images/Conserving%20Bogs%20the%20management%20handbook.pdf>
- Wilson, D., Renou-Wilson, F., Farrell, C., Bullock, C. and Muller, C. (2012). Carbon Restore – the potential of restored Irish peatlands for carbon uptake and storage; CCRP Report. EPA Wexford.
- Wilson, D., Dixon, S.D., Artz, R.R., Smith, T.E.L., Evans, C.D., Owen, H.J.F., Archer, E., & Renou-Wilson, F. (2015). Derivation of greenhouse gas emission factors for peatlands managed for extraction in the Republic of Ireland and the UK. Biogeosciences Discuss., 12, 7491–7535.
- Wheeler, B. D., & Shaw, S. C. (1995). Restoration of Damaged Peatlands – with Particular Reference to Lowland Raised Bogs Affected by Peat Extraction. London: HMSO.
- Wittram, B. W., Roberts, G., Buckler, M., King, L., & Walker, J. S. (2015). A Practitioners Guide to Sphagnum Reintroduction. Edale: Moors for the Future Partnership.

BRACKLIN WEST DECOMMISSIONING AND REHABILITATION PLAN - ADDENDUM 1

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Ballivor Derrygreenagh Bog group (Ref. P0501-01). As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. Bracklin West Bog is located in Co. Westmeath.

This addendum outlines the findings of the Appropriate Assessment reporting carried out in respect of proposed PCAS activities at Bracklin West Bog.

Appropriate Assessment Reporting Findings

An Appropriate Assessment Report⁵ was commissioned by Bord na Móna to inform whether the proposed PCAS activities at Bracklin West Bog had the potential to result in Likely Significant Effects on European Sites.

The concluding statement of this report reads as follows:

'It is concluded beyond reasonable scientific doubt, in view of best scientific knowledge, on the basis of objective information and in light of the conservation objectives of the relevant European Sites, that the proposed Decommissioning and Rehabilitation, individually or in combination with other plans and projects, will not have a significant effect on any European Site'.

Therefore following screening, Appropriate Assessment is not required for the project as it is not directly connected with or necessary to the management of any European Site(s) and as it can be concluded, on the basis of objective information, that the project, individually or in combination with other plans or projects is not likely to have a significant effect on any European Site(s).

⁵ MKO (2023). Article 6 (3) Appropriate Assessment Screening Report. Bracklin West Bog, Co. Westmeath, Decommissioning and Rehabilitation Plan 2023

APPENDIX I: A STANDARD PEATLAND REHABILITATION PLAN TO MEET CONDITIONS OF THE IPC LICENCE

In the event that the Scheme (PCAS) is not supported by additional funding, Bord na Móna is still obligated to carry out peatland rehabilitation to meet the conditions of the IPC Licence. Under its EPA licences and following cessation of peat extraction, BnM is mandated to ‘decommission’ its operations by removing materials ‘that may result in environmental pollution’ and establish that ‘rehabilitation’ measures have environmentally stabilised peat production areas.

This proposed standard peatland rehabilitation plan is outlined here to **estimate potential costs**. Bord na Móna will still be expected to cover the costs that would have accrued from standard decommissioning and rehabilitation activities, as part of its original obligations. The existing costs associated with both the removal of potentially polluting materials and the environmental stabilisation of the peatlands resides with Bord na Móna. However, the expenditure necessary to deliver the additional and enhanced decommissioning, rehabilitation and restoration and the benefits that flow from these measures and interventions/improvements will be eligible for funding by government through the Climate Action Fund and Ireland’s National Recovery and Resilience Plan.

The same process as outlined in Section 2 will be followed.

Scope of rehabilitation

The principal scope of this rehabilitation plan is to rehabilitate the bog. This is defined by:

- The area of Bracklin West bog.
- EPA IPC Licence - Ref. P0501-01. As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. Bracklin West bog is part of the Ballivor-Derrygreenagh bog group.
- The current condition of Bracklin West Bog. This site has a gravity drainage system.
- The key objective of rehabilitation, as defined by this licence, is **environmental stabilisation** of the bog.
- To minimise potential impacts on neighbouring land. Boundary drains around Bracklin West Bog will be left unblocked as blocking boundary drains could affect adjacent land.
- Land-use. Bord na Móna are currently planning to build a wind farm on cutaway bog in the Ballivor area. This project is known as Ballivor Wind Farm and is in the pre-planning stage, but the planning application layout design does not include any wind farm infrastructure within or near Bracklin West bog. Rehabilitation of Bracklin West bog will not be affected by this proposed renewable energy project.

Rehabilitation goals and outcomes

The key rehabilitation goal and outcome for Bracklin West Bog is environmental stabilisation of the site via wetland creation. This is defined as:

- Carrying out drain blocking to re-wet peat and slow runoff.
- Stabilising potential emissions from the site (e.g. suspended solids).
- Environmental stabilisation.

The outcome is setting the site on a trajectory towards establishment of natural habitats.

Criteria for successful rehabilitation:

- Rewetting of residual peat and shallow cutaway in the former area of industrial peat production to offset potential silt run off and to encourage development of vegetation cover via natural colonisation, and reducing the area of bare exposed peat.
- That there is a stabilising/improving concentration of suspended solids and ammonia associated with the measures undertaken to stabilise the peat surface by the blocking of the internal drainage system and the maximised rewetting of the peat surface. This will be demonstrated by developing a stable or downward trajectory of water quality indicators (suspended solids and ammonia) towards what would be typical of a re-wetted cutaway bog. This will be measured via water quality monitoring (suspended solids and ammonia).
- Receiving water bodies have been classified under the River Basin Management Plan and this classification includes waters that are At Risk from peatlands and peat extraction. The success criteria will be that the At Risk classification will see improvements in the associated pressures from this peatland or if remaining At Risk, that there is an improving trajectory in the pressure from this peatland.

Rehabilitation targets

- Demonstrating the delivery of the rehabilitation through site visits and through updated aerial photography (indicating presence of peat blockages and re-wetting). This will be demonstrated by a post rehab aerial survey.
- Stabilising potential emissions from the site (e.g. suspended solids). The key target will be developing a stable or downward trajectory of water quality indicators (suspended solids and ammonia) towards what would be typical of a re-wetted cutaway bog. This will be demonstrated by water quality monitoring results.

Rehabilitation measures:

- Blocking field drains in drier sections of the former industrial production area using a dozer to create regular peat blockages (seven blockages per 100 m) along each field drain, field re-profiling, blocking outfalls and managing overflows.
- Berms and field reprofiling (45m x 60m cell), blocking outfalls, managing overflows and drainage channels for excess water and *Sphagnum* inoculation.
- Re-alignment of piped drainage; and management of water levels to create/enhance existing wetlands.
- No measures are planned for the majority of surrounding marginal woodland habitats to the north and west.
- Silt ponds will continue to be maintained during the rehabilitation and decommissioning phase.
- Evaluate success of short-term rehabilitation measures and enhance where necessary.
- Decommissioning of silt-ponds will be assessed and carried out, where required.

Timeframe:

- 2023-2024. 1st phase of rehabilitation. Field drain blocking and cell creation.
- 2025. 2nd phase. Further realignment of piped drainage and other re-wetting measures dependent on success of 1st phase re-wetting, as determined by ongoing monitoring of water levels and re-vegetation.

- Other enhancement measures such as fertiliser treatment will be carried out, if needed. These will be determined by ongoing monitoring.
- 2025-2026. Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- 2025-2026. Decommission silt-ponds, if necessary.

Table AP-1. Rehabilitation measures and target area.

Type	Code	Description	Area (Ha)
Deep peat cutover bog	DPT1	Regular drain blocking (3/100 m) + modifying outfalls and managing water levels with overflow pipes	95
Dry cutaway	DCT1	Modifying outfalls and managing water levels with overflow pipes	30.7
Wetland cutaway	WLT1	Modifying outfalls and managing water levels with overflow pipes	3.9
Marginal land	MLT1	No work required	15.78
Constrained area	Constraint	Constraint – Agricultural field to the west, railway line.	1.77
Additional	AW2	Targeted drain blocking	5.4
Total Area			152.6

See Drawing number BNM-DR-24-15-20 titled **Bracklin West Bog: Standard Rehab Measures** included in the accompanying Mapbook which illustrates the standard rehab measures to be applied.

Monitoring, after-care and maintenance

- There will be initial quarterly monitoring assessments of the site to determine the general status of the site, the condition of the silt-ponds, assess the condition of the rehabilitation work, assess the progress of natural colonisation, monitoring of any potential impacts on neighbouring land and general land security. The number of site visits will reduce after 2 years to bi-annually. These site visits will assess the need to additional rehabilitation.
- Water quality monitoring will be established.
- Monitoring results will be maintained, trended and reported on each year as part of the requirement to report on Condition 10.1 of the IPC Licence on Bog Rehabilitation in the Annual Environmental Report, which will be available in April each year at www.epa.ie.
- The parameters to be included (as per condition 6.2 of the IPC Licence) include monthly monitoring for pH, Flow, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD.
- This sampling regime on a selected number of silt ponds will be carried out over a two-year cycle. The original (licence) requirement was for a quarterly sampling regime.

- Where other uses are proposed for the site, these will be assessed by Bord na Móna in consultation with interested parties. Other after-uses can be proposed for licensed areas and must go through the required assessment and planning procedures.

Validation and IPC Licence surrender

Reporting to the EPA will continue until the IPC License is surrendered. The bog will be included in the full licence surrender process as per the Guidance to Licensees on Surrender, Cessation and Closure of Licensed Sites (EPA, 2012) when:

- The planned rehabilitation has been completed;
- Water quality monitoring demonstrates that water quality of discharge is stabilising or improving; and
- The site has been environmentally stabilised.

APPENDIX II: BOG GROUP CONTEXT

The Ballivor-Derrygreenagh Bog Group comprises 11 discrete and defined bog units within Co's. Offaly, Westmeath and Meath (and one site used for transport – Hill of Down Railway). There are two main sub-groups; Ballivor (7 sites) and Derrygreenagh (5 sites). Nearly all of the Derrygreenagh sub-group and all of the Ballivor sub-group is located within the River Boyne catchment. A small portion of the western side of Toar Bog is located in the River Shannon catchment. Each bog area further comprises a range of habitats from bare milled former peat extraction areas to re-colonising cutaway to workshops areas and transport infrastructure.

Industrial peat extraction in the Ballivor-Derrygreenagh Bog Group ceased in 2020.

The Ballivor Bogs sub-group is located close to Ballivor Town in Co. Meath and most of the bogs extend across the Meath and Westmeath border. The Bord na Móna Ballivor Peat Moss factory is located 4 km from Ballivor Village on the margin of Ballivor Bog. An industrial railway links Ballivor to Carrenstown, Bracklin and Lisclogher East. Milled peat was supplied from Ballivor, Carrenstown, and part of Bracklin to Ballivor peat moss factory for horticultural products, with milled fuel peat being transported via road to Lough Ree Power (Lanesborough Co. Longford).

Intensive decommissioning and rehabilitation for the Ballivor-Derrygreenagh Bog Group started in 2021 at a number of individual bogs.

Industrial peat extraction in the Ballivor-Derrygreenagh Bog Group ceased in 2020. Decommissioning for the Ballivor-Derrygreenagh Bog Group started in 2021 at a number of individual bogs. Enhanced rehabilitation as part of the Peatland Climate Action Scheme (PCAS) will be carried out at Carranstown Bog and is expected to start in 2022. There is still some historical energy peat stock remaining on some bogs and these peat stock will be transferred via the BnM rail network to Edenderry Power Station up to 2024 when the power station is expected to have ceased using peat.

Bord na Móna is currently developing a wind energy project called Ballivor Wind Farm. This proposed project is in the pre-planning stage. It is expected to be submitted to planning in 2023. Bord na Móna are also continuing to review its landbank for future potential renewable energy projects.

A breakdown of the component bog areas for the Ballivor-Derrygreenagh Bog Group IPC License Ref. PO-501-01 is outlined in Table Ap-2.

Table Ap-2: Ballivor-Derrygreenagh Bog Group names, area and indicative status (Derrygreenagh Energy Peat sub-group)

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Status	Plan
Ballivor	654	Industrial peat production commenced at Ballivor in the 1940s. Some sections have been cutaway. Some sections still have relatively deep residual peat.	Ballivor Bog formerly supplied a range of commercial functions including the supply of horticultural peat, sod peat and latterly; fuel peat for Lough Ree Power. Some sections were never re-developed to milled peat and have revegetated as cutaway.	2020	Draft updated 2022	

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
			Some areas of cutaway are developing pioneer cutaway vegetation communities. Expected to be part of the proposed Ballivor Wind Farm, which is currently in pre-planning.		
Bracklin (excluding Bracklin West)	680	Industrial peat production commenced at Bracklin in the 1940s. Some sections have been cutaway. Some sections still have relatively deep residual peat.	Bracklin Bog formerly supplied a range of commercial functions including the supply of horticultural peat, sod peat and latterly; fuel peat for Lough Ree Power. The main section was never re-developed to milled peat and has revegetated as mature cutaway habitats Bare peat is prevalent in the western section, which was in milled peat extraction. Expected to be part of the proposed Ballivor Wind Farm, which is currently in pre-planning.	2020	Draft updated 2022
Carranstown	306	Industrial peat production commenced at Carranstown in the 1980s. The majority of the site has relatively deep peat.	Carrenstown Bog formerly supplied a range of commercial functions including the supply of horticultural peat and latterly; fuel peat for Lough Ree Power. The majority of the site is rehabilitated. A constrained area is part of the proposed Ballivor Wind Farm, which is currently in pre-planning.	2020	Rehabilitated 2022
Lislogher East	486	Industrial peat production commenced at Lislogher East in the 1950s. Part of the site is cutaway while there is a mosaic of residual peat depths.	Lislogher East formerly supplied sod turf both for fuel and horticulture. This bog was never re-developed to supply milled peat. The majority of the bog is developing cutaway habitats and there is a mosaic of bare peat areas where there has been recent sod peat extraction.	2020	Draft updated 2022
Lislogher West	239	Lislogher West was drained in 1980s. The bog is drained and still has residual vegetation in places.	Lislogher West was drained but never fully developed for industrial peat extraction.	N/A	Draft updated 2023
Kinnegad	352	Industrial peat production commenced at Kinnegad in the 1980s. The majority of the site still has relatively deep peat.	Kinnegad Bog formerly supplied a range of commercial functions -mainly the supply of horticultural peat and latterly; fuel peat for Lough Ree Power. The majority of the site is bare peat.	2020	Draft 2017
Hill of Down Railway	22		Rail link – not used for peat extraction	N/A	
Ballybeg	847	Industrial peat production commenced at Ballybeg in the 1950s.	Ballybeg Bog formerly supplied a range of commercial functions including the	2020	Draft 2017

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
		Most of the site is cutaway	supply of horticultural peat and fuel peat for Edenderry Power. Much of the site is bare peat. The northern half has been cutaway and is establishing cutaway habitats.		
Derryarkin	710	Industrial peat production commenced at Derryarkin in the 1950s. Most of the site is cutaway	Derryarkin Bog formerly supplied a range of commercial functions including the supply of fuel peat for Rhode Power Station, Croghan Brickette Factory and Edenderry Power. Most of the site is developing cutaway habitats. Some re-wetting was carried out in the past. Part used for gravel extraction.	2015	Draft 2017
Derryhinch	337	Industrial peat production commenced at Derryhinch in the 1950s. There is a mosaic of residual peat depths left	Derryhinch Bog formerly supplied a range of commercial functions including the supply of fuel peat for Rhode Power Station, Croghan Brickette Factory and Edenderry Power. Most of the site is bare peat with emerging cutaway habitats. Part of the site was used to trial herb production	2020	Draft 2017
Drumman	1,122	Industrial peat production commenced at Drumman in the 1950s. Most of the site is cutaway	Drumman Bog formerly supplied a range of commercial functions including the supply of fuel peat for Rhode Power Station, Croghan Brickette Factory and Edenderry Power. Most of the site is developing cutaway habitats. Some re-wetting was carried out in the past. Part used for gravel extraction. Part of the site was used to trial herb production. Part of the site is used for log storage (biomass)	2020	Draft 2017
Toar	445	Industrial peat production commenced at Toar in the 1980s. Most of the site has deep residual peat.	Toar Bog formerly supplied a range of commercial functions including the supply of horticultural peat and fuel peat for Edenderry Power. Most of the site is bare peat. Part of the site is used for log storage (biomass)	2020	To be updated 2023

APPENDIX III: ECOLOGICAL SURVEY REPORT

Ecological Survey Report

Note: This Ecological Survey Report has been appended to provide a background to the current Bracklin West Rehabilitation Plan. The Ecological Survey Report is not restricted to the current extent of Bracklin West Bog but describes the wider Bracklin Bog area as a whole. This report outlines an ecological survey of Bracklin Bog in its entirety. This report should not be taken as a management plan for the site as other land-uses may still be considered. Information within this report may inform the development of other land-uses and identify areas with particular biodiversity value. The report outlines potential options for biodiversity management after industrial peat production has ceased, (if this is the proposed main land-use for the site).

Bog Name:	<u>Bracklin</u>	Area (ha):	680 ha (1680 acres)
Works Name:	Ballivor	County:	Westmeath
Recorder(s):	MMC & DF	Survey Date(s):	9 & 11/07/2012, 2016

Habitats present (in order of dominance)

The most common habitats present at this site include:

- Birch-dominated scrub and woodland (eBir, oBir, cBir) (Codes refer BnM classification of pioneer habitats of production bog).
- Pioneer Heather-dominated dry heath (dHeath) (in mosaic with scrub and pEang)
- Pioneer Bog Cotton -dominated poor fen (pEang,)
- Bare peat (mainly along travel paths)
- Pioneer dry Cocksfoot-False Oatgrass -dominated grassland (gDa-Arr)
- Pioneer dry Purple Moorgrass-dominated grassland (gMol)
- Embryonic bog vegetation (Em)
- Pioneer Bottle Sedge –dominated poor fen and open water (pRos/Ow)
- Pioneer Sweet Vernalgrass-dominated grassland (gAn-Ho-Eq)
- Pioneer dry calcareous grassland (gCal)
- Silt ponds (Silt) with Gorse/Birch scrub and Purple Moorgrass-dominated grassland (gMol)
- Riparian zones (Rip) (with drains and associated habitats such as scrub)

The most common habitats found around the margins of the site include:

- Birch woodland (WN7) (Codes refer to Heritage Council habitat classification, Fossitt 2000),
- Raised bog (PB1) and Poor flush (PF2)
- Cutover Bog (PB4)
- Secondary cutover bog mosaics with developing dry heath/facebank PB1, poor fen and scrub.
- Scrub (WS1)

- Dry meadow (GS2) (around old famine house)
- Oak-Ash-Hazel woodland (WN2) (around old famine house)
- Hedgerows (WL1)
- Improved grassland (GA1) around the boundary where the GIS boundary extends into adjacent fields
- Wet grassland (GS4) (old cutover)

Description of site

Bracklin Bog is located close to Raharney and Ballivor in eastern Co. Westmeath, adjacent to the Co. Meath border. It is part of the Ballivor Bog group with Lislogher Bog East and West located to the north and Carranstown Bog located to the south of the site. A railway links the milled production bog to Carranstown and the rest of the Ballivor bog group and there are old abandoned railway link to Lislogher to the north.

Bracklin Bog was formerly an old sod peat production bog and the majority of the bog was abandoned in the 1970-1980's. This area is now heavily vegetated with cutaway habitats. The majority of the site has had no milled peat production. Part of this cutaway area and remnant bog was initially developed for milled peat and regular field drains were dug through some of the bog, particularly some of the marginal remnant areas. However, this development was abandoned. A small section to the west has been developed into milled peat production and is now dominated by bare peat.

The large former sod peat production area is now heavily vegetated with overall vegetation cover generally about 90%. This area has similar characteristics to other old sod peat bogs like Timahoe North and South. Deep wide trench drains were dug at intervals separating the production bays across the bog in a north-east to south-west direction. These riparian zones are now generally heavily vegetated with dense Birch scrub and woodland, forming long bands of woodland through the site. Some contain running water and have developed riparian characteristics while some have silted up. The majority of the site is dry and there is little open water or wetland development. There are several narrow strips of high bog running through the middle of each bay that are the remaining banks left after sod peat production. These narrow strips are generally dominated by dry Heath (dHeath)-like vegetation as the remnant bog has dried out. They have also been colonised by Gorse and Birch scrub in places.

The cutaway areas have generally similar habitat development through the site that varies relative to the time since the various sections came out of production. Some bays obviously came out of production at a much later stage and have more frequent bare peat in mosaic with the pioneer habitats. The older sections have much denser vegetation cover and much more scrub cover. The majority of the cutaway vegetation is a mosaic of pioneer Heather-dominated dry heath (dHeath), Bog Cotton-dominated poor fen (pEang) and Birch scrub (e/oBir). The older sections tend to have 100% vegetation cover. One feature of this site is the excellent Birch colonisation and many of the younger areas have frequent small Birch saplings (eBir) (< 0.5 m high) that will develop to form thicker Birch scrub in the next 10 years. Another feature of this site is the relatively higher abundance of Hare's-tail Bog Cotton in the Bog Cotton-dominated cutaway vegetation. This species tended to be more frequent in some of the former production bays around the northern margin (where peat was deeper or closer to high bog that provides a seed source). It also appears in some of the embryonic bog communities. Other more typical raised bog species such as Bog Asphodel, Deergrass and White Beak Sedge, which are not usually found in pioneer cutaway vegetation on BnM cutaway, are found amongst the other cutaway vegetation

at this site but are generally rare. Hummocks of various *Sphagnum* species can also be found throughout the site and are generally associated with Bog Cotton-dominated vegetation (where it is wetter), but their overall cover is rare. However, there are several areas where the *Sphagnum* cover becomes a lot more frequent.

Some of the former production bay that runs along the northern margin of the former production area has significant *Sphagnum* regeneration in places (north-east corner). There are occasional large hummocks of *S. papillosum*, *S. subnitens*, *S. capillifolium* developing in association with Hare's-tail Bog Cotton, Common Bog Cotton and Heather. Hare's-tail Bog Cotton is particularly frequent. Production has not significantly lowered the surface of the bog so there is probably deep peat in this area.

Further south-west along this bay, the *Sphagnum* cover becomes frequent and the vegetation is a typical raised bog community (mapped as an embryonic bog community). This may be an area where peat production was limited, or there was no production at all, so some of the *Sphagnum* cover may be remnant *Sphagnum* cover. This area seems to have initially been developed for milled peat production and perhaps was only screw-levelled. The level of the bog is relatively high and there is a significant fall to adjacent production bays. The bog surface was quite firm and the relatively shallow drains were active. The vegetation cover was dominated by Heather and by the two Bog Cotton species. There was also occasionally frequent Bog Asphodel, Deergrass and White Beak Sedge, so the vegetation cover was quite similar to high bog vegetation. Soft Rush and Purple Moorgrass were present, indicating the previous disturbance, but were rare and absent in places.

The bog is underlain with some ridges and mounds and the peat topography is variable in places. The mounds tend to have more bare peat cover and are dominated by pioneer dry heath with Birch scrub. The basins tend to be dominated by pioneer poor fen Bog Cotton-dominated vegetation. Some of the former production bays are sloped and there are natural shallow drainage channels cut through the peat in places. These slopes have probably led to some erosion along these natural drainage channels.

Towards the centre of the site there is some development of an embryonic *Sphagnum* community associated with a small wetland area. This is **not** a remnant raised bog area but *Sphagnum* regenerating on cutaway. The wetland has formed in a local small basin with impeded drainage that has developed along one of the old remnant bands of high bog that was left after sod-peat cutting. The vegetation is somewhat similar to the *Sphagnum*-rich poor fen vegetation that is developing at Oweninny. There is an abundant carpet of *S. cuspidatum* cover associated with Soft Rush and/or Common Bog Cotton that was sitting on water. Other species present include Jointed Rush, Marsh Pennywort, Marsh Cinquefoil, Marsh Bedstraw, Reedmace, Horsetail, indicating poor fen influence. Hummocks of *S. palustre* and *S. subnitens* are also present in some of the denser areas and around the margins where it was somewhat drier. This basin formerly contained an open water area (see aerial photos), but this has now vegetated and infilled with pioneer Bottle Sedge-dominated vegetation (pRos). When examining LiDAR data, it is interesting to note that this basin has not developed on the lowest part of the site and there is lower ground that contains more typical drier communities dominated by scrub. This basin seems to be localised and has developed with a mound/ridge on one side and the band of high bog on another side.

There are several mounds and ridges towards the centre of the site where the underlying glacial till has been exposed or where there is a thin layer of remnant peat. The areas with the exposed gravel tend to have small patches of pioneer calcareous grassland (gCal). This grassland community tends to be rich in orchids with frequent Common Spotted Orchid and some Marsh Helleborine. Much of this grassland has become rank and dominated by False Oatgrass (gDa-Arr) forming a meadow-type community. Species present include Silverweed, Red Clover, Sweet Vernal grass, Yorkshire Fog, Long-leaved Plantain, Marsh Thistle, Nettle, Meadowsweet,

Sorrell, Knapweed, Hogweed, Brambles, and Bindweed. One area towards the centre of the site and adjacent to the railway has a relatively extensive area of this grassland community with limited scrub cover, which is somewhat unusual on the cutaway. This habitat attracted a lot of butterflies. Associated with these mounds there is also some development of a more acidic grassland community dominated by Sweet Vernal-grass (gAn-Ho-Eq). This grassland type also contains other acidic grassland indicators such as Heath Bedstraw and Tormentil. Other species such as Hawthorn and Elder are also associated with the scrub on and around these mounds.

A small pocket of dry calcareous grassland contains a significant Marsh Helleborine population (> 500 individuals). This was a small gravelly area and was quite disturbed. The Marsh Helleborine were associated with Catsear, Coltsfoot, Ox-eye Daisy, Sweet Vernal-grass, Yorkshire Fog, Glaucous Sedge, Eared Willow, Cocksfoot, Red Clover, Knapweed, Wild Strawberry, Creeping Thistle, Hawthorn, Purple Moorgrass, Wild Carrot, Long-leaved Plantain, Mouse-ear Chickweed, Yarrow, Black Medick, Self Heal, Red Fescue, Rosebay Willowherb, False Oatgrass, Slender St John's Wort, Tormentil, Bramble, Groundsel, Fragrant Orchid, Common Spotted Orchid.

Large high bog remnant

There is a relatively large bog remnant (15.7 ha within BnM GIS property boundary) located along the southern margin that is of conservation interest to the local community. There are several parallel drains in the high bog close to the northern margin and adjacent to the production bog, which did not have *Sphagnum* cover. However, the majority of the high bog has not been drained extensively. There are natural transitions to Birch woodland to the east, south and west, which increase the conservation value of this high bog remnant somewhat. There are also relatively natural transitions/slopes to old regenerating cutover bog/dry heath to the south (outside the BnM property boundary). There are slopes from the west and east, creating a basin towards the eastern side, which may be as a result of subsidence. The high bog contains typical raised bog features and has a hummocky micro-topography. The bog surface was generally firm-spongy underfoot. It has been unburnt for some time and has a high *Cladonia portentosa* cover. It has a typical species assemblage and there are some algal hollows with White Beak-sedge. Deergrass was a prominent feature of the vegetation towards the margin. Small hummocks of *S. papillosum* and *S. capillifolium* and *S. subnitens* were present, although the *Sphagnum* cover was low. Bog Rosemary was present. *Sphagnum cuspidatum* was also present in some hollows but its cover was overall very low. The majority of the bog could be classified as sub-marginal in ecotope quality, although it was noticeable that further south towards the bog margin, the quality of the high bog deteriorated and *Sphagnum* was absent and there was more bare peat cover (marginal ecotope). Further into the bog there are some larger hollows or former pools. These generally do not retain any pool features and have re-vegetated, although some were algal and remained open.

A depression has developed towards the eastern side and is visible on the aerial photos. This section has some surface water and also has frequent to abundant *Sphagnum* cover. There are indications of flushing around the margins and within this section, where the Heather is more vigorous. The vegetation is dominated by Heather and Hare's-tail Bog Cotton, with *S. papillosum* and *S. capillifolium* hummocks and *S. cuspidatum* hollows. While the surface was squelchy and soft, there was no indication of quaking to the bog, indicating that this area was likely to be secondary *Sphagnum* development due to subsidence. This area could be considered sub-central in quality due to the abundant *Sphagnum* cover. There were also no indications of relic active bog features such as former pool complexes or large *S. imbricatum* hummocks. *Sphagnum imbricatum* was not recorded on the

high bog, (which is unusual for a remnant this size). The depression with frequent *Sphagnum* cover continues further north towards the production bog boundary where the drains are infilled with *S. cuspidatum*.

The high bog transitioned to Birch woodland to the east, which has developed on old cutover bog. An old face-bank is still present within the woodland, although the Birch has spread onto the high bog in places. The woodland is dominated by numerous narrow-stemmed Birch trees with a low canopy of < 8 m. The ground cover is typical and is dominated by Brambles, Purple Moor-grass and Bracken, with some Bilberry cover. There are Deer tracks through the woodland and onto the high bog.

Further east there is a low mound where the peat is thin and the underlying gravel has a significant influence on the vegetation. This area was managed as a small farm in the past and was known as Robbersbush. It is now mostly vegetated with scrub and woodland with some open, now rank grassland and Bracken. Some mature Ash and Oak trees are visible. There used to be a path through this site, but this is now overgrown. The high bog area to the east of this old farm has been burnt in the recent past, although is recovering. The high bog (PB1) is poor in quality with a firm surface, significant bare peat cover and no *Sphagnum* cover. A small depression does have some regenerating *Sphagnum* cover. There is also a small flush (PF2) through this high bog area, which is vegetated by Purple Moorgrass. There are indications of the fire damage in the surrounding scrub and woodland on the high bog with standing dead Birch around the margins of the woodland regenerating from their bases and Bracken becoming prominent where there was former scrub.

Old famine House area (Tonduff)

This area is located towards the south-east part of Bracklin bog, between the railway along the eastern margin and the main travel path further west. It has developed around a low mineral island and this area was also farmed in the past. Old field enclosures are visible on the OSI 2nd edition 6 inch map. The area now contains dry meadow grassland, which is quite rank and ungrazed. This is surrounded by Birch woodland that has developed on cutover bog, with old face-banks still present. The woodland is dominated by Birch and contains Rowan and Bilberry. Pine is present on the high bog margin of the woodland. Some Alder are also present around the meadow margins. The remains of an old house are still present on a small mound in the area and this has now developed into a woodland copse with elements of WN2 Oak-Ash-Hazel woodland. There are several mature Sycamore trees around the house forming the woodland copse and associated with these there are also some Hazel, Elder, Holly, Hawthorn and Ash. The ground cover contains Wood Avens, Herb Robert, Wood Sedge, Ivy, Hogweed, and Bluebell. There are also some exotic plants and over-grown shrubs that were once part of the old garden associated with the house.

Birch-dominated woodland dominates the area to the south and west of Tonduff and the travel path. This Birch woodland has developed on old cutover bog with frequent old face-banks and drains present. The woodland contains Bilberry.

Designated areas on site (cSAC, NHA, pNHA, SPA other)

None

The western end of Bracklin Bog is located within 1 km of the River Boyne and Blackwater cSAC and SPA (River Deel) (Site codes 002299 & 4232)

<p>Adjacent habitats and land-use</p> <p>Adjacent habitats include wet grassland (GS4), improved agricultural grassland (GA1), conifer plantation (WD4), Birch woodland (WD7), remnant high bog (PB1) and cutover bog (PB4).</p>
<p>Watercourses (major water features on/off site)</p> <ul style="list-style-type: none"> • Bracklin Bog is located within the River Boyne catchment. • The milled peat production bog drains via gravity to several silt-ponds around the margins and on to the River Deel. • The remaining bog drains via the old drainage network to a variety of streams around the margins. There is no silt-pond treatment for the cutaway area. Old trench drains associated with sod peat bogs were cut through the bog. Some of these are still flowing and developing typical riparian features. • There are several small wetlands with some open water on the site where drainage is impeded or where there is a localised basin.
<p>Peat type and sub-soils</p> <p>The main peat type left on the cutaway area is a more acidic red peat. This is indicated by the typical cutaway re-vegetation being dominated by Heather and Bog Cotton and is typical of old sod peat production bogs where deeper remnant peat was left on the bog.</p> <p>Mixed gravel till is exposed at several places through the bog on the surfaces of mounds.</p>
<p>Fauna biodiversity</p> <p>Birds</p> <p>Several bird species were noted on the site during the survey.</p> <ul style="list-style-type: none"> • Peacock • Kestrel • Meadow Pipit were noted on the large high bog remnant • More common bird species recorded around the bog included Blackcap, Song Thrush, Wood Pigeon, Whitethroat, Blue Tit, Blackbird, Redpoll, Rook, Grey Crow and Wren. • Blackbird, Blackcap, Wood Pigeon and Song Thrush were noted around Tonduff. <p>Mammals</p> <p>Signs of several mammal species were noted on the site during the survey.</p>

- Several Hares were sighted at various locations around the bog. Signs of Hares were also quite frequent around the bog.
- Signs of Fox (droppings and prints) and Badger (prints) were also noted around the bog.
- Deer tracks though Birch woodland and onto high bog remnant at the southern bog margin.

Other species

- Ringlet and Meadow Brown butterflies were frequently flushed from grassy areas on the site. Small Heath was recorded several times around the cutaway and on some of the high bog remnants. Common Blue was also recorded on the site associated with gravelly habitats with calcareous grassland.

Meadow Brown, Ringlet and Wood White were recorded around the meadow at Tonduff.

APPENDIX IV. ENVIRONMENTAL CONTROL MEASURES TO BE APPLIED TO BOG REHABILITATION

- Bog restoration/rehabilitation measures will be restricted to within the footprint of the proposed rehabilitation area.
- The proposed rehabilitation will have due regard to noise limits and hours of operation (i.e. dusk and dawn) to minimise any potential disturbance on resident and local fauna that utilise the site and immediate environs.
- All plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations (SI 359/1996).
- The proposed activities will be restricted to daylight hours and there will be no requirement for artificial lighting.
- Silt ponds will be inspected and maintained as per the IPC Licence.
- During periods of heavy precipitation and run-off, activities will be halted.
- Measures will be carried out using a suitably sized machine and in all circumstances, excavation depths and volumes will be minimised where possible.
- All machines will be regularly checked and maintained prior to arrival at the site to prevent hydrocarbon leakage.
- Hoses and valves will be checked regularly for signs of wear and will be closed and securely locked when not in use.
- Fuelling and lubrication of equipment shall only be carried out in designated areas away from surface water drainage features and ecologically sensitive areas.
- Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for disposal or re-cycling.
- Vehicles will never be left unattended during refuelling.
- No direct discharges to waters will be made. No washings from vehicles, plant or equipment will be carried out on site.
- All plant refuelling will take place using mobile fuel bowsers. Only dedicated trained and competent personnel will carry out refuelling operations.
- Mobile storage such as fuel bowsers will be banded to 110% capacity to prevent spills. Tanks for bowsers and generators shall be double skinned. When not in use, all valves and fuel trigger guns from fuel storage containers will be locked. All pumps using fuel or containing oil will be locally and securely banded where there is the possibility of discharge to waters.
- Potential impacts caused by spillages etc. during rehabilitation will be reduced by keeping spill kits and other appropriate equipment on-site.
- Site activities will be carried out in accordance with 'best practice'. In order to ensure compliance and implementation of 'best practice', these measures will be communicated to relevant Bord na Móna staff and updated as required.

APPENDIX V. BIOSECURITY

The potential for importation or introduction of non-native plant species (such as Japanese Knotweed, Himalayan Balsam, etc.) during future rehabilitation management, such as drain-blocking using excavators, has the potential to result in the establishment of invasive species within the site. Section 49 of the European Communities (Birds and Natural Habitats) Regulations 2011 prohibits the introduction and dispersal of invasive alien species (particularly plant species) listed on Part 1 (third column) of the 'Third Schedule'.

This section aims to reduce the risk from, and impacts of, invasive species and protecting biodiversity on lands under Bord na Móna ownership. Rehabilitation and decommissioning in the bog will have due regard to the relevant biosecurity measures outlined below:

- Records of problematic invasive species within the various bog units will be marked out with signs to highlight areas of infestation to personnel.
- All plant machinery will be restricted from disturbing known colonies of invasive species.
- All plant machinery will avoid unnecessary crossings to adjoining lands.
- Good site hygiene will be employed to prevent the introduction and spread of problematic invasive alien plant species (i.e. Japanese Knotweed (*Fallopia japonica*), Himalayan Balsam (*Impatiens glandulifera*), Himalayan Knotweed (*Persicaria wallichii*), etc.) by thoroughly washing vehicles prior to entering the area.

The biosecurity measures outlined above are in line with best practice guidelines issued by the National Roads Authority (NRA, 2010) – The Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads and broadly based on the Environment Agency's (2013) – The Knotweed Code of Practice: Managing Japanese Knotweed on Development Sites (Version 3, amended in 2013).

In respect of Bracklin West Best Practice measures will be adhered with regarding the presence of Rododendron.

In addition to the above, Best Practice measures around the prevention and spread of Crayfish plague⁶ will be adhered with throughout all rehabilitation measures and activities.

⁶ <https://www.biodiversityireland.ie/projects/invasive-species/crayfish-plague/>

APPENDIX VI. POLICY AND REGULATORY FRAMEWORK

Bord na Móna Plc is a publicly owned company, originally established in 1934 to develop some of Ireland's extensive peat resources for the purposes of economic development and to support energy security. In the decades since its establishment the company has employed tens of thousands of people in its fuel, energy, and horticultural growing media businesses. For much of its history the company's support of important national policy aims has been enabled and encouraged in a variety of ways by Government.

Today, Bord na Móna is undertaking a number of highly significant actions in support of climate policy. These actions involve a radical transformation and decarbonisation of nearly the entire Bord na Móna business. This transformation will be driven by unlocking the full potential of our land and creating significant value for Ireland and the Midlands in particular.

Bord na Móna is an integral part of the economic, social, and environmental fabric of Ireland and Irish life. As a key employer in the Midlands, the company is conscious that its obligations go beyond purely commercial and environmental – there is also a social responsibility to employees and the communities served by Bord na Móna. It is the company's role and absolute priority to ensure that its long-term strategy delivers on all of these important areas in a robust and balanced way.

There are a wide range of policies, plans, legislation and land designations that inform the development of this Bord na Móna peatland rehabilitation plan. Bord na Móna have also developed and operate various policies and strategies that also inform the development of this rehabilitation plan.

1 EPA IPC Licence

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Ballivor-Derrygreenagh Bog Group (Ref. P0-501-01). As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. The bog is part of the Ballivor-Derrygreenagh group. This regulatory requirement is the main driver of the development of this rehabilitation plan.

2 The Peatlands Climate Action Scheme (PCAS)

Bord na Móna (BnM) understand that it is the Minister's (DECC) intention to impose an obligation on Bord na Móna to develop a programme of measures, 'the Scheme', for the enhanced decommissioning, rehabilitation and restoration of boglands previously used to supply peat for electricity generation within the State. The enhanced decommissioning, rehabilitation and restoration of the peatlands funded by the Scheme (PCAS) will deliver benefits across climate action (GHG mitigation through reduced carbon emissions and acceleration towards carbon sequestration), enrich the State's natural capital, increase eco-system services, strengthen biodiversity, improve water quality and storage attenuation as well as developing the amenity potential of the peatlands.

It is envisaged that Bord na Móna carry out an enhanced decommissioning, rehabilitation and restoration, under the Scheme (PCAS), and supported by the Climate Action Fund and Ireland's National Recovery and Resilience Plan across a footprint of 33,000 ha. This scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations under existing EPA IPC licence conditions. Interventions and measures supported by the Scheme will ensure that environmental stabilisation is achieved (meaning IPC obligations are met), and importantly, significant additional benefits, particularly relating to climate action and

other ecosystem services, will also be delivered. However, only the additional costs associated with the additional and enhanced rehabilitation, i.e., those activities which go beyond the existing decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support under the Scheme.

The proposed enhanced rehabilitation detailed in this document, are predicated on the understanding that the element of the activities, over and above the 'standard' rehabilitation necessary to comply with pre-existing Condition 10 IPC Licence requirements, will be deemed eligible costs by the Scheme regulator and funded by the Climate Action Fund and Ireland's National Recovery and Resilience Plan.

For the avoidance of doubt, should the Scheme and the associated statutory obligation on Bord na Móna not materialise, Bord na Móna will not carry out the enhanced decommissioning, rehabilitation and restoration measures described in this plan. Bord na Móna will instead plan to complete an adapted standard decommissioning and rehabilitation measures required under Condition 10 and outlined in Appendix I.

3 National and EU Climate and Biodiversity Policy

The National Policy Position establishes the fundamental national objective of achieving a transition to a competitive, low carbon, climate-resilient and environmentally sustainable economy by 2050. It sets out:

- the context for the objective;
- clarifies the level of GHG mitigation ambition envisaged; and
- establishes the process to pursue and achieve the overall objective.

The evolution of climate policy in Ireland will be an iterative process based on the adoption by government of a series of national plans over the period to 2050. GHG mitigation and adaptation to the impacts of climate change are to be addressed in parallel national plans – respectively through the National Climate Action Plan. The plans will be continually updated, as well as being reviewed on a structured basis at appropriate intervals and, at a minimum, every five years. This will include early identification and ongoing updating of possible transition pathways to 2050 to inform sectoral strategic choices.

Bord na Móna is following a decarbonisation programme aimed at reducing the carbon emissions from its activities. Industrial peat production has now ceased, and several other decarbonisation measures are being implemented. The company aims to further develop renewable energy and resource recovery markets with a key objective of reducing the carbon intensity of all products. In addition, the carbon emission mitigation benefits associated with the post-peat extraction rehabilitated peatland following re-wetting, revegetation and colonisation of significant areas with native woodland will make a significant contribution to achieving the State's carbon emission reduction targets.

Peatlands rehabilitation and restoration is referenced in Section 17.3.3 of the Land Use, Land Use Change, Forestry and Marine Chapter of the National Climate Action Plan 2021 as follows:

“The rehabilitation of degraded peatlands to a condition in which they regain their ability to deliver specific ecosystem services has considerable potential for initial mitigation gains, and future carbon sequestration. Additional benefits of peatland restoration include positive socio-economic outcomes for the Midlands, increased natural capital, enriched biodiversity, improved water quality, and flood attenuation.”

The scheme is included as Action 33 in the Climate Action Plan 2021 Annex of Actions - Deliver the Enhanced Decommissioning, Rehabilitation and Restoration (EDRR) Scheme for Bord na Mona Peatlands.

EDRRS is also referenced in the Climate Action Plan 2021 as a measure to deliver a Just Transition in the Midlands. International research and scientific understanding of peatlands is now reflected in key Irish national policy and strategy documents such as the National Raised Bog Special Areas of Conservation (SACs) Management Plan 2017 - 2022 (Department of Arts, Heritage and the Gaeltacht 2017), The National Peatland Strategy (Department of Arts, Heritage and the Gaeltacht 2015), The National Biodiversity Action Plan (National Parks and Wildlife Service 2017), The River Basin Management Plan for Ireland 2018-2021 (Department of Housing, Planning and Local Government 2018), and the Biodiversity – Climate Change Sectoral Action Plan (Department of Arts, Heritage and the Gaeltacht 2019). Each of the national plans, which are also complemented with the recently published EU Green Deal communication on Biodiversity Strategy for 2030 (COM 2020) have overlapping objectives and actions that focus on the restoration of peatlands damaged by turf-cutting, drainage and other impacts, as well as the re-wetting of Bord na Móna industrial peat extraction bogs.

While not specifically identified as a restoration implementor, EDRRS objectives are in line with those of the United Nations Decade on Ecosystem Restoration 2021-2030 of Preventing, Halting and Reversing the Degradation of Ecosystems worldwide.

EDRRS is also in line with the EU Commission proposal for a Nature Restoration Law which will apply legally binding targets for nature restoration in different eco-systems to every Member State. The aim is to cover at least 20% of the EU's land and sea areas by 2030 with nature restoration measures and eventually extend these to all ecosystems in need of restoration by 2050.

4 National Peatlands Strategy

The National Peatlands Strategy (2015) contains a comprehensive list of actions, necessary to ensure that Ireland's peatlands are preserved, nurtured and become living assets within the communities that live beside them. It sets out a cross-governmental approach to managing issues that relate to peatlands, including compliance with EU environmental law, climate change, forestry, flood control, energy, nature conservation, planning, and agriculture. The Strategy has been developed in partnership between relevant Government Departments/State bodies and key stakeholders through the Peatlands Council.

The strategy recognises that Ireland's peatlands will continue to contribute to a wide variety of human needs and to be put to many uses. It aims to ensure that Ireland's peatlands are sustainably managed so that their benefits can be enjoyed responsibly. It aims to inform appropriate regulatory systems to facilitate good decision making in support of responsible use. It also aims to inform the provision of appropriate incentives, financial supports and disincentives where required. The strategy attempts to strike an appropriate balance between different needs, including local stakeholders like turf-cutters and semi-state bodies such as Bord na Móna.

In line with a National Peatlands Strategy recommendation, a Peatlands Strategy Implementation Group (PSIG), was established, assisted in the finalisation of the Strategy, is overseeing subsequent implementation and will report to Government on an annual basis on the implementation of the actions and principles contained within the Strategy.

Bord na Móna is a key stakeholder in the National Peatlands Strategy and the Peatlands Strategy Implementation Group. The strategy recognises the potential for some Bord na Móna sites to be restored and to contribute to the national SAC and NHA network of protected raised bog sites. The strategy (agreed in 2015) also recognises the various different values of cutaway bog and developed six key principles (with Bord na Móna) for the after-use of cutaway bog.

- Bord na Móna will continue to assess and evaluate the potential of the company's land bank, using a land use review system. The assessment will help prepare a set of evidence-based management plans for the various areas of peatland. These plans will also inform its cutaway bog rehabilitation.
- The policy of Bord na Móna is not to open up any undrained new bogs for peat production.
- Lands identified by Bord na Móna as having high biodiversity value and/or priority habitats will be reserved for these purposes as the principal future land use.
- Generally, Bord na Móna cutaway bogs that flood naturally will be permitted to flood unless there is a clear environmental and/or economic case to maintain pumped drainage.
- In deciding on the most appropriate afteruse of cutaway peatlands, consideration shall be given to encouraging, where possible, the return to a natural functioning peatland ecosystem.
- This will require re-wetting of the cutaway peatlands which may lead in time to the restoration of the peatland ecosystem.
- Environmentally, socially and economically viable options should be analysed to plan the future use of industrial cutaway peatlands, in conjunction with limiting factors as outlined in Bord na Móna's Strategic Framework for the Future Use of Peatlands.

The National Peatlands Strategy highlights the importance and value of developing peatland rehabilitation plans for Bord na Móna cutaway sites and implementing this peatland rehabilitation. Some of these principles have now been superseded by the company's decision to cease industrial peat extraction. The National Peatlands Strategy is currently being reviewed by Government.

5 Draft National River Basin Management Plan 2022-2027 (Water Framework Directive)

The National River Basin Management Plan (Department of Housing, Planning, Community and Local Government 2017) is the key national plan for Ireland to achieve the objectives of the Water Framework Directive (WFD). In broad terms, the objectives of the WFD are (1) to prevent the deterioration of water bodies and to protect, enhance and restore them with the aim of achieving at least good status and (2) to achieve compliance with the requirements for designated protected areas.

The NRBMP 2018-2021 outlined how peat extraction can be a potentially significant pressure on various water quality parameters. Peatland rehabilitation of Bord na Móna cutaway (in addition to other measures) was part of the WFD (2018-2021) programme of measures. The NRBMP 2018-2021 takes account of the fact that Bord na Móna was in the process of phasing out the extraction of peat for energy production, that it set a target to rehabilitate 9,000 ha of cutaway bogs (covering 25 peatlands) by 2021 (in 2018) and will look to implement best-available mitigation measures to further reduce water quality impacts caused by peat extraction while the phasing-out process is taking place. This NRBMP 2018-2021 rehabilitation target was superseded by the acceleration of the Bord na Móna de-carbonisation programme and the Scheme (**PCAS**).

The development of site rehabilitation plans and the delivery of peatland rehabilitation by Bord na Móna was expected to have a positive impact on water quality and will help the NRBMP 2018-2021 deliver its objectives in relation to the Water Framework Directive and is one of the five key principle actions.

The draft NRBMP 2022-2027 describes how the number of waterbodies impacted by peat, industry and forestry have decreased by 10, 10 and 5 waterbodies, respectively since the second cycle. Impacts on water quality and river habitat arising from peat and peat extraction and associated drainage include the release of ammonium and

fine-grained suspended sediments, and physical alteration of aquatic habitats. Drainage of peatlands also results in changes to the hydromorphological condition of rivers.

The draft NWBMP 2022-2027 outlines how maintaining and restoring Irish bogs will lead to a decrease in waterborne carbon leaching to levels comparable with intact bogs as well as reducing losses of peat silt and ammonia. Vegetation on the surface of the peat can also slow the flow of water over the land surface. Based on the EPA's most recent reports, peat extraction and drainage is impacting on 106 water bodies across the country, with peat the single pressure on 28 of these water bodies. However, compared to the data in the second-cycle plan, the number of water bodies impacted by peat has decreased.

The cessation of industrial peat extraction by Bord na Móna in 2021 was expected to have a significant positive impact on water quality of receiving water courses by reducing the impact of peat extraction as a key pressure on particular water courses. This is now being supported by the results and conclusions of the draft NWBMP 2022-2027.

6 National Biodiversity Action Plan 2016-2021

The National Biodiversity Action Plan 2016-2022 has a vision that biodiversity and ecosystems in Ireland are conserved and restored, delivering benefits essential for all sectors of society and that Ireland contributes to efforts to halt the loss of biodiversity and the degradation of ecosystems in the EU and globally. Ireland's 2nd National Biodiversity Action Plan outlines the main policies, strategies, actions and targets in relation to biodiversity. This plan has several Bord na Móna specific objectives and actions including implementing the BnM Biodiversity Action Plan 2016-2021 and overlaps with both the National Peatlands Strategy and the National Raised Bog Special Areas of Conservation Management Plan 2017-2022.

The delivery of rehabilitation via PCAS is expected to significantly contribute in the future to actions and targets of the National Biodiversity Action Plan 2016-2021, particularly in relation to peatland restoration and creation of new habitats such as wetlands and woodlands.

A new National Biodiversity Action Plan is currently being developed.

7 National Conservation Designations

Bord na Móna operates in a wider landscape that also includes a network of European and National nature conservation sites (Special Areas of Conservation (SACs), Special Protection Areas (SPAs), National Heritage Areas (NHAs, cNHAs) and National Nature Reserves). Bord na Móna will take account of this network of conservation objectives and their conservation objectives when developing these rehabilitation plans. It is expected that peatland rehabilitation will, in general, benefit the conservation objectives of this network of nature conservation sites.

8 National Raised Bog Special Area of Conservation Management Plan 2017-2022.

The National Raised Bog Special Area of Conservation Management Plan 2017-2022 sets out a roadmap for the long-term management, restoration and conservation of protected raised bogs in Ireland. The Plan strikes an appropriate balance between the need to conserve and restore Ireland's raised bog network as part of Ireland's commitments towards the EU Habitats Directive, and the needs of stakeholders and gives recognition to the

important role that communities have to play in the conservation and restoration of raised bogs. The National Raised Bog Special Areas of Conservation (SACs) Management Plan 2017-2022 is part of the measures being implemented in response to the on-going infringement action against Ireland in relation to the implementation of the EU Habitats Directive, with regard to the regulation of turf cutting on the Special Areas of Conservation (SACs). The then Minister for Arts, Heritage and the Gaeltacht, also published a **Review of Raised Bog Natural Heritage Area Network** in 2014.

Bord na Móna has played a key role in the development of the National Raised Bog Special Area of Conservation Management Plan 2017-2022 and the Review of the Raised Bog Natural Heritage Area Network. Several Bord na Móna sites were assessed by the National Parks and Wildlife Service as part of the above Plan and Review and there is an expectation that several Bord na Móna sites will be designated as SACs and NHAs in the future. This will reinforce the network of protected raised bog sites and replace in part sites that will be de-designated as they have been deemed to be significantly damaged and are deemed to have no raised bog restoration prospects. PCAS is expected to restore several sites that will contribute to The National Raised Bog Special Areas of Conservation (SACs) Management Plan 2017-2022 targets in relation to the restoration of raised bog habitat.

Bord na Móna has also responded to the needs of the NRBMP and provided several sites to the government for the relocation of turf-cutters from SACs. This is part of a suite of ongoing bog conservation measures in the NRBMP to manage turf-cutting in protected sites. Bord na Móna and the National Parks and Wildlife Service continues to engage regarding the ongoing relocation of turf-cutters from protected raised bog sites.

9 All-Ireland Pollinator Plan 2021-2025

The All-Ireland Pollinator Plan 2021-2025 outlines key objectives and actions to protect and support pollinating insects and the habitats they rely on. A Bord na Móna specific action in this plan includes the adoption of pollinator-friendly management within the Bord na Móna network of sites. One action to help achieve this objective is habitat rehabilitation and restoration, where possible, of pollinator-friendly habitats, including peatland habitats.

10 Land-use Planning Policies

As Bord na Móna operates in many counties across Ireland, it is important to note the respective development plans in these counties. Many of the existing development plans recognise the potential that exists in the after-use of cutover/cutaway peatlands. Bord na Móna seeks to work with all of the relevant local authorities to ensure that the most appropriate after-uses are reflected in local planning policy. The following areas of consistent importance are of both direct and indirect relevance to Bord na Móna: heritage, tourism, biodiversity/conservation, landscape, renewable energy, and economy/enterprise.

11 National Archaeology Code of Practice

Bord na Móna operates under an agreed Code of Practice regarding archaeology with the Department of Arts, Heritage and the Gaeltacht and the National Museum of Ireland which provides a framework to enable the Company to progress peat extraction whilst carrying out archaeological mitigation. (<https://www.archaeology.ie/sites/default/files/media/publications/cop-bord-na-mona-en.pdf>)

The Code replaced a set of Principles agreed with the Department of Arts, Heritage and the Gaeltacht in the 1990s. Under the Code Bord na Móna, the Minister and Director work together to ensure that appropriate archaeological mitigation is carried out in advance of peat extraction.

- BNM must ensure that any monuments or archaeological objects discovered during peat extraction are protected in an appropriate manner by following the Archaeological Protection Procedures.
- BNM must ensure that any newly discovered monuments on Bord na Móna lands are reported in a timely manner to the National Monuments Service of the Department of Arts, Heritage and the Gaeltacht.
- BNM must ensure that any archaeological objects discovered on Bord na Móna lands are reported immediately to the Duty Officer of the National Museum of Ireland.
- Bord na Móna will adhere to the Archaeology Code of Practice relating to management of any archaeological finds that may arise during cutaway peatland rehabilitation and decommissioning.

12 Bord na Móna Biodiversity Action Plan 2016-2021

Rehabilitation of industrial peatlands is a key objective of the Bord na Móna Biodiversity Action Plan 2016-2021. This action plan outlines the main objectives and actions around biodiversity on Bord na Móna lands. The Bord na Móna Biodiversity Action Plan also outlines key International and European policy in relation to biodiversity. This includes the **United Nations Convention on Biodiversity 2011-2020 (CBD)** and **European Biodiversity Strategy to 2020**. Further details of these policies and Bord na Móna's responses can be found in the Bord na Móna Biodiversity Action Plan (Bord na Móna, 2016). Both policy documents highlight targets such as reducing pressure on biodiversity, promoting sustainability, habitat restoration and benefits of ecosystem services.

One example of a key CBD target is:

- *“Restore at least 15% of degraded areas through conservation and restoration activities.”*

The EU's headline target for progress by 2020 is to:

- *“halt the loss of biodiversity and the degradation of ecosystems in the EU by 2020, restore them as far as feasible, while stepping up the EU contribution to averting global biodiversity loss.”*

This rehabilitation plan is aligned to the CBD target and the EU Biodiversity Strategy target and will help Ireland meet its commitment to these international Biodiversity policies.

13 Bord na Móna Commitments

Bord na Móna made the commitment in 2009 not to develop any new peatland sites for industrial peat production. The company has continued to work with different stakeholders.

The company announced that industrial peat production would be cut by over 50 percent in 2019 and would entirely cease over most of its lands by the mid-2020s. Rehabilitation measures would continue to be carried out with the focus on re-wetting and rehabilitation of cutover and cutaway areas in line with national policies (such as the National Peatland Strategy, the National Biodiversity Action Plan, the Climate Action Plan 2019, the Water Framework Directive, etc.) and rehabilitation guidelines set down by the Environmental Protection Agency. To date, 15,000 hectares of cutaway and cutover bog have been rehabilitated using this approach with 5,000 hectares in active rehabilitation.

In line with Bord na Móna's accelerated decarbonisation programme, the company made a further commitment to a significantly larger rehabilitation target. This was reflected in our plans to rehabilitate a further 20,000 hectares of cutaway and cutover bog to wetland and woodland mosaics by 2025. In addition, we planned to restore a further 1,000 hectares of raised bog habitat by 2025.

The above commitments have now been followed by the decision by the company to cease industrial peat extraction and rehabilitate a target of 33,000 ha between 2021-2025.

These commitments outline the importance of peatland rehabilitation to Bord na Móna. The company will continue to demonstrate environmental responsibility and continue to deliver on these commitments in relation to peatland rehabilitation and in relation to the future management of these lands to maximise their benefits, particularly their ecosystem service benefits, along with the sustainable development of a portion of the land bank for other uses, such as renewable energy.

14 Bord na Móna Strategic Framework for the future use of cutaway peatlands 2020 (Draft)

The general after-use strategy of Bord na Móna is outlined in the Bord na Móna Strategic Framework for Future-Use of Cutaway Bogs 2020 (draft document). This document outlines how Bord na Móna's cutover peatland estate is complex in nature with great variability in terms of peat depths, peat types, drainage, subsoil condition and environmental value. Thus, future options require consideration on a site-specific basis, also bearing in mind the considerable internal variation within bogs. The development of the land-bank will also take account of national needs, while also taking account of the various national legislation, policies and plans related to the management of peatlands. In general, Bord na Móna will seek to balance and optimise commercial, social, and environmental value of these sites, and develop integrated land-uses, while taking account of the need for sustainability and their biodiversity value.

Any consideration of other future after-uses for Bord na Móna land such as development or other mixed uses will be conducted following the relevant planning guidelines and consultation with relevant authorities and will be considered within the framework of this peatland rehabilitation plan.

APPENDIX VII. DECOMMISSIONING

1. Condition 10 Decommissioning

This is a requirement of the applicable Integrated Pollution Control Licence issued by the Environmental Protection Agency. This condition 10.1 requires the following:

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.

The main success criteria pertaining to successfully complying with this condition is ensuring that no environmental liability remains from this infrastructure and material and that the bog can be deemed suitable for surrender of the licence 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 production operation at the 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, stock pile covering, pumps, septic tanks and fuel tanks.

In relation to this bog, the list and tasks would be as follows:

Item	Description	Bracklin West Decommissioning Plan
1	Clean-up of remaining or unconsolidated waste or materials located in Bogs, Yards, Buildings and Offices	Where relevant
2	Cleaning Silt Ponds	Cleaning Silt Ponds
3	Decommissioning Peat Stockpiles	Where relevant
4	Decommissioning or Removal of Buildings and Compounds	Where relevant
5	Decommissioning Fuel Tanks and associated facilities	Where relevant
6	Decommissioning and Removal of Bog Pump Sites	Not relevant
7	Decommissioning or Removal of Septic Tanks	Where required

In addition, condition 7 of the licence requires these now defined waste items to be disposed of or recovered as follows:

7.1 Disposal or recovery of waste shall take place only as specified in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* of this licence and in accordance with the appropriate National and European legislation and protocols. No other waste shall be disposed of/recovered either on-site or off-site without prior notice to, and prior written agreement of, the Agency.

7.2 Waste sent off-site for recovery or disposal shall only be conveyed to a waste contractor, as agreed by the Agency, and only transported from the site of the activity to the site of recovery/disposal in a manner which will not adversely affect the environment.

7.3 A full record, which shall be open to inspection by authorized persons of the Agency at all times, shall be kept by the licensee on matters relating to the waste management operations and practices at this site. This record shall as a minimum contain details of the following:

7.3.1 The names of the agent and transporter of the waste.

7.3.2 The name of the persons responsible for the ultimate disposal/recovery of the waste.

7.3.3 The ultimate destination of the waste.

7.3.4 Written confirmation of the acceptance and disposal/recovery of any hazardous waste consignments sent off-site.

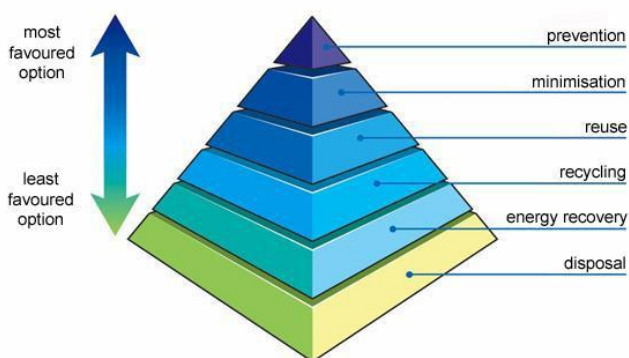
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

7.3.6 Details of any rejected consignments.

A copy of this Waste Management record shall be submitted to the Agency as part of the AER for the site.

As required by the licence, these waste items will be removed for recycling or disposal, using external contractors with the required waste collection permits, approved under 7.2, with waste records maintained as required under 7.3.

Where possible, Bord na Móna will utilize the appropriate waste hierarchy to identify waste that can be reused or recycled ahead of disposal.



The validation of the success of condition 10.1 is carried out through an Independent Closure Audit (ICA), followed by an EPA Exit Audit (EA) and the eventual partial or full surrender of the licence.

2. Enhanced Decommissioning.

The remaining infrastructure does not constitute a risk to the environment and would not be a requirement of condition 10 of the licence. The removal of these are deemed as enhanced measures. These may enhance the future afteruse of the bog for amenity value, security against access for illegal and unsocial activities and general State and community benefit. In relation to this bog, this would include the infrastructure defined below:

Item	Enhanced Decommissioning Type	Bracklin West Decommissioning Plan
1	Removal of Railway Lines	Removal of Railway Lines
2	Decommissioning Bridges and Underpasses	Where Applicable
3	Decommissioning Railway Level Crossing	Where Applicable
4	Restricting Access (bogs and silt ponds)	Restricting Access to Bog
5	Removal of High Voltage Power Lines	Where Applicable

APPENDIX VIII. GLOSSARY

Cutaway Bog: A Bord na Móna site generally becomes cutaway when it is economically unviable to continue industrial peat extraction or when the majority of peat has been removed.

Deep peat cutover bog. Deep peat cutaway bog is defined as former raised bogs that have been in industrial peat production, where production has ceased but the residual peat depth is typically in excess of 2m. *Sphagnum* mosses are key species of raised bogs and the majority of the peat mass is formed from these mosses. *Sphagnum* species and other raised bog species are a key part of raised bog habitat function and prefer more acidic, nutrient poor, water-logged conditions. Typical raised bog *Sphagnum* mosses and other bog species do not thrive with the more typical alkaline water chemistry of cutaway bog but do grow well in these more acidic conditions where peat has been re-wetted. There is potential to re-develop *Sphagnum*-rich plant communities in these conditions if the peat can be re-wetted. This brings the opportunity of re-developing *Sphagnum*-rich vegetation communities that are considered Carbon sinks or peat-forming habitats and restoring the carbon sequestration function of these sites.

Dry cutaway bog: Cutaway bog is categorised as dry cutaway where it is not practical or feasible to re-wet these areas completely. It is inevitable that some areas of cutaway will remain relatively dry due to the heterogenous topography of the cutaway, as well as requirements for continued drainage on site for identified after-uses, or off site in relation to neighbouring lands or other infrastructure. Ridges and mounds of glacial deposits can become exposed during peat extraction and form a heterogenous topographical mosaic separated by basins. Dry cutaway may have very thin or no residual peat where ridges and mounds have been exposed. The exposed sub-soils are a mix of glacial gravels, muds and tills that can be quite free-draining. Dry cutaway may also have deeper residual peat, but in a location (i.e. at the margin) where the peat cannot be re-wetted due to boundary constraints. Dry cutaway may also develop in situations where there a relatively steep slope that inhibits re-wetting. The majority of dry cutaway will develop towards grassland, heath, scrub and dry woodland habitats.

Enhanced decommissioning: This is defined as decommissioning carried out under the Scheme, which is proposed to be externally funded.

Enhanced rehabilitation: This is defined as rehabilitation carried out under Scheme, which is proposed to be externally funded. It is proposed by Government that Bord na Móna be obligated to carry out enhanced decommissioning, rehabilitation and restoration on peatlands. This Scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations under existing EPA IPC licence conditions. Interventions and activities supported by the Scheme will ensure that environmental stabilisation is achieved (meaning IPC obligations are met), and importantly, significant additional benefits, particularly relating to climate action and other ecosystem services, will also be delivered. However, only the costs associated with the additional, enhanced and accelerated measures, i.e., those interventions which go beyond the existing decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support under the Scheme.

Environmental stabilisation: The key objective of peatland rehabilitation is environmental stabilisation. This means developing habitats and vegetation back onto the bare peat, slowing water movement across the bog, minimising effects to downstream waterbodies and meeting the conditions of the IPC Licence. This is achieved by a combination of re-wetting, where possible, and natural colonisation of the former cutaway, with or without intervention. Habitats will develop that reflect the underlying environmental conditions. Other after-use development may also serve to act as environmental stabilisation.

Marginal land. Marginal land is defined as land around the margin of the industrial peat production area. This margin generally contains a range of habitats including scrub, birch woodland, cutover bog and raised bog remnants. It has a variety of land-uses including turf-cutting (private turbary). The Scheme will consider potential rehabilitation and restoration actions (e.g. drain blocking) within marginal land zones, where appropriate.

Rehabilitation: Rehabilitation is defined in general by Bord na Móna as environmental stabilisation of the former cutaway. This is generally achieved via re-wetting, where possible, and natural colonisation of the former cutaway, with or without intervention. It is not possible to restore raised bog habitats on BnM cutaway in general in the short-term. In general, most of the peat mass has been removed from many BnM cutaway sites and the environmental characteristics of these areas have therefore changed radically (peat depths, hydrology, water chemistry, substrate type, nutrient status). This means there will therefore be different habitat outcomes (wetlands, fen, heathland, grassland and Birch woodland). Other after-use development may also serve to act as rehabilitation.

Restoration: Ecological restoration is defined as the process of re-establishing to the extent possible the structure, function and integrity of indigenous ecosystems and the sustaining habitats they provide” (SER, 2004). Defined in this way, restoration encompasses the repair of ecosystems (Whisenant, 1999) and the **improvement of ecological conditions in damaged wildlands** through the **reinstatement of ecological processes**. In general, Bord na Móna cutaway peatlands cannot be restored back to raised bog in a reasonable timeframe as their environmental conditions has changed so radically (with the removal of the acrotelem – the living layer and much of the peat mass). However, they can be returned to a **trajectory** towards a naturally functioning peatland system (Renou-Wilson, 2012). **Raised bog restoration** is an objective of some BnM sites where there is residual natural raised bog vegetation and where the majority of the peat is still intact.

Standard rehabilitation: This is defined as rehabilitation that is designed to meet the conditions of the EPA IPC Licence. The key objective of rehabilitation is environmental stabilisation. This is achieved by a combination of re-wetting, where possible, and natural colonisation of the former cutaway, with or without intervention. Other after-use development may also serve to act as rehabilitation.

Standard decommissioning: This is defined as decommissioning that is designed to meet the conditions of the EPA IPC Licence. This is defined as to 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.

Wetland cutaway bog. Wetland cutaway bog is defined as former raised bogs that have been in industrial peat production, where production has ceased and the majority of peat has been cutaway, and where this cutaway has the potential to be re-wetted. A significant number of Bord na Móna sites have pumped drainage and these sites are likely to develop a mosaic of wetland habitats when pumping is reduced or stopped. The water chemistry of wetland cutaway frequently is strongly influenced by the more alkaline sub-soils that have been exposed during peat production. This means that pioneer vegetation is more typical of fen and wetland, rather than raised bog. Wetland cutaway will have a broad range of hydrological conditions depending on the local topography. In some cases, these wetlands may form deep water (> 0.5 m) whilst other areas may have the water table at or just below the surface of the ground.

APPENDIX IX. EXTRACTIVE WASTE MANAGEMENT PLAN

(Minimisation, treatment, recovery and disposal)

Objective:

The objective of this generic plan is to comply with the requirements of regulation 5 of the Waste Management (Management of Waste from Extractive Industries) Regulations, and to prevent or reduce waste production and its harmfulness.

Scope:

This plan covers IPPC Licence's Ref P0501-01, Ballivor- Derrygreenagh Group of Bogs in Counties Meath and Westmeath.

1.0 Extractive Waste:

Waste classified as extractive waste from peat extraction operations arise from three operations associated with this activity.

1.1 Silt Pond excavations and maintenance.

All peat extraction activities in the Mount Dillon bog group are serviced by silt lagoons/ponds. During the excavation of these silt ponds, pre IPPC Licensing in 1999 and since licensing, the excavated material is stored adjacent to the silt pond, where it either remains in situ or levelled out. As required by condition 6.6, these silt lagoons are cleaned twice per annum or more often if inspections dictate. These silt cleanings are also deposited on the same location, adjacent to the silt pond, where they may be levelled periodically to allow room for subsequent cleanings. These mounds of silt pond excavation material and cleanings are generally no higher than 2-3 metres.

1.2 Power Station screenings:

Edenderry Power Station screens the peat from the bogs prior to processing. This screening removes oversized peat, stones and bog timbers. Schedule 3 (ii) of the IPPC licence permits disposal of these peat screenings back to the bog, where it is levelled and graded into the surrounding peat landscape. These locations have been agreed with the Agency as per condition 7.4 of the IPPC Licence, and as per the attached locations.

1.3 Bog Timbers:

During peat extraction operations, bog timbers often arise in the bog surface and are required to be cleared. These timbers consist of bog pine, oak and some yew. Some of these timbers, such as the oak and yew are removed for use in the wood craft industry, with the remaining bog pine stockpiled in locations at the opposite end of each bog, where it generally becomes a habitat for flora and fauna. These piles of timber are generally no higher than 1-2 metres.

2.0 P0501-01 IPPC Licence Extractive Waste Conditions

2.1 Condition 7.5 Extractive Waste Management

The licensee shall draw up a Waste Management Plan (to be known as an Extractive Waste Management Plan) for the minimisation, treatment, recovery and disposal of extractive waste. This Plan shall meet the requirements of regulation 5 of the Waste Management (Management of Waste from the Extractive Industries) Regulations, 2009. The Plan shall be submitted for agreement by the Agency by the 31st December 2012. The Plan shall be reviewed at least once every five years thereafter in a manner agreeable to the Agency and amended in the event of substantial changes to the operation of a waste facility or to the waste deposited. Any amendments shall be notified to the Agency.

All extractive waste shall be managed in accordance with the Extractive Waste Management Plan. A report on the implementation of the Extractive Waste Management Plan shall be provided in the AER.

2.2 Condition 7.6 Waste Facility

- (i) No new waste facility may be developed or an existing waste facility modified unless agreed by the Agency.
- (ii) The licensee shall ensure that all existing waste facilities are managed and maintained to ensure their physical stability and to prevent pollution or contamination of soil, air, surface water or groundwater.
- (iii) The licensee shall ensure that all new waste facilities are constructed, managed and maintained to ensure their physical stability and to prevent pollution or contamination of soil, air, surface water or groundwater.
- (iv) Operational measures shall be continuously employed to prevent damage to waste facilities from personnel, plant or equipment.
- (v) The licensee shall establish and maintain a system for regular monitoring and inspection of waste facilities.
- (vi) All records of monitoring and inspection of waste facilities, as required under the licence, shall be maintained on-site in order to ensure the appropriate handover of information in the event of a change of operator or relevant personnel.

2.3 Condition 7.7 Excavation Voids

7.7.1 Unless otherwise agreed by the Agency, only extractive waste shall be placed in excavation voids.

7.7.2 When placing extractive waste into excavation voids for rehabilitation and construction purposes, the licensee shall, in accordance with regulation 10 of the Waste Management (Management of Waste from the Extractive Industries) Regulations, 2009, and the Extractive Waste Management Plan:

- Secure the stability of the waste
- Put in place measures to prevent pollution of soil, surface water and ground water.
- Carry out monitoring of the extractive waste and excavation void.

Condition 7.5. Extractive Waste Management Plan. 5 (1)

3.0 Minimisation.

3.1 Silt pond excavation material and cleanings.

IPPC Licence conditions require all production areas to be serviced by an appropriately designed silt pond based on storage volume and retention time. Condition 6.6 requires all ponds to be cleaned bi-annually and more often if inspections dictate, so the only opportunity for minimisation of same is through Standard Operating Procedures. These are required under condition 2.2.2 (i) regarding minimisation of suspended solids, and are in-place to minimise the generation of silt, which in-turn will minimise the generation of silt pond waste.

3.2 Power Station Screenings.

These screenings cannot be minimised as they are a consequence of peat production, stones, timbers and oversize peat materials are naturally occurring on the bog, and are required to be removed prior to processing.

3.3 Bog Timbers.

Bog timbers are also naturally occurring materials within a bog and are required to be removed prior for production. The volume of these bog timbers varies from bog to bog and as such their minimisation is not controllable or quantifiable.

4.0 Treatment

4.1 Silt pond excavation material and cleanings.

The silt pond excavation material and silt cleanings do not require any treatment for its end use which will be either backfilling these silt pond voids as per condition 7.7.1 above as part of the Bog Rehabilitation Plan, or reincorporated into the surrounding peatlands.

4.2 Power Station Screenings.

The factory screenings are permitted to be returned to the bog as they were naturally occurring materials from the bog, and as such do not require any treatment to serve this purpose.

4.3 Bog Timbers

As per 1.3 above, these timbers are stockpiled at two locations in each bog, as per the attached list of sites and become habitats for various flora and fauna.

5.0 Recovery

5.1 Silt pond excavation material and cleanings.

Condition 2.2.2 (vi) requires the reuse of silt pond waste to be examined. This was undertaken in 2006, the outcome of which was that this waste peat silt material, as a fuel, was contaminated with sub-soils, rendering it unsuitable for combustion. In addition, volumes are small compared to overall peat production volumes.

5.2 Power Station Screenings.

Given the nature of these screenings as outlined in 1.2 above, there is no further use identified and they are permitted to be disposed of back to the bog.

5.3 Bog Timbers

Investigations into processing these materials into smaller fractions for potential heating purposes did not yield any viable results. In addition, these older stockpiles are now classified as habitats and as such would not be considered for reuse as a fuel.

6.0 Disposal

6.1 Silt pond excavation material and cleanings.

Schedule 3 (ii) permits the disposal of silt pond cleanings (Lagoon Sediments) to the bog and these locations, adjacent to the silt pond site, are presented in the attached spreadsheet, with associated grid coordinates.

6.2 Power Station Screenings.

Schedule 3 (ii) permits the disposal of screenings (Peat Screenings) to the bog at designated locations agreed under Condition 7.4, and these locations, are presented in the attached spreadsheet, with associated grid coordinates.

6.3 Bog Timbers

These naturally occurring bog timbers are stockpiled at locations in each bog, grid coordinates attached.

7.0 Extractive Waste Management Plan

5 (2a)(i)

The vast majority of peat extraction bogs were all designed and drained for production prior to the 1960's and as such the production fields layout cannot be altered. Under our Cleaner Reduction Procedures, various design changes have been implemented to the production machines and process to reduce lost peat which eventually is captured in the silt ponds and requires removal as waste peat silt. This along with training and ongoing research and development will continuously reduce waste peat and subsequently waste silt pond cleanings. Bog timbers are present naturally in various volumes and quantities in different bogs and as peat production involves stripping peat in layers, the exposure, generation and removal of these timbers is unavoidable. Work has been undertaken recently into project looking at grinding of these bog timbers in situ using a timber miller, and if this project becomes viable it will contribute to the reduction of bog timbers.

5 (2a)(ii)

Given the nature and expanse of peat bogs, the stockpiling and storage of these waste materials do not present a visual, storage or stability problem. As required under Condition 10 of the IPPC Licence, the silt pond excavations and screenings will be utilised to backfill the silt pond voids once the bogs have finished and stabilised in accordance with our Bog Rehabilitation Plan. Storage of these wastes in the interim, open to the elements does not present a change on the nature of these wastes that will threaten the environment or prevent their reuse during the bog rehabilitation process.

5 (2a)(iii)

Under Condition 10 of the IPPC Licence, all silt ponds will be decommissioned once the bog surface has stabilised, in agreement with the Agency. This will involve the removal of weirs and flow controls, returning the silt pond back to its original drain or removing the silt pond from the drainage system. Both of these activities will involve placing the silt pond extraction and cleaning material back into the excavation void.

5 (2a)(iv)

The peat bogs do not contain any topsoil, so this is not required.

5 (2a)(v)

Peat mineral resources do not undergo any treatment.

5 (2b)

These three extractive waste are all being reused and recovered back to their original extraction points and have not undergone any physical, chemical, or biological change.

5 (2c)(i, ii & iii)

These three extractive wastes, stored on the bog for reuse or recovery during the bog rehabilitation phase, do not require any management or monitoring during the operation of these bogs. Silt pond excavations and cleanings are stored adjacent to the silt pond and quickly revegetated and stabilise, the screenings are graded back into the bog at the agreed locations upon disposal and the bog timbers do not prevent any water or airborne danger to the environment.

5 (3)

The three extractive wastes arising from peat extraction operations at this site are classified wastes from mineral non-metalliferous excavation, with an EWC code of 0101 02. The materials are not classified as hazardous under Directive 91/689/EEC20, and do not contain substances or preparations classified as dangerous under Directives 67/548/EEC5 or 1999/45/EC6 above a certain threshold.

The peat excavations and cleanings are stored in locations and in a manner that they could not collapse, and are remote in their nature. The stockpiles are located adjacent to silt ponds that are cleaned regularly and as such these stockpiles are managed and levelled to facilitate further cleanings.

Therefore the material stored at these waste facilities would not be considered to be a Category A waste facility.

Classification in accordance Annex II.

Waste Material	Description	Classification	Chemical Process treatment	Deposition description	Transport System
Silt Pond Excavations and cleanings	Peat and mineral soils associated with peatlands. Stored for reuse during bog rehabilitation, with no displacement of overburden	01 01 02	None	Excavated from silt ponds by excavator and deposited adjacent to the silt pond.	Excavator
Peat Screenings	Stones, timbers and oversized peat particles, reincorporated into low areas, agreed with the Agency, and stabilized under normal natural bog conditions	01 01 02	None	Removed by screen at the factory and transported by tractor and trailer to the designated and agreed locations	Tractor and trailer.
Bog Timbers	Pine, Oak and Yew species, stored at locations in each bog. Not subject to any stability issues due to exposure to atmospheric/meteorological conditions.	01 01 02	None	Removed from the bog surface by excavator and transported by tractor and trailer to the agreed locations	Tractor and Trailer

Description of operations.

Silt pond excavations arise from the requirement to have silt ponds treating all peat extraction sites. Silt pond cleanings arise from the removal of peat silt from silt ponds as required under IPPC Licence. Bog timbers arise from preparation of the bogs surface for peat production. Estimated quantities of materials are below:

Closure plan. (Bog Rehabilitation Plan).

Condition 10.1 – 10.3 of the IPPC Licence requires the following:

- 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.
- 10.1.2 Implement the agreed cutaway bog rehabilitation plan (refer Condition 10.2).

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.

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.

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. This plan including maps and ecological classifications are available on file at the Mount Dillon IPPC Licence Coordinators office.

The location in relation to the silt pond excavations and cleanings are adjacent to the silt ponds, which are considered under the Shannon River Basin Management Plan in accordance with the requirements of Directive 2000/60/EC.

Screenings and bog timbers are all naturally occurring elements of peatland and their placement back to the bog in smaller concentrated designated waste facilities does not constitute a risk to the prevention of water compliance.

The lands under where these materials are deposited are peatlands and are un-affected by the placing of this material.

Review.

This plan will be reviewed every five years, the first review to take place in September 2017. This review will entail an inspection of these waste facilities to ensure their placing, management, maintenance and stability comply with the requirements of the Extractive Waste Management requirements and condition 7.5, 7.6 and 7.7 of the Mount Dillon IPPC Licence P0504-01.

APPENDIX X. MITIGATION MEASURES FOR THE APPLICATION OF FERTILISER

- Any fertiliser used will be Rock Phosphate and will not be applied in the following conditions:
 1. The land is waterlogged;
 2. The land is flooded, or it is likely to flood;
 3. The land is frozen, or covered with snow;
 4. Heavy rain is forecast within 48 hours (forecasts will be checked from Met Éireann).
 5. The ground slopes steeply and there is a risk of water pollution, when factors such as surface run-off pathways, the presence of land drains, the absence of hedgerows to mitigate surface flow, soil condition and ground cover are taken into account.
- 6. Buffer zones in respect of waterbodies, as specified on <https://www.epa.ie/about/faq/name,57156,en.html>, will be adhered with at all times with regard to fertiliser application.
- 7. No fertiliser will be spread within or in proximity to European Sites. Fertiliser will not be spread within 25m of a hydraulic break (where slope indicates runoff potential); 25m of an area subject to annual winter inundation, 25m of a natural watercourse, or 25m of any drains where conveyance is to be retained through the proposed rehabilitation extent.
- 8. Fertiliser will be applied to headlands and bare fields where the surface slope indicates runoff is directed away from the above areas, and to within 2m of internal drainage channels within the cutover high field areas. These drainage channels will be blocked in advance of fertiliser application, restricting potential run-off to downstream drainage channels.

Water body / Feature	Buffer zone
Any water supply source providing 100m ³ or more of water per day, or serving 500 or more people	200 metres (or as little as 30 metres where a local authority allows)
Any water supply source providing 10m ³ or more of water per day, or serving 50 or more people	100 metres (or as little as 30 metres where a local authority allows)
Any other water supply for human consumption	25 metres (or as little as 30 metres where a local authority allows)
Lake shoreline	20 metres
Exposed cavernous or karstified limestone features (such as swallow holes or collapse features)	15 metres
Any surface watercourse where the slope towards the watercourse exceeds 10%	10 metres
Any other surface waters	5 metres*

APPENDIX XI. CONSULTATION SUMMARIES**Table APXI -1 Consultees contacted**

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Bracklin West	Department of Housing, Local Government and Heritage NPWS	Multiple Staff Members	22/02/2023	Email		
Bracklin West	National Museum of Ireland	Multiple Staff Members	22/02/2023	Email		
Bracklin West	Department of Housing, Local Government and Heritage	General Email Contact	22/02/2023	Email		
Bracklin West	Dept of Agriculture Food & the Marine	General Email Contact	22/02/2023	Email		
Bracklin West	Department of Environment, Climate and Communications	Multiple Staff Members	22/02/2023	Email		
Bracklin West	Dept of Rural and Community Development	General Email Contact	22/02/2023	Email		
Bracklin West	Department of the Housing Local Government and Heritage	General Email Contact	22/02/2023	Email		
Bracklin West	Minister for Environment, Climate and Communications	Minister - Eamon Ryan	22/02/2023	Email		
Bracklin West	Minister of state for Agriculture with responsibility for Land use and Biodiversity	Pippa Hackett Minister of State for Land Use and Biodiversity	22/02/2023	Email		
Bracklin West	Oireachtas	Minister Malcolm Noonan	22/02/2023	Email	23/02/2023	Email
Bracklin West	An Taisce	General Email Contact	22/02/2023	Email		
Bracklin West	Environmental Protection Agency	Multiple Staff Members	22/02/2023	Email		
Bracklin West	Inland Fisheries Ireland	General Email Contact	22/02/2023	Email		
Bracklin West	Local Authority Waters Programme	Multiple Staff Members	22/02/2023	Email		

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Bracklin West	Teagasc	General Email Contact	22/02/2023	Email		
Bracklin West	The Heritage Council	General Email Contact	22/02/2023	Email		
Bracklin West	Waterways Ireland	General Email Contact	22/02/2023	Email		
Bracklin West	An Forum Uisce (The Water Forum)	General Email Contact	22/02/2023	Email		
Bracklin West	Coillte	Multiple Staff Members	22/02/2023	Email		
Bracklin West	Irish Water	General Email Contact	22/02/2023	Email		
Bracklin West	Irish Water- Water Supply Project Eastern and Midlands Region	General Email Contact	22/02/2023	Email		
Bracklin West	Office of Public Works (OPW)	Multiple Staff Members	22/02/2023	Email	21/03/2023	Email
Bracklin West	CARO (Climate Action Regional Office) Eastern and Midlands	General Email Contact	22/02/2023	Email		
Bracklin West	Bat Conservation Ireland	General Email Contact	22/02/2023	Email		
Bracklin West	Birdwatch Ireland	General Email Contact	22/02/2023	Email		
Bracklin West	Butterfly Conservation Ireland	General Email Contact	22/02/2023	Email		
Bracklin West	Eastern and Midland Regional Assembly	General Email Contact	22/02/2023	Email		
Bracklin West	Fisheries Ireland	General Email Contact	22/02/2023	Email		
Bracklin West	Friends of the Earth	General Email Contact	22/02/2023	Email		
Bracklin West	Irish Environmental Network (IEN)	General Email Contact	22/02/2023	Email		
Bracklin West	Friends of the Irish Environment	General Email Contact	22/02/2023	Email		

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Bracklin West	ICMSA (Irish Creamery Milk Suppliers Association)	General Email Contact	22/02/2023	Email		
Bracklin West	ICSA (Irish Cattle and Sheep Farmers Association)	General Email Contact	22/02/2023	Email		
Bracklin West	Irish Farmers Association	General Email Contact	22/02/2023	Email		
Bracklin West	Irish Peatlands Conservation Council	General Email Contact	22/02/2023	Email		
Bracklin West	Irish Raptor Study Group	General Email Contact	22/02/2023	Email		
Bracklin West	Irish Rural Link (Community Wetlands Forum)	General Email Contact	22/02/2023	Email		
Bracklin West	Irish Rural Link	General Email Contact	22/02/2023	Email		
Bracklin West	Irish Wildlife Trust	General Email Contact	22/02/2023	Email		
Bracklin West	Inland Waterways Association of Ireland (IWA)	General Email Contact	22/02/2023	Email		
Bracklin West	National Association of Regional Game Councils	General Email Contact	22/02/2023	Email		
Bracklin West	NPWS Rangers North Midlands	General Email Contact	22/02/2023	Email		
Bracklin West	University of Galway (Peatlands and People)	General Email Contact	22/02/2023	Email		
Bracklin West	PPN Offaly Public Participation Network	General Email Contact	22/02/2023	Email		
Bracklin West	Ranger Association Committee	General Email Contact	22/02/2023	Email		
Bracklin West	Shannon Flood Risk State Agency Co-ordination Working Group	General Email Contact	22/02/2023	Email		
Bracklin West	Sustainable Water Action Network (SWAN)	General Email Contact	22/02/2023	Email		

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Bracklin West	Trinity College Dublin	General Email Contact	22/02/2023	Email		
Bracklin West	Turf Cutters and Contractors Association	General Email Contact	22/02/2023	Email		
Bracklin West	UCD / Irish Rural Link	General Email Contact	22/02/2023	Email		
Bracklin West	University College Dublin	General Email Contact	22/02/2023	Email		
Bracklin West	Waterways Ireland	General Email Contact	22/02/2023	Email		
Bracklin West	Woodlands of Ireland	General Email Contact	22/02/2023	Email		
Bracklin West	Westmeath County Councillors - Chief Exec	General Email Contact	22/02/2023	Email		
Bracklin West	Westmeath County Councillors - Director of Service	General Email Contact	22/02/2023	Email		
Bracklin West	Westmeath County Councillors - Director of Service	General Email Contact	22/02/2023	Email		
Bracklin West	Westmeath County Council Executive Directors	Listed for all Director of Services	22/02/2023	Email		
Bracklin West	Westmeath County Councillor	Deirdre Reilly	22/02/2023	Email		
Bracklin West	Westmeath County Councillor - Mullingar-Kinnegad	John Shaw	22/02/2023	Email		
Bracklin West	Westmeath County Councillor - Mullingar-Kinnegad	Emily Wallace	22/02/2023	Email		
Bracklin West	Westmeath County Councillor - Mullingar-Kinnegad	Andrew Duncan	22/02/2023	Email		
Bracklin West	Westmeath County Councillor - Mullingar-Kinnegad	Michael Dollard	22/02/2023	Email		

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Bracklin West	Westmeath County Councillor - Mullingar-Kinnegad	Aoife Davitt	22/02/2023	Email		
Bracklin West	Westmeath County Councillor - Mullingar-Kinnegad	Denis Leonard	22/02/2023	Email		
Bracklin West	Westmeath County Councillor - Mullingar-Kinnegad	Ken Glynn	22/02/2023	Email		
Bracklin West	Westmeath County Councillor - Mullingar-Kinnegad	Hazel Smyth	22/02/2023	Email	27/02/2023	Email
Bracklin West	Westmeath County Councillor - Mullingar-Kinnegad	Billy Collentine	22/02/2023	Email		
Bracklin West	Westmeath County Councillor - Mullingar-Kinnegad	Frank McDermott	22/02/2023	Email		
Bracklin West	Westmeath County Councillor - Mullingar-Kinnegad	Paddy Hill	22/02/2023	Email		
Bracklin West	All Land- owners in vicinity of bog		02/03/2023	Letter drop		

Table APXI -2 Response summary from Consultees contacted

Organisation	Summary of Response by Stakeholder	BnM Response
OPW	<p>Submission from The OPW on the BnM Decommissioning & Rehabilitation Plan for Bracklin West Bog</p> <p>The Bracklin West Bog is within the benefiting boglands of the OPW Boyne Arterial Drainage Scheme. The Boyne ADS channels extend up to the western and south eastern boundaries of Bracklin West Bog and provide drainage outfalls for the bogland. However, there are no measures in the draft rehabilitation plan for modification of these channels or impacts on OPW drainage maintenance activities. However as part of this consultation process it is recommended that OPW seek clarification from Bord na Móna on the following:</p> <ol style="list-style-type: none"> 1. Does BnM envisage any impacts or constraints on OPW carrying out normal Arterial Drainage Maintenance activities on the OPW Boyne scheme channels C1/37/4/7, C1/37/14 and C1/37/16/1. Any impacts on OPW Arterial Drainage Schemes needs to be assessed in the decommissioning and rehabilitation plan. 2. Bracklin West Bog is within the “Benefited Boglands” of the Boyne Arterial Drainage Scheme, therefore the OPW is seeking clarification from Bord na Móna with regard to future drainage maintenance liabilities for the OPW on this bogland that will be rewetted during the decommissioning and rehabilitation of this bog. <p>In general, the OPW supports the BnM bog rehabilitation and rewetting as a Nature Based Catchment Management measure in managing flood flows in the Boyne River Catchment and the many other environmental co-benefits from developing this project.</p>	BnM responded acknowledging the submission and confirmed that they do not envisage any impacts that would constrain ADM activities or any future requirements for OPW drain maintenance activities on this bogland.
Cllr. Hazel Smyth Green Party Representative, Westmeath County Council (WCC)	<p>Less than 3% of the world's land surface is made up of bogs but they contain twice as much carbon as the world's forests. They are a vital defence in helping us fight the drastic effects of climate change. As well as playing a hugely important role in capturing carbon from the atmosphere and absorbing rainfall to prevent flooding. They are vital habitats for many very special forms of plants, birds and insects. They also offer a magical getaway for people to come to relax, unwind and explore which is more important than ever for our mental health and well-being. I hope that this project will further contribute to Westmeath being a sustainability and wellness hub</p>	BnM responded acknowledging the submission and made reference to the proposed adjacent Ballivor Windfarm.

Organisation	Summary of Response by Stakeholder	BnM Response
	<p>for all of Ireland. I would call for this bog to be considered for renewable energy projects, to the extent that this is possible while maintaining the integrity and environment of the bog. It is important that the local community be engaged with respect to the rehabilitation of this bog and that any amenity area supports the local community needs. The need for education and awareness regarding the importance of this bogland is also essential. The problems with burning turf in terms of our health, biodiversity and our environment need to be communicated clearly to all. The need for enforcement to protect this bogland is critical and I ask that this be considered as part of the development of this bogland.</p>	

APPENDIX XII. ARCHAEOLOGY

Role of the Archaeological Liaison Officer

1. To communicate this Code of Practice and the *Archaeological Protection Procedures* (Appendix IV) to all personnel operating on the bog.
2. To ensure that all notices relating to the *Archaeological Protection Procedures* are posted and maintained at appropriate locations on the bog.
3. To report any stray finds, presented to the Liaison Officer from his/her group of bogs, to the Duty Officer of the National Museum of Ireland.
4. To provide for the appropriate protection of the stray find, whether in-situ or removed from the bog, as directed by the Duty Officer of the National Museum of Ireland.




Code of Practice

Code of Practice

5. To arrange for the delivery or collection of the stray find, as directed by the Duty Officer of the National Museum of Ireland.
6. To complete the Report of Discovery of Archaeological Object(s) in Bogs (Appendix V), as directed by the Duty Officer of the National Museum of Ireland.
7. To maintain a file of all stray finds and associated documentation and provide copies to the Project Archaeologist.
8. To provide assistance, where required, to the Department during archaeological surveys.
9. To provide assistance, where required, to Bord na Móna's Consultant Archaeologists, during investigation and mitigation of monuments.
10. To report to the Bord na Móna members on the Archaeology Management Liaison Committee any planned developments or new activities on cutaway peatland areas within his/her group of bogs.



	Procedure: ENV017	Rev: 1
	Title: Archaeological Findings	Approved: EM

1) Purpose

The purpose of this procedure is to describe the arrangements in Bord na Móna for findings of Archaeological material (Stray Finds).

All objects, sites or monuments, no matter how fragmentary, are important elements of our heritage.

2) Procedure

1. Check whether there are any known archaeological monuments in your area.
2. Be vigilant at all times - objects or traces of structures can be found on the field surfaces, in the drain faces, on the bog margins or caught within the mechanics of machinery.
3. If an object is found leave it in place, if it is safe to do so, note its position and immediately contact your Archaeological Liaison Officer who will assess the situation and contact the Duty Officer of the National Museum of Ireland.
4. Resist the temptation to investigate the find spot as this may disturb fragile archaeological deposits.
5. If the object is already dislodged or is in imminent danger, remove it carefully, mark its find spot and report it immediately to your Archaeological Liaison Officer.
6. Objects made of wood, leather or textile, which are removed from peat should be kept in conditions similar to those in which they are found. This can be done by packing them in peat or, if waterlogged, placing them in a clean basin of water and sealing the container. Resist the temptation to clean or remove peat from the object.
7. If timbers or other materials, such as gravel or stones, which could be part of a man-made structure are noted on the bog, mark the location and report it immediately to your Archaeological Liaison Officer. If you suspect the find is of archaeological importance, resist the temptation to expose it any further as this could result in damage to the structure.
8. Report anything that looks unnatural in the bog – your Archaeological Liaison Officer will decide whether it should be referred to the appropriate authorities.

NOTE: Our archaeological heritage is a finite, non-renewable resource. Once a site is destroyed its information is lost forever and we have lost the chance to understand a little more about our past, where we have come from and perhaps the opportunity to learn for the future.

Your Archaeological Liaison Officer is

3) Records

Revision Index			
Revision	Date	Description of change	Approved
1	13/09/2020	First release	EMcD
2			



**Archaeological Impact Assessment of Proposed Bog
Decommissioning and Rehabilitation at Bracklin West Bog,
Co. Westmeath**

Report For

Bord Na Móna Energy Ltd.

Author

Dr. Charles Mount

Bord Na Móna Project Archaeologist



Introduction

The EPA (2002) *Guidance on the process of preparing and implementing a bog rehabilitation plan* notes that the licensee should characterise the bog prior to embarking on detailed planning and implementation. This characterisation should detail how the land is classified in terms of statutory protections, e.g. as European sites, world heritage sites, RAMSAR sites, National Heritage Areas, national monuments, archaeological heritage, etc. This archaeological impact assessment report was prepared by Dr. Charles Mount for Bord na Móna Energy Ltd to fulfil this characterisation in relation to archaeological heritage. It represents the results of a desk-based assessment of the impact of proposed bog rehabilitation on c.750 hectares at Bracklin West Bog, Co. Westmeath on the known archaeological heritage of the bog. The proposed rehabilitation actions will be a combination of measures to create wetlands and re-wet deep peat as outlined in the draft Methodology Paper for the proposed Bord na Móna Decommissioning, Rehabilitation and Restoration Scheme. These enhanced measures for Bracklin West Bog will include:

- A widespread drain-blocking programme will be implemented across the cutaway, where possible. This will have to be planned in association with the wind farm infrastructure. In general, field drains will be blocked where possible to re-wet cutaway and re-wet to the optimum water-level. More intensive measures will be targeted towards the bare peat.
- In areas of deeper peat, berms and field reprofiling will be carried out to create 45m x 60m cells. These will be carried out in deep peat areas where water has potential to be retained within the cell. Measures will also entail blocking outfalls, managing overflows, creating drainage channels for excess water and carrying out Sphagnum inoculation.
- Less intensive measures (targeted drain-blocking) will be used in areas where habitats have already established.
- Measures will include drain blocking (3/100 m), modifying outfalls and managing water levels with overflow pipes;
- Wetland measures including blocking outfalls and managing water levels with overflow pipes.

Bracklin West Bog is located c.2.9km north of Raharney and east of the L1504 road. The bog rehabilitation area occupies the townlands of Ballynaskeagh, Bracklin, Craddanstown, Killagh, and Mucklin on OS 6 inch sheets Westmeath Nos. 13, 14, 20 and 21.

Methodology

This is a desk-based archaeological assessment that includes a collation of existing written and graphic information to identify the likely archaeological potential of Bracklin West Bog. The extent of the rehabilitation area is indicated in Fig. 1. This area was examined using information from:

- The IAWU Peatland Survey
- The 2005 Bord na Móna Survey
- The Record of Monuments and Places
- The Sites and Monuments Record (SMR) that is maintained by the Dept of Housing, Local Government and Heritage
- The Excavations database
- Previous assessments

An impact assessment has been prepared and recommendations have been made.



Desktop assessment

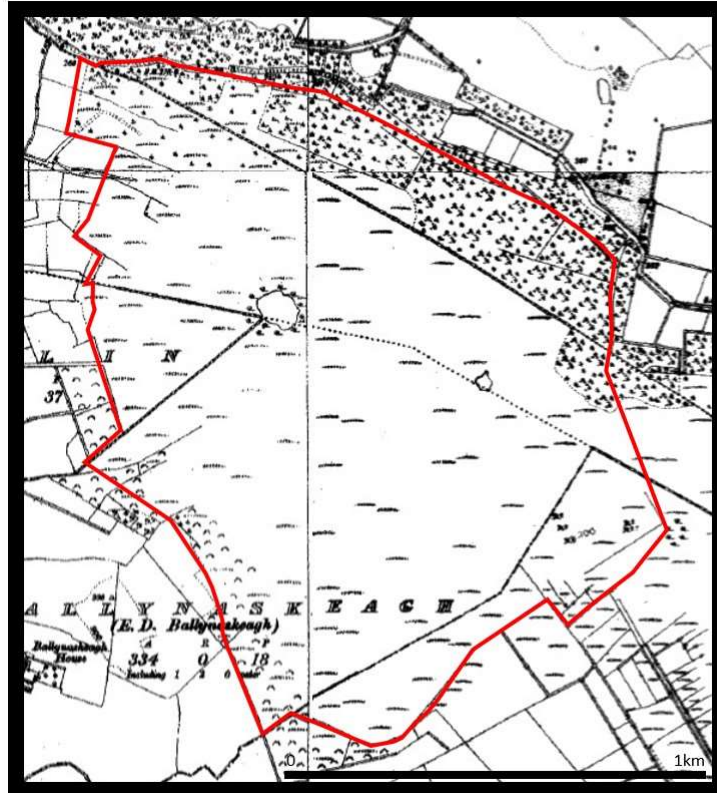


Fig. 1. Bracklin West Bog, Co. Westmeath, detail of the Record of Monuments and Places map sheets Westmeath Nos. 13, 14, 20 and 21. The proposed rehabilitation area is outlined with the red line.

Peatland survey

Bracklin West Bog was not surveyed by the Irish Archaeological Wetland Unit (IAWU).

Recorded Monuments

The Record of Monuments and Places (RMP) for Co. Westmeath which was established under Section 12 of the National Monuments (Amendment) Act, 1994 was examined as part of the assessment (DAHGI 1997). This record was published by the Minister in 1997 and includes sites and monuments that were known in Bracklin West Bog before that date. This review established that there are no RMPs located in the proposed rehabilitation area (see Fig. 1).

2005 Archaeological Survey of Ireland Peatland Survey

Bracklin West Bog was surveyed by ADS Ltd in 2005 as part of the Archaeological Survey of Ireland Peatland Survey (Licence No. 05E0793). No sightings of archaeological material were recorded during the fieldwalking survey (Whitaker 2006, 11-12).

Archaeological Excavations

The Excavations Bulletin at excavations.ie was checked for reports of licenced excavations carried out in the rehabilitation area. This indicate that there have been no licenced excavations carried out in the rehabilitation area.



Sites and Monuments Record

The Sites and Monuments Record (SMR) which is maintained by the Department of Housing, Local Government and Heritage was examined as part of the assessment on the 1st of February 2023. This review established that there are no SMRs located in the proposed rehabilitation area (see Fig. 2).



Fig. 2. Bracklin West Bog, Co. Westmeath, detail of the Sites and Monuments Record. The proposed rehabilitation area is outlined with the red line.

Previous assessments

Bracklin West Bog has been the subject of an Environmental Impact Assessment Report (EIAR) carried out by Irish Archaeological Consultancy LTD in 2018 for Bord na Móna Energy Limited in relation to IPC Licence P0500-03. This assessment included a review of the topographical files and finds registers of the National Museum of Ireland intended to identify all finds from the bog reported to the Museum by that date and these are included below in Table 1 (Pers Comm. Jane Whitaker). The assessment noted that there was a high potential for archaeological features to be uncovered during the course of any future development works in Bracklin West Bog.

Reported finds

As noted above the EIAR carried out by Irish Archaeological Consultancy LTD in relation to IPC Licence P0500-03 contains a complete list of known finds from Bracklin West Bog reported to the National Museum of Ireland up to 2018 (see Table 1).

Townland	Museum No./ catalogue NO.	Description
Bracklin	1964:83	Wooden lid



Bracklin	1959:31	Bronze sword blade
Bracklin	1959:09	Neolithic pottery vessel
Bracklin	1962:243	Polished stone axehead

Table 1. List of archaeological finds from Bracklin Bog reported to the National Museum of Ireland.

Impact assessment

There are no known sightings of archaeological material in the rehabilitation area. There are some finds known from the bog (see Table 1).

Recommendations

There are no known sightings of archaeological material in the rehabilitation area. There are some finds known from the bog (see Table 1). Should any previously unknown archaeological material be uncovered during the rehabilitation works, it should also be avoided and reported to the Bord na Móna Archaeological Liaison Officer and the National Museum of Ireland.

Conclusion

This is a desk-based archaeological assessment and includes a collation of existing written and graphic information to identify the likely archaeological potential of the proposed rehabilitation area. Bracklin West Bog was surveyed by ADS Ltd in 2005 as part of the Archaeological Survey of Ireland Peatland Survey and no sightings of archaeological material were recorded. There are no known sightings of archaeological material in the rehabilitation area. There are some finds known from the bog (see Table 1). Should any previously unknown archaeological material be uncovered during the rehabilitation works, it should also be avoided and reported to the Bord na Móna Archaeological Liaison Officer and the National Museum of Ireland.

References

DAHGI 1997. Recorded Monuments Protected under Section 12 of the National Monuments (Amendment) Act, 1994. County Westmeath.

EPA 2020. Guidance on the process of preparing and implementing a bog rehabilitation plan.

Mackin *et al.* 2017. Best practice in raised bog restoration in Ireland. Irish Wildlife Manuals, No. 99. National Parks and Wildlife Service.

Whitaker, J. 2006. Peatland Survey 2005 Allen, Kilberry & Coolnamóna Bogs Counties Kildare, Laois, Meath, Offaly, & Westmeath. Unpublished report for Department of the Environment, Heritage and Local Government.

Dr. Charles Mount
1 February 2023

APPENDIX XIII. WATER QUALITY MONITORING RESULTS FOR BRACKLIN WEST BOG

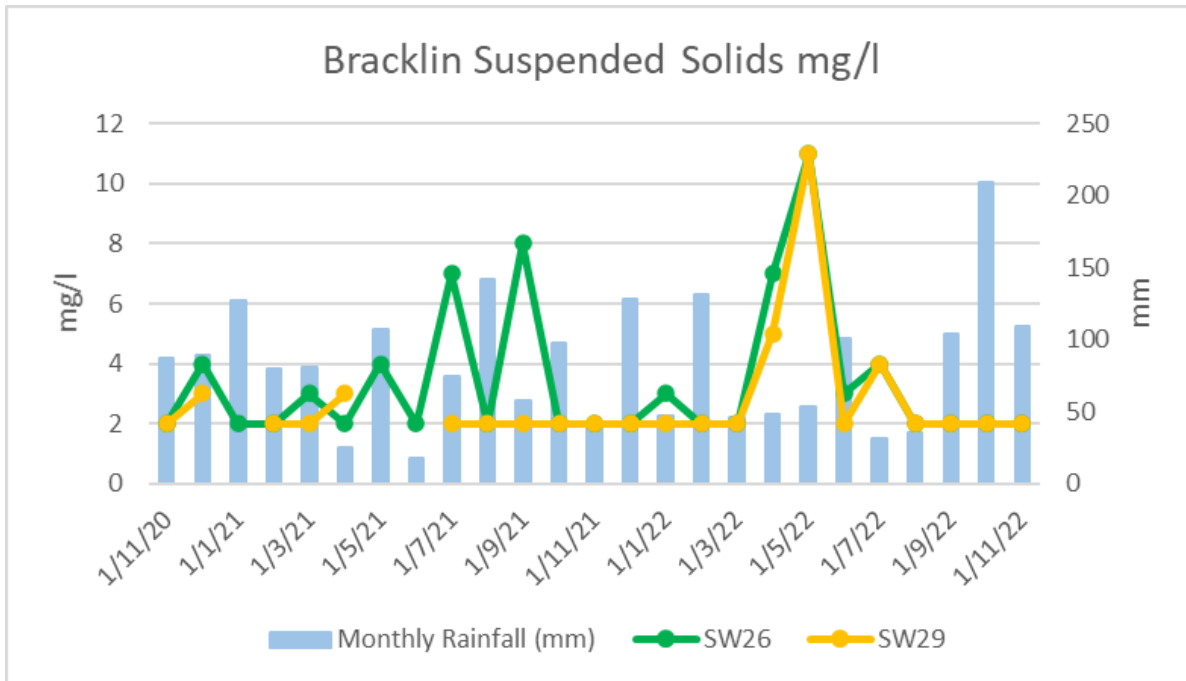


Figure AP13.1 Suspended solids in water sampling at Bracklin West from different discharge points.

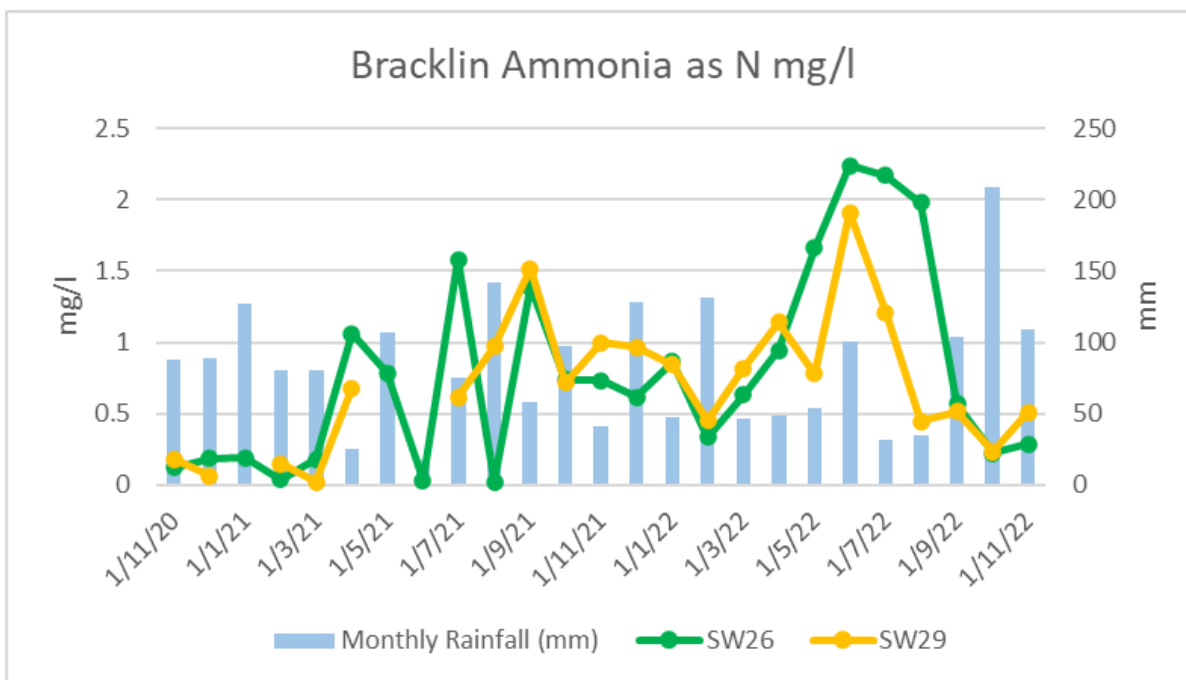


Figure AP13.2 Ammonia concentrations in water sampling from Bracklin West from different discharge points.

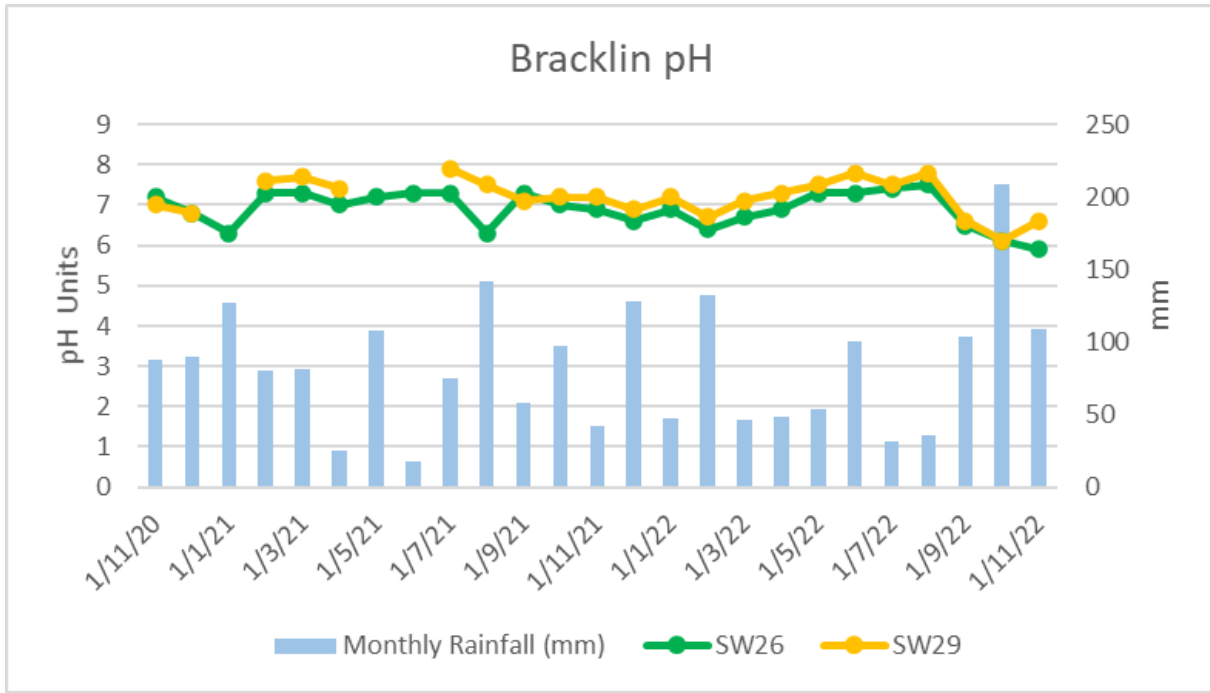


Figure AP13.3 PH concentrations in water sampling from Bracklin West from different discharge points.

PCASSW Sampling Scheme				Suspended Solids		Suspended Solids		Suspended Solids		Suspended Solids		Suspended Solids		Suspended Solids		Suspended Solids		Suspended Solids		Suspended Solids		Suspended Solids		Suspended Solids		Suspended Solids		Suspended Solids		Suspended Solids		Suspended Solids		Suspended Solids		Suspended Solids	
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l		
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22									
Derrygreenagh	P0501-01	Bracklin	SW26	2	4	2	2	3	2	4	2	7	2	2	2	2	3	2	2	2	2	5	11	2	4	2	2	2	2	2	2	2	2	2	2	2	2
Derrygreenagh	P0501-01	Bracklin	SW29	2	3	NF	2	2	3	NF	NF	2	2	2	2	2	2	2	2	2	2	5	11	2	4	2	2	2	2	2	2	2	2	2	2	2	
			Monthly Rainfall (mm)	87.7	89.3	126.9	80.3	80.9	25.5	107.4	17.4	74.9	142.1	58.1	97.7	41.6	128	47.6	131.8	46.2	48.7	53.4	100.6	31.6	35.2	104.1	208.8	109.3									
PCASSW Sampling Scheme				Colour		Colour		Colour		Colour		Colour		Colour		Colour		Colour		Colour		Colour		Colour		Colour		Colour		Colour		Colour		Colour		Colour	
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co		
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22									
Derrygreenagh	P0501-01	Bracklin	SW26	222	371	255	199	343	257	386	269	319	384	246	352	286	213	243	175	205	343	246	170	171	155	372	223	241									
Derrygreenagh	P0501-01	Bracklin	SW29	422	313	NF	199	87.5	318	NF	NF	196	252	149	304	268	181	224	164	170	285	193	109	159	125	313	196	251									
PCASSW Sampling Scheme				COD		COD		COD		COD		COD		COD		COD		COD		COD		COD		COD		COD		COD		COD		COD		COD		COD	
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l		
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22									
Derrygreenagh	P0501-01	Bracklin	SW26	53	61	43	42	67	52	76	81	72	92	32	77	53	51	55	40	35	60	64	55	57	55	102	59	59									
Derrygreenagh	P0501-01	Bracklin	SW29	79	52	NF	48	31	74	NF	NF	55	63	10	63	48	37	49	34	29	54	50	37	44	45	87	51	51									
PCASSW Sampling Scheme				pH		pH		pH		pH		pH		pH		pH		pH		pH		pH		pH		pH		pH		pH		pH		pH		pH	
Bog Group	Licence No	Bog Name	SW Code -GIS	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units		
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22									
Derrygreenagh	P0501-01	Bracklin	SW26	7.2	6.8	6.3	7.3	7.3	7	7.2	7.3	7.3	6.3	7.3	7	6.9	6.6	6.9	6.4	6.7	6.9	7.3	7.3	7.4	7.5	6.5	6.1	5.9									
Derrygreenagh	P0501-01	Bracklin	SW29	7	6.8	NF	7.6	7.7	7.4	NF	NF	7.9	7.5	7.1	7.2	7.2	6.9	7.2	6.7	7.1	7.3	7.5	7.8	7.5	7.8	6.6	6.1	6.6									
			Monthly Rainfall (mm)	87.7	89.3	126.9	80.3	80.9	25.5	107.4	17.4	74.9	142.1	58.1	97.7	41.6	128	47.6	131.8	46.2	48.7	53.4	100.6	31.6	35.2	104.1	208.8	109.3									
PCASSW Sampling Scheme				TP as P		TP as P		TP as P		TP as P		TP as P		TP as P		TP as P		TP as P		TP as P		TP as P		TP as P		TP as P		TP as P		TP as P		TP as P		TP as P		TP as P	
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l		
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22									
Derrygreenagh	P0501-01	Bracklin	SW26	0.05	0.06	0.05	0.05	0.15	0.05	0.05	0.06	0.08	0.05	0.08	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.08	0.07	0.05	0.05	0.05	0.05	0.05									
Derrygreenagh	P0501-01	Bracklin	SW29	0.05	0.05	NF	0.05	0.05	0.05	NF	NF	0.07	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.07	0.05	0.05	0.05	0.05	0.05	0.05									
PCASSW Sampling Scheme				TS		TS		TS		TS		TS		TS		TS		TS		TS		TS		TS		TS		TS		TS		TS		TS		TS	
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l		
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22									
Derrygreenagh	P0501-01	Bracklin	SW26	212	97	61	193	193	92	207	238	373	128	365	146	109	87	139	80	93	164	324	412	385	430	253	86	15									
Derrygreenagh	P0501-01	Bracklin	SW29	132	126	NF	335	423	266	NF	NF	309	254	321	141	158	145	346	131	111	246	379	321	333	321	253	129	73									
PCASSW Sampling Scheme				Ammonia as N		Ammonia as N		Ammonia as N		Ammonia as N		Ammonia as N		Ammonia as N		Ammonia as N		Ammonia as N		Ammonia as N		Ammonia as N		Ammonia as N		Ammonia as N		Ammonia as N		Ammonia as N		Ammonia as N		Ammonia as N		Ammonia as N	
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l		
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22									
Derrygreenagh	P0501-01	Bracklin	SW26	0.124	0.184	0.192	0.038	0.18	1.06	0.788	0.033	1.58	0.019	1.39	0.739	0.734	0.617	0.867	0.337	0.634	0.943	1.66	2.24	2.17	1.98	0.569	0.224	0.285									
Derrygreenagh	P0501-01	Bracklin	SW29	0.181	0.064	NF	0.147	0.024	0.68	NF	NF	0.615	0.969	1.52	0.715	0.998	0.968	0.846	0.453	0.816	1.14	0.778	1.91	1.21	0.448	0.517	0.236	0.511									
			Monthly Rainfall (mm)	87.7	89.3	126.9	80.3	80.9	25.5	107.4	17.4	74.9	142.1	58.1	97.7	41.6	128	47.6	131.8	46.2	48.7	53.4	100.6	31.6	35.2	104.1	208.8	109.3									
PCASSW Sampling Scheme				DOC		DOC		DOC		DOC		DOC		DOC		DOC		DOC		DOC		DOC		DOC		DOC		DOC		DOC		DOC		DOC		DOC	
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l		
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21																							