

Bord na Móna

Ballycon Bog

**Cutaway Bog Decommissioning and
Rehabilitation Plan
2022**

This document seeks to address the requirements of Condition 10.2 of IPC License Ref. P0503-01:

“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 Ballycon Bog upon cessation of peat production and compliments the licence requirement to decommission the site.

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

Industrial peat production has now fully ceased at Ballycon Bog.

In addition, to preparing this document to comply with Condition 10 of IPC Licence Ref. P0503-01, due regard was also given to the Peatlands Climate Action Scheme (PCAS) announced by the Minister. This Scheme will see the Minister support, via the Climate Action Fund and Ireland’s National Recovery and Resilience Plan, Bord na Móna in developing a package of measures, ‘the Scheme’, for enhanced decommissioning, rehabilitation and restoration of cutaway peatlands referred to as, the Peatlands Climate Action Scheme’. However, only the additional costs associated with the additional and enhanced rehabilitation, i.e., measures which go beyond the existing standard mandatory decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support. The additional costs of the Scheme will be supported by Government, administered by the Department of Environment, Climate and Communications (DECC), while the National Parks and Wildlife Service (NPWS) will act as the Scheme regulator.

While this document outlines the enhanced rehabilitation measures planned for Ballycon 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 Ballycon 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 Ballycon Bog will be conducted in adherence to the relevant planning guidelines and consultation with relevant authorities and will be considered within the framework of this rehabilitation plan.

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NON-TECHNICAL SUMMARY

- Industrial peat extraction has finished at Ballycon Bog for some time (ceased from 2001).
- Bord na Móna is now planning to complete rehabilitation at Ballycon Bog, located approximately 8km south-west of Edenderry, in Co. Offaly.
- This is happening as Bord na Móna are obliged to carry out peatland rehabilitation via an IPC License issued by the Environmental Protection Agency. In addition, the Government has agreed to support peatland rehabilitation via the establishment of the Peatland Climate Action Scheme (PCAS). This is funded via the Government and by Bord na Móna.
- The key objective of peatland rehabilitation is environmental stabilisation. This means developing habitats and vegetation back onto the bare peat (putting a “skin” back onto the peat), and minimising effects to downstream waterbodies. Ballycon 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 cannot 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.
- The development and support of a range of habitats in Ballycon Bog will support biodiversity including plants, insects, birds and mammals. This includes some species that are rare and protected in the wider landscape. It will increase the national area of native woodland. Many wetland habitats in the wider landscape have been reclaimed for agriculture and other uses and peatland rehabilitation is an opportunity to create new peatland and wetland habitats.
- Ballycon Bog was developed for industrial peat harvesting in the 1960’s and ceased in 2001.
- Some rehabilitation works have already been carried out at Ballycon, consisting of drain blocking and bund construction, initially carried out in 2006. In 2015, some headlands were fertilised in 2015 to encourage the development of pioneer dry cutaway habitats. Follow-up drain blocking was carried out in a small portion of the site 2018. There has been significant natural colonisation on site since peat extraction ceased and in response to rehabilitation.
- The former peat extraction area now consists of mainly wetland habitat, mosaics of fen, established pioneer peatland habitats and scrub, with over 90% of the site revegetated, following earlier rehabilitation measures and natural colonisation. Habitats at the site continue to stabilise. Small areas of bare peat remain.
- Measures proposed for Ballycon Bog include additional drain blocking and additional measures required to raise water levels to the surface of the peat, including modifying outfalls and managing water levels with overflow pipes. Drier area will be targeted for drain-blocking.
- Bord na Móna plan to carry out this work in 2022.
- These rehabilitation measures will be planned by a team consisting of expert ecologists, hydrologists and engineers. It is a guiding principle of Bord na Móna rehabilitation planning that no actions or activities will be undertaken that would negatively impact on adjacent land. No boundary drains will be blocked. Water will still leave the bog via the existing outlets.

- This is a peatland rehabilitation plan. This plan does not consider future after-use or development. Bord na Móna continually reviews its land-bank to consider future commercial or industrial developments, such as renewable energy. Any other proposed development will be planned in adherence to relevant planning guidelines and will consider the rehabilitation and the condition of the bog.
- Peatland rehabilitation of this bog will bring a range of benefits to the local community via improvements to the local landscape and is also important for supporting national policies and strategies in relation to reduction of carbon emissions from these peatlands, supporting biodiversity and improvements to water quality.

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SUMMARY

Name of bog: Ballycon Bog

Area: 281.1 ha

Site description:

- Ballycon Bog was developed for industrial peat harvesting in the 1960's. Industrial peat production permanently ceased in 2001.
- The majority of the former peat extraction area (greater than 90%) has now revegetated due to previous rehabilitation efforts and natural colonisation. The former peat production footprint now comprises wetland habitat, mosaics of pioneer open cutaway habitat and scrub.
- Ballycon was a pumped bog during the years of peat production. The pump has since been decommissioned and the site is now drained by a gravity-based drainage system.
- Ballycon bog is a shallow-peat cutover bog. The commercially valuable peat deposits on site have been exhausted. As a result, peat depths on site are shallow, generally 0.5-2.5m, with small discrete pockets of deeper peat (2.6m+) in the eastern section of the site.

Rehabilitation goals and outcomes

Bord na Móna is committed to discharging the obligations arising from Condition 10 of the IPC licence.

This is defined as:

- Meeting conditions of the IPC licence.
- Stabilisation or improvement in water quality parameters (e.g. suspended solids).
- Environmental stabilisation.
- The site has already developed a mosaic of pioneer cutaway habitats, notably wetland, Birch woodland, scrub, and fen habitats and has largely stabilised. There is only a small area of bare peat. These areas will be assessed for potential for targeted actions to enhance existing wetland habitats.
- Rehabilitation will focus on additional measures to optimise hydrological conditions for **climate action benefits as part of PCAS** in the areas recently out of peat extraction. This will be achieved via **deep peat re-wetting** and the **development of wetlands, fen, Reed Swamp and wet woodland on shallow cutaway peat**, and eventually naturally functioning wetland/peatland habitats. Measures will focus on adjusting water-levels, where needed, and looking to improve re-wetting on areas that are relatively dry, where possible.
- Optimising hydrological conditions for the development of embryonic *Sphagnum*-rich vegetation communities in suitable deep residual peat areas.
- Rehabilitation will support the National Policies on Climate Action and GHG mitigation by maintaining and enhancing the current residual peat storage capacity of the bog (locking the carbon into the ground). It is expected that the bog will have reduced emissions (reduced source) as it develops naturally functioning wetland and peatland habitats. 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 Ballycon Bog.
- EPA IPC Licence - Ref. P0503-01. 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 Scheme (PCAS)** includes enhanced measures which are designed to exceed/meet the standard stabilisation requirements as defined by the IPC Licence and to enhance the ecosystem services of Ballycon Bog, in particular, optimising **climate action benefits**.
- The key goals and outcomes of rehabilitation at this bog outlined above.
- To minimise potential impacts on neighbouring land, boundary drains around Ballycon Bog will be left unblocked, as blocking boundary drains could affect adjacent land.
- Constraints include commercial forestry. Part of the site was developed for conifer forestry in the 1980s and is leased to Coillte.

Criteria for successful rehabilitation:

The Criteria for successful rehabilitation to meet Condition 10 of the IPC Licence 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 management of existing wetlands, and the creation of compatible fen, reed swamp, wet woodland and other wetland and peatland habitats. The target will be the delivery of measures and this will be measured by an aerial survey after rehabilitation is completed.
- Stabilising/improving potential emissions to water (e.g. suspended solids). 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 for climate action (Climate action verification). This will be measured by an aerial survey after rehabilitation has been completed.
- Reduction in carbon emissions (Climate action verification). 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.
- 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/part carbon sink. Some areas will naturally be dry and develop birch woodland and other drier habitats. It will take some time for stable naturally functioning habitats to fully develop at Ballycon Bog.
- Improvement in biodiversity and ecosystem services (climate action verification).

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 hydrology and drainage appraisal.
- Carry out an ecological appraisal of the potential impacts of the planned rehabilitation.
- Carry out proposed measures, which will include a combination of hydrological management, additional drain blocking, wetland creation and fertiliser applications targeting bare peat sections of headlands.
- Silt ponds will continue to be maintained during the rehabilitation and decommissioning phase.
- 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.

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

Monitoring, after-care and maintenance

The monitoring, after-care and maintenance programme for Ballycon Bog, as required to meet Condition 10 of the IPC Licence, is defined as:

- Quarterly monitoring assessments of the site to determine the general status of the site, assess the condition of the rehabilitation work, assess the progress of natural colonisation, monitoring of any potential impacts on neighbouring land and general land security. The number of site visits will reduce after 2 years to bi-annually. These site visits will assess the need to additional rehabilitation, if needed.
- **Water quality monitoring** will be established. Monitoring of key water quality parameters for 2 years after rehabilitation will include: Ammonia, Phosphorous, Suspended solids (silt) & pH.
- 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.

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. It is proposed that sites can be monitored against this baseline in the future.
- 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.

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 indicators are stabilising/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 Allen/Clonsast bog group (Ref. P0503-01). 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. Ballycon bog is part of the Allen/Clonsast bog group (see Appendix II for details of the bog areas within the Allen/Clonsast Bog Group). Ballycon Bog is located in Co. Offaly.

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

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

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

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

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

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

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

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

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

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

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

1.1 Constraints and Limitations

This document seeks to address the requirements of Condition 10.2 of IPC License Ref. P0503-01:

“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.”

It also seeks to outline measures to optimise climate action and other ecosystem services benefits, mainly through hydrological management.

This document covers the area of **Ballycon Bog**.

Industrial peat extraction at Ballycon Bog permanently ceased in 2001, having commenced in the 1960's. The site has largely revegetated following previous rehabilitation work and natural recolonisation. Currently the former peat production area comprises of mainly wetland habitats, and mosaics of pioneering cutaway habitats and scrub. There are some small areas of bare peat remaining.

It is anticipated that the combination of active enhanced rehabilitation measures and natural colonisation will quickly accelerate environmental stabilisation. Nevertheless, it will still take some time (30-50 years) for naturally functioning wetland and peatland ecosystems to fully re-establish.

Parts of Ballycon 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 Ballycon 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.

Part of the western section of Ballycon Bog was developed for conifer forestry in the 1980s and is leased to Coillte (BNM Ballycon, FID code: 3867). An additional plot of Coillte forestry plantation, BNM Derryrobinson (FID: 3872) occurs outside the southern boundary of Ballycon Bog, set back a minimum distance of 20m from the site boundary.

The former works area at Ballycon is now leased to a 3rd party (Real Leaf Farm) to develop as a hydroponic farm to grow salad crops.

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

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 (covering the period 2011 to 2021 inclusive) 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-practice regarding peatland rehabilitation and after-use through the International Peat Society and the Society for Ecological Restoration (Joosten & Clarke, 2002; Clarke & Rieley, 2010; Gann *et al.*, 2019);
- Consultation and engagement with internal and external stakeholders;
- GIS Mapping;
- BNM drainage surveys;
- Bog topography and LIDAR data;
- Previous research studies on site;
- 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 Ballycon Bog, in particular, optimising climate action benefits.

2.1 Desk Study

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

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

- Hinde *et al.* (2010). *Sphagnum* re-introduction project: A report on research into the re-introduction of *Sphagnum* mosses to degraded moorland. Moors for the Future Research Report 18.
- Joosten & Clarke (2002). Wise Use of mires and peatlands – Background and Principles including a framework for Decision-making.
- Lindsay (2010). Peatbogs and Carbon: a Critical Synthesis to Inform Policy Development in Oceanic Peat Bog Conservation and Restoration in the Context of Climate Change.
- Mackin *et al.* (2017). Best practice in raised bog restoration in Ireland. Irish Wildlife Manuals, No. 99. National Parks and Wildlife Service,
- McBride *et al.* (2011). The Fen Management Handbook (2011), Scottish Natural Heritage.
- McDonagh (1996). Drain blocking by machines on Raised Bogs. Unpublished report for National Parks and Wildlife Service.
- NPWS (2017a). National Raised Bog Special Areas of Conservation management plan. Department of Arts, Heritage and the Gaeltacht.
- Pschenyckyj *et al.*, 2021, Optimising Water Quality Returns from Peatland Management while Delivering Co-Benefits for Climate and Biodiversity. An Fóram Uisce.
- Quinty & Rochefort (2003). Peatland Restoration Guide, second edition. Canadian *Sphagnum* Peat Moss Association and New Brunswick Department of Natural Resources and Energy.
- Regan, *et al.* (2020). Ecohydrology, Greenhouse Gas Dynamics and Restoration Guidelines for Degraded Raised Bogs. EPA Research Report. Prepared for the Environmental Protection Agency by Trinity College Dublin.
- Renou-Wilson *et al.* (2011). BOGLAND - Sustainable Management of Peatlands in Ireland. STRIVE Report No 75 prepared for the Environmental Protection Agency.
- Schouten (2002). Conservation and Restoration of Raised Bogs: Geological, Hydrological and Ecological Studies. Dúchas - The Heritage Service of the Department of the Environment and Local Government, Ireland;
- Thom (2019). Conserving Bogs – Management Handbook.
- Wheeler & Shaw (1995). Restoration of Damaged Peatlands – with Particular Reference to Lowland Raised Bogs Affected by Peat Extraction.
- Wittram *et al.* (2015). A Practitioners Guide to Sphagnum Reintroduction. Moors for the Future Partnership.

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

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

- Water Framework Directive catchments.ie/maps/ Map Viewer (www.catchments.ie);
- OPW Indicative Flood Maps (www.floodmaps.ie);
- CFRAM Preliminary Flood Risk Assessment (PFRA) maps (www.cfram.ie);
- River Basin Management Plan for Ireland 2018 – 2021;
- Bord na Móna Annual Report 2020;
- Spatial data in respect of Article 17 reporting, available online at <https://www.npws.ie/maps-and-data/habitat-and-species-data/article-17>.

2.2 Consultation

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

2.3 Field Surveys

Bord na Móna carried out a baseline ecological survey of all of its properties in 2009-2012 and developed habitat maps. As part of this exercise Ballycon Bog was originally surveyed in May of 2010, and re-surveyed in 2015. Additional ecological walk-over surveys and visits have taken place at Ballycon Bog between 2012-2021, with a final visit undertaken in June 2021. These visits have been undertaken 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-practice guidance from Smith *et al.* (2011). Map outputs including all habitat maps and target notes were produced using GIS software application packages (ArcGIS). General marginal habitats and other habitats that had not been modified significantly by industrial peat extraction were classified using Fossitt *et al.* (2000). Plant nomenclature for vascular plants follows Stace (2010), while mosses and liverworts nomenclature follows identification keys published by the British Bryological Society (2010). A more detailed Bord na Móna classification system was previously developed for classifying pioneer cutaway habitats as Fossitt categories were deemed not to be detailed enough for cutaway bog (much of cutaway bog could be classified as Cutover Bog - PB4). 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 site visit was used to categorise any changes in habitat extent at Ballycon in June 2021.

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

3. SITE DESCRIPTION

Ballycon bog is situated in Co. Offaly, approximately 8Km south-west of Edenderry, close to the junction of the R400 and R402 roads (Grid reference: N 55034 26285). It is part of the Allen/Clonsast bog group (Ref. P0503-01).

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. Ballycon Bog is linked to the adjacent Mountlucas Bog (also owned by Bord na Móna) to the west, Derrycricket Bog to the south and Cloncreen Bog to the east by a railway line and machinery travel paths.

A former BnM workshop is located in the south-west of site. This was formerly used for the construction and maintenance of railway lines for other bogs. This area is now leased.

The majority of the site is now re-vegetated and developing a mosaic of cutaway wetland, woodland and peatland habitats.

See Drawing number BNM-DR-23-03-01 titled **Ballycon Bog: Bog Site Location**, included in the accompanying Mapbook¹, which illustrates the location of Ballycon Bog in context to the surrounding area.

3.1 Status and Situation

3.1.1 Site history

Ballycon Bog was first developed for industrial peat harvesting in the 1960's and the majority of peat has been removed. Ballycon is considered a shallow peat cutaway bog. Industrial peat production permanently ceased at Ballycon Bog in 2001.

It formerly provided peat for use in the Derrinlough Briquette factory and also as fuel peat for Edenderry Power Station, Offaly. The existing east-west rail line through Ballycon is still in use however and has been utilised as recently as 2020 to transport peat from adjacent sites to the power station. Drainage at Ballycon during peat-production was facilitated through maintenance of a pump-based drainage system. The pump has since been decommissioned and now the site is drained via gravity-based drainage system.

Ballycon Bog was partially rehabilitated in 2005-2006. Measures consisted of drain blocking and bund construction. The restoration works have resulted in the development of a mosaic of wetland, scrub, woodland and pioneering cutaway bog habitats. Additional rehabilitation works have also been carried out since then; some headlands were fertilised in 2015 to encourage the development of pioneer dry cutaway habitats and there was follow-up drain blocking in 2018 across a small area.

3.1.2 Current land-use

Industrial peat production has permanently ceased at Ballycon Bog since 2001. Biodiversity and ecosystem services have been identified as the primary land use at Ballycon Bog by Bord na Móna and the site is managed as a Biodiversity Area. As much as 90% of the former peat production area has now revegetated to some degree, due to previous rehabilitation efforts and natural colonisation.

¹ Cutaway Bog Decommissioning and Rehabilitation Plan – Ballycon Bog Map Book

Part of the western/north-western section of the site was developed for commercial conifer forestry plantation in the 1980s and is leased to Coillte. This area is beyond the scope of this rehab plan.

There is a rail transport link along the southern boundary of the site. This will be used to transport peat to Edenderry Power for several years until peat stocks are cleared from nearby bogs.

There are no known right of way constraints on this bog.

The former Ballycon Works and Yard was used to repair industrial railway sections. This activity has now ceased and the yard has been cleared of industrial equipment and associated railway material. The former yard has now been leased to a 3rd party (Real Leaf Farm) and is now being developed as a hydroponics facility to grow salad crops. This development has received planning permission from Offaly County Council.

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 Ballycon Bog, jobs would have included those involved in peat extraction for use in the Derrinlough Briquette factory and fuel peat for West Offaly Power (WOP) in Shannonbridge, Offaly.

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 Ballycon Bog is largely Oolitic limestone with a smaller area of Waulsortian Limestones)² in the mid-section of the site. The underlying geology of Ballycon bog is calcareous. The underlying

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

soils and sub-soils are classed as 'Cutover/Cutaway Peat'. Peat reserves were exhausted at this site exposing marl in many places. Exposed shell marl incidence is most prevalent on the eastern side of the site.

The lowest lying areas of the site are underlain by marl and lacustrine clay (below c. 39.5mOD), while one main ridge of more elevated material (rising to >43.5mOD) trends into the bog in a south-east to north-westerly direction. This has been interpreted as glacial till (based on comparable features present in the surrounding area). The lacustrine deposits encountered would be expected to limit vertical losses to depth in areas where this occurs. Basal peat in Ballycon is largely underlain with lacustrine grey gritty plastic clay (GGPC), green plastic clay (GPC), sand and shell marl.

3.2.2 Peat type and depths

Ballycon bog is a shallow-peat cutover bog. The commercially valuable peat deposits on site have been exhausted. The residual peat is mostly fen peat, with small pockets of acidic peat. As a result, peat depths on site are shallow, generally 0.5-2.5m, with small discrete pockets of deeper peat (2.6m+) in the eastern section of the site.

3.3 Key Biodiversity Features of Interest

The majority of Ballycon Bog has developed into a vegetated cutaway. The previous rehabilitation works have resulted in the development of a mosaic of wetland, scrub, woodland and pioneering cutaway bog habitats.

3.3.1 Current habitats

The western side of the site has been out of production for a longer period of time and therefore has more well-developed habitats. The ground is also somewhat higher and drier, meaning that scrub/woodland habitats predominate. Part of the western/north-western section of the site was developed for commercial conifer forestry plantation in the 1980s. The section adjacent to the conifer plantation is heavily wooded with some closed Birch scrub developing into immature Birch woodland. The majority is open or emergent Birch scrub (in mosaic with pioneering common cotton grass community) with some higher fields also developed some dry heath.

Towards the northern side in this western section and as the ground falls there is some development of wetland vegetation in mosaic with open Birch scrub, with patches of more diverse and open Bottle Sedge and Bog Cotton-dominated vegetation. This area contains tussocks with large hummocks of several different typical bryophytes such as *Calliergonella cuspidata*, *Rhytidiadelphus squarrosus* and *Pleurozium schreberi*. Some of the more acidic sections classified as pioneering common cotton grass community are developing large hummocks of *Sphagnum palustre*, *S. subnitens* and *S. fallax*. Some of the wettest areas have several small pockets of open water with Reedmace. These small ponds were attracting significant numbers of insects. There is also some diverse calcareous grassland on drier ground in this area dominated by Glaucous Sedge that merges and forms mosaics with similar grassland dominated by Purple Moorgrass.

The majority of the site is developing a mosaic of wetlands with pioneer poor fen vegetation and emerging scrub. As part of earlier rehabilitation works, a long berm was built through the middle of the site (E-W) with the main aim to hold more water in the northern half and other sections of the bog and create new wetlands. This work has successfully increased the extent of wetland and pioneer fen habitat in the site.

Much of the poor fen developing in the more open central and western zones of the site is dominated by Bog Cotton. More open water has developed on both sides of the central embankment. The fringes of this open

water are generally vegetated with Bog Cotton-dominated vegetation (with or without scrub) and smaller amounts of Soft Rush-dominated and Bottle Sedge-dominated vegetation. The open water is divided by several high fields that dissect these areas (some of which have been breached to allow water to pass between them). Some of the poor fen vegetation associated with the wetlands is somewhat more diverse and dominated by Horsetail (*Equisetum palustre*) and Cuckoo Flower (*Cardamine pratensis*) in places, possibly indicating the influence of the exposed marl and sub-soil.

The majority of the mid-eastern section of the site was dominated by a mosaic of bare peat, Bog Cotton and emergent Birch trees. This area also contained many small areas of open water along with occasional low-lying fields that were a mixture of bog cotton and open water.

The south eastern corner of the site is a mosaic of wetlands including open water and poor fen vegetation with species such as Bog Cotton, Marsh Arrow Grass and Soft Rush. A large area of Reedbed, dominated by Common Reed, is developing to the south of the largest sections of open water while smaller areas of Reedmace and Common Reed can be found throughout the eastern section of the site. The north-eastern section of the site becomes wetter again with larger areas of open water present. The northern section was similar to the southern sections with poor fen vegetation dominating.

A small area of Birch woodland (WN7) is located at the northern margin of the site. The canopy is dominated by Birch and the understorey and shrub layers are quite dense with Holly, Birch, Willow Bramble and Heather. Bilberry and Honeysuckle appears in the ground layer. A Badger sett was noted in this woodland.

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

See Drawing number BNM-DR-23-03-17 titled **Ballycon Bog: Current Habitat Map**, included in the accompanying Mapbook, which illustrates the habitats at Ballycon Bog.



View of the typical wetland habitat and emergent vegetation present at Ballycon Bog (June, 2021).



Pioneer fen vegetation at Ballycon Bog (June, 2021).

| | |
|--|--|
|  <p><i>Areas with lighter pioneer vegetation cover (2013).</i></p> |  <p><i>Pioneer birch, with wetland habitat in the background (June, 2021).</i></p> |
|  <p><i>Mosaic of dry Calluna-dominated vegetation and emergent Betula-dominated scrub habitat on the headland at Ballycon (May, 2020).</i></p> |  <p><i>Wetland with emergent horsetails in the southern section of the site (July 2021)</i></p> |

Table 1: Photos of Habitats at Ballycon Bog.

3.3.2 Species of conservation interest

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

Ballycon Bog intersects the 10km hectad (N52), which has NBDC records of 91 species of birds (2007-2011 Bird Atlas period), 155 species of flowering plant, 32 species of moss, and 3 species of liverwort, 15 species of terrestrial mammal, 1 species of amphibian, 33 species of mollusc, 19 species of butterfly, 11 species of moth, along with 101 records for other insects.

A review of available Biodiversity records from the NBDC of flora and fauna recorded within a polygon including Ballycon Bog found records for terrestrial mammal species, including Irish Hare (*Lepus timidus subsp. hibernicus*),

Red Squirrel (*Sciurus vulgaris*), Western European, Pine Marten (*Martes martes*), European Otter (*Lutra lutra*) and Fallow Deer (*Dama dama*). There are also several records for Badger (*Meles meles*) setts within the marginal habitats of the site. These records have been largely gathered from the results of BNM ecology surveys.

NBDC records for lepidopteran species at Ballycon bog include Green-veined White (*Pieris napi*), Common Blue (*Polyommatus icarus*), Dingy Skipper (*Erynnis tages*), Marsh Fritillary (*Euphydryas aurinia*), Orange-tip (*Anthocharis cardamines*), Small Heath (*Coenonympha pamphilus*) and Speckled Wood (*Pararge aegeria*).

NBDC records for odonata species at Ballycon bog include Banded Demoiselle (*Calopteryx splendens*) and Common Darter (*Sympetrum striolatum*). During the most recent survey of Ballycon Bog, carried out in June 21, Beautiful Demoiselle (*Calopteryx virgo*), Black-tailed Skimmer (*orthetrum cancellatum*) and Hairy Dragonfly (*Brachytron pratense*) were also recorded.

Numerous bird species are known to use the cutover bogs in Ireland's midlands as breeding grounds, wintering grounds or both. NBDC records for species of conservation concern recorded at Ballycon Bog or within 1km of the site include red-listed³ bird species Common Goldeneye (*Bucephala clangula*), Northern Lapwing (*Vanellus vanellus*) and Common Snipe (*Gallinago gallinago*), and EU Birds Directive Annex I species Peregrine Falcon (*Falco peregrinus*) and Common Kingfisher (*Alcedo atthis*).

NBDC records for amber listed species include the species Barn Swallow (*Hirundo rustica*), Black-headed Gull (*Larus ridibundus*), Eurasian Marsh Harrier (*Circus aeruginosus*), Eurasian Wigeon (*Anas penelope*), House Martin (*Delichon urbicum*), Mallard (*Anas platyrhynchos*), Northern Wheatear (*Oenanthe oenanthe*), Ringed Plover (*Charadrius hiaticula*), Sky Lark (*Alauda arvensis*) and Whooper Swan (*Cygnus cygnus*).

Other notable species recorded from Ballycon Bog during previous surveys carried out by BNM ecologists include the rare vagrant bird species Eurasian Marsh Harrier (*Circus aeruginosus*) and Common Crane (*Grus grus*); Annex I species Peregrine Falcon (*Falco peregrinus*), Hen Harrier (*Circus cyaneus*) and breeding waders including Northern Lapwing (*Vanellus vanellus*) and Ringed Plover (*Charadrius hiaticula*). The Amber listed Whooper Swan (*Cygnus cygnus*) occurs during the winter months, and Hen Harrier (also Amber) both forage and potentially roost at the site during the winter months.

On the most recent visit to Ballycon Bog carried out in June of 2021, 24 species of bird were recorded utilising or associating with habitats onsite, including the red listed species Snipe (*Gallinago gallinago*) and Meadow Pipit (*Anthus pratensis*). The amber listed species Ringed Plover (*Charadrius hiaticula*), Mallard (*Anas platyrhynchos*), Sky Lark (*Alauda arvensis*) and Barn Swallow (*Hirundo rustica*) were also recorded during the survey.

Blue Fleabane (*Erigeron acer*) and Basil Thyme (*Acinos arvensis*) have been previously been recorded at the site. Both species are nationally rare plant species listed in the Irish Red Data Book (Curtis and McGough 1988) and Basil Thyme is also listed on the Flora Protection Order (FPO) (part of Wildlife Act). Rare plants Marsh Helleborine (*Epipactis palustris*) and Bee Orchid (*Ophrys apifera*) have also been recorded at Ballycon Bog.

3.3.3 Invasive species

Invasive alien species known to occur at Ballycon 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.

³ Gilbert G, Stanbury A and Lewis L (2021), "Birds of Conservation Concern in Ireland 2020 –2026". Irish Birds 9: 523—544

No aquatic invasive species are described in available EPA documentation⁴ in respect of WFD Cycle 2 sub-catchment reporting.

A broad range of common garden escapes are occasionally present around the margins of Bord na Móna 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's or SPA's) in close proximity (i.e. within a 5km radius at minimum) to Ballycon Bog.

The closest EU designated sites are Raheenmore bog SAC (site code: 000582) and The Long Derries, Edenderry SAC (site code: 000925), which lie approximately 10km north-west and 10km north-east of Ballycon respectively. The qualifying interests of Raheenmore bog SAC include active raised bogs [7110], degraded raised bogs still capable of natural regeneration [7120] and depressions on peat substrates of the Rhynchosporion [7150]. This SAC overlaps Raheenmore Bog pNHA.

The Long Derries, Edenderry SAC is designated for Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210]. This SAC overlaps The Long Derries, Edenderry pNHA.

There are no Special Protection Areas (SPAs) within 15km of Ballycon Bog.

The closest nationally designated site to Ballycon Bog is the Grand Canal NHA (site code: 02104), located approximately 4.3km north at the closest point. Daingean Bog NHA (site code: 002033) lies 7.4km west of Ballycon Bog. Black Castle bog NHA (site code: 000570) lies 7.9km north-east of Ballycon Bog.

3.4.1 Other Nature Conservation Designations

The Ramsar Convention entered into force in Ireland on 15th March 1985. Ireland currently has 45 sites/wetlands designated as Wetlands of International Importance (Ramsar Sites). These cover a surface area of 66,994ha. There are no Ramsar Sites in the local vicinity of Ballycon Bog (i.e. within 3km). The closest Ramsar Site to Ballycon Bog is Raheenmore Bog (site no: 417) which lies approximately 10km north-west.

This bog is a classic example of a midland raised bog developed in a small basin on the catchment divide between two major river systems. The peat, 15m in places, makes it the deepest known raised bog in Ireland. Vegetation is typical, with a good cover of Sphagnum mosses, but the formerly extensive hummock and hollow system is reduced due to drainage impacts.

<https://www.arcgis.com/apps/MapTour/index.html?appid=cd6e1a247bdc4179b9dfc0461e950f1e#>

⁴ [https://catchments.ie/wp-content/files/subcatchmentassessments/07_6%20Blackwater\[Longwood\]_SC_010%20Subcatchment%20Assessment%20WFD%20Cycle%202.pdf](https://catchments.ie/wp-content/files/subcatchmentassessments/07_6%20Blackwater[Longwood]_SC_010%20Subcatchment%20Assessment%20WFD%20Cycle%202.pdf)

3.5 Hydrology and Hydrogeology

Ballycon Bog is located in the River Barrow Catchment and in the Figile (020) sub catchment. The River Daingean (EPA Code: 14D06) flows east, adjacent to the northern boundary of the site and then flows in a south-easterly direction outside the eastern boundary of the site. The River Derrycricket (EPA Code: 14D13) flows in an easterly direction, adjacent to the southern boundary of the site before discharging to the River Daingean. The Ballaghassaan stream (EPA Code: 14B24) flows north through the lands south of Ballycon before joining the Derrycricket near the south eastern boundary of Ballycon Bog. These watercourses drain towards the River Figile (EPA Code: 14F01) to the south-east of the site.

Drainage at Ballycon during peat-production was facilitated through maintenance of a pump-based drainage system. The pump has since been decommissioned and now the site is drained via gravity-based drainage system. The bog had field drains running in a general north-northwest to south-southeast orientation. Many of the drains have been blocked by previous rehabilitation efforts or have naturally infilled.

Regional hydrological data suggest that Ballycon receives average precipitation of 845mm/yr (1981-2010), with an estimated evapotranspiration rate of c. 514mm/yr. A, leaving an average effective precipitation of 331mm/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 331mm/yr, which equates to an annual runoff rate of c. 3,310m³/ha.

GSI data indicates that Ballycon Bog is underlain by the Edenderry Oolite Member and the Waulsortian Limestones which are classified as a Locally Important Aquifer - Bedrock which is Generally Moderately Productive and a Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones respectively. Additionally, to the east of the bog there is an additional locally important aquifer (karstified) belonging to the Allenwood Formation. Geological Survey of Ireland (GSI) mapping identifies a single karst feature, a spring, within close proximity to the bog (approx. 2 – 2.5km SW of the bog). No data exists concerning depth to bedrock, however, the closest bedrock outcrop occurs 1.75km to the North-West of the bog.

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. Locally important aquifers are capable of supplying locally important abstractions (e.g. smaller public water supplies, group schemes), or good yields (100-400 m³/d). This data gives an indication of sub-surface deposits (bedrock and unconsolidated materials) in terms of their groundwater resource potential and dominant groundwater flow type.

Regionally important aquifers are those in which the network of fractures, fissures and joints, through which groundwater flows, is well connected and widely dispersed, resulting in a relatively even distribution of highly permeable zones. There is good aquifer storage and groundwater flow paths can be up to several kilometres in length. There is likely to be substantial groundwater discharge to surface waters ('baseflow') and large (>2,000 m³/d), dependable springs may be associated with these aquifers.

The majority of the bog is located in an area mapped by GSI as of low groundwater vulnerability, with small areas of moderate vulnerability (GSI Mapviewer). 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. 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 maps are based on the type and thicknesses of subsoils (sands,

gravels, glacial tills (or boulder clays), peat, lake and alluvial silts and clays), and the presence of karst features. Groundwater is most at risk where the subsoils are absent or thin and, in areas of karstic limestone, where surface streams sink underground at swallow holes. These data indicate there is generally low risk of any groundwater contamination occurring at this site.

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. Industrial peat production has now permanently ceased at Ballycon Bog.

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

Silt ponds (1 no.) are present to the south-east of Ballycon to manage discharges into the Ballaghassaan, Derrycricket and Daingean River. The extractive industry (peat harvesting) was identified as a pressure in second cycle of the river basin management plan in respect of the Daingean River.

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-23-03-02 titled **Ballycon Bog: Structures and Sampling**, along with Drawing number BNM-DR-03-23-WQ01 titled **Ballycon Bog: Water Quality Map** included in the accompanying Mapbook, which illustrate the various drainage and water quality infrastructure present at Ballycon.

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 main emission limit value associated with this bog is 35mg/l suspended solids, with trigger levels for ammonia of 3.0mg/l and COD 100mg/l.

Initial monthly results are included in Appendix XIII. These results are for 14 months from November 2020 to Dec 2021 and indicate the baseline water quality from 100% of the bogs catchment. Ballycon bog last produced peat in 2001 and since then has had various partial rehabilitation measures between undertaken between 2005 and 2018.

As peat extraction has long ceased in this bog, it would be expected that key water quality parameters, that can impact water quality from peat extraction activities, such as suspended solids, would remained relatively static, as the bog surface has stabilised across the bog. During this monitoring period, results for ammonia are indicating a slight downward trend, again linked to peat extraction not taking place, with overall ammonia levels significantly

lower than a typical bog that had ceased peat extraction in 2020. All other parameters fluctuated slightly, most likely influenced by normal weather patterns, especially rainfall, with suspended solids static during the period.

Monthly ammonia concentrations from November 2020 to December 2021 had a range of 0.005 to 0.155 mg/l with an average of 0.050 mg/l.

Results for suspended solids for the same period indicate a range of 2 to 7mg/l with an average of 3.0 mg/l.

From an analysis of any monitoring over the previous 7 yrs, the IPC licence environmental monitoring 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 Surface water monitoring results for Ballycon

| Bog | SW | Monitoring | pH | SS | TS | Ammonia | TP | COD | Colour |
|----------|-------|------------|-----|----|-----|---------|------|-----|--------|
| Ballycon | SW-30 | Q1 2020 | 7.7 | 2 | 291 | 0.241 | 0.06 | 54 | 283 |
| Ballycon | SW-30 | Q4 18 | 7.8 | 5 | 374 | 0.31 | 0.05 | 54 | 40 |
| Ballycon | SW-30 | Q2 17 | 7.7 | 25 | 304 | 0.36 | 0.05 | 70 | 89 |
| Ballycon | SW-30 | Q2 14 | 7.6 | 5 | 410 | 0.02 | 0.05 | 51 | 90 |

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

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

Water will still discharge from designated emission points when rehabilitation at Ballycon has been completed. 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 water body receptor, the River Daingean and is expected to support the future status of the waterbody as being of Good 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 November 2020 and is enabling a baseline to be established, with sampling to progress during the scheduled works, and for a period of up to 2 years post rehabilitation. Depending on the period required to confirm that the main two parameters, suspended solids and ammonia as remaining compliant with the licence emission and trigger limit values and there is an improving trajectory in these two parameters i.e. reduction in concentration, the monitoring programme and intensity will be periodically reviewed and amended.

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. As much as 90% of the former peat production area has now revegetated to some degree, due to previous rehabilitation efforts and natural colonisation and only small areas of bare peat remain. Rehabilitation of the remaining 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 some active drainage, which facilitates the oxidation of peat. Peat extraction generally transforms a natural peatland 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. The EPA NEROS project carried out GHG flux research at Moyarwood Bog and found that Moyarwood Bog was overall a Carbon sink (sink for CO₂ and a source for Methane) 6 years after bog restoration was carried out (Renou-Wilson *et al.* 2018).

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

3.9 Current ecological rating

(Following NRA (2009) Evaluation Criteria)

This majority of the site can be rated as having a County value ecological value (D/C) as it is dominated by a large area of developing semi-natural wetland habitats which may act as a refuge and as ecological corridors for wildlife. Some parts of the site contain species of conservation significance such as breeding waders (Lapwing), and attract species such as Kingfisher and Otter, and also contain (County-level important) populations of plant species of conservation significance such as Basil Thyme.

4. CONSULTATION

4.1 Consultation to date

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

There has been ongoing consultation about rehabilitation, biodiversity and other general issues over the years about Allen-Clonsast group bogs including Ballycon 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.
- Midlands & East Regional WFD Operational Committee (River Basin Management Plans).
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).
- Bird surveys and monitoring carried out by Birdwatch Ireland at Ballycon for Bord na Móna.
- Field visit during International Peat Society conference June 2015. Delegates to the conference visited Ballycon to learn more about cutaway peatland development and rehabilitation.
- Consultation with Real Leaf Farm in association with a proposed hydroponics project (2020).
- Demonstration of peatland rehabilitation and outline of PCAS objectives given to Minister Eamon Ryan and Department of Environment, Climate and Communications staff during a visit to Ballycon Bog (June 2021).
- Irish Times Content Studio – Peatland rehabilitation video created by Irish Times Content Studio to promote PCAS and peatland rehabilitation – presented on Irish Times and Irish Examiner website (June 2021).

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

All correspondence received will be acknowledged and evaluated against the rehabilitation work proposed here, and the final draft of the Ballycon Bog Rehabilitation Plan will contain a review of the consultation.

4.2 Issues raised by Consultees

N/A Yet as consultation has not commenced.

4.3 Bord na Móna response to issues raised during consultation

N/A Yet as consultation has not commenced.

5. REHABILITATION GOALS AND OUTCOMES

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

- Meeting conditions of IPC Licence.
- Stabilisation or reduction in water quality parameters of water discharging from the site (e.g. suspended solids).
- Reducing pressure on receiving waterbodies that have been classified as At Risk from peatlands and from peat extraction, via stabilization or improving water-quality from this bog, and therefore, reducing pressures.
- Optimising hydrological conditions for **climate action benefits as part of PCAS**. This will focus on optimising the wet cutaway peatland footprint (looking to re-wet areas that currently remain dry).
- The majority of the site is already developing different cutaway habitats. A key goal and outcome will be supporting the continued development of these habitats, and eventually naturally functioning peatland and wetland habitats.
- Supporting and enhancing the biodiversity value of the site.
- 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.

- Ballycon bog has largely revegetated and has developed pioneer habitats. Rehabilitation will look to optimise the re-wetted footprint and look to adjust water levels across the site to improve conditions for the development of wetland vegetation and the reduction of GHG gases.
- However it will take some time for stable naturally functioning habitats to fully develop. This will happen over a longer timeframe than the implementation of this rehabilitation plan.
- Re-wetting residual peat will initially maintain and enhance the carbon storage capacity of the bog. There is scientific consensus that restoration of hydrology in damaged bog can improve carbon storage, water storage and attenuation and help support biodiversity both on the site and in the catchment (See Section 3.8). This will reduce carbon emissions from the site from a larger carbon source to a smaller carbon source. In time, the site has the capacity to develop in part as a carbon sink. PCAS is expected to deliver significant contributions to Ireland's climate action.
- It is not expected that the site has the potential to develop active raised bog (ARB) analogous to the priority EU Habitats Directive Annex I habitat within the foreseeable future (c.50 years). Furthermore, only a small proportion of the bog has potential to develop *Sphagnum*-rich habitats in this timeframe. Nevertheless, re-wetting across the entire bog, as part of the Scheme, will improve habitat conditions of the whole bog. Other peatland habitats will develop in a wider mosaic that reflects underlying conditions.
- Rehabilitating former industrial peat production bog will also in the longer-term support other ecosystem services such as the development of new habitat to support biodiversity and local attenuation of water flows from the bog.

- WFD status in receiving water bodies can be affected by peatlands and peat extraction, but is also affected by other sources such as agriculture. In addition, receiving water bodies that are assessed as 'At Risk' from peatlands and from peat extraction are likely to have several contributory sources of impacts (private peat extraction and Bord na Mona). Reducing pressures due to former peat extraction activities at Ballycon Bog will contribute to stabilising or improving water quality status of receiving water bodies in general. Ultimately, improving the WFD status of the receiving water-body will depend on reducing pressure from a range of different sources, including peatlands in general (private and Bord na Mona).
- Bord na Móna are also planning rehabilitation measures in some adjacent bogs (e.g. Cloncreen) in 2022. There are expected to be cumulative water quality and other ecosystem service benefits to receiving water bodies such as the River Figile from rehabilitating more than one bog in the same catchment.
- Re-wetting in general will benefit the future preservation of most known and unknown archaeological features. An Archaeological Impact Assessment (AIA) is to be carried out under the PCAS scheme.

6. SCOPE OF REHABILITATION

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

- The area of Ballycon Bog.
- EPA IPC Licence - Ref. P0503-01. 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. Ballycon bog is part of the Allen-Clonsast 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 Ballycon Bog, in particular, optimising **climate action benefits**. The proposed interventions will mean that environmental stabilization is achieved (meaning IPC obligations are met) and, in addition, significant other ecosystem service benefits particularly for climate action will be accrued.
- The local environmental conditions of Ballycon Bog mean that wetland development is the most suitable rehabilitation approach for the majority of this site, with deep peat measures focussed on a small section of the south-eastern part of the site where some residual deep peat remains. Ballycon Bog was formerly pumped, but now has a gravity drainage regime.
- The site has largely revegetated and is largely environmentally stabilised already. Rehabilitation measures will focus on additional measures to improve the re-wetted footprint across the site and adjust water levels to encourage wetland vegetation to develop to support climate action, and support and develop the biodiversity value of the site.
- The key goals and outcomes of rehabilitation set by Bord na Móna. Bord na Móna have defined the key goal and outcome of rehabilitation at Ballycon Bog as **environmental stabilisation, optimising residual peat re-wetting, and the development of embryonic raised bog on deep peat along with wetlands/Reed Swamp and fen on shallow more alkaline peat and other subsoils and areas where there is likely to be deeper water.**
- Rehabilitation of Ballycon Bog will support multiple national strategies of climate action, biodiversity action and other key environmental strategies such as the Water Framework Directive.
- It is not proposed to carry out any rehabilitation in the marginal cutover bog zone as this is quite fragmented by private turbary or is relatively narrow.

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 sites where there has not been significant industrial peat extraction and the peat body is largely intact (deep peat sites that are drained). At other sites, 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, etc.) and there will therefore be different habitat outcomes (wetlands, fen, heathland, grassland and Birch woodland).
- **Part of the site has already established areas of dense Birch woodland.** This vegetation can form a constraint to drain-blocking and in some situations a Felling License (and re-planting plan) would be required to allow drain-blocking in some specific areas. This in general would be counter-productive, but is only likely to affect small specific areas

- Remaining peat depths are shallow, 0.5-2.5m for the most part, apart from pockets in the eastern section of the site where depths are deeper, 2.6m+.
- **Surrounding landscape and neighbours.** Another key constraint is the interaction between the Bord na Móna sites and the surrounding landscape. Care has to be taken that no active rehabilitation management is carried out that could negatively and knowingly impact on surrounding land. This includes any hydrological management on neighbouring farmland. It is anticipated that the work proposed here (blocking drains and re-wetting cutaway peatlands) will not have any flooding impacts on adjacent land.
- **Current land-uses.** Part of the site is leased to Coillte and planted with conifer forestry. Another area is leased to Real Leaf Farm (the former yard). Rehabilitation will be planned as to not impact on these land-uses. This will not affect the key goals and outcomes of the plan to enhance wetland habitats and optimise hydrological conditions for climate action.
- **Archaeology.** The discovery of monuments or archaeological objects during peatland rehabilitation may potentially constrain the rehabilitation measures proposed for a particular area. While the rehabilitation will optimise hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future, any new archaeology may require rehabilitation measures will be reviewed and adapted. If this occurs, rehabilitation measures will be reviewed and adapted. An Archaeological Impact Assessment (Appendix XII) will be carried out to mitigate against any impact on found archaeology at Ballycon Bog. In the worst-case scenario works affecting the surface and sub-surface of the bog might disturb previously unknown archaeological deposits or artefacts without preservation by record taking place. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it should be avoided and reported to Bord na Móna Archaeological Liaison Officer and the National Museum of Ireland.
- **Public Rights of Way.** Where a public right of way or similar burden exists on Bord na Móna property, consideration will be given to ensuring that this remain intact where possible. In some instances, depending upon previous land uses and management, alternative solutions may be required. These will be explored in consultation with local communities and statutory bodies during consultation.

6.2 Key Assumptions

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

6.3 Key Exclusions

The scope of this rehabilitation plan does not cover:

- Part of the site was developed for conifer forestry in the 1980s and is leased to Coillte.
- The former yard – leased to Real Leaf – is excluded from this rehabilitation plan.
- The longer-term development of stable naturally functioning habitats to fully develop at Ballycon Bog. The plan covers the short-term rehabilitation **actions** and **an additional monitoring and after-care programme** to monitor the rehabilitation and to respond to any needs.
- This plan is not intended to be an after-use or future land-use plan for Ballycon Bog.

- The longer-term management of this site, potentially as a nature conservation site, or for amenity, or for other uses in the future.

Draft

7. CRITERIA FOR SUCCESSFUL REHABILITATION

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

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

Rehabilitation is generally defined by Bord na Móna as

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

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

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

- Rewetting of residual peat in the former area of industrial peat production to offset potential run off of suspended solids and to encourage and accelerate 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.
- Where the section of the water body, that this bog drains to, 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, confirms that there is an improving trajectory in water quality from the peat extraction associated with activities at this bog. This will be measured by the EPA Water Framework Directive 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 3 yrs., post cessation of peat extraction with ongoing rehabilitation, were considered. These are indicating a downward trend in Ammonia concentrations (Figure 7.1).

Similarly monitoring of surface water ammonia emissions from a Corlea bog in Mountdillon over the past 3 yrs. post cessation of peat extraction with ongoing rehabilitation, indicate downward trends.

Following commencement, and as the monthly monitoring program at Ballycon continues in 2022 during the rehabilitation works, and data from the 2021 monitoring program is compiled, further trending will be produced to verify any ongoing trends.

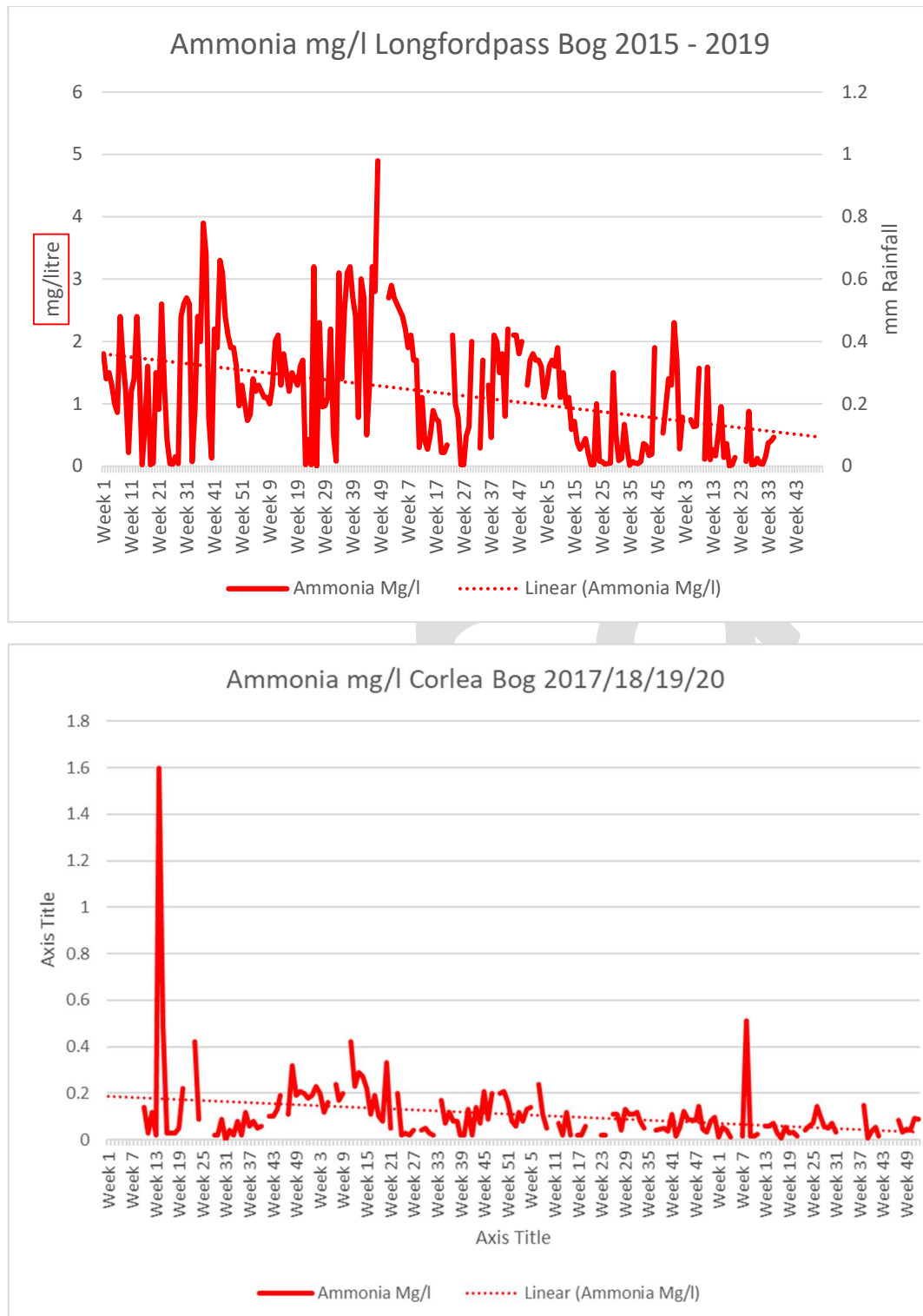


Figure 7.1. Ammonia trends at Longfordpass (2015-2019) and Corela (2017-2020)

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

- Optimising the extent of suitable hydrological conditions to optimise climate action and other ecosystem service benefits (optimising and maximising residual peat re-wetting). This will be measured by an aerial survey after rehabilitation has been completed.
- Accelerating the trajectory of the bog towards becoming a reduced carbon source. This will be measured through habitat mapping and the development of cutaway bog condition assessment. This cutaway bog condition assessment will include assessment of environmental and ecological indicators such as vegetation cover, vegetation communities, presence of key species, *Sphagnum* cover, bare peat cover and water levels (similar to ecotope mapping). Baseline monitoring will be carried after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.
- Reduction in carbon emissions. This will be estimated via a combination of habitat condition assessment and application of appropriate carbon emission factors derived from other sites. Baseline monitoring (habitat condition) will be carried 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 wetland, fen, reed swamp, heath, scrub, fen, embryonic *Sphagnum*-rich peatland communities and birch woodland, where conditions are suitable. As much as 90% of the former peat production area has now revegetated as pioneer vegetation/wetlands, due to previous rehabilitation efforts and natural colonisation. This will be demonstrated and measured via aerial photography, habitat mapping and cutaway/habitat condition assessment. 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.
- 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.

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

| Criteria type | Criteria | Target | Measured by | Expected Timeframe |
|----------------|---|--|--|--------------------|
| IPC validation | Rewetting in the former area of industrial peat production | Delivery of rehabilitation measures Reduction in bare peat. | Aerial photography after rehabilitation has been completed – to demonstrate measures (drain-blocking) Establishment of a baseline for future monitoring of bare peat, vegetation establishment and habitat condition. | 2022-2025 |
| IPC validation | Key water quality parameters Ammonia, Phosphorous, Suspended solids, pH and conductivity | Reduction or stabilisation of key water quality parameters associated with this bog | Water quality monitoring for a period after rehabilitation has been completed | 2021-2024 |
| IPC validation | Reducing pressure from peat production on the local water body catchment (WFD) | Where this section of the water body, that this bog drains to, has not been identified as under pressure from peat extraction, that the intervening EPA monitoring programme associated with its Programme of Measures for this water body, confirms that its classification remains at not being at risk from peat extraction associated with activities at this bog. | EPA WFD monitoring programme | WFD schedule |

| Criteria type | Criteria | Target | Measured by | Expected Timeframe |
|-----------------------------|--|---|---|--------------------|
| 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 bog condition assessment and appropriate carbon emission factors. | 2022-2025 |
| Climate action verification | Setting the site on a trajectory towards establishment of a mosaic of compatible habitats | Establishment of compatible cutaway habitats | Habitat map, Cutaway bog condition map Baseline monitoring to be carried out during the scheme when rehabilitation is complete. Sites can be re-monitored in the future and compared against this baseline. | 2022-2025 |
| Climate action verification | Biodiversity and ecosystem services. Habitat establishment Presence of key species – | Improvement in biodiversity and ecosystem services. | Metrics that relate to selected biodiversity and ecosystem services Presence of key species – Walkover survey | 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.

Baseline monitoring to be carried out during the scheme when rehabilitation is complete. Sites can be re-monitored in the future and compared against this baseline.

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

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

- **Funding to pay for resources required to deliver the planned rehabilitation (Bord na Móna and external).** Bord na Móna maintains a provision on its balance sheet to pay for these future costs when industrial peat extraction ceases. Bord na Móna is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence. It is expected that additional costs of enhanced rehabilitation will be supported by Government through the Climate Action Fund and Ireland's National Recovery and Resilience Plan.
- **Bord na Móna to have sufficient resources (staff and training) to deliver the planned rehabilitation with required associated skills and competencies.**
- **Bord na Móna to have sufficient resources (suitable machinery) and staff to maintain this machinery.**
- **Weather conditions to be within normal limits over the rehabilitation plan timeframe.** Long periods of wet weather have the capacity to significantly affect ground conditions and constrain the delivery of rehabilitation. The potential impact of wet weather on ground conditions can be reduced by appropriate planning and management. Bord na Móna have significant experience of managing these issues through 70 years of working in these peatland environments.
- **Rehabilitation measures to be effective.** The rehabilitation measures proposed in this plan are based on 40 years of Bord na Móna experience of peatland management and best practice applied internationally in peatland management. Measures proposed in this plan have already been shown to be effective at other sites. Bord na Móna will apply a flexible and adaptable approach to the more innovative rehabilitation measures proposed in this plan. If measures are not initially effective, Bord na Móna will review any requirement for additional practical rehabilitation.
- **Natural colonisation of vegetation to develop semi-natural habitats at a rate within the normal limits.** The development of naturally functioning semi-natural habitats on degraded bog takes time. It may take 30-50 years for active raised bog vegetation to re-develop on suitable cutaway that was previously bare peat. However, Bord na Móna experience has demonstrated the effectiveness of these type of measures for re-wetting bog and creating carbon sinks (Renou-Wilson et al. 2018).
- Rehabilitation measures have been designed to accelerate and work with natural colonisation and other natural processes. Bord na Móna experience of rehabilitation has shown that re-wetting improves conditions for natural colonisation and that natural colonisation is accelerated where the environmental conditions are most suitable. Rehabilitation measures have been designed to modify the conditions of areas within sites where conditions are less suitable for natural colonisation (modifying hydrology, topography, nutrient status or availability of potential seed sources).
- **Monitoring to be robust and effective.** Rehabilitation Monitoring will be established to validate the success of rehabilitation as required by Condition 10 of the IPC Licence and to verify the benefits of the proposed enhanced measures to optimise climate action. This will focus on collecting a range of scientific data that can then quickly be adapted 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 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-23-03-22 titled **Ballycon Bog: Aerial Imagery 2020**

BNM-DR-23-03-04 titled **Ballycon Bog: PeatDepths**

BNM-DR-23-03-03 titled **Ballycon Bog: LiDAR Map**

BNM-DR-23-03-09 titled **Ballycon 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-23-03-05 Ballycon 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 Ballycon bog will include (see Table 8.1):

- The majority of the site has already developed a mosaic of wetland habitats with the potential for some deeper water. Hydrological management will look to optimise summer water levels to maximise the development of wetland vegetation (by looking to set water depths at < 0.5 m, where possible. It is inevitable that some small sections will naturally have deeper water due to the topography at this site). Water-levels will be adjusted at outfalls and by adjusting piped drainage.
- Modifying water levels through targeted rehabilitation by altering levels within internal outfalls and piped drainage, and increasing the extent of wetland habitat mosaics. This will further slow the movement of water through and out of Ballycon Bog.
- Deep Peat measures in suitable areas including intensive drain blocking (max 7/100).
- Areas that are relatively dry will be targeted for additional measures. This will include drain-blocking, bunding and managing water levels with overflow pipes and regular drain blocking.
- Targeted fertiliser applications to accelerate vegetation establishment on areas of **bare peat** on headlands and within certain areas of dry cutaway. Areas where vegetation has established do not need fertiliser application.
- Silt ponds will be retained and maintained during the rehabilitation phase. During the monitoring and verification phase silt ponds will be continually inspected and maintained, where appropriate. When it is deemed that silt ponds are not required, as the bog has been successfully stabilised and there is no silt run-off, the condition of the silt ponds will be reviewed. Silt ponds 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 Ballycon Bog. Note that the types of rehab and areas of rehab may change in response to stakeholder consultation and refinement of the enhanced rehabilitation measures.

| Type | | Enhanced Rehabilitation Measure | Extent (Ha) |
|-----------------|-------------|---|-------------|
| Deep Peat | DPT 2 | More intensive drain blocking (max 7/100), modifying outfalls | 7.96 |
| Dry Cutaway | DCT1 | Modifying outfalls and managing water levels with overflow pipes | 5.18 |
| Dry Cutaway | DCT2 | Regular drain blocking (3/100m) + modifying outfalls and managing water levels with overflow pipes + targeted fertiliser treatment | 36.55 |
| Wetland | WLT3 | Modifying 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 | 0.49 |
| Additional Work | AW2 | Management of water levels, targeted drain blocking. | 185.96 |
| Marginal land | MLT1 | No work required | 15.31 |
| Other | Constraint | Coillte conifer plantation forestry and works site | 29.23 |
| Other | Silt ponds | | 0.04 |
| Other | Archaeology | | 0.25 |
| Total | | | 280.97 |

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

- Seek formal approval of the enhanced plan, noting the alternative 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 engineering drawings outlining how the various rehabilitation methodologies (The Scheme PCAS) will be applied to Ballycon 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).
- A drainage management assessment of the proposed enhanced rehabilitation measures will be carried out and any issues identified resolved and the rehabilitation plan adapted.
- A review of known archaeology and an archaeological impact appraisal of the proposed rehabilitation will be carried out. The results of this assessment will be incorporated into the rehabilitation plan to minimise known archaeological disturbance, where possible.
- A review of issues that may constrain rehabilitation such as known rights of way, turbary and existing land agreements is to be carried out.

- An ecological appraisal of the potential impacts of the planned rehabilitation on the presence of sensitive ground-nesting bird breeding species (e.g. breeding waders) is to be carried out. The scheduling of rehabilitation operations will be adapted, where required.
- Ensure all activities comply with the environmental protection requirements of the IPC Licence.
- Carry out Appropriate Assessment of the Rehabilitation Plan.
- 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 additional drain blocking, and fertiliser applications targeting bare peat areas of headlands, high fields and other areas (where required) in addition to wetland creation and management prescriptions. All rehabilitation will be carried out with regard to best practice environmental control measures (Appendix IV).
- Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions.
- Carry out the proposed monitoring, as outlined.
- Phase 2 actions will be carried out in targeted areas to accelerate re-vegetation and colonisation of target species. Phase 2 actions may include seeding of targeted vegetation and inoculation of *Sphagnum*.
- Silt ponds will be monitored during this period and there will be continued maintenance and cleaning to prevent potential suspended solids run-off from the site during the rehabilitation phase.
- 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

- **2021-2022:** Short-term planning actions.
- **2022-2023:** Short-term practical actions.
- **2023-2025:** Long term practical actions. Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- **2025:** Decommission silt-ponds, if necessary.

8.5 Budget and costing

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

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

Bord na Móna maintains a provision on its balance sheet to pay for the future costs of **standard** rehabilitation and decommissioning when industrial peat extraction ceases. This is updated every year - for more information see the Bord na Móna Annual Report (Bord na Móna 2021). Bord na Móna is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

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

9. AFTERCARE AND MAINTENANCE

9.1 Programme for monitoring, aftercare and maintenance

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

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

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

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

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

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

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

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

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

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

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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:

- The area of Ballycon Bog.
- EPA IPC Licence - Ref. P0503-01. 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. Ballycon Bog is part of the Alan-Clonsast Bog Group.
- The current condition of Ballycon Bog. This site was formerly pumped, but now has gravity drainage. The site is mostly vegetated or developing pioneer wetland habitats and is already largely stabilised.
- The key objective of rehabilitation, as defined by this licence, is **environmental stabilisation** of the bog.
- To minimise potential impacts on neighbouring land. Boundary drains around Ballycon Bog will be left unblocked as blocking boundary drains could affect adjacent land.

Rehabilitation goals and outcomes

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

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

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

Criteria for successful rehabilitation:

- Rewetting of residual peat and shallow cutaway in the former area of industrial peat production to offset potential run off of suspended solids 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 blockages and re-wetting). This will be demonstrated by a post rehab aerial survey.
- Stabilising potential emissions from the site (e.g. suspended solids). The key target will be developing a stable or downward trajectory of water quality indicators (suspended solids and ammonia) towards what would be typical of a re-wetted cutaway bog. This will be demonstrated by water quality monitoring results.

Rehabilitation measures:

- Blocking field drains in drier sections of the former industrial production area using a dozer to create regular peat blockages (three blockages per 100 m) along each field drain.
- Re-alignment of piped drainage; and management of water levels to create/enhance existing wetlands.
- No measures are planned for the majority of surrounding marginal peatland habitats.
- Silt ponds will continue to be maintained during the rehabilitation and decommissioning phase.
- Evaluate success of short-term rehabilitation measures and enhance where necessary.
- Decommissioning of silt-ponds will be assessed and carried out, where required.

Timeframe:

- 2022-2023 1st phase of rehabilitation. Field drain blocking.
- 2024. 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.
- 2024-2026. Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.

- 2024-2026. Decommission silt-ponds, if necessary.

Table AP-1. Rehabilitation measures and target area.

| Type | Code | Description | Area (Ha) |
|------------------|------------|---|---------------|
| Additional works | AW2 | Targeted drain blocking | 67.15 |
| Deep peat | DPT1 | Regular drain blocking (3/100 m) + modifying outfalls and managing water levels with overflow pipes | 8.08 |
| Dry cutaway | DCT1 | Modifying outfalls and managing water levels with overflow pipes | 41.7 |
| Wetland | WLT1 | Modifying outfalls and managing water levels with overflow pipes | 119.5 |
| Marginal Land | MLT1 | No work required | 15.3 |
| Other | Silt Pond | Silt ponds | 0.04 |
| Other | Constraint | Constrained areas | 29.2 |
| Total | | | 280.97 |

See Drawing number BNM-DR-23-03-20 titled **Ballycon Bog: Standard Rehab Measures** included in the accompanying Mapbook which illustrates the standard rehab measures to be applied.

Monitoring, after-care and maintenance

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

Validation and IPC Licence surrender

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

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

APPENDIX II: BOG GROUP CONTEXT

The Allen -Clonsast Bog Group is located mainly in counties Offaly and Westmeath. Garrymore Bog is located in Co. Laois. All the associated bogs are located in the River Barrow Catchment area except Clonad Bog which is located in the Lower Shannon River Catchment.

The Allen- Clonsast Bog Group is one of the first developed bog groups in Ireland. Bord na Móna was set up in 1946 and it commenced the development of bogs to fuel power station and supply peat for the horticultural industry. The Allen - Clonsast bogs were developed for the supply of milled peat to the Edenderry Power Station, Croghan Power Station (now decommissioned) and the Croghan Briquette factory (now decommissioned).

Much of the Allen -Clonsast Bog complex became cutaway as long-term peat production activity reduced the peat reserves on individual bogs. Rehabilitation measures comprising naturalisation and development of alternative after-uses have been already explored at the Allen -Clonsast Bog Group, including coniferous forestry, biomass, agricultural grassland, amenity use, rare species conservation management 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 Allen - Clonsast, it was found that these require financial investment that exceeds any potential commercial output value. A windfarm has been constructed at Mountlucas Bog and another windfarm project is currently in development at Cloncreen.

The Long Derries SAC is located south of Ticknevin Bog. Ticknevin also contains a relatively large area of remnant raised bog that was never developed by Bord na Móna. This area, called Cloncannon bog, was assessed by consultants for NPWS as part of the review of the raised bog Natural Heritage Area network (NPWS 2014).

A breakdown of the component bog areas for the Allen - Clonsast Bog Group IPC License Ref. PO503-01, and current, indicative Peat Production Status, is outlined in Table Ap-2.

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

| Bog | Area (Ha) | Stage of development | Land-Use and History | Peat Production Cessation | Rehab Plan Status |
|----------|-----------|---|---|---------------------------|----------------------|
| Ballycon | 281 | <p>Cutaway Bog</p> <p>Ballycon was first developed for industrial peat harvesting in the 1960's and the majority of peat has been removed. Ballycon is considered a shallow peat cutaway bog.</p> | <p>Rehabilitation works were carried out in 2006 that consisted of drain blocking and bund construction. Some headlands were fertilised in 2015 to encourage the development of pioneer dry cutaway habitats and there was follow-up drain blocking in 2018.</p> <p>The site is now a mosaic of cutaway wetland and woodland habitats and is a Biodiversity Area.</p> <p>BnM has also operated a workshop on site. Part of the site was developed for conifer forestry in the 1980s and is leased to Coillte. There is a rail transport link along the southern boundary of the site.</p> | 2001 | To be finalised 2021 |

| Bog | Area (Ha) | Stage of development | Land-Use and History | Peat Production Cessation | Rehab Plan Status |
|------------|-----------|--|---|---------------------------|----------------------|
| Ballykeane | 451 | Cutaway Bog Ballykeane Bog was developed for industrial peat production in the 1970's. Ballykeane is a shallow peat cutaway bog. | Part of the site is cutaway and has started to develop pioneer vegetation. The majority of the bog is still bare peat. Part of Ballykeane Bog is being used as a herb production trial. | 2020 | Draft 2017 |
| Cavemount | 499 | Cutaway Bog Cavemount Bog was first developed for industrial peat production in the 1970's. Peat production ceased in 2015. Cavemount is a shallow peat cutaway bog. | Ongoing rehabilitation has been carried out across the site which is now developing as a wetland, holding nationally important numbers of wintering and breeding wetland birds. A portion of the site still has bare peat but is vegetating. Part of the site was developed for conifer forestry in the 1980s and is leased to Coillte. Flux tower and GHG monitoring onsite as part of the SmartBOG project. The site is a location for the CarePeat InterReg Project, of which BnM is an associated partner. There is a rail transport link through the site. | 2015 | Finalised 2021 |
| Clonad | 447 | Cutaway Bog Clonad Bog was first developed for industrial peat production in the 1970's. | The majority of the former production area is bare peat with some establishing cutaway habitats at various stages of development. There is a rail transport link through the site. The proposed Irish Water pipeline crosses this bog. | 2020 | Finalised 2021 |
| Cloncreen | 1,009 | Cutaway Bog Cloncreen Bog was first developed for industrial peat production in the 1970's. Peat production ceased in 2018 and the majority of peat has been cutaway. Cloncreen Bog is a shallow peat cutaway bog. | The site has developed a mosaic of pioneer cutaway habitats with some bare peat mosaics. Planning Permissions was granted in 2016 for Cloncreen Windfarm. Construction has started (summer 2020) on 22 turbines (Approx. 75 MW) at various locations around the site in association with linking road infrastructure, a sub-station and power-lines. There is a rail transport link through the site. The proposed Irish Water pipeline crosses this bog. | 2018 | To be finalised 2021 |
| Clonsast | 1,534 | Cutover Bog Clonsast Bog was first developed for industrial peat production in the 1950's and was used for sod peat. Peat production ceased in 1980's. The majority of the bog was never converted to milled peat production and some relatively deep peat remains. Clonsast Bog is considered a deep peat cutover bog. | Clonsast has now established a mosaic of mature cutaway habitats. BnM formerly operated a farm at Clonsast. Farmland was developed on rehabilitated cutaway bog. The farm venture ceased in the 1980's and the farmland was sold. A significant portion of the site has been leased to Coillte and planted with conifer forestry in the 1980s. Some of the original research on establishing forestry on cutaway was established at Clonsast (Trench 14). BnM carried out a re-wetting trial in 2018. | 1980's | Draft 2017 |

| Bog | Area (Ha) | Stage of development | Land-Use and History | Peat Production Cessation | Rehab Plan Status |
|--------------------|-----------|--|--|---------------------------|-------------------|
| | | | This site is largely stabilised. There is a rail transport link through the site. | | |
| Clonsast Bulge | 379 | Cutover Bog Clonsast Bulge was first developed by BnM in the 1950's. | The majority of Clonsast Bulge used for peat extraction has been developed by Coillte for conifer forestry in the 1980's. Part of the site is undeveloped (Clonavoe Bog remnant). This site is largely stabilised. | 1960's | Draft 2017 |
| Clonsast North | 191 | Cutaway Bog Clonsast North was first developed by BnM in the 1930's. The remaining peat deposits at Clonsast North are generally shallow and so the bog is considered a shallow peat cutaway bog. | The cutaway is naturally colonising with a mosaic of Birch woodland and wetland. The site was partially re-wetted in 2018. There is a rail transport link through the site. | 2000's | Draft 2017 |
| Daingean Derries | 277 | Cutover Bog Daingean Derries was first developed in the late 1980's. Deep peat reserves remain. Daingean Derries is considered a deep peat cutover bog. | Daingean Derries Bog formerly supplied both horticultural peat and fuel peat. The majority of former production area is bare peat. Some bog restoration on part of the site completed in 2017-2018. There is a rail transport link through the site. | 2020 | Draft 2017 |
| Daingean Rathdrum | 367 | Cutover Bog Daingean Rathdrum was first developed in the late 1980's. Deep peat reserves remain. Daingean Rathdrum is considered a deep peat cutover bog. | Daingean Rathdrum Bog formerly supplied both horticultural peat and fuel peat. The majority of former production area is bare peat. There is a rail transport link through the site. A small area of development bog (32 ha) has been restored. | 2020 | Draft 2017 |
| Daingean Townparks | 90 | This bog was never drained or developed but there is a transport link along the margin of the site | Daingean Bog NHA (intact raised bog) There is a rail transport link through the site. No rehabilitation required. | N/A | N/A |
| Daingean Raillink | 5 | N/A | N/A | N/A | N/A |
| Derrycricket | 190 | Derrycricket was originally developed for peat production in the 1950's-1960's. Peat production at Derrycricket ceased in the 1980's. | Coillte developed approximately 80% of the former production area for conifer forestry in the 1980's. This site is largely stabilised. Transport link. | N/A | Draft 2017 |
| Derrylea | 665 | Cutover Bog Derrylea bog was first developed for commercial peat production in the 1940's. However, peat production at Derrylea predates BnM and is believed to have commenced in the 19 th century. Despite a long history of production, deep peat reserves on much of the site with some shallow pockets of peat on the western half of the former production area. Derrylea Bog is considered a deep peat cutover bog. | Some rehabilitation has been completed around the margins of the bog. There is a rail transport link through the site. | 2020 | Draft 2017 |

| Bog | Area (Ha) | Stage of development | Land-Use and History | Peat Production Cessation | Rehab Plan Status |
|-------------|-----------|--|---|---------------------------|-------------------|
| Derryounce | 389 | Cutover Bog Derryounce Bog was first developed prior to 1975. Derryounce is considered a deep peat cutover bog. Peat production at Derrycricket ceased in the 1980's. | Coilte have developed 80% of the former production area as conifer forestry. Rehabilitation was carried out to create a lake and wetland habitats in the 1990s. Derryounce Lake Amenity area is leased to Portarlinton Community Development Association. This site is now largely stabilised. There is a rail transport link through the site. | 1980's | Draft 2017 |
| Esker | 567 | Cutover Bog Esker Bog was first developed in 1975. Peat production at Esker ceased in the 2020. There is deep peat remaining on the western side of the former production area but the eastern area is considered cutaway. Esker Bog is a deep peat cutover bog. | The majority of the site is bare peat. The eastern portion is establishing cutaway habitats. There is a rail transport link through the site. The proposed Irish Water pipeline crosses this bog. | 2020 | Finalised 2021 |
| Garryhinch | 814 | Cutover Bog Garryhinch Bog was first developed in 1950's. Peat production ceased at Garryhinch in 2020. There is some deep peat remaining on much of the former production area. Garryhinch Bog is considered a deep peat cutover bog. | The majority of the site is re-vegetated with a range of wetland and woodland habitats. Extensive sod peat production (private and licenced by BnM) has occurred across the site in the past few years and these areas are bare peat. | 2020 | Draft 2017 |
| Garrymore | 307 | Cutover Bog Garrymore Bog was first developed in the 1980's. Peat production at Garrymore ceased in the 2020. There is deep peat remaining. Garrymore Bog is considered a deep peat cutover bog. | Garrymore Bog formerly supplied horticultural peat. Part of the site is used for sod turf. The former production area is bare peat. | 2020 | Draft 2017 |
| Mount Lucas | 1225 | Cutover Bog Peat Production at Mount Lucas commenced in the mid-1970's and ceased in 2020. Most of Mount Lucas is cutaway with shallow residual peat depths. The north-west corner of the former production area retains some pockets of deep peat. Mount Lucas is considered a shallow peat cutover bog. | Peat production ceased across a significant part of the site before 2005 with ongoing peat extraction in the western side up to 2020. The cutaway area has developed a mosaic of cutaway habitats with Birch woodland dominant. The recently ceased production area is bare peat. Mountlucas windfarm is now operational (since 2014). Some rehabilitation was carried out in association with windfarm construction, specifically the creation of small wetland features. A public amenity walking route was developed on the existing windfarm. This was opened in 2015. BnM have developed an aquaculture project in partnership with Bord Iascaigh Mhara and have developed herb production trials on site. There is a rail transport link through the site. | 2020 | Draft 2021 |

| Bog | Area (Ha) | Stage of development | Land-Use and History | Peat Production Cessation | Rehab Plan Status |
|-----|-----------|----------------------|---|---------------------------|-------------------|
| | | | The proposed Irish Water pipeline crosses this bog. | | |

See Drawing number BNM-DR-23-03-24 titled **Ballycon Bog Group**, included in the accompanying Mapbook which illustrates the location of Ballycon Bog and the Allen Clonsast Bog Group in context to the surrounding area.

Draft

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: | Ballycon | Area (ha): | 281.5 ha (695.6 acres) |
| Works Name: | Derrygreenagh | County: | Offaly |
| Recorder(s): | MMC & DF | Survey Date(s): | 17/05/2010, 2015 |

Habitats present (in order of dominance)

The most common habitats present at this site include:

- Pioneer poor fen communities. Bog cotton-dominated vegetation (pEang) is most common and this is found in mosaic with bare peat and both emerging and open Birch scrub. (Codes refer BnM classification of pioneer habitats of production bog. See Appendix II). There are smaller amounts of Bottle Sedge-dominated vegetation (pRos), Soft Rush-dominated vegetation (pJeff) and *Campylopus* moss-dominated vegetation (pCamp) colonising bare peat. .
- Birch scrub. This is best developed at the west side of the site and some closed scrub (cBir) that is approaching Birch woodland development is present. The majority of the scrub is emerging (eBir) or open (oBir). Some of the scrub adjacent to the conifer plantation is found in association with dry heath (dHeath)
- Open water. Wetlands are extensive in the central and eastern sides of the site. These generally form mosaics with fringing and emergent poor fen vegetation (particularly pEang). Patches of Common Reed (pPhrag) and Reedmace (pTyph) are present but are both rare.
- Conifer plantation (WD4) (Codes refer to Heritage Council habitat classification, Fossitt 2000), See Appendix II.)
- Bare peat (BP). There is still extensive bare peat towards the western and north-western parts of the site. The vegetated areas still have unvegetated sections within them.
- Dry Heath (dHeath). This habitat is found in association with emerging Birch scrub at both the eastern and western ends of the site on somewhat higher ground around the margins.
- Dry calcareous grassland (gCal). This type of grassland appears in some areas along some embankments and other locations where sub-soil was exposed or peat is quite shallow, but is not extensive. It is also found in association with scrub.
- Purple Moorgrass-dominated grassland (gMol). This type of grassland is found in some of the drier areas where the peat is quite shallow, such as the northern part of the scrubbed area towards the western side of the site.
- Coltsfoot-dominated vegetation (DisCF).

- Riparian zones (RIP). The site boundaries include parts of the Philipstown River and the Wouge River and associated embankments. The embankments along the rivers are vegetated with grassland (GS2) and small patches of Bramble scrub (WS1).
- Birch woodland (WN7). This habitat is located at the northern end of the site on the bog margin.
- Raised bog (PB1). A small dry remnant of high bog is present at the northern end of the site adjacent to the Birch woodland.

Description of site

Ballycon bog is situated close to the junction of the R400 and R402 roads, approximately 8 km east of Daingean Village, Co. Offaly. This site is located adjacent to two other Bord na Mona bogs, Mount Lucas and Derrycricket Bogs. It is located within a relatively flat landscape and is surrounded by farmland, other peatlands and associated habitats. Ballycon Bog has been completely out of production since 2001 (although some of the site has been out of production for much longer). The majority of the site has been designated as a biodiversity area. Rehabilitation works were carried out on the site in 2005-2006 in order to encourage the site to flood and develop more wetlands. The site also includes a conifer plantation along the western boundary. An active works site is located in the south western corner and is used for the construction and maintenance of railway lines for other bogs. A railway line runs along the south of the site and is quite active with trains crossing a number of times a day.

The western side of the site has been out of production for a longer period of time and has therefore more-developed habitats. The ground is also somewhat higher and drier, meaning that scrub/woodland habitats are likely to predominate. This section adjacent to the conifer plantation is heavily wooded with some closed Birch scrub developing to immature Birch woodland. The majority is open or emergent Birch scrub (in mosaic with pEang) with some higher fields also developed some dry heath. Some bare peat is still present. Some of the scrub in this area has died back and is standing dead. This is probably related to the recent changes in hydrology caused by the development of the berm. The eastern side of this higher wooded area is changing rapidly with the appearance of much more scrub that indicated by the last aerial photo. This area will develop closed scrub and woodland quite rapidly.

Towards the northern side in this western section and as the ground falls there is some development of wetland vegetation in mosaic with open Birch scrub, with patches of more diverse (more diverse than rest of site) and open Bottle Sedge and Bog Cotton-dominated vegetation. This area contains tussocks with large hummocks of several different typical bryophytes such as *Calliergonella cuspidata*, *Rhytidiadelphus squarrosus* and *Pleurozium schreberi*. Some of the more acidic sections (pEang) are developing large hummocks of *Sphagnum palustre*, *S. subnitens* and *S. fallax*. Some of the wettest areas have several small pockets of open water with Reedmace. These small ponds were attracting significant numbers of insects. There is also some diverse calcareous grassland on drier ground in this area dominated by Glaucous Sedge that merges and forms mosaics with similar grassland dominated by Purple Moorgrass. This grassland was being used by several Butterfly species.

The majority of the site is developing a mosaic of wetlands with pioneer poor fen vegetation and emerging scrub. A long berm was built through the middle of the site (E-W) with the main aim to hold more water in the northern half and other sections of the bog and create new wetlands. This development has been quite successful and the landscape of the bog has changed significantly since the aerial photo was taken, with a significant new area of open water and associated wetlands appearing. The recent construction of the berm along with the fact that

a significant portion of the site was in production until 2001 has influenced the development of the site and lead to a relatively open landscape. Much of the vegetation is still in the pioneer phase and there are significant areas where the pioneer vegetation is in mosaic with bare peat.

Much of the poor fen developing in the more open central and western zones of the site is dominated by Bog Cotton. More open water has developed on both sides of the central embankment. The fringes of this open water are generally vegetated with Bog Cotton-dominated vegetation (with or without scrub) and smaller amounts of Soft Rush-dominated and Bottle Sedge-dominated vegetation. The open water is divided by several high fields that dissect these areas (some of which have been breached to allow water to pass between them). Some of the poor fen vegetation associated with the wetlands is somewhat more diverse and dominated by Horsetail (*Equisetum palustre*) and Cuckoo Flower (*Cardamine pratensis*) in places, possibly indicating the influence of the exposed marl and sub-soil.

The majority of the mid-east of the site was dominated by a mosaic of bare peat, Bog Cotton and emergent Birch trees. This area also contained many small areas of open water along with occasional low lying fields that were a mixture of bog cotton and open water. Many areas of bare peat also existed and appeared to be slow to colonise with vegetation, these areas generally existed on high fields that had not flooded in recent winters. Vegetation, mainly Bog Cotton and Birch, were colonising these areas of bare peat from the edges. Lapwing and Ringed Plover were nesting on some of the areas of bare peat.

The south eastern corner of the site is a mosaic of wetlands including open water and poor fen vegetation with species such as Bog Cotton, Marsh Arrow Grass and Soft Rush. During the winter months this area had been flooded to a greater extent but as the water receded, an area of small pools and mainly Bog Cotton-dominated areas prevailed. A large area of Reedbed, dominated by Common Reed (pPhrag), is developing to the south of the largest sections of open water while smaller areas of Reedmace (pTyp) and pPhrag can be found throughout the eastern section of the site. The north-east of the site becomes wetter again with larger areas of open water present. The northern section was similar to the southern sections with poor fen vegetation dominating.

A long drain/silt trap runs from the south of the site to the north (eastern side) and comprises a long narrow drain that was gradually infilling with vegetation such as Common Reed and Reedmace. The material that had been excavated from the drain was present in a ridge running along side the drain and was mainly made up of marl and gravel. The vegetation that bordered the drain was a mixture of calcareous grassland, emergent Birch and Colt's Foot-dominated areas. A large area immediately to the south of the silt trap appears to be composed of material excavated from the silt trap, this area appeared to have been used as a silt trap in the past but only the main drain remains now. The area appeared to have flooded during the winter and was dominated by areas of bare peat and exposed gravel and marl with Bog Cotton, Soft Rush, Bottle Sedge and Colt's foot becoming established.

A small area of Birch woodland (WN7) is located at the northern margin of the site. The canopy is dominated by Birch and the understorey and shrub layers are quite dense with Holly, Birch, Willow Bramble and Heather. Bilberry and Honeysuckle appears in the ground layer. A Badger sett was noted in this woodland.

A narrow, canalised River (Wouge River) flows along a section of the southern border. This river has steep sides that comprise peat and marl substrates. This river has not been cleaned out for a number of years and was becoming vegetated, while some of the banks had collapsed leading to a somewhat more naturalised riparian area in parts. A Kingfisher has been observed (2009) using this river and suitable nesting areas exist along the

rivers banks for this species. The Philipstown River along parts of the northern boundary also has similar riparian development and is found in channel adjacent to steep embankments.

Blue Fleabane and Basil Thyme have been recorded more recently at the site (13/08/2010). Both species are nationally rare plant species listed in the Irish Red Data Book (Curtis and McGough 1988) and Basil Thyme is also listed on the Flora Protection Order (FPO) (part of Wildlife Act). As part of the FPO, this species and its habitat both have legal protection. One population of Basil Thyme was noted in and around the Bord na Móna workshop and yard area. Blue Fleabane was also recorded along the railway track near the workshop area. Both species are esker plants and not typical bog plants, and are likely to have colonised the site during Bord na Móna operations via the railway. A nearby esker site containing both species (The Long Derries) was used by Bord na Móna in the past for gravel extraction and this site is likely to be the source for these two species.

These plant species favour areas with loose gravel that are subject to periodic disturbance. Both species are likely to persist within the workshop and yard area as current activity and site conditions within the yard seem to favour these species. Periodic disturbance of areas of gravel in order to encourage rarer plants, specifically Basil Thyme, could sustain populations of these plants at Ballycon. However, this type of habitat may slowly be reduced in extent when BnM operations cease at Ballycon, as these areas eventually mature and develop other plant communities like scrub. It may be possible to establish other populations of these species at other suitable sub-sites within Ballycon via the translocation of gravel and seed-bank around the current populations. One possible solution is to develop some of the main railway line as an amenity walkway when production ceases. A suitable management regime to maintain the habitat of these rare plant species could easily be developed in association with the development and maintenance of these walkways. This will be considered within the wider context of the Derrygreenagh and Ballydermot Bogs, which are viewed as strongholds for the species in east Offaly. Consultation and licensing will be required with NPWS.

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

None

Adjacent habitats and land-use

Conifer plantation (WD4), raised bog remnant (PB1), wet grassland (GS4), lowland depositing river (FW2), improved agricultural grassland (GA1) and cutover bogs (PB4) all border Ballycon bog.

Watercourses (major water features on/off site)

- The Philipstown River flows along the northern boundary of the site and close to the eastern boundary of the site.
- The Wouge River flows along much of the southern section of the site. This River joins the Philipstown River to the east. The Wouge River has been canalised in the past with a large settlement pond located along its course in the south east of the site.
- All of the water courses on the bog are part of the South Barrow catchment area.

Peat type and sub-soils

At several locations around the bog areas of marl were protruding from the peat. Marl exposure increases towards the east of the site.

Fauna biodiversity

Several bird species were noted on the site during the survey.

- Marsh Harrier (female recorded several times from April-May, single birds recorded occasionally in midlands)
- Crane (recorded in February-March, 2010 rare vagrant in Ireland)
- Lapwing (several pairs – probably breeding – see Copland 2010)
- Ringed Plover (several pairs – probably breeding – see Copland 2010)
- Whooper Swan (single male recorded in May, over-summering. A group of 14 was recorded in February)
- Buzzard (roosting on site)
- Wheatear
- Skylark (breeding)
- Snipe (3)
- Kingfisher (recorded 2009? Along stream adjacent to southern boundary)
- Mallard (3)

Other more common species include Sedge Warbler, Reed Bunting, Coal Tit, Robin, Goldfinch, Chaffinch, Greenfinch, Pied Wagtail, Stonechat, Blackcap, Willow Warbler, Grasshopper Warbler, Pheasant, Moorhen, Mute Swan (2 nests), Little Grebe, Wren, Black-headed Gull (9), Heron (2), Grey Crow, Rook, Raven, Magpie, Blackbird, House Martin and Swallow. There was considerable activity from the latter two species who were both feeding on insects low over the open water.

Other species recorded at Ballycon in the past year include Peregrine Falcon and Hen Harrier (www.irishbirding.com)

Mammals

Mammals included;

- Rabbit
- Hare
- Fox
- Badger (Sett noted in Birch woodland along northern boundary).
- Otter

Other Animals

Invertebrates included;

- Orange Tip Butterfly
- Green Veined White Butterfly
- Four-spotted Chaser (Common Dragonfly)
- Great Pond Snail (in areas of open water)

Fish;

- Stickleback in drains

Activities on the site

- Bird-watching (several records from Ballycon on www.irishbirding.ie by several different people)

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 bowers. Only dedicated trained and competent personnel will carry out refuelling operations.
- Mobile storage such as fuel bowers will be banded to 110% capacity to prevent spills. Tanks for bowers and generators shall be double skinned. When not in use, all valves and fuel trigger guns from fuel storage containers will be locked. All pumps using fuel or containing oil will be locally and securely banded where there is the possibility of discharge to waters.
- Potential impacts caused by spillages etc. during rehabilitation will be reduced by keeping spill kits and other appropriate equipment on-site.
- Site activities will be carried out in accordance with 'best practice'. In order to ensure compliance and implementation of 'best practice', these measures will be communicated to relevant Bord na Móna staff and updated as required.

APPENDIX V. BIOSECURITY

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

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

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

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

In addition to the above, Best Practice measures around the prevention and spread of Crayfish plague⁵ will be adhered with throughout all rehabilitation measures and activities.

⁵ <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 Allen-Clonsast bog group (Ref. PO-503-01). 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 Allen-Clonsast bog 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 Draft National River Basin Management Plan 2022-2027 (Water Framework Directive)

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

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

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

The draft NWBMP 2022-2027 describes how the number of waterbodies impacted by peat, industry and forestry have decreased by 10, 10 and 5 waterbodies, respectively since the second cycle. Impacts on water quality and river habitat arising from peat and peat extraction and associated drainage include the release of ammonium and fine-grained suspended sediments, and physical alteration of aquatic habitats. Drainage of peatlands also results in changes to the hydromorphological condition of rivers.

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

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

6 National Biodiversity Action Plan 2016-2021

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

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

7 National conservation designations

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

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

The National Raised Bog Special Area of Conservation Management Plan 2017-2022 sets out a roadmap for the long-term management, restoration and conservation of protected raised bogs in Ireland. The Plan strikes an appropriate balance between the need to conserve and restore Ireland's raised bog network as part of Ireland's commitments towards the EU Habitats Directive, and the needs of stakeholders and gives recognition to the important role that communities have to play in the conservation and restoration of raised bogs. The National Raised Bog Special Areas of Conservation (SACs) Management Plan 2017-2022 is part of the measures being implemented in response to the on-going infringement action against Ireland in relation to the implementation of the EU Habitats Directive, with regard to the regulation of turf cutting on the Special Areas of Conservation (SACs). The then Minister for Arts, Heritage and the Gaeltacht, also published a **Review of Raised Bog Natural Heritage Area Network** in 2014.

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

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

9 All-Ireland Pollinator Plan 2021-2025

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

10 Land-use planning policies

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

11 National Archaeology Code of Practice

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

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

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

12 Bord na Móna Biodiversity Action Plan 2016-2021

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

One example of a key CBD target is:

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

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

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

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

13 Bord na Móna commitments

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

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

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

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

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

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

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

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

APPENDIX VII. DECOMMISSIONING

1. Condition 10 Decommissioning

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

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

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

The main success criteria pertaining to successfully complying with this condition is ensuring that no environmental liability remains from this infrastructure and material and that the bog can be deemed suitable for surrender of the licence under section 95 of the EPA Acts. This is achieved by Bord na Móna identifying and quantifying any mechanical and infrastructural resources that were installed in the bog to enable the development and production operation at the site. This list is then refined to identify any items that would be deemed as possibly resulting in environmental pollution, should they not be removed.

Typically, these items/infrastructures would be any remaining, unconsolidated plant, equipment and attachments, waste materials, unused raw materials such as land drainage pipes, remaining peat stockpiles, stock pile covering, pumps, septic tanks and fuel tanks.

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

| Item | Description | Ballycon 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 | Decommissioning or Removal of Buildings and Compounds |
| 5 | Decommissioning Fuel Tanks and associated facilities | Where relevant |
| 6 | Decommissioning and Removal of Bog Pump Sites | Where relevant |
| 7 | Decommissioning or Removal of Septic Tanks | Where relevant |

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.

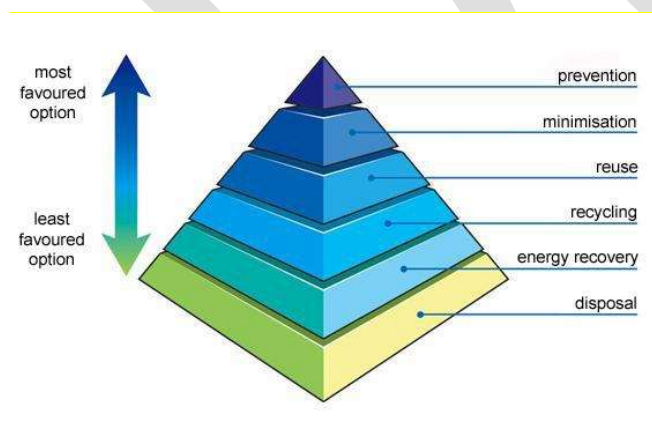
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

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 licence. The removal of these are deemed as enhanced measures. These may enhance the future afteruse of the bog for amenity value, security against access for illegal and unsocial activities and general State and community benefit. In relation to this bog, this would include the infrastructure defined below:

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

APPENDIX VIII. GLOSSARY

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

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

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

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

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

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

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

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

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

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

Standard decommissioning: This is defined as decommissioning that is designed to meet the conditions of the EPA IPC Licence. This is defined as to render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution.

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

APPENDIX IX. EXTRACTIVE WASTE MANAGEMENT PLAN

(Minimisation, treatment, recovery and disposal)

Objective:

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

Scope:

This plan covers IPPC Licence's Ref. PO503, Allen - Clonsast bog group.

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

1.2 Power Station screenings:

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

1.3 Bog Timbers:

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

2.0 P0503 IPPC Licence Extractive Waste Conditions

2.1 Condition 7.5 Extractive Waste Management

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

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

2.2 Condition 7.6 Waste Facility

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

2.3 Condition 7.7 Excavation Voids

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

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

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

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

3.0 Minimisation.

3.1 Silt pond excavation material and cleanings.

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

3.2 Power Station Screenings.

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

3.3 Bog Timbers.

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

4.0 Treatment

4.1 Silt pond excavation material and cleanings.

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

4.2 Power Station Screenings.

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

4.3 Bog Timbers

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

5.0 Recovery

5.1 Silt pond excavation material and cleanings.

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

5.2 Power Station Screenings.

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

5.3 Bog Timbers

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

6.0 Disposal

6.1 Silt pond excavation material and cleanings.

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

6.2 Power Station Screenings.

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

6.3 Bog Timbers

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

7.0 Extractive Waste Management Plan

5 (2a)(i)

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

5 (2a)(ii)

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

5 (2a)(iii)

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

5 (2a)(iv)

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

5 (2a)(v)

Peat mineral resources do not undergo any treatment.

5 (2b)

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

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

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

5 (3)

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

The peat excavations and cleanings are stored in locations and in a manner that they could not collapse and are remote in their nature. The stockpiles are located adjacent to silt ponds that are cleaned regularly and as such these stockpiles are managed and levelled to facilitate further cleanings. Therefore, the material stored at these waste facilities would not be considered to be a Category A waste facility.

Classification in accordance Annex II.

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

Description of operations.

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

Closure plan. (Bog Rehabilitation Plan).

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

- 10.1 Following termination of use or involvement of all or part of the site in the licensed activity, the licensee shall:
- 10.1.1 Decommission, render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution.
- 10.1.2 Implement the agreed cutaway bog rehabilitation plan (refer Condition 10.2).

10.2 Cutaway Bog Rehabilitation Plan:

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

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

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

10.4 A final validation report to include a certificate of completion for the Rehabilitation Plan, for all or part of the site as necessary, shall be submitted to the Agency within six months of execution of the plan. The licensee shall carry out such tests, investigations or submit certification, as requested by the Agency, to confirm that there is no continuing risk to the environment. This plan including maps and ecological classifications are available on file at the IPPC Licence Coordinators office.

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

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

The lands under where these materials are deposited are peatlands and are un-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 IPPC Licence Ref. PO503.

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 APX -1 Consultees contacted

Table APX -2 Response summary from Consultees contacted

Draft

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.



| | | |
|--|-------------------|------------------|
|  | 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 | 13/09/2020 | First release | EMcD |
| 2 | | | |



Archaeological Impact Assessment of Proposed Bog Decommissioning and Rehabilitation at Ballycon Bog, Co. Offaly

Report For

Bord Na Móna Energy Ltd.

Author

Dr. Charles Mount

Bord Na Móna Project Archaeologist



Introduction

The EPA (2002) *Guidance on the process of preparing and implementing a bog rehabilitation plan* notes that the licensee should characterise the bog prior to embarking on detailed planning and implementation. This characterisation should detail how the land is classified in terms of statutory protections, e.g. as European sites, world heritage sites, RAMSAR sites, National Heritage Areas, national monuments, archaeological heritage, etc. This archaeological impact assessment report was prepared by Dr. Charles Mount for Bord na Móna Energy Ltd to fulfil this characterisation in relation to archaeological heritage. It represents the results of a desk-based assessment of the impact of proposed bog rehabilitation on c.281 hectares at Ballycon, Co. Offaly on the known archaeological heritage of the bog. The proposed rehabilitation actions will be a combination of measures to create wetlands and re-wet deep peat as outlined in the draft Methodology Paper for the proposed Bord na Móna Decommissioning, Rehabilitation and Restoration Scheme. These enhanced measures for Ballycon Bog will include:

- The majority of the site has already developed a mosaic of wetland habitats with the potential for some deeper water. Hydrological management will look to optimise summer water levels to maximise the development of wetland vegetation (by looking to set water depths at < 0.5 m, where possible. It is inevitable that some small sections will naturally have deeper water due to the topography at this site). Water-levels will be adjusted at outfalls and by adjusting piped drainage.
- Modifying water levels through targeted rehabilitation by altering levels within internal outfalls and piped drainage, and increasing the extent of wetland habitat mosaics. This will further slow the movement of water through and out of Ballycon Bog.
- Deep Peat measures in suitable areas including intensive drain blocking (max 7/100) and blocking outfalls.
- Areas that are relatively dry will be targeted for drain-blocking. This will include bunding and managing water levels with overflow pipes and regular drain blocking.
- Targeted fertiliser applications to accelerate vegetation establishment on areas of **bare peat** on headlands and high fields, and within certain areas of dry cutaway. Areas where vegetation has established do not need fertiliser application.
- Silt ponds will be retained and maintained during the rehabilitation phase. During the monitoring and verification phase silt ponds will be continually inspected and maintained, where appropriate. When it is deemed that silt ponds are not required, as the bog has been successfully stabilised and there is no silt run-off, the condition of the silt ponds will be reviewed. Silt ponds 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.

Ballycon Bog is located c.6.4km south-east of Daingean and south of the R402 road. The bog occupies the townlands of Ballycon and Esker More, on OS 6 inch sheet Offaly No. 19.



Methodology

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

- The IAWU Peatland Survey
- The Sites and Monuments Record that is maintained by the Dept of Housing, Local Government and Heritage
- The Excavations database
- Previous assessments

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

Desktop assessment

Recorded Monuments

The Record of Monuments and Places (RMP) for Co. Offaly which was established under Section 12 of the National Monuments (Amendment) Act, 1994 was examined as part of the assessment (DAHGI 1995). This record was published by the Minister in 1995 and includes sites and monuments that were known in Ballycon Bog before that date. This review established that there are no RMPs located in the proposed rehabilitation area (Fig. 1).

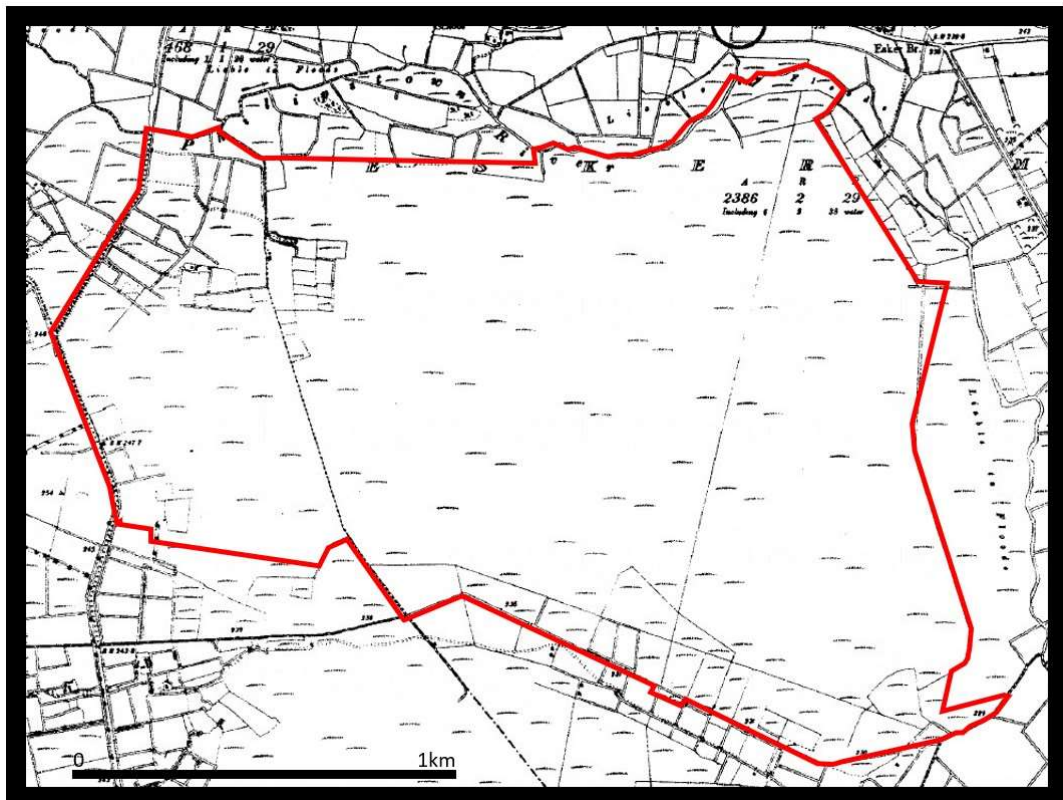


Fig. 1. Ballycon Bog, Co. Offaly, detail of the Record of Monuments and Places map sheet No. 19. The proposed rehabilitation area is outlined with the redline. There are no Recorded Monuments in the area.



Peatland survey

Ballycon Bog was surveyed by the Irish Archaeological Wetland Unit (IAWU) in 2002 as part of the Archaeological Survey of Ireland Peatland Survey under Licence number 02E0838. Two sightings of archaeological material were identified and recorded and subsequently lodged in the records of the Archaeological Survey of Ireland (see Table 1). These consisted of a worked vertical post lying on the field surface and two stakes lying on the field surface. It is not clear from the IAWU data if the three pieces of wood were left *in situ* or removed for sampling.

| SMR_NO | SMR Class | IAWU No. | IAWU Class | Townland | ITM E | ITM N | N.G.R. E | N.G.R. N | Depth |
|---------------|------------------|-------------|---------------|------------|--------|--------|----------|----------|-------|
| OF019-018---- | Redundant record | OF-EKM 0005 | Unworked wood | Esker More | 655389 | 726898 | 255450 | 226870 | 0.00 |
| OF019-019---- | Redundant record | OF-EKM 0006 | Worked wood | Esker More | 655833 | 725657 | 225894 | 225629 | 0.00 |

Table 1. List of sites recorded by IAWU in Ballycon Bog.

Sites and Monuments Record

The Sites and Monuments Record (SMR) which is maintained by the Department of Housing, Local Government and Heritage was examined as part of the assessment on the 27th of January 2021. The SMR consists of records included in the RMP and sites and monuments notified to the Dept. since the publication of the RMP. This review established that there are two sightings entered in the SMR in the proposed rehabilitation area. The sightings are indicated in Table 1 above and Fig. 2 below. These are the sightings identified by the 2002 IAWU that were notified to the Archaeological Survey with no additions. Note these sightings were not accepted by the Archaeological Survey as archaeological monuments but were classed as redundant records.

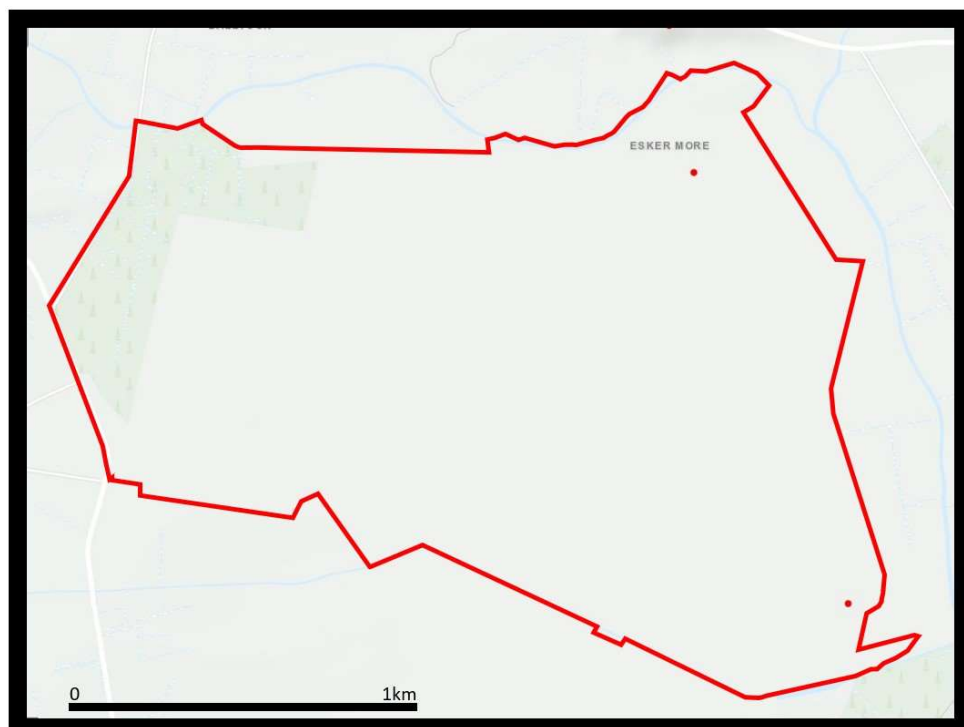
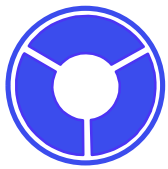


Fig. 2. Ballycon Bog, Co. Offaly, detail of the Sites and Monuments Record. The proposed rehabilitation area is outlined with the redline. There are two SMRs in the area.



Archaeological investigations

Examination of the excavations bulletin at excavations.ie indicated that there have been no other licensed archaeological investigations carried out in the rehabilitation area.

Previous assessments

Ballycon Bog has been the subject of an Environmental Impact Assessment Report (EIAR) carried out by Irish Archaeological Consultancy LTD in 2018 for Bord na Móna Energy Limited in relation to IPC Licence P0500-01. This assessment included a review of the topographical files and finds registers of the National Museum of Ireland intended to identify all finds from the bog reported to the Museum by that date and these are included below in Table 2 (Pers Comm. Jane Whitaker). The assessment noted the archaeological material identified in the IAWU Peatland Survey in 2002 and noted that was a moderate potential for archaeological features to be uncovered during the course of any future development works in Ballycon Bog.

Reported finds

As noted above the EIAR carried out by Irish Archaeological Consultancy LTD in relation to IPC Licence P0500-01 contains a complete list of known finds from Ballycon Bog reported to the National Museum of Ireland up to 2018 (see Table 2).

| Townland | Museum No. | Description |
|------------|------------|--------------------|
| Esker More | IA/76/1975 | Paddle-like object |

Table 2. List of archaeological finds from Allen Bog reported to the National Museum of Ireland.

Impact assessment

There are two known sightings of archaeological material in the rehabilitation area (see Table 1). All peat harvesting ceased in Ballycon Bog in 2001 prior to the 2002 survey. It is not clear from the IAWU 2002 data if the sightings were left *in situ* or removed for sampling. If left *in situ* the wood may survive.

Recommendations

It is possible that the two sightings of wood made in Ballycon Bog in 2002 survive *in situ* (see Table 1). To avoid any possible impact these two locations should be preserved *in situ* and avoided by the rehabilitation works with a 20m buffer zone. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it should also be avoided and reported to the Bord na Móna Archaeological Liaison Officer and the National Museum of Ireland.

Conclusion

This is a desk-based archaeological assessment and includes a collation of existing written and graphic information to identify the likely archaeological potential of the proposed rehabilitation area. It is possible that the two sightings of wood made in Ballycon Bog in 2002 survive *in situ* (see Table 1). To avoid any possible impact these two locations should be preserved *in situ* and be avoided by the rehabilitation works with a 20m buffer zone. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it should also be avoided and reported to the Bord na Móna Archaeological Liaison Officer and the National Museum of Ireland.



References

DAHGI 1995. Recorded Monuments Protected under Section 12 of the National Monuments (Amendment) Act, 1994. County Offaly.

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

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

Dr. Charles Mount
8 February 2022

11. APPENDIX XIII. WATER QUALITY MONITORING RESULTS FOR BALLYCON BOG

Table AP13.1. Water quality data for 12 months from November 2020 to Dec 2021 at Ballycon bog.

| PCAS SW Sampling Scheme | | | | | Suspended Solids | Suspended Solids | Suspended Solids | Suspended Solids | Suspended Solids | Suspended Solids | Suspended Solids | Suspended Solids | Suspended Solids | Suspended Solids | Suspended Solids | Suspended Solids | Suspended Solids | Suspended Solids |
|-------------------------|------------|----------|----------------|-------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Bog Group | Licence No | Bog Name | Unique I.D No. | SW Code GIS | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l |
| Allen Group | P0503-01 | Ballycon | 430 | SW30 | 2 | 2 | 3 | 3 | 4 | 7 | 2 | 2 | 3 | 3 | 2 | 5 | 2 | |
| | | | | ELV | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 |
| PCAS SW Sampling Scheme | | | | | Colour | Colour | Colour | Colour | Colour | Colour | Colour | Colour | Colour | Colour | Colour | Colour | Colour | Colour |
| Bog Group | Licence No | Bog Name | Unique I.D No. | SW Code GIS | mg/l Pt Co | mg/l Pt Co | mg/l Pt Co | mg/l Pt Co | mg/l Pt Co | mg/l Pt Co | mg/l Pt Co | mg/l Pt Co | mg/l Pt Co | mg/l Pt Co | mg/l Pt Co | mg/l Pt Co | mg/l Pt Co | mg/l Pt Co |
| Allen Group | P0503-01 | Ballycon | 430 | SW30 | 191 | 146 | 184 | 201 | 199 | 157 | 144 | 180 | 171 | 144 | 76.4 | 89.9 | 149 | 148 |
| PCAS SW Sampling Scheme | | | | | COD | COD | COD | COD | COD | COD | COD | COD | COD | COD | COD | COD | COD | COD |
| Bog Group | Licence No | Bog Name | Unique I.D No. | SW Code GIS | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l |
| Allen Group | P0503-01 | Ballycon | 430 | SW30 | 62 | 51 | 54 | 55 | 57 | 54 | 61 | 75 | 85 | 60 | 47 | 59 | 63 | 66 |
| PCAS SW Sampling Scheme | | | | | pH | pH | pH | pH | pH | pH | pH | pH | pH | pH | pH | pH | pH | pH |
| Bog Group | Licence No | Bog Name | Unique I.D No. | SW Code GIS | pH Units | pH Units | pH Units | pH Units | pH Units | pH Units | pH Units | pH Units | pH Units | pH Units | pH Units | pH Units | pH Units | pH Units |
| Allen Group | P0503-01 | Ballycon | 430 | SW30 | 7.7 | 7.8 | 7.6 | 7.7 | 7.5 | 7.8 | 7.9 | 7.3 | 7.9 | 7.5 | 8 | 8 | 7.8 | 7.9 |
| PCAS SW Sampling Scheme | | | | | TP as P | TP as P | TP as P | TP as P | TP as P | TP as P | TP as P | TP as P | TP as P | TP as P | TP as P | TP as P | TP as P | TP as P |
| Bog Group | Licence No | Bog Name | Unique I.D No. | SW Code GIS | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l |
| Allen Group | P0503-01 | Ballycon | 430 | SW30 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.08 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| PCAS SW Sampling Scheme | | | | | TS | TS | TS | TS | TS | TS | TS | TS | TS | TS | TS | TS | TS | TS |
| Bog Group | Licence No | Bog Name | Unique I.D No. | SW Code GIS | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l |
| Allen Group | P0503-01 | Ballycon | 430 | SW30 | 229 | 333 | 148 | 139 | 161 | 156 | 197 | 306 | 466 | 360 | 415 | 148 | 194 | 156 |
| PCAS SW Sampling Scheme | | | | | Ammonia as N | Ammonia as N | Ammonia as N | Ammonia as N | Ammonia as N | Ammonia as N | Ammonia as N | Ammonia as N | Ammonia as N | Ammonia as N | Ammonia as N | Ammonia as N | Ammonia as N | Ammonia as N |
| Bog Group | Licence No | Bog Name | Unique I.D No. | SW Code GIS | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l |
| Allen Group | P0503-01 | Ballycon | 430 | SW30 | 0.04 | 0.053 | 0.04 | 0.041 | 0.06 | 0.043 | 0.028 | 0.155 | 0.103 | 0.053 | 0.022 | 0.005 | 0.029 | 0.039 |
| PCAS SW Sampling Scheme | | | | | DOC | DOC | DOC | DOC | DOC | DOC | DOC | DOC | DOC | DOC | DOC | DOC | DOC | DOC |
| Bog Group | Licence No | Bog Name | Unique I.D No. | SW Code GIS | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l |
| Allen Group | P0503-01 | Ballycon | 430 | SW30 | 24.8 | 21.5 | 18.9 | 19.1 | 20.3 | 19.3 | 23.1 | 29.7 | 31 | 62.8 | 78.5 | 22 | 22.9 | 23.4 |