Bord na Móna

Derrybrat Bog

Cutaway Bog Decommissioning and Rehabilitation Plan 2021

This document seeks to address the requirements of Condition 10.2 of IPC License Ref. P0500-01:

> "*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 Derrybrat 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 permanently ceased at Derrybrat Bog.

In addition, to preparing this document to comply with Condition 10 of IPC Licence Ref. P0500-01, due regard was also given to the Peatlands Climate Action Scheme (PCAS) announced by the Minster. 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 the Derrybrat 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 Derrybrat 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 Derrybrat 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.

Document Control Sheet	
Document Name:	Derrybrat Bog - Cutaway Bog Decommissioning and Rehabilitation Plan 2021
Document File Path:	G:\Ecology Team\EPA draft rehab plans 2017 word docs\Boora ref.500\ Derrybrat
Document Status:	Draft

This document comprises:	DCS	TOC	Text (Body)	References	Maps	No. of Appendices
	1	2	31	3	(3)	10

Rev. 0.1	Author(s):	Checked By:	Approved By:
Name(s):	DMK	MMC	MMC
Date:	15/07/2021	20/08/2021	20/08/2021

Rev. 1	Author(s):	Checked By:	Approved By:
Name(s):			
Date:			
Rev. 1.1	**Author(s):**	**Checked By:**	**Approved By:**
Name(s):			
Date:			

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NON-TECHNICAL SUMMARY

- Bord na Móna is planning to rehabilitate Derrybrat Bog, near Kilcormac in Co Offaly.
- Peat harvesting is now finished at Derrybrat Bog.
- 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, and minimising impacts to downstream. Essentially this means putting the 'skin' of plants and mosses back on the peat. The bog 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 and Reeds will thrive.
- Many Bord na Móna bogs can not be restored back to raised bog, as so much peat has been removed and the environmental conditions have been modified. However other natural habitats will develop like shallow wetlands with Reedbeds and Birch woodland, and in time a naturalised peatland can be restored.
- Re-wetting peat is also better for climate action. This reduces carbon emissions as re-wetting the remaining peat reduces carbon losses such as the production of Carbon Dioxide, the main Greenhouse Gas. The site is expected to still be a reduced carbon source for some time, but eventually the carbon sink function can re-establish as peat-forming conditions are restored. This will take some time.
- The development of a range of habitats in Derrybrat 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 wetland habitats.
- Derrybrat Bog was drained and developed for industrial peat production in the 1950s. Peat production ceased in 2016. Some rehabilitation was carried out in 2018 and in 2020. Much of the site has already started to develop pioneer habitats including cutaway wetlands.
- The wetland is now supporting wetland species including Black-headed Gull, Lapwing and Redshank.
- Measures proposed for Derrybrat Bog include drain blocking and other measures required to raise water levels to the surface of the peat (changing levels of pipes for example). Some fertiliser will be spread on headlands and other areas (a small part of the overall area) to encourage vegetation growth.
- Bord na Mona plan to carry out this work in 2022.
- These rehabilitation measures will be planned by a team consisting of ecologists, hydrologists and engineers. It is a principle of Bord na Móna rehabilitation planning that no actions will be taken that would negatively impact on adjacent land. No boundary drains will be blocked. Water will still leave the site via the existing outlets.
- It will take some time for vegetation and habitats to fully develop at this bog, and a peatland ecosystem to be restored. However, it is expected that most of the site will be developing pioneer habitats after 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 planned in adherence to relevant planning guidelines and will consider the rehabilitation and the condition of the site.
- Bord na Móna have proposed to construct a windfarm in an adjacent bog at Drinagh (Derrinlough Windfarm). Planning permission has recently been consented. An amenity track through Derrybrat and along the industrial railway is planned to link the Boora amenity complex with the amenity being developed as part of the Derrinlough Windfarm. This amenity can be integrated into the rehabilitation plan.
- Peatland rehabilitation of these bogs 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.

PLAN SUMMARY

Name of bog: Derrybrat **Area:** 170.2Ha

Site description:

- Derrybrat Bog was drained and developed for industrial peat production in the 1950s. Industrial peat production ceased in 2016.
- Some peatland rehabilitation was carried out in 2018 as a trial. This consisted of drain-blocking.
- The former peat production footprint now comprises bare peat, mosaics of pioneer vegetation and emergent woodland/scrub habitats. The southern section has developed a mosaic of wetland habitats. Some active drainage channels are present on site.
- Peat depths are limited on site with peat depths over most of the site are approximately 0.5-2.5m. Derrybrat is considered a **shallow peat** cutover bog.
- Derrybrat bog is drained by the Silver River which flows northward along the western site boundary. The Grand Canal is located over 3km to the north of Derrybrat.
- Part of the site has been planted with commercial conifer forestry by Coilte.

Rehabilitation goals and outcomes

Bord na Móna is committed to discharging the obligations arising from Condition 10 of the IPC licence. The primary goals and outcomes of this plan are to (1) meet condition 10 requirements and (2) optimise climate action benefits from enhanced rehabilitation measures.

Optimising hydrological conditions for **climate action benefits as part of PCAS**. This will be achieved via **wetland creation and intensive re-wetting**. This will be achieved via intensive **re-wetting**. This is defined as:

- Carrying out enhanced rehabilitation with the application of enhanced peat rehabilitation measures to re-wet peat and slow water movement across the site. The site has already developed a mosaic of pioneer cutaway habitats. Rehabilitation will focus on targeted actions to raise water levels and areas where there is still significant bare peat cover. This site will develop a mosaic of compatible wetland and cutaway peatland habitats.
- Optimising hydrological conditions for the development of fen, reed swamp and wet woodland on shallow cutaway peat, and eventually naturally functioning peatland and wetland habitats.
- Stabilisation or improvement in water quality parameters (e.g. suspended solids).
- Environmental stabilisation.
- Rehabilitation will support the National Policies on Climate Action and Green House Gas (GHG) mitigation by maintaining and enhancing the current condition peat storage capacity of the bog (locking the carbon into the ground). In time, it is expected that the bog will develop as a reduced carbon source. The development of carbon sink function is dependent on the restoration of peat-forming conditions. It will also support Ireland's commitments towards Water Framework Directive and the National River Basin Management Plan 2018-2021.

Scope of rehabilitation

The principal scope of this rehabilitation plan is defined by:

- The area of Derrybrat Bog.
- EPA IPC Licence - Ref. P0500-01. 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 key objective of 'rehabilitation', as required by this licence, is achieved by the **environmental stabilisation** of the bog.

- The enhanced rehabilitation measures defined in the Scheme (PCAS), which are designed to exceed/meet the standard stabilisation requirements as defined by the IPC Licence and to enhance the ecosystem services of Derrybrat Bog, in particular, optimising **climate action benefits**.
- The local environmental conditions of this bog. Derrybrat Bog has variable environmental characteristics with a range of residual peat depths, hydrology and topography. Derrybrat is suited to wetland development, particularly in the southern section.
- The key goals and outcomes of rehabilitation at this bog outlined above.
- Minimising potential impacts on neighbouring land. Some boundary drains around Derrybrat Bog will be left unblocked as blocking boundary drains could affect adjacent land.
- Future land-use at Derrybrat Bog has not been defined by Bord na Móna. Biodiversity and ecosystem services have been identified as the current primary land use.

Criteria for successful rehabilitation:

The Criteria for successful rehabilitation for IPC Licence validation and for climate action verification have been defined as:

- Rewetting of residual peat in the former area of industrial peat production to slow water movement across the site to retain silt, accelerating the development of vegetation cover via natural colonisation, and reducing the area of bare exposed peat (IPC Licence validation) through the creation of compatible fen, Reed swamp, wet woodland and other wetland and peatland habitats.
- Stabilising or reducing key emissions to water (e.g. potential silt-run-off) This will be measured via water quality monitoring (suspended solids and ammonia) for at least 2 years after the rehabilitation has been completed (IPC Licence validation).
- Reducing pressure from peat production on the local river catchment (WFD) (IPC Licence validation). This will be measured by the EPA WFD monitoring programme.
- Optimising the extent of suitable hydrological conditions to optimise climate action (Climate action verification).
- Reduction in carbon emissions (Climate action verification). This will be measured by an aerial survey after rehabilitation has been completed.
- Setting the site on a trajectory towards establishment of a mosaic of compatible habitats including fen, Reed swamp, wet woodland, heath, scrub, embryonic *Sphagnum*-rich peat forming communities, Birch woodland habitats, where conditions are suitable, and eventually towards a reduced carbon source/carbon sink (Climate action verification). These habitats will generally establish initially as pioneer vegetation. It will take some time for stable naturally functioning peatland habitats to fully develop at Derrybrat Bog.
- Improvement in biodiversity and ecosystem services. (Climate action verification).

Meeting climate action verification criteria and monitoring of these criteria is dependent on support from the Climate Action Fund and Ireland's National Recovery and Resilience Plan or other sources of funding.

Summary of measures:

The below section is a summary of measures proposed for rehabilitation.

- Planning actions, including developing a detailed site plan and carrying out a drainage management assessment.
- Carry out an ecological appraisal of the potential impacts of the planned rehabilitation.
- Carry out proposed measures, which will be a combination of targeted drain blocking, peat field re-profiling, modifying outfalls and water level management.
- Phase 2 measures may include fertiliser application targeting bare peat areas on headlands, high fields and other areas, and further water level management.

- Silt ponds will continue to be maintained during the rehabilitation and decommissioning schedule.
- Evaluate success of short-term rehabilitation measures outlined above and remediate, where necessary.
- Decommissioning of silt-ponds will be assessed and carried out, where required.

Timeframe:

- 2021-2022. Short-term planning actions.
- 2022. Short-term practical actions.
- 2022-2024. Long term practical actions. Evaluate success of short-term rehabilitation measures outlined above and remediate, where necessary.
- 2024. Decommission silt-ponds, if necessary.

Monitoring, after-care and maintenance

The monitoring, after-care and maintenance programme for Derrybrat Bog, as required to meet Condition 10 of the IPC Licence, 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, asses 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 any additional rehabilitation.
- **Water quality monitoring** will be established. Monitoring of key water quality parameters will include: Ammonia, Phosphorous, Suspended solids (silt), pH and conductivity.

Additional Monitoring:

- The monitoring and validation of re-vegetation via natural colonisation and changes in bog condition will be carried out using an aerial survey, after rehabilitation measures are implemented. This will be repeated after 5 years to map and validate changes.
- Biodiversity Ecosystem services will be monitored using specific indicators.
- Carbon emissions monitoring only be carried out on a small proportion of BnM sites to develop better understanding of carbon emissions and GHG emission factors from different types of BnM sites and will be developed on association with other established research programmes. Reduction in carbon emissions will be modelled by a combination of habitat condition assessment and application of appropriate carbon emission factors derived from other sites. Baseline monitoring (habitat condition) will be carried after rehabilitation is completed (during the Scheme). It is proposed that sites can be monitored against this baseline in the future.
- Monitoring as part of Climate Action Verification is dependent on support from the Climate Action Fund or other external funding.

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.
- The site has been environmentally stabilised.

1. INTRODUCTION

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Boora bog group (Ref. P0500-01). As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the cutaway boglands within the licensed area. The bog is part of the Boora bog group (see Appendix II for details of the bog areas within the Boora Bog Group). Derrybrat Bog is located in Co. Offaly.

This document seeks to address the requirements of Condition 10.2 of IPC License Ref. P0500-01:

> "*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 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;
- 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 actions;
- Budget and Costings; and
- Associated aftercare, maintenance and monitoring.

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 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.

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 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 PCAS 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 outfall management, drain-blocking and management of water levels within the bog;
- re-profiling/re-wetting of extant deep peat 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.

Derrybrat Bog is proposed to be part of this this Scheme (PCAS) and this rehabilitation plan outlines the approach taken.

1.1 Constraints and Limitations

This document only covers the area of Derrybrat Bog, see Drawing number BNM-DR-23-06-01 titled **Derrybrat Bog**.

Future land-use at Derrybrat Bog has not been defined by Bord na Móna. Bord na Móna will continue to review the future after-use of its land-bank. Any consideration of any other future after-uses for Derrybrat Bog, will be conducted in adherence to the relevant planning legislation and consultation with relevant authorities and will be considered within the framework of this rehabilitation plan.

Amenity use has been consented via planning for a small section of Derrybrat as part of the Derrinlough Windfarm. This amenity (proposed track along the bed of the industrial railway) will link Derrinlough Windfarm and the Lough Boora Discovery Park.

Industrial peat extraction at Derrybrat Bog permanently ceased in 2016. Currently the former peat production area comprises a mosaic of various different pioneer habitats, in addition to bare peat and exposed gravel sub-

soil. The combination of active rehabilitation measures and natural colonisation will quickly establish and/or increase the extent of pioneer vegetation and will be planned to accelerate environmental stabilisation. Nevertheless, it will take some time (30-50 years) for naturally functioning peatland ecosystems to fully re-establish.

Parts of Derrybrat Bog (outside the areas owned and under the control of Bord na Móna) are currently used by domestic turf cutters to harvest peat. These areas are ecologically and hydrologically linked to the area owned by Bord na Móna where rehabilitation is planned. It is beyond the scope of this rehabilitation plan to address turf cutting issues on the margins of Derrybrat Bog that are outside of the control of Bord na Móna. Nevertheless, Bord na Móna are aware of such issues which may constrain the proposed rehabilitation actions, and this rehabilitation plan considered potential impacts of these on the delivery of the stated objectives. In addition, a small area within the northeast of Derrybrat bog, within the control of Bord na Móna, has been identified as Turbary. However, this land has not been subject to peat extraction although some historic drainage has been undertaken.

The area of Derrybrat Bog leased to Coillte is not considered part of the scope of this rehabilitation plan.

Rehabilitation in other areas of the bog may also be constrained due to other property issues or issues such as rights of way.

2. METHODOLOGY

This rehabilitation plan was developed with a combination of desktop and field surveys, consultations with internal and external stakeholders and cognisance of the Scheme (PCAS). 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 survey, additional confirmatory site visits and monitoring and desktop analysis forms the basis for the development of the 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-practise 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 LIDAR data:
- Hydrological modelling; and
- The development of a **Methodology Paper (draft) 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 Derrybrat 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-practise 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.
- 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.
- Pschenyckyj et al., 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 & Rochefort (2003). Peatland Restoration Guide, second edition. Canadian *Sphagnum* Peat Moss Association and New Brunswick Department of Natural Resources and Energy.
- 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:

- Boora Integrated Pollution Control Licence;
- Boora 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);
- 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 2018 – 2021;
- Bord na Móna Annual Report 2019;
- 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 will be 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 Derrybrat Bog was originally surveyed in October of 2009, and re-surveyed in September of 2014, additional ecological walk-over surveys and visits have taken place at Derrybrat Bog between 2014-2021 to inform rehabilitation planning and habitat maps have been updated, where required. This rehabilitation plan is informed by the original baseline survey as well as subsequent site walk-over surveys and visits, and updates to baseline data.

Habitat mapping followed best-practise 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 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). Much of the pioneer cutaway vegetation is still at an early stage of its development and cannot be assigned to Fossitt Level 3 categories yet.

A detailed ecological baseline survey report for Derrybrat Bog is contained in Appendix II.

3. SITE DESCRIPTION

Derrybrat Bog is located adjacent to the R357 in Co. Offaly, circa 6km to the south of Ferbane and 5Km north west of Kilcormac.

See Drawing number BNM-DR-23-06-01 titled **Derrybrat Bog: Bog Site Location**, included in the accompanying Mapbook[1] , which illustrates the location of Derrybrat Bog in context to the surrounding area.

The surrounding landscape is a mosaic primarily consists of low-lying agricultural land (pasture) interspersed with other raised bogs, many of which have also been managed by Bord na Móna for peat production with some areas utilised for domestic turf-cutting. Lough Boora Discovery Park is approximately 4km east of Derrybrat.

The Silver River, a tributary of the River Brosna, flows northward along the western boundary of Derrybrat Bog. The Grand Canal is located, at the closest point, approximately 3Km the north of the site. Derrybrat is linked to Boora Bog to the east (also owned by Bord na Móna) and Drinagh to the West by railway line and a machinery travel path. The railway line runs east-west and divides Derrybrat into two main sections, namely; the north and south sections.

A portion of the site was planted with commercial forestry plantation by Coilte in the 1980s. An area of land in the west of the northern section of Derrybrat has been planted with Eucalyptus as part of a Bord na Móna biomass trial.

3.1 Status and Situation

3.1.1 Site history

The site formerly provided peat for use in the Derrinlough Briquette factory and Ferbane Power Station, Ferbane, Co. Offaly.

3.1.2 Current land-use

Industrial peat production has now permanently ceased at Derrybrat Bog. Future land-use at Derrybrat Bog has not been defined by Bord na Móna. Some rehabilitation measures ie. drain blocking, were previously carried out in the southern section of the site and can be seen on the recent 2020 aerial imagery, Drawing number BNM-DR-23-01-22 titled **Derrybrat Bog**.

The existing east-west rail line through Derrybrat is still maintained. It is used to transport peat from adjacent sites to Derrinlough and will continue to be used until Derrinlough Brickette factory ceases production.

A large block of Conifer Plantation is situated at the east of the site. This area is managed by Coillte and was planted in the 1980s. The most common crop species is Sitka Spruce *Picea sitchensis*. A smaller amount of Lodgepole Pine *Pinus contorta* also exists within the plantation.

A small trial plantation of biomass fuel Eucalyptus was established in the south west corner of the northern section of the Derrybrat by Bord na Móna.

[1] Cutaway Bog Decommissioning and Rehabilitation Plan - Derrybrat Bog Map Book

An amenity track along the industrial railway has been proposed for this site in the future as part of the proposed Derrinlough Windfarm. This would link the Boora area with amenity tracks proposed for Drinagh Bog as part of the Derrinlough Windfarm.

There are no known right of ways on this bog.

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 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.

In respect of Derrybrat Bog, jobs included in the above study would have included those to facilitate extraction of peat at this site, and associated processing and transfer to the relevant power station.

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).

3.2 Geology and Peat Depths

3.2.1 Sub-soil geology

The underlying geology at Derrybrat Bog is limestone (Waulsortian Limestones) [2]. The underlying soils and sub-soils are classed as 'Cutover/Cutaway Peat'.

Published bedrock and Quaternary geological maps only present the shallowest deposits encountered, and fail to present in information on the buried peat substrate. Coring carried out by RPS in 2021 across Derrybrat provided further insight into the deposits underlying the site, particularly when combined with GPR data concerning the elevation of the peat substrate. Combining the two datasets reveals the majority of the bog to be underlain by marl and lacustrine clay (below c. 50mOD), while a small ridge of more elevated material (rising to >53.5mOD) underlies the bog to the south-east. Given the presence of till derived from limestone in the surrounding areas this material has been interpreted as glacial till; however, no coring was carried out in this

[2] https://www.gsi.ie/en-ie/data-and-maps/Pages/Bedrock.aspx

specific area with only marl or lacustrine clay deposits encountered. The lacustrine deposits encountered would be expected to limit vertical losses to depth in areas where this occurs.

The glacial deposits generally consist of grey gravelly clay/silt and are exposed as gravel mounds and ridges in places. Gravel has also been exposed at several locations through the bog where there are ridges and mounds.

3.2.2 Peat type and depths

Commercial peat extraction was undertaken at Derrybrat Bog up until 2016. As a result of the harvesting programme in place at Derrybrat, peat depths are varied across the site. The northern section contains shallow peat reserves. Peat depths of 0-1m occur over approximately 75% of the northern section. Some pockets of deeper peat, 1.1-2.5m in depth, still persist. Approximately 50% of the peat reserves in the southern section are 0-1.1m in depth. The remaining 50% of the southern portion of Derrybrat Bog contains peat reserves of 1.1-2.5m in depth.

Fen peat is the main peat type remaining in Derrybrat.

3.3 Key Biodiversity Features of Interest

The bog is currently developing pioneer cutaway wetland habitats (poor fen, Reed swamp, Birch woodland) (Figure 3.1-3.2). Much of the site is re-vegetating or re-wetted and the area of bare peat has been reduced significantly. Some rehabilitation measures have previously been carried out on the southern section. The resultant environmental conditions in this section are therefore generally wetter and closer to optimal condition than the same in the northern section.

3.3.1 Current habitats

Northern section

The majority of this area has been re-vegetating for a number of years. Some high fields have been kept open to facilitate access and remain sparsely vegetated. The re-vegetating fields contain several pioneer habitats including emerging Birch-scrub, poor fen and dry grassland. This area is relatively dry with only minor development of wetland vegetation communities. Tall reed vegetation and Bog Cotton-dominated poor fen are present in places. Fragments of remnant raised bog, a silt-pond and a small portion of cutover bog along the eastern margin are also present in this section.

Southern Section

This is the largest section. Some rehabilitation measures (namely; drain blocking) have already taken place in the southern section. The majority of this area is dominated by bare peat pioneer vegetation communities. Reedbeds, poor fen and Birch scrub are present. Open water habitats are also present in the north central region of this section. Some exposed glacial sub-soil is also present that is being colonised by scrub and Birch woodland. A Coillte conifer plantation has been planted on the eastern side. There is a small area of drained raised bog located along the southern margin

See Drawing number BNM-DR-23-06-17 titled **Derrybrat Bog: Current Habitat Map**, included in the accompanying Mapbook, which illustrates the habitats at Derrybrat Bog.

Figure 3.1. View of the revegetating milled peat surface (2021) across Derrybrat bog.

Figure 3.2 View of wetland habitat and emergent vegetation at Derrybrat Bog with the conifer plantation in the background(2021)

3.3.2 Species of conservation interest

A number of species of conservation concern utilize the habitats available at Derrybrat Bog. The following is a summary of the records of these species available within both BnM records and those of the National Biodiversity Centre.

Multiple mammal species have been recorded at Derrybrat Bog. Evidence of badger *Meles meles*, fox *Vulpes vulpes*, hare *Lepus timidus hibernicus* and rabbit *Oryctologus cuniculus* were observed on site during BnM walkover surveys. NBDC data contains records of European hedgehog *Erinaceus europaeus*, Eurasian pygmy shrew *Sorex minutus,* Eurasian red squirrel *Sciurus vulgaris,* European otter *Lutra lutra,* Irish stoat *Mustela erminea Hibernica* and pine marten *Martes martes* on or in close proximity to the site.

Common frog *Rana temporaria* has been recorded on the site.

Cutaway bog habitat is useful to numerous bird species at different times of year. The following is an account of the species of conservation concern recorded on or close to the site (2Km grid square N11). Records that predate 1990 have been omitted so that only relevant up-to-date information is provided. Records from BnM commissioned surveys (Derinlough EIAR) and data available through the National Biodiversity Centre indicate that the wet areas offer a refuge to flocks of wintering wildfowl. Whooper Swans *Cygnus cygnus* (listed on Annex I of the EU Birds Directive) have been recorded using the site occasionally. Whooper Swan roosts are known to exist on the adjacent Derrinlough and Drinagh sites but are not recorded at the Derrybrat Bog. Records of other wintering wildfowl on site include; Mute Swan *Cygnus olor*, Teal *Anas crecca*, Eurasian Wigeon *Anas Penelope*, Northern Pintail *Anas acuta* and Northern Shoveler *Anas clypeata*. Other wetland birds of conservation concern recorded on site include; Great Cormorant *Phalacrocorax carbo*, Kingfisher *Alcedo atthis*, Grey Heron *Ardea cinerea*, Little Grebe *Tachybaptus ruficollis* and Black Headed Gull *Chroicocephalus ridibundus*. Raptor species, including Hen Harrier *Circus cyaneus*, also use the site during Winter months (Derrinlough EIAR). A Hen Harrier Winter roost was recorded in 2019 in the north-east section of Derrybrat. Wintering wader species such as Golden Plover *Pluvialis apricaria*, Lapwing *Vanellus vanellus* and Snipe *Gallinago gallinago* have all been recorded at Derrybrat.

During summer wader species such as Lapwing, Redshank *Tringa totanus*, Woodcock *Scolopax rusticola*, Ringed Plover *Charadrius hiaticula* and Snipe *Gallinago gallinago* have been recorded attempting to breed on site. Black Headed Gull have also been recorded attempting to breed on site during the Summer months. Raptors such as Merlin *Falco columbarius*, Common Kestrel *Falco tinnunculus* and Sparrowhawk *Accipiter nisus* have been recorded on site. It is possible that Kestrel or Sparrowhawk could breed on site as suitable habitat exists but no confirmed breeding records exist. There have been records of Merlin during spring but breeding, on site, is considered unlikely due to an absence of suitable nesting habitats. Barn owl *Tyto alba* have been recorded attempting to breed on or close to site. Marsh Harrier *Circus aeruginosus* has been recorded flying over the site during April 2019. Other avian species of conservation concern recorded using the site include; Common Swift *Apus apus*, Grey Partridge *Perdix perdix,* and Lesser Black-Backed Gull *Larus fuscus*.

3.3.3 Invasive Alien Species

Invasive alien species known to occur at the subject bog (or desktop review suggests presence is likely), and for which reasonably foreseeable source impact pathways for dispersal may result from the proposed PCAS are described here. No invasive plant species, as listed under Regulation (EU) 1143/2014 on the prevention and management of the introduction and spread of invasive alien species, have been recorded at Derrybrat Bog. A broad range of common garden escapes are occasionally present around the margins of Bord na Mona bogs, and although spatial overlap with the PCAS is expected to be limited, these are, where necessary, to be treated in line with Best Practice during PCAS activities.

3.4 Statutory Nature Conservation Designations

There are no European Sites (SAC or SPA) located within 5km of Derrybrat Bog. Due to its location within the Lower River Shannon catchment, Derrybrat is hydrologically connected to at least two downstream European Sites namely the Middle Shannon Callows SPA (Site Code 004096 -17km due west), and the River Little Brosna Callows SPA (Site Code 004086 - ca.22km south west). Distance to both sites is increased via hydrological link.

The nearest SAC is Moyclare Bog (Site Code 000581), which is 7.4Km approximately to the north west. Ferbane Bog SAC (Site Code 000575) is approximately 7.4Km to the north of Derrybrat.

Lough Boora pNHA (Site Code: 001365) is approximately 1.5Km to the west of site. The Grand Canal pNHA (Site Code 002104) is <3km to the North of Derrybrat at its closest.

3.5 Hydrology and Hydrogeology

Derrybrat forms part of the Lower Shannon Catchment (Catchment ID : 25A) as defined by the EPA under the Water Framework Directive (WFD) and is situated within the BROSNA_SC_070 Sub-Catchment. The bog is located south of Ferbane and north-west of Kilcormac alongside the Silver River which flows along the western boundary. The bog contain several drainage pathways which drain the southern portion of the bog towards the north-east into the Cloonkeen stream, while the northern portion of the bog drains towards the Fallan River to the west.

Regional hydrological data suggest that Derrybrat receives average precipitation of 842mm/yr (1981-2010), with an estimated evapotranspiration rate of c. 499mm/yr. A , leaving an average effective precipitation of 343mm/yr. Assuming no recharge to groundwater and no groundwater contribution to discharge from the bog, the available precipitation that may become runoff (assuming no change in storage) is 343mm/yr, which equates to an annual runoff rate of c. 3,430m^3/ha.

There is one active silt pond present on the Derrybrat site. Situated in the north west of the site, this silt pond manages discharges into the Silver River and in turn the Brosna. The bog has field drains running in a general north to south orientation. Derrybrat is a gravity drained bog.

GSI data indicates that Derrybrat Bog is primarily underlain by Waulsortian Limestones, which is classified as a locally important aquifers as it is only moderately productive in local zones. Geological Survey of Ireland (GSI) mapping of karst features does not identify any karst features within the immediate vicinity of the bog, with the nearest mapped features occurring >2km to the west of the bog on the opposite side of the Sliver River. No data exists concerning depth to bedrock, a number of bedrock outcrop features can be identified in close proximity to the southern margin of the bog (<1km).

An aquifer is an underground body of water-bearing rock or unconsolidated materials (gravel or sand) from which groundwater can be extracted in useful amounts. GSIs Aquifer classes are divided into three main groups based on their resource potential, and further subdivided based on the type of openings through which groundwater flows. There are nine aquifer categories in total.

The main subsoil types in the surrounding area includes till derived from limestone immediately to the north and south of the bog. There is alluvium along the western boundary associated with the Sliver River. Further east the bog would have originally formed part of a much large complex of bogs, therefore the available subsoil mapping only indicates the presence of peat.

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.

While Groundwater Vulnerability is typically used to indicate the susceptibility to groundwater pollution, it can provide a useful proxy indication of likely groundwater flow rates in the surrounding area. Groundwater vulnerability for the surrounding areas is generally considered to be moderate to high given the variable permeability of the subsoil types; however, a number of extreme vulnerability areas can be identified in the surrounding area, given the close proximity of bedrock to the surface in a number of locations north and south of the bog.

The peat is underlain by glacial deposits interbedded with glacio-fluvial deposits over limestone bedrock. The glacial deposits generally consist of grey gravelly clay/silt (present on an adjacent cutaway site). Lacustrine deposits in the site generally consist of shell marl. The bog water table across the site is expected to be high when bog drains are blocked.

3.6 Emissions to surface-water and water-courses

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.

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 period. Silt pond decommissioning will be considered when sites are deemed to be on a trajectory of environmental stability and peatland rehabilitation has been completed.

Derrybrat bog has one treated surface water outlet to the IE_SH_25S020700 SILVER (KILCORMAC)_050 . The Silver River 050 is classified as At Risk and at Moderate Ecological Status (2010-2015), was listed as being under pressure from peat extraction in the second cycle of the river basin management plan and is indicated as remaining so in the third cycle, currently under preparation.

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-23-06-02 titled **Derrybrat Bog: Structures and Sampling**, along with Drawing number BNM-DR-23-06-WQ01 titled **Derrybrat Bog: Water Quality Map** included in the accompanying Mapbook, which illustrate the various drainage and water quality infrastructure present at Derrybrat.

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 Silver Kilcormac Priority Area for Action (PAA) is located near Kilcormac, Co. Offaly and consists of four waterbodies, the Ballynacarrig_010 (an incoming tributary), and the Silver_020, the Silver_030 and the

Silver_050, which are all sections of the main channel. All 4 waterbodies are categorised as At Risk and are at Moderate Ecological Status (2010-2015). Three of the waterbodies have moderate invertebrate biological status, the Ballynacarrig_010, Silver_020 and the Silver_030, while the Silver_050 has good invertebrate status however the fish status or potential is at moderate status and so its overall ecological status remains at moderate. The aim is to restore these 4 waterbodies to Good Ecological Status by 2022-2027.

The Silver (Kilcormac) River is an important fishery river especially for the "Croneen" trout, which is a genetically distinctive population of brown trout – Salmo trutta). There is a run of "Croneen" trout from Lough Derg to the Silver River particularly from mid-July to September depending on water levels. The Silver River is also an important spawning river for many other species of fish and brook lamprey (Lampetra planeri) due to favourable substrate. It also supports the protected white-clawed crayfish (Austropotamobius pallipes). There is one protected area within the Silver river - the Clonaslee Eskers and Derry Bog SAC (Site Code – 000859).

The Midlands and Eastern catchment assessment workshops were held in Ballycoolin, Dublin from the 9th to 12th May 2017. They were attended by representatives of local authority staff (operational staff on all days and both operational and senior staff on final day of the workshop), Local Authority Waters and Communities Office (LAWCO) (now part of the Local Authority Waters Programme LAWPRO), Irish Water, Inland Fisheries Ireland, Forest Service, Coillte, National Parks and Wildlife Service, Teagasc, Department of Housing Planning and Local Government, Geological Survey Ireland, National Federation of Group Water Schemes, Department of Agriculture, Food and Marine, Bord na Móna, Waterways Ireland and Environmental Protection Agency. The workshop was facilitated jointly by LAWCO and EPA. The reason for the selection of the Silver River PAA detailed in the Midlands and Eastern Outcomes Report are given below:

(1) Potential quick win.

(2) One deteriorated waterbody at time of assessment.

(3) Building on existing works of Offaly County Council/IFI/ Bord Na Móna/NFGWS.

(4) 1 Group Water scheme (Ballyboy) and 1 Public Water Supply (Kilcormac) in the PAA (the Silver_030).

The main emission limit value associated with this bog is 35mg/l suspended solids, with trigger levels for ammonia of 3.7mg/l and COD 100mg/l.

Initial monthly ammonia concentrations from February to May 2021 have a range of 0.048 to 0.267mg/l with an average of 0.117mg/l.

Results for suspended solids for the same period indicate a range of 3 to 7 mg/l with an average of 4.0 mg/l.

From an analysis of any licence compliance monitoring over the 5 yrs. of the IPC licence environmental monitoring of some of the discharges from this bog, indicate that results were under the ELV for SS and trigger levels for ammonia and COD.

From an analysis of any licence compliance monitoring over the 5 yrs. of the IPC licence environmental monitoring of some of the discharges from this bog, indicate that results were under the ELV for SS and trigger levels for ammonia and COD (Table 3.1).

Table3.1.

Bog	SW	Monitoring	pH	SS	TS	Ammonia	TP	COD	Colour
Derrybrat	SW-9A	Q2 20	7.8	7	476	0.176	<0.05	61	208
Derrybrat	SW-9A	Q3 18	8	5	314	0.05	0.05	37	38
Derrybrat	SW-9A	Q4 16	7.5	9	376	0.5	0.01	78	102

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. Re-wetted peat also aid the primary objective of stabilizing peat, as when peat is re-wetted it minimises risk 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/rehabilitated peatlands normally improves as a result of bog rehabilitation and restoration measures and the restoration of natural peatland processes (Bonn *et al*., 20017). Peatland rehabilitation 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 Raised Bog Restoration Project and ongoing Bord na Móna rehabilitation is expected to have a positive impact on water quality and help the NWBMP deliver its objectives in relation to the WFD.

Water will still discharge from designated emission points when rehabilitation at Derrybrat Bog has been completed. The existing silt the silt pond will continue to be maintained and operated as long as required, or such point as they can be decommissioned, with no change in outfall type This discharge will have improving 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 downstream water body receptors, and is expected to support the improvement of the current and future status of Silver River, currently assessed as being of Moderate Status.

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 will 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.

In order 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 February 202 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.

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.

This enhanced monitoring programme will aim to include a minimum of 70% of a bog's drainage catchments, whatever number of surface water outlets these include.

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 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 & 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.

3.7 Fugitive Emissions to air

None

The bog is no longer in industrial peat production. Rehabilitation of the cutaway 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

The bog is likely to be a carbon source as it is a drained (degraded) peatland with currently active drainage, which facilitates the oxidation of peat. Peat extraction generally transforms a natural raised bog which acts as a modest carbon sink into a cutaway ecosystem which is a large source of carbon dioxide (2–5 t C/ha/year) (Waddington & McNeil, 2002; Alm *et al*., 2007; Wilson *et al*., 2007, Wilson *et al*., 2015). Furthermore, they are also a significant source of methane (Huttunen *et al*., 2003; Laine *et al*., 2007a) as a consequence of the conditions within the peat body that provide a suitable environment for the microbial breakdown of plant litter and root exudates. Degraded peatlands also release carbon/GHG emissions via the fluvial/aquatic pathway (Dissolved Organic Carbon – DOC, Suspended Solids/Particulate Matter, degassing of GHGs from water).

The EPA-funded CarbonRestore Project (Renou-Wilson et. al. 2012) found that rewetting of drained peatlands can lead to restoration of functional peatland, such as the return of typical plant and animal species, which in turn may lead to the restoration of peat-formation and the C-sink function.

It is expected that Derrybrat Bog can become a reduced carbon source following rehabilitation. The potential of any cutaway site to develop as a reduced carbon source/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. The site is expected to develop Reed Swamp and fen habitats. Birch woodland is expected to develop on the drier mounds and peripheral headlands.

3.9 Current ecological rating

(Following NRA (2009) Evaluation Criteria)

The majority of the site can be rated as having a **Moderate value, locally important (D) as** much of the site has developed wetlands and scrub. The wet areas attract breeding waders such as lapwing and redshank, and a black-headed gull colony.

It is expected that the overall ecological value of this site will increase in the future as the site re-vegetates, matures and forms semi-natural habitats, such as more extensive areas of fen and Reed swamp.

4. CONSULTATION

4.1 Consultation to date

Consultation will seek 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. Stakeholders can be emailed a copy of this draft plan when it has been finalised internally by Bord na Móna, and invited to make submissions on the objectives and content of this plan in relation to Derrybrat Bog.

There has been ongoing consultation about rehabilitation, biodiversity and other general issues over the years about Derrybrat 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.
- The development of Lough Boora Discovery Park (Offaly County Council).
- Bird surveys carried out by Birdwatch Ireland for Bord na Móna.
- Breeding bird surveys of the adjacent Drinagh Bog with Birdwatch Ireland.
- Midlands & East Regional WFD Operational Committee (River Basin Management Plans).
- Sub-committee on Shannon Flooding Work Programme and Measures (OPW, Waterways Ireland, ESB, LA's, Fisheries Ireland, NPWs etc).
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).
- Proposed amenity track development (proposed Derrinlough Windfarm).

To inform the current Plan, both national and local stakeholders, including neighbours whose land adjoins Derrybrat 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) have been contacted. Any identified local interest groups have been sought and informed of the opportunity to engage with this rehabilitation plan, and when identified have been invited to submit their comments or observations in relation to the proposed rehabilitation at Derrybrat Bog (see Appendix XI).

Further to the above, telephone correspondence was undertaken as either follow up to submissions received, or to instigate consultation. All correspondence received has been acknowledged and evaluated against the rehabilitation work proposed here; these are also summarised in Appendix XI.

4.2 Issues raised by Consultees

N/A. Not issued to consultees yet.

4.3 Bord na Móna response to issues raised during consultation

N/A

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 water-bodies 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 Reed Swamp and fen on shallow more alkaline peat and other subsoils.
- Optimising hydrological conditions for the protection of exposed archaeological structures, their retention *in situ* and preservation into the future.
- 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.

- Current land-uses. Lough Boora Discovery Park is an important midlands amenity site and Derrybrat is situated adjacent to this larger area. It is not proposed to carry out any intensive rehabilitation actions to change or negatively affect any amenity infrastructure or existing land-uses.
- Some rehabilitation has already been carried out in recent years at Derrybrat Bog.
- It will take some time for stable naturally functioning habitats to fully develop at Derrybrat Bog. This will happen over a longer time-frame 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, making the overall bog wetter. 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 contributary sources of impacts (private peat extraction and Bord na Móna).

- Re-wetting in general will benefit the future preservation of most known and unknown archaeological features.
- Bord na Móna are also planning rehabilitation measures in some adjacent bogs (e.g. Boora) in 2021. There are expected to be cumulative water quality and other ecosystem service benefits to receiving water bodies such as the Silver River and downstream River Brosna from rehabilitation more than one bog in the same catchment.

6. SCOPE OF REHABILITATION

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

- The area of Derrybrat Bog (See Map-book).
- EPA IPC Licence - Ref. P0500-01. As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the cutaway boglands within the licensed area. Derrybrat bog is part of the Boora 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 Derrybrat Bog, in particular, optimising **climate action benefits**. The proposed interventions will mean that environmental stabilisation 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 Derrybrat Bog identify cutaway re-wetting as the most suitable rehabilitation approach for this site. There is a strong alkaline influence on the water chemistry at this site. This means that re-wetting will lead to the development of fen, Reed Swamp and other associated wetland/peatland habitats.
- A significant part of the site has already largely vegetated and stabilised, with a waterbody now supporting local wildfowl and waders occurring within the east of the site. This area within the east of the site is now considered rehabilitated. The aerial photo demonstrates the contrast between the rewetted area within the east and those areas that remain dryer. Although some rehabilitation measures, i.e. drain blocking, were undertaken within the south of the site in the recent past, much of this area still remains dry and additional measures are needed to optimise the hydrological regime across the site.
- Integrating rehabilitation measures with existing conifer forestry. It is not proposed to change or affect any conifer or commercial forestry via this scheme. The future forestry management of these areas will be defined by Coillte.
- Integrating rehabilitation measures with future potential amenity projects.
- Enhancing existing wetlands where possible and where feasible. Any measures will be positively aligned with the above land-uses.
- The key objective of rehabilitation, as defined by this licence, is **environmental stabilisation** of the bog. Bord na Móna have defined the key goal and outcome of rehabilitation at Derrybrat Bog as **environmental stabilisation** and **optimising suitable hydrological conditions, and setting the site on a trajectory towards the development of naturally functioning peatland habitats (fen, Reed swamp and other associated wetland habitats).**
- Rehabilitation of Derrybrat Bog will support multiple National strategies of climate action, biodiversity action and other key environmental strategies such was 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 not proposed to completely rehabilitate the marginal cutover bog zone. Bog restoration i.e. drain blocking, will be carried out in the small bog remnant at the southern tip of the site and to the east.

6.1 Key constraints

- **Bog conditions.** Rehabilitation outcomes of sites are constrained by the environmental characteristics of these particular areas. For example, there is potential for raised bog restoration at some bogs where

there has not been significant industrial peat extraction and the peat body is largely intact (deep peat sites that are drained). At other bogs, most of the peat mass has been removed, the environmental characteristics of these areas have therefore changed radically (peat depths, hydrology, water chemistry, substrate type, nutrient status), and there will therefore be different habitat outcomes (wetlands, fen, heathland, grassland and Birch woodland).

- At Derrybrat Bog, the majority of the bog has been cutaway. Much of the cutaway has already naturally colonised with pioneering vegetation and has re-wetted in part due to previous rehabilitation efforts. There are local factors that will influence the future trajectory of this site (such as it was always a relatively 'wet' bog which was never pumped nor potentially fully drained) which need to be considered as part of the wider rehabilitation work.
- **Current land-use.** Key land-uses are **forestry**. Re-wetting will be planned as to not to impact on current forestry.
- Amenity use has been consented via planning for a small section of Derrybrat as part of the Derrinlough Windfarm. This amenity (proposed track along the bed of the industrial railway) will link Derrinlough Windfarm and the Lough Boora Discovery Park. Re-wetting will be planned as to not to impact on planned future amenity. This future amenity will not does not constrain re-wetting at this site as it is located along the route of the industrial railway.
- **Surrounding landscape and neighbours.** Another key constraint is the interaction between the Bord na Móna sites and the surrounding landscape. Care must 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**. The discovery of monuments or archaeological objects during peatland rehabilitation may potentially constrain the rehabilitation measures proposed for a particular area. If this occurs, rehabilitation measures will be reviewed and adapted.
- **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.

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 practical rehabilitation.

6.3 Key Exclusions

The scope of this rehabilitation plan does not cover:

- The longer-term raised bog restoration trajectory of the site. The plan covers the short-term rehabilitation **actions** and **an additional monitoring and after-care programme** to monitor the rehabilitation during the Scheme and to respond to any needs (failure of environmental stabilisation for

example). It is expected that this rehabilitation plan will set the site on an enhanced and accelerated trajectory towards environmental stabilisation and wetland creation. The plan does not set any goals or outcomes, for example, the extent (specific area) of active raised bog habitat (ARB) that may develop at this site in the long-term. This is beyond the scope of this rehabilitation plan.

- This plan is not intended to be an after-use or future land-use plan for Derrybrat Bog.
- The longer-term management of this site, potentially as a nature conservation site, or for amenity, or for other uses in the future. This will require further engagement with stakeholders.
- The former area of Derrybrat Bog site that is now a commercial Coillte forestry plantation.
- The area of Derrybrat Bog site that is now used as a Eucalyptus biomass plantation site.

7. CRITERIA FOR SUCCESSFUL REHABILITATION

This section outlines what criteria will be used to indicate successful rehabilitation and what key criteria/targets will be used to mark the achievement of the rehabilitation goals and outcomes and validate the completion of the rehabilitation.

A key objective of this 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. suspended solids).

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

- Rewetting of residual peat in the former area of industrial peat production to offset potential run off of suspended solids and to encourage development of vegetation cover via natural colonisation, and reducing the area of bare exposed peat. 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. This will be measured by the EPA WFD monitoring programme.

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 4 yrs., post cessation of peat extraction with ongoing rehabilitation, were considered. These are indicating a downward trend in Ammonia concentrations.

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 Derrybrat continues in 2021 during the rehabilitation works, and data from the 2020 monitoring program is compiled, further trending will be produced to verify any ongoing trends.

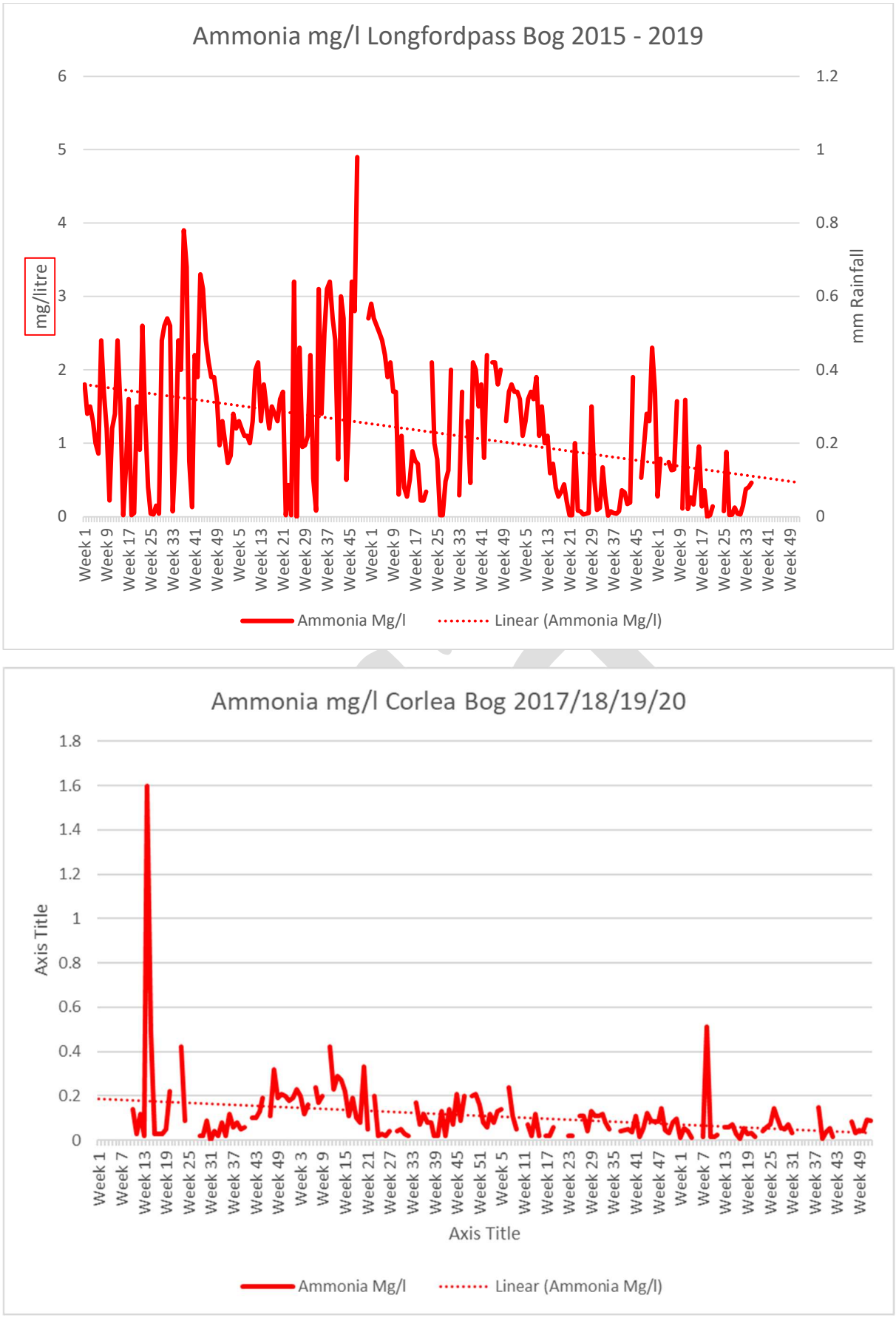

Figure 7.1. Ammonia levels over the period 2015-2019 at Longfordpass and Corlea.

7.1.1 Additional criteria for successful rehabilitation for the optimisation of climate action and other ecosystem service benefits:

- Optimising the extent of suitable hydrological conditions to optimise climate action and other ecosystem service benefits (optimising residual peat re-wetting). This will be measured and demonstrated by site monitoring (updated aerial photography) to measure the extent of suitable hydrological conditions.
- Accelerating the trajectory of the site towards becoming reduced carbon source. 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).
- 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 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, fen, Reed swamp, wet woodland, heath, scrub, Birch woodland, and embryonic *Sphagnum*-rich peatland communities, where conditions are suitable. These habitats will generally establish initially as pioneer vegetation. It will take some time for stable naturally functioning habitats to fully develop at Derrybrat Bog. This will be demonstrated by the reduction in bare peat and the establishment of further pioneering habitats. This will be measured via aerial photography, habitat mapping and cutaway/habitat condition assessment.
- 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 after rehabilitation is completed (during the Scheme). It is proposed that sites can be monitored against this baseline in the future. These metrics will be defined in the context of the overall Scheme resources and after consultation with stakeholders.

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

Criteria type	Criteria	Target	Measured by	Expected Time-frame
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.	2021-2024
IPC validation	Key water quality parameters Ammonia, Phosphorous, Suspended solids (silt), pH and conductivity	Reduction or stabilisation of key water quality parameters	Water quality monitoring. Started in advance of the proposed rehabilitation.	2020-2023
IPC validation	Reducing pressure from peat production on the local river catchment (WFD)	No decline in the WFD status of the local river catchment	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-monitored in the future and compared against this baseline.	2022-2025
Climate action verification	Reduction in carbon emissions.	Reduction in carbon emissions	Carbon emissions – estimated using a high bog condition assessment and appropriate carbon emission factors.	2022-2025

Criteria type	Criteria	Target	Measured by	Expected Time-frame
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.	2022-2025
Climate action verification	Biodiversity and ecosystem services. Habitat establishment Presence of key species – Sphagnum Breeding birds Wintering birds Pollinators	Improvement in biodiversity and ecosystem services.	Metrics that relate to selected biodiversity and ecosystem services (to be defined). Presence of key species – Sphagnum – Walkover survey Breeding birds – Breeding bird survey Pollinators – Pollinator walk 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.	2022-2025

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.

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.
- **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 practise applied internationally in peatland management. Measures proposed in this plan have already been shown to be affective 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 cutaway peatland takes time. Pioneer vegetation can develop relatively quickly (3-10 years) and wetland habitats can develop relatively quickly. Birch woodland make take 20-30 years to develop. However, it may take 50 years for active raised bog vegetation to re-develop on ground that was previously cutaway. Different environmental conditions will have a significant impact on the rate of natural colonisation, and as a result of the combination of different environmental conditions and the application of different rehabilitation measures, there will be a variety of habitat outcomes.
- 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 measures to optimise climate action. This will focus on a 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.

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 remaining peat depths, 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-23-06-22 titled **Derrybrat Bog: Aerial Imagery2020**

BNM-DR-23-06-04 titled **Derrybrat Bog: PeatDepths**

BNM-DR-23-06-03 titled **Derrybrat Bog: LiDAR Map**

BNM-DR-23-06-07 titled **Derrybrat Bog: Depression Analysis**

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-23-06-05 Derrybrat Bog: 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 Derrybrat Bog will include**:**

- Re-wetting some areas of the bog through regular field drain blocking using a dozer/excavator to create three peat barriers every 100 m along each field drain.
- Re-alignment of piped drainage.
- Blocking drains in targeted existing pioneering vegetation mosaics, to accelerate re-wetting, and/or manage water levels to the correct height to accelerate the current trajectory towards Reed swamp and fen, using a dozer/excavator.
- The creation of berms across some sections of the bog to control/retain water levels. This measure seeks to retain shallow (< 10 cm) water conditions across multiple fields.
- Targeted fertiliser applications to accelerate vegetation establishment on areas of bare peat on headlands and high fields, see Mapbook.
- Modifying water levels at outfalls, as it may be desirable to change and control water levels at the site over time, e.g. to increase water levels as the site becomes increasingly vegetated. This will further slow the movement of water through and out of Derrybrat Bog.
- Some blocking of drains in marginal (degraded) remnant raised high bog areas is also proposed as part of this plan.
- The existing silt pond will be retained and maintained during the rehabilitation phase. During the monitoring and verification phase the silt pond will be continually inspected and maintained, where appropriate. When it is deemed that the silt pond is not required, as the bog has been successfully stabilised and there is no run-off of suspended solids, the condition of the silt pond will be reviewed. The

silt pond will either be de-watered (water levels lowered to a level where the silt pond will naturally develop as a small wetland feature), left in situ, or infilled (where discharges do not require silt control).

- Seeding of vegetation is not required at this site as natural colonisation and the development of pioneer habitats is already significantly progressed.

Table 8.1: Types of and areas for enhanced rehabilitation measures at Derrybrat Bog.

Type	Code	Description	Area (Ha)
Deep peat cutover bog	DPT1	Regular drain blocking (3/100 m) + blocking outfalls and managing water levels with overflow pipes	5.1
	DPT2	More intensive drain blocking (7/100 m) + blocking outfalls and managing overflows	4.3
	DPT3	More intensive drain blocking (7/100 m), + field reprofiling + blocking outfalls and managing overflows	4.8
	DPT4	Berms and field re-profiling (45m x 60m cell) + blocking outfalls and managing overflows + drainage channels for excess water + *Sphagnum* inoculation	
	DPT5	Cut and Fill cell bunding (30m x 30m cell) + blocking outfalls and managing overflows + drainage channels for excess water + *Sphagnum* inoculation	
Dry cutaway	DCT1	Blocking outfalls and managing water levels with overflow pipes	31.7
	DCT2	Regular drain blocking (3/100 m) + blocking outfalls and managing water levels with overflow pipes + targeted fertiliser treatment	16.9
	DCT3	More intensive drain blocking (7/100 m) + blocking outfalls and managing overflows + targeted fertiliser treatment	
Wetland cutaway	WLT1	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes	
	WLT2	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes + Targeted blocking of outfalls within a site	14.6
	WLT3	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes + Targeted blocking of outfalls within a site + constructing larger berms to re-wet cutaway + transplanting Reeds and other rhizomes	55.2
	WLT4	More intensive drain blocking (7/100 m), + blocking outfalls and managing overflows + transplanting Reeds and other rhizomes	
	WLT5	More intensive drain blocking (7/100 m), + field reprofiling + blocking outfalls and managing overflows + transplanting Reeds and other rhizomes	
Marginal land	MLT1	No work required	33.8
	MLT2	More intensive drain blocking (7/100 m)	3.7
	MLT3	More intensive drain blocking (7/100 m) + blocking outfalls and managing overflows + boundary berm	
Other		Silt-ponds	0.2
Total			170.2

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

- Seek formal approval of the enhanced plan, noting the alternative adapted standard plan should funding from the Scheme not materialise, from the EPA.
- Agree an *ex ante* budget of eligible costs (based on the approved enhanced plan) with the Scheme regulator.

- Develop a detailed site plan with detailed site drawings outlining how the various rehabilitation methodologies (The Scheme PCAS) will be applied to Derrybrat Bog. This will take account of peat depths, topography, drainage and hydrological modelling. (See map for an indicative view of the application of different rehabilitation methodologies).
- Carry out a drainage management assessment of the proposed rehabilitation measures.
- Carry out a review of known archaeology and an archaeological impact appraisal of the proposed rehabilitation. Incorporate the results of this appraisal into the rehabilitation plan to minimise known archaeological disturbance, where possible.
- Carry out a review of issues that may constrain rehabilitation such as known rights of way, turbary and existing land agreements. There are no known rights of way at Derrybrat bog.
- Carry out an ecological appraisal of the potential impacts of the planned rehabilitation, such as the presence of sensitive ground-nesting bird breeding species (e.g. Curlew or Lapwing) or larval webs of Marsh Fritillary butterfly, etc. The scheduling of rehabilitation operations will be adapted, if needed. Surreys will be scoped and carried out based on the baseline ecological survey and previous knowledge of sites.
- Ensure all activities comply with the environmental protection requirements of the IPC Licence.
- Carry out Appropriate Assessment 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.
- See Derrybrat Decommissioning and Rehabilitation Plan – Addendum 1 for more details of the Stage 1 AA screening conclusion.
- 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 hydrological management, drain blocking, peat field re-profiling and cell-bunding. All rehabilitation will be carried out with regard to best practice environmental control measures (Appendix IV).
- Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions.
- Carry out the proposed monitoring, as outlined.
- While natural colonisation is expected to commence almost immediately once peat production ceases, Phase 2 actions will be carried out in targeted areas to accelerate re-vegetation and colonisation of target species. Phase 2 actions will include fertiliser application on high fields and headlands (where there is bare peat).
- Silt-ponds will be monitored during this period and there will be continued maintenance and cleaning to prevent run-off of suspended solids from the site during the rehabilitation phase.
- Submit an *ex post* report to the Scheme regulator to verify the eligible measures to be carried out in year 1 of the Scheme, and an *ex ante* estimate for year 2 of the Scheme; and so on for each year of the Scheme

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

- 2021. Short-term planning actions.
- 2022. Short-term practical actions.
- 2021-2024. Long term practical actions. Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- 2024. Decommission silt-ponds, if necessary.

8.5 Budget and costing

Bord na Móna (BnM) appreciates the Minister's intention to 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 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 2020). 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 be allocated to the site based on the area of deep peat habitats, wetland habitats, shallow cutaway areas, drier areas, and regenerating bog communities across the bog (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 further requirements for 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. The extent of bare peat will be assessed using this baseline data, and habitat maps will be updated.
- **Water quality monitoring** at the bog will be established. This will start in advance of the proposed rehabilitation. 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.
- 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, DOC and COD.
- This monthly sampling regime on a selected number of silt ponds will be carried out over a three-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 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 targets for successful rehabilitation are being achieved, then the water quality monitoring programme will be reviewed, with consideration of potential ongoing scientific 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 targets for successful rehabilitation have **not** been achieved, then the rehabilitation measures and status of the site will be evaluated and enhanced, where needed. This evaluation may indicate no requirement for additional enhancement of rehabilitation measures, but may demonstrate that more time is required before key targets for successful 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, 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 rehabilitation. These proposed monitoring measures will be funded by the 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 will be carried out 5 years 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.
- 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.
- It is proposed to monitor the improvement of some biodiversity ecosystem services. To be defined in relation to monitoring of the overall Scheme.

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.

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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:

- EPA IPC Licence - Ref. P0500-01. 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. Derrybrat bog is part of the Boora Bog group.
- A key objective of rehabilitation, as defined by this licence, is **environmental stabilisation** of the bog.
- The area of former industrial peat production at Derrybrat Bog (See Mapbook). Industrial peat production has now permanently ceased at Derrybrat Bog.
- Minimising potential impacts on neighbouring land. Some boundary drains around Derrybrat Bog will be left unblocked as blocking boundary drains could affect adjacent land.

Rehabilitation goals and outcomes

The key rehabilitation goal and outcome for Derrybrat Bog is environmental stabilisation of the site via re-wetting. 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 peatland habitats.

Criteria for successful rehabilitation:

- Rewetting of residual peat 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).
- That the main water body associated with surface water from this bog continues to be excluded in the EPA's list of peat pressure water bodies as reported in the River Basin Management Plans. Where the water body has been identified as under pressure from peat extraction, that the intervening EPA monitoring programme associated with its Programme of Measures for this water body shows positive improvements in water quality impacts that were attributable to the original peat extraction activity.

Rehabilitation targets

- Demonstrating the delivery of the rehabilitation through site visits and through updated aerial photography (indicating presence of peat barriers, elevated water levels and re-wetting).
  Stabilising potential emissions from the site (potential run-off of 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 the former industrial production area and creating regular peat barriers (three barriers per 100 m) along each field drain.
- Re-alignment of piped drainage.
- Realignment of gravity outfalls (where needed).
- Fertiliser treatment of high fields and headlands (typically slow to naturally re-colonise) to encourage natural colonisation, if needed.
- No measures are planned for the surrounding marginal peatland habitats.
- Silt ponds will continue to be maintained during the rehabilitation and decommissioning.
- Evaluate success of short-term rehabilitation measures and enhance where necessary.
- Decommissioning of silt-ponds will be assessed and carried out, where required.
- See Drawing number BNM-DR-23-06-20 titled **Derrybrat Bog: Standard Rehab Measures** included in the accompanying Mapbook which illustrates the standard rehab measures to be applied.

Timeframe:

- 2022. 1st phase of rehabilitation. Field drain blocking with dozer/excavator.
- 2022. 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.
- 2023-2024. Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.

- 2023-2024. Decommission silt-ponds, if necessary.

Budget and Costing

- Bord na Móna maintains a Provision on its balance sheet to pay for the future costs of 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 2020). 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 has been allocated to the site based on the area of different cutaway types across the bog.

Table AP-1. Rehabilitation measures and target area.

Type	Code	Description	Area (Ha)
Dry Cutaway	DCT1	Limited drain blocking, Blocking outfalls and managing water levels with overflow pipes	48.6
Deep Peat	DPT1	Regular drain blocking (3/100 m) + blocking outfalls and managing water levels with overflow pipes	14.2
Wetland	WLT1	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes	69.8
Marginal land	MLT1	No work required	37.5
Silt ponds		Silt-ponds	0.2
Total			**170.2**

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, asses 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 any 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.
- The water quality monitoring demonstrates that water quality of discharge is stabilising or improving.
- The site has been environmentally stabilised.

APPENDIX II: BOG GROUP CONTEXT

The Boora group of bogs are sited between Killeigh (Offaly) in the East to Banagher (Offaly) in the West and between Kinnitty (Offaly) in the south and Clara (Offaly) in the North. The River Shannon is the major river catchment for the area with a smaller area lying within the Barrow catchment.

The Boora Group is one of the oldest bog groups in Ireland. Bord na Móna was set up in 1946 and it commenced the development of the Boora Bogs in 1946 with milled peat production commencing in 1955. Milled peat was produced in the Boora Bog for the supply of fuel peat to the power station in Ferbane which commenced power generation in 1957 and closed in 2001. The Boora bogs were also developed for the supply of milled peat to the Derrinlough Briquette factory, which commenced production in 1957.

Much of the Boora Bog complex became cutaway as it was in peat production at an early stage. A number of rehabilitation measures comprising naturalisation and development of alternative after-uses have been already explored at the Boora Bog Group, including coniferous forestry, biomass, agricultural grassland, amenity use, rare species conservation management (specifically Grey Partridge) and wetland creation. Some of this was carried out in the 1980s While agricultural fields and coniferous forestry have been developed successfully on the cutaway bogs at Boora, it was found that these require financial investment that at this time exceeds any potential commercial output value. The Lough Boora Discovery Park encompasses all areas relating to amenity and biodiversity. www.loughboora.com.

The bogs in The Boora Bog Group have been used in the past to supply milled peat for the horticultural market, local power stations (Ferbane, Shannonbridge and West Offaly Power) and Derrinlough Briquette factory. Industrial peat extraction has now ceased in the Boora Bog Group. Remaining peat stocks are being transported to Derrinlough Briquette Factory and other customers.

A breakdown of the component bog areas for the Boora Bog Group IPC License Ref. PO500-01, and current, indicative Peat Production Status, is outlined in Table Ap-2. These areas are also outlined in the Mapbook (Map of the Boora Bog Group).

Table Ap-2: Boora Bog Group names, area and indicative status

Bog	Area (Ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Killaun	359.5	Cutover Bog Industrial peat production commenced at Killaun Bog in 1996 and ceased in 2020. Only the upper most layers of peat have been harvested. Deep peat reserves remain on site. Killaun is considered a deep peat cutover bog.	Killaun Bog formerly supplied a range of commercial customers including; horticultural peat and fuel peat. Most of the former production area is bare peat.	2020	Draft 2017
Boora	1,842.4	Cutaway Harvested since the 1950's resulting in the exhaustion of the commercially viable peat resource at the bog. The majority of Boora Bog is considered a shallow peat cutaway bog. Some areas of deep peat persist at this site.	The majority of Boora bog has already been rehabilitated. A significant area of cutaway bog has been re-wetted, developed as conifer forestry (Coillte) and developed as farmland (1980s). This site now forms the core of Lough Boora Discovery Park.	2020	Finalised 2021 Rehab beginning 2021

Pollagh/ Cornalaur	280.8	Cutaway At Pollagh Bog, industrial peat production began in 2004 and ceased in 2020. Peat reserves of variable depth remain on site. Some deep peat areas remain. Pollagh is considered a cutover bog with variable peat depths.	Pioneer emergent peatland vegetation communities are developing throughout the bog. The adjacent Cornalaur Bog was never developed for peat production.	2020	Finalised 2021 Rehab beginning 2021
Noggusboy	917.4	Cutaway Bog Industrial peat production commenced at Noggusboy during the 1950's and ceased in 2020. Long-term peat extraction has exhausted commercially viable peat reserves on this bog. Noggusboy is considered a shallow peat cutaway bog.	Part of the site was developed for conifer forestry by Coillte. Part of the site was developed as Cloghan Lake, as part of Lough Boora Discovery Park, in 1999. There is some emerging naturally colonising cutaway.	2020	To be finalised in 2021
Drinagh	1,339.1	Cutaway Bog Industrial peat production commenced at Drinagh during the 1950's and ceased in 2020. Some small pockets of deep peat reserves remain in parts of Drinagh Bog but most of the commercially viable peat reserves have been exhausted. Drinagh is considered a shallow peat, cutaway bog.	Drinagh East is cutaway and has been extensively rehabilitated as wetland. This part of the site has extensive development of naturally functioning peatland habitats. Some Coillte conifer forestry is also present. There is some emerging naturally colonising cutaway in Drinagh West.	2020	Draft 2017
Killaranny	242.8	Cutover Bog Industrial peat production commenced at Kilaranny during the 1980's. Deep peat reserves remain on much of the bog. Kilaranny is considered a deep peat cutover bog.	Kilaranny Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat. A portion of the site is leased by NPWS since 2011 as a re-location area for turf cutters from nearby Clara Bog SAC.	2020	Finalised 2021
Oughter	352.9	Cutaway Development of Oughter Bog commenced in the 1960's. Industrial peat production ceased in 2012. Shallow peat depths remain over much of the former production bog area. Oughter is considered a shallow peat cutaway bog.	The site has naturally been re-wetting and there is already significant natural colonisation. Part of the site has been developed as the Midlands National Shooting Centre of Ireland.	2012	Finalised 2021 Rehab beginning 2021
Galros	191.5	Cutover Bog Industrial peat production commenced at Galros during the 1980's and ceased in 2020. Some areas of deep peat remain on the former production area. Galros is considered a cutover bog of variable peat depth.	Galros Bog formerly supplied a range of commercial customers including; horticultural peat and fuel peat. Some naturally emerging cutaway habitats are developing in part of the site.	2020	Draft 2017
Clongawny More	987.2	Industrial peat production commenced at Clongawny More during the 1950's and ceased in 2020. Some pockets of deep peat persist, particularly in the south-	Part of the site rehabilitated, as part of Lough Boora Discovery Park, in 1999.	2020	Draft 2017

		western portion of the former production area. Clongawny More is considered a cutover bog with variable peat depths throughout the site.	Some Coillte conifer forestry is also present. The site has naturally been re-wetting and there is already significant natural colonisation. BnM currently have submitted an application for renewable energy development on this bog.		
Derrinboy	305.7	Cutover Bog Derrinboy was first developed by BnM in the 1980's. Peat production ceased at Derrinboy in 2020. This bog was used to supply horticultural peat. Only the upper layers of peat have been harvested. Derrinboy is considered a deep peat cutover bog.	Derrinboy Bog formerly supplied a range of commercial customers including; horticultural peat and fuel peat.	2020	To be finalised in 2021
Moneitta	707.5	Cutover Bog Moneitta was first developed by BnM in the 1970's. Peat production ceased at Monietta in 2020. This bog was used to supply horticultural peat. Only the upper layers of peat were harvested. Moneitta is considered a deep peat cutover bog.	Moneitta Bog formerly supplied a range of commercial customers including; horticultural peat and fuel peat.	2020	Draft 2017
Boora Lemanaghan Rail_Link	6.9	N/A	Not applicable	N/A	N/A
Derries	368.2	Cutaway Bog Development of The Derries Bog commenced in the 1960's. Industrial peat production ceased in 2005. Shallow peat depths remain over much of the former production bog area. The Derries Bog is considered a shallow peat cutaway bog.	Wetland rehabilitation carried out over part of site in 1999. Amenity trackway development in 2015. Part of the Lough Boora Discovery Park. The site has now been extensively naturally colonised and is a mosaic of wetland and Birch woodland habitats.	2005	Finalised 2021 Rehab beginning 2021
Turraun	534.5	Cutaway Bog Development of Turraun Bog commenced in the 1950's. Industrial peat production ceased in 2018. Turraun is considered a shallow peat cutaway bog.	Wetland rehabilitation carried out over part of area in 1999 as part of the Lough Boora Discovery Park. This section of the site has now been extensively naturally colonised and is a mosaic of wetland and Birch woodland habitats.	2018	Finalised 2021 Rehab beginning 2021
Derryclure	327.6	Cutover Bog Derryclure was first developed by BnM in the 1980's. Peat production ceased at Derryclure in 2020. This bog was used to supply horticultural peat. Only the upper layers of peat were harvested. Derryclure is considered a deep peat cutover bog.	Derryclure Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat.	2020	Draft 2021
Lemanaghan	1,253.7	Cutover Bog Industrial peat production commenced at Lemanaghan during the 1950's and ceased in 2019. Varied peat depths across the site. Deep peat reserves remain on	Lemanaghan Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat.	2020	Draft 2017

		much of the former production area of Lemanaghan Bog. It is considered a cutover bog.	There are some naturally emerging cutaway habitats.		
Belair North	565.7	Cutover Bog Belair North was first developed by BnM in the 1960's. TPeat production ceased at Belair North in 2020. This bog was used to supply horticultural peat. Only the upper layers of peat were harvested. Belair North is considered a deep peat cutover bog.	Belair North Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat.	2020	Draft 2017
Derrybrat	171.6	Cutaway Bog Industrial peat production commenced at Derrybrat during the 1950's and ceased in 2016. Derrybrat has shallow peat depths across the site. It is considered a shallow peat cutaway bog.	The site has been partially rehabilitated and there is already significant natural colonisation. Some conifer forestry has been developed by Coilte on the site.	2016	Finalised 2021
Belair South	228.8	Cutover Bog Belair South was first developed by BnM in the 1970's. Peat production ceased at Belair South in 2020. This bog was used to supply horticultural peat. As a result, only the upper layers of peat were harvested. Belair South is considered a deep peat cutover bog.	Belair South Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat.	2020	Draft 2017
Boora Bog Group Total	**10,983.7**				

See Drawing number BNM-DR-23-06-24 titled **Boora Bog Group**, included in the accompanying Mapbook which illustrates the location of Derrybrat Bog and the Boora Bog Group in context to the surrounding area.

APPENDIX III: ECOLOGICAL SURVEY REPORT

Ecological Survey Report

Note: This report outlines an ecological survey of the bog. 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.

Bog Name:	**Derrybrat**	**Area (ha):**	177.27 ha (438.02 acres)
Works Name:	Boora	**County:**	Offaly
Recorder(s):	MMC & DF	**Survey Date(s):**	1 October 2009 01 September 2014
Photos:	Photos taken – see L:\AI_Data\Boora\Ecology Team\Photos\Derrybrat		

Key biodiversity features of interest (2014)

There are several significant features of interest at this site.

- There are several fragments of raised bog (PB1) (high bog) around the margins of the site. However, the majority of these fragments are in poor condition with no prospects of restoration to active bog status. Some of the southern fragment does contain typical wet hollows with *Sphagnum sp.* and *Rhynchospora alba* that could qualify as Rhynchosporion depressions (a EU Habitats Directive Annex I habitat found on raised bogs). Codes refer to Heritage Council habitat classification system, Fossitt 2000. See Appendix I).
- The southern fragment of raised bog does have Scot's Pine naturally colonising on it from an adjacent plantation planted on adjacent cutover bog. This area has potential to develop into Bog woodland with biodiversity potential in the future, particularly as this type of habitat (dominated by Scot's Pine) is quite rare (in this region).
- Tufa (a calcareous deposit that may indicate potential for rich fen development in the future) has been noted in the drains in the northern section. (2014 – likely to be from shell marl influence – precipitating calcium)

2014

- A significant amount of the southern section is developing pioneer wetland habitats with potential to attract breeding waders and potentially Whooper swans during winter flooding. Lapwing were noted on the periphery of the site. There may be potential to enhance re-wetting within this bog by blocking main outfall. There are indications of shell marl influence as well.
- The northern cutaway sections are developing and are dominated largely by scrub habitats.

Habitats present (in order of dominance)

- Habitats present to the south of the railway line: Bare Peat, Birch-dominated scrub (eBir, oBir), pioneer Poor Fen communities (pJeff, pEang, pTrig), Bare peat, Dry Heath (dHeath), Dry Grassland (gCal), Conifer Plantations (WD4), Cutover Bog (PB4), Bog Woodland (WN7) and Agricultural Grassland (GA1). (Codes refer to BnM habitat classification system and Heritage Council habitat classification system. See Appendix I).

- Habitats present to the north of the railway line: Birch-dominated scrub (eBir), pioneer Poor Fen communities (pJeff, pEang, pTrig), Bare peat, Silt ponds (including raised ridges of spoil), Cutover Bog (PB4), Raised Bog (PB1) and Scrub (WS1).

Description of site (2014)

Derrybrat bog is small in comparison to the neighbouring BnM bogs in Boora group. It is located between Drinagh and Boora Bog. The Silver River flows close to its northern and western edges, while the R437 Ferbane to Kilcormac road runs along much of its eastern boundary. A BnM railway line runs in an east west direction through the middle of the site and divides the site into two main sections.

Northern section

The majority of this area is classed as cutaway bog by the land-use map. The majority of this area has been re-vegetating for some time apart from several high fields that have been kept open for access and are unvegetated. The re-vegetating fields contain several pioneer habitats including emerging Birch-scrub (eBir) Poor fen communities (pJeff, pTrig) and Dry grassland (gCal). This area is relatively dry with only minor development of other vegetation communities associated with wetland areas such as Tall Reed (pPhrag) or Bog Cotton dominated poor Fen vegetation. Silt-ponds, a small portion of Raised bog (PB1) and old Cutover Bog (PB4) along the eastern margin are also present in this area.

Southern Section

This is the largest section. There is also some exposed glacial sub-soil in places. A small part of the cutaway in the south-east section is re-vegetating and contains some pioneer Scrub (eBir) and Poor fen communities (pJeff, pEang). A Conifer plantation (WD4) has been planted on the eastern side. There is a small area of Raised Bog (PB1) (high bog) located along the southern margin. Part of the adjacent cutover to this high bog (and within the BnM boundary) has also been planted with Scot's Pine (WD4) and another section contains improved grassland (GA1).

2014

The northern section is dominated by several blocks of pioneer cutaway habitats that are separated by several bare peat fields. The cutaway blocks are maturing and are dominated by Birch/Willow scrub and pioneer Bog Cotton-dominated poor fen. There are also several patches of Common Reed development amongst the scrub. Several sections are somewhat drier or have a greater influence from underlying gravel and have a greater proportion of Soft Rush. Some of the less developed sections are still open with increased Marsh Arrowgrass cover. The area within the silt ponds is poorly developed with cover of Birch over relatively bare peat. There are some gravel ridges that are exposed and tend to be somewhat grassier or have increased cover of Colt's-Foot or Horsetail.

The majority of the southern section is still dominated by bare peat although it seems to be now out of production. The eastern side is the most developed section and the most vegetation cover, and shows typical zonation of pioneer cutaway habitats from Bog Cotton dominated areas where it is wettest, through to increasing cover of Soft Rush and Birch colonisation to higher ground where Birch scrub is developing. Some of the higher ground also has cover of disturbed vegetation (DissTuss) where the scrub cover has not developed as significantly. The central area had several large and scattered pools of temporary open water and varying amounts of pioneer Bog Cotton and some Marsh Arrowgrass in the low-lying areas, separated by high fields with bare peat. Overall vegetation cover is low at present. Further west a gravel mound/ridge has emerged and has varying amounts of Birch/Willow scrub in mosaic with Soft Rush. Birch scrub is consolidating on the oldest section with scattered clumps of Soft Rush around the margins. Further south of the gravel mound there is also pioneer fen vegetation with varying amounts of Bog Cotton and Marsh Arrowgrass.

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

None

Adjacent habitats and land-use

The majority of the land around the site has been improved for agriculture and is grazed (GA1). Other adjacent habitats around the margins of the site include Conifer Plantation (WD4), Bog Woodland (WN7), Cutover Bog (PB4), fragments of Raised Bog (PB1) and Scrub (WS1).

Watercourses (major water features on/off site)

The Silver River flows north within 100 m of the main site along the western side. This river is part of the Little Brosna and Shannon catchment. Part of the BnM Derrybrat property includes a small strip of land north or the main bog, which runs along the river channel.

A silt trap complex is located in the north-west of the site.

Site topography

The site is generally flat apart from the main embankment that divides the site into two sections. The conifer plantation was planted on somewhat higher ground on the eastern side while there is a low ridge of land separating the cutaway from the Silver River flood plain.

Peat type and sub-soils

Shell marl noted in the northern section. Typical mixed gravel sub-soil ridges and mounds emerging.

Fauna biodiversity

- Several bird species were recorded: Snipe (3), Meadow Pipits (4), Mallard (2), Wren (2) Robin (3) and Blackbird.(1) Broken snail shells were strewn around a small rock in the north west of the site, indicating Thrush activity.
- Signs of Hares (prints and grazing) over majority of site
- Signs of Rabbits around site
- Extensive recent Badger activity along the southern section within the Bog Woodland and in the Conifer Plantation to the east.
- Evidence of Fox in the form of droppings to the west of the site.

2014

- Birds recorded on the site included Greylag Goose (4) (loafing), Lapwing (4) (periphery), Snipe (1) Blackbird, Whitethroat, Willow Warbler, Reed Bunting, Chiffchaff, Blue Tit, Heron, Chaffinch, Goldcrest, Cuckoo., Grew Crow, Wren, Swallow, Redpoll, Wood Pigeon and Pheasant.
- Other wildlife include Hare, Orange Tip

Fungal biodiversity

Piptoporus betulinus (Razorstrop Fungus), *Pleurotus sp*., *Chantharellus cibarius, Leccinum scabrum* (Brown Birch Bolete) and *Russula sp*.

Activities on the site

- Two areas of Conifer Plantation are present. The larger one to the east of the site is managed by Coillte and is dominated by Sitka Spruce. A second smaller but older plantation located along the southern margin of the site and is dominated by Scot's Pine with Birch. This area has been heavily grazed by horses/ponies while dumping of a domestic and agricultural nature has also occurred.
- The railway that divides the site is an impotent route linking several bogs to the Derrinlough Peat Briquette Factory.

Potential future natural habitats on the site

This section attempts to predict the development of natural habitats on the site, assuming there is no intervention or changes in land-use. This prediction is based on research and methods used to predict the natural vegetation of Ireland (Cross 2006). Cross (2006) predicted that cutaway bog is likely to develop a mosaic of Birch forest, alder and ash-alder carr, fen and heath in the future. There is no time-line given for the development of these habitats, although it could be expected that the development of natural climax habitats could take hundreds of years. The complexity is the result of small scale variations in the substrate and other environmental factors such as drainage and ground-water influence.

- A significant portion of the site is expected to develop dry species-poor Bog woodland (WN7) in the drier areas. There is likely to be a succession from a mosaic of Birch scrub, dry calcareous grassland, and poor fen/wet grassland vegetation types to this type of woodland.
- This woodland is likely to be a mosaic containing small patches of more open habitat with scrub (WS1), wet grassland (GS4) and poor fen vegetation (PF2), especially in wetter areas where drainage is impeded. Any wet areas have the capability to develop wet Willow-Alder woodland (WN6) in the long-term.
- Small areas with exposed glacial till are likely to develop somewhat differently. Time required to re-vegetate these areas may also very significantly. Dry calcareous grassland (GS1) could be expected to initially develop in these areas in association with scrub (dominated by Birch). There is likely to be a slow succession to Ash-Hazel rich woodland (WN2) (in contrast to development of Bog woodland). Other dry ridges with some peat cover may develop Dry heath dominated by Heather (HH1).
- The high bog at the southern end of the site is likely to develop Scot's Pine-dominated bog woodland (WN7) in the long-term. The development of this habitat is already underway with the spread of the Pine over the high bog.
- The small area of high bog (Raised bog) along the northern boundary is likely to dry out and become dominated by Heather. This area may be colonised by trees in the future as well.

HABITAT DESCRIPTIONS (2009)

<u>Habitats developed on industrial cutaway</u>

Pioneer Poor Fen communities (pJeff)

Areas in the north west and mid south of the site, and many drains were characterised by this habitat which is dominated by *Juncus effusus* with emergent *Betula pubescens*.

Pioneer Poor Fen communities (pEang)

An area dominated by pEang is located in the northern section of the site. This area also contained considerable sections of eBir and pJeff with some minor patches of pTrig along with clumps of *Typha latifolia* in some of the drainage channels. Other plant species included *Daucus carota*, *Salix cinerea*, *Anthoxanthum odoratum*, *Cirsium arvense, Cirsium vulgare, Tussilago farfara, Mentha sp., Potentilla anserina, Potentilla anglica, Juncus articulatus, Chamaerion angustifolium, Hypericum pulchrum, Salix repens, Campylopus introflexus, Rumex acetosa, Taraxacum agg, Molinia caerulea, Agrostis* sp*., Holcus lanatus, Cerastium fontanum, Carex demissa, Epilobium sp., Senecio aquaticus, Dactylorhiza sp, Potamogeton sp. and small patches of Phragmites australis.*

Pioneer Poor Fen communities (pPhrag, pTyph)

Several areas of *Phragmites australis* were noted, particularly in the northern section amongst the eBir. *Typha latifolia* was also noted as being present in many drains on the site.

Open Water complexes (OW, pTyp, pPhrag)

The only riparian habitat on this site was the silt pond to the north of the railway line. This area appears to have been regularly cleaned out and emergent plant species included *Menyanthes trifoliata*, *Equisetum sp*., *Typha latifolia and Juncus effusus.* The water in the silt trap appeared to have a brown colour.

***Betula pubescens* scrub (eBir, oBir)**

Betula pubescens is commonly found on this site and has developed sections of both open birch and emergent Birch scrub, along with emergent birch with other habitat types such as *Juncus effusus*. Other plant species typically frequenting areas of Birch scrub include *Juncus effusus, Eriophorum angustifolium, Osmunda regalis, Calluna vulgaris, Ulex europaeus, Pinus* sp*. and Campylopus introflexus.*

Areas of Birch scrub are also located along the margins of the site*.*

In some areas of this habitat in the northern section, relatively large patches of *Phragmites australis* have developed.

***Calluna vulgaris*-dominated community (dHeath)**

An area of dHeath is located on the eastern edge of the site close to the road. This community forms a mosaic with pioneer Poor fen vegetation dominated by *Eriophorum angustifolium* and with bare peat, where there has been no recolonisation. The vegetation is dominated by *Calluna vulgaris* and contains *Ulex europaeus*, *Pinus* sp. saplings and *Betula pubescens* saplings and young trees, particularly along the drains. *Osmunda regalis*, *Erica tetralix*, *Eriophorum angustifolium*, *Molinia caerulea* and *Cladonia* sp. were are present in the ground vegetation.

Dry grassland communities (gCal)

A linear stretch of this habitat runs adjacent to the railway line that dissects the site. This grassland is dominated by *Dactylis glomerata*. Other species present included *Agrostis stolonifera*, *Potentilla anserina*, *Urtica dioica*, *Daucus carota*, *Hypochaeris radicata*, *Anthoxanthum odoratum*, *Juncus effusus*, *Juncus articulatus*, *Vicia cracca*, *Cirsium arvense*, *Galium aparine*, *Ranunculus repens*, *Geranium* sp., *Plantago major*, *Trifolium repens*, *Rubus fruticosus*, *Festuca rubra*, *Centaurea nigra*, *Carex flacca, Lotus corniculatus* and *J. inflexus.*

Silt Pond area

Silt ponds are present in the northern part of the site. A series of long linear pools are present along with tall ridges of spoil that has been dredged from the ponds over the years. The ponds contain some emergent species such as *Typha latifolia* and *Schoenoplectus lacustris,* although the cover of these species is not extensive. Other aquatic and emergent species include *Equisetum fluviatile*, *Eriophorum angustifolium*, *Potamogeton* sp. and *Alisma plantago-aquatica*.

The piles of spoil are re-vegetating and contain several communities such as DisCF, gCal and Dense Bracken.

Dry Disturbed/Pioneer communities (DisCF, DisWill)

This pioneer community was found at several locations around the site including on the spoil heaps associated with the silt ponds. These ridges of spoil supported *Tussilago farfara*, *Cirsum arvensis, Trifolium sp. Hypochaeris radicata, Cerastium fontanum, Agrostis stolonifera, Anthoxanthum odoratum, Cirsium vulgare, C. arvense, Holcus lanatus, Centurea nigra, Potentilla anglica, Mentha aquatica, Salix cinerea, Chamaerion angustifolium, Potentilla anserina, Senecio jacobaea, Equisetum sp.,* and *Daucus carota*. There was also a significant amount of bare spoil present in some sections.

Conifer Plantation (WD4)

A large block of Conifer Plantation is located towards the east of the site. This area is managed by Coillte and was planted in the 1980s. The main tree species planted here is Sitka Spruce (*Picea sitchensis*), along with some Lodgepole Pine (*Pinus contorta*). The plantation as a whole has had varied success with some areas doing better than others. In the future, some viable timber (saw Log) should be achieved from this site but on the other large sections are never likely to produce a timber end product. Some brashing of inspection paths has occurred recently so the inventory of this forest should be updated and this information made available. Species found here include *Polytrichum* sp., *Hedera helix, Dryopteris felix-mas, Betula pubescens, Salix cinerea* and *Russula* sp.

A second Conifer plantation is located in the south of the site (within the BnM bog boundary) and consists of *Pinus sylvestris* with *Betula pubescens.* This plantation was planted on old cutover bog and is quite mature. This plantation is likely to be privately managed and there may be ownership issues related to this area. The woodland is heavily grazed and as a result a poorer diversity of plant species as would otherwise exist in such a habitat is found here. Littering (domestic and agricultural rubbish) has also occurred in the woodland. In terms of timber production some of the trees are in excellent condition and have achieved tall straight stems and some Birch (*Betula pubescens*) trees achieved dbh readings of 300mm. Other species in the woodland consist of *Urtica dioica*, *Rubus fruticosus*, *Geranium robertianum*, *Sorbus aucuparia*, *Ilex aquifolium* and *Vaccinium myrtillus* along with fungal species *Piptoporus betulinus* and *Chantharellus cibarius.* Numerous signs of Badgers were observed in the woodland.

Habitats around the margin of the bog

Raised Bog (PB1)

This habitat is found along the north-east margin of the site. A small area of remnant high bog is present. This high bog is dominated by *Calluna vulgaris* and is relatively dry. Other species present include *Carex panicea*, *Molinia caerulea*, *Betula pubescens*, *Trichophorum cespitosum*, *Narthecium ossifragum*, *Eriophorum vaginatum* and *Narthecium ossifragum*. Moss species include *S. capillifolium*, S. *papillosum*, *Hypnum* sp. and *Leucobryum*

glaucum. *Cladonia portentosa* is also relatively frequent. This area would be classified as Facebank and Marginal Ecotopes. Some dried pools are present. There has been some drainage in the past. The high bog is surrounded by old cutover bog around its outside that contains a variety of habitats.

There are poor restoration prospects for raised bog regeneration in this section.

Cutover Bog (PB4)

This habitat is located in the north-east margin of the site and adjacent to the remnant high bog. It consists of relatively old cutover and face-banks where there has not been any sod-peat cutting for some time. The cutover is dominated by *Molinia caerulea*. There are also some patches of *Betula pubescens*-dominated scrub, including *Salix* spp. and patches of *Pteridium aquilinum*. *Ulex europaeus*-dominated scrub is also present.

Raised bog (PB1) with Scot's Pine

This habitat is located at the southern end of the site. It is generally quite dry and one notable feature is the spread of Scot's Pine (*Pinus sylvestris*) over the high bog from the adjacent conifer plantation. Small trees are quite frequent on the high bog. Piles of old bog timbers separate this area from the adjacent production areas and there is a distinct slope from this boundary back towards the boundary with the conifer plantation and cutover bog. It is poached in places by cattle/horses/ponies. The vegetation is dominated by *Calluna vulgaris* and also contains *Rhynchospora alba*, *Erica tetralix*, *Narthecium ossifragum*, *Molinia caerulea*, *Trichophorum cespitosum*, *Eriophorum vaginatum* and *Eriophorum angustifolium*. One notable feature is the relatively high frequency of *Andromeda polifolia* in association with some of the areas with developing trees. Mosses present include *Pleurozium schreberi*, *Hypnum cupressiforme* and *Campylopus introflexus*. There are some relic hummocks of *Sphagnum capillifolium, S. subnitens* and S. *papillosum*. There are only very small hollows with *S. cuspidatum*. The edge of the cutover is quite mature and developing scrub/Bog woodland with *Pinus sylvestris* and *Betula pubescens*. Some sections of high bog have secondary Sphagnum growth where water is running off the bog surface towards the edge of the cutover. Pooling of water has created some small patches with rich Sphagnum cover and nd *Rhynchospora alba* that could qualify as Rhynchosporion depressions (an EU Habitats Directive Annex I habitat found on raised bogs).

This area is developing into Bog woodland is likely to have a significant biodiversity potential.

Bog Woodland (WN7)

This habitat is located at the southern tip of the site. Trees from the neighbouring Conifer plantation, mainly Scot's Pine, are spreading onto the high bog. There is a narrow zone along the edge of the high bog and adjacent to the conifer plantation that is dominated by widely spaced medium-sized trees. The under-lying vegetation is typical of the raised bog and is dominated by *Calluna vulgaris* and *Molinia caerulea*.

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 bunded to 110% capacity to prevent spills. Tanks for bowsers and generators shall be double skinned. When not in use, all valves and fuel trigger guns from fuel storage containers will be locked. All pumps using fuel or containing oil will be locally and securely bunded where there is the possibility of discharge to waters.
- Potential impacts caused by spillages etc. during rehabilitation will be reduced by keeping spill kits and other appropriate equipment on-site.
- 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

No invasive flora species have been recorded at Derrybrat Bog.

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 inspecting and washing vehicles prior to entering sites.

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, accessed on the Environment Agency's website on the 11th of July 2016).

In addition to the above, Best Practise measures around the prevention and spread of Crayfish plague[3] and Zebra Mussel will be adhered with throughout all rehabilitation measures and activities.

[3] 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 Boora bog group (Ref. P0500-01). 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 Boora 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 Climate 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.

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 National River Basin Management Plan 2018-2021 (Water Framework Directive)

The National River Basin Management Plan (2018-2021) (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 outlines 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) is part of the WFD

(2018-2021) programme of measures. The NRBMP takes account of the fact that Bord na Móna is 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 rehabilitation target is set to be 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 is expected to have a positive impact on water quality and will help the NWBMP deliver its objectives in relation to the Water Framework Directive and is one of the five key principle actions.

The cessation of industrial peat extraction by Bord na Móna in 2021 is 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.

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.

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.

Derrybrat Bog is located in an area zoned by Offaly County Council as open countryside.

11 National Archaeology Code of Practise

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 Practise 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 EUs 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 polices.

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

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.

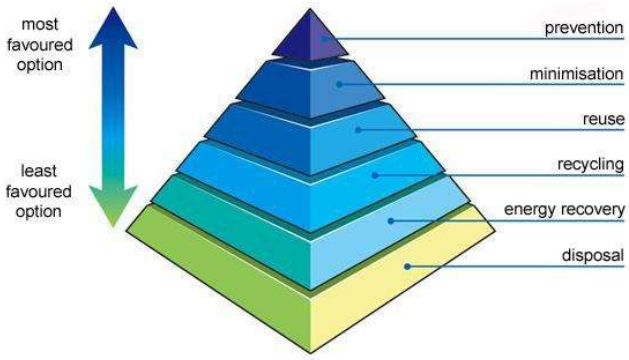
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

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 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 and 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 license. 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	Derrybrat Decommissioning Plan
1	Removal of Railway Lines	Removal of Railway Lines
2	Decommissioning Bridges and Underpasses	Review need for Silver River Bridge
3	Decommissioning Railway Level Crossing	Decommissioning Railway Level Crossing
4	Restricting Access (bogs and silt ponds)	Restricting Access to Bog.
5	Removal of High Voltage Power Lines	Not 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 (ie. at the margin) where the peat can not 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 externally funded.

Enhanced rehabilitation: This is defined as rehabilitation carried out under the 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 stabilisiation: 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 Lisence. 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 stabilisiation.

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 to 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 in 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. P0500-01, Boora Bog Group in County Offaly.

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 Boora are serviced by a 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 ores 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 that 2-3 metres.

1.2 Power Station screenings:
Peat from the bogs is screened prior to processing. This screening removes oversized peat, stones and bogs 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 P0502-01 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 31' December2012. 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 out 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	**C**lassification	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 Boora 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 there 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-effected 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 Boora IPPC Licence Ref. PO500-01.

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.
- No fertiliser will be spread on land within 2 metres of a surface watercourse.
- 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. Reproduced as follows:

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	Communication Format	Date Response Received	Response format

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

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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.

Bord na Móna	**Procedure: ENV017**	**Rev: 1**
Title: Archaeological Findings	**Approved: EM**	**Date: 13/10/2020**

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	13/10/2020	First release	EMcD