Mount Lucas Bog

Cutaway Bog Decommissioning and Rehabilitation Plan 2021

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 Mount Lucas 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 Mount Lucas Bog. Bord na Móna have now announced the complete cessation of industrial peat production.

In addition, to preparing this document to comply with Condition 10 of IPC Licence Ref. P0503-01, due regard was also given to the proposed Peatlands Climate Action Scheme (PCAS) announced by the Minster. This Scheme will see the Minister support, via the Climate Action Fund, Bord na Móna in developing a package of measures, 'the proposed 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 proposed Scheme will be supported by Government through the Climate Action Fund, 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 Mount Lucas 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 proposed 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 proposed Scheme.

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

Bord na Móna have developed a wind energy project at Mountlucas Bog. Rehabilitation will take account of the windfarm infrastructure and current land-uses on site and will seek to integrate peatland re-wetting with the current infrastructure and land-uses.

Any consideration of any other future after-uses for Mount Lucas 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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SUMMARY

Name of bog: Mount Lucas Bog **Area:** 1226.5 ha

Site description:

- Mount Lucas Bog is located approximately eight kilometres south-east of Daingean in Co Offaly.
- Peat Production at Mount Lucas commenced in the mid-1970's, and finished in 2020. The peat was used as fuel peat to supply the Edenderry Power Station.
- A significant part of the site has been out of peat production for > 20 years. This area is a mosaic of pioneering cutaway, with Birch woodland, some bare peat, wetland and grassland habitats. Part of the site has been used for peat extraction up to 2019 and is bare peat.
- Mountlucas Bog has a gravity-based drainage system. The site has relatively dry cutaway in part, which is reflected by the extensive development of Birch woodland and scrub.
- Peat depths are shallow for the most part (i.e. <1m) apart from the NW corner where extant peats are up to 2-3m in depth, and the SW portion where some remaining peat up to 2m deep is present.
- The site hosts an operational wind farm (Mountlucas Wind Farm), along with forestry trials, an aquaculture project (Peataqua), and medicinal herbs (Bord na Móna Herbs www.bordnamonaherbs.com) trial plots.

Rehabilitation goals and outcomes

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

Being cognisant of the proposed Scheme for supporting enhanced decommissioning, rehabilitation and restoration measures (PCAS), the key rehabilitation goal and outcomes for Mount Lucas Bog is the overall **environmental stabilisation** of the site via **optimising climate action benefits, where possible, and integrating rehabilitation with the existing renewable energy infrastructure and other site infrastructure and land-uses**. This is defined as:

- Carrying out enhanced rehabilitation with the application of enhanced rehabilitation measures in selected areas to re-wet peat and slow water movement across the site. Part of the site has already developed a mosaic of pioneer cutaway habitats and is largely stabilised. Rehabilitation will focus on re-wetting areas recently out of peat extraction where there is still significant bare peat cover, as well as targeted actions to enhance existing wetland habitats and create small wetland features. This site will develop a mosaic of compatible wetland and cutaway peatland habitats.
- Optimising hydrological conditions for the development of wetlands, fen, Reed Swamp and wet woodland on shallow cutaway peat in the area recently out of peat extraction, and eventually naturally functioning wetland/peatland habitats.
- Optimising hydrological conditions for the development of embryonic *Sphagnum*-rich vegetation communities in suitable deep residual peat areas.
- Enhancing existing wetlands and re-wetting peat in the older cutaway, where possible,
- Integrating rehabilitation measures with current infrastructure and land-use on site,
- Stabilisation or improvement in water quality parameters (e.g. suspended solids).
- Environmental stabilisation.
- Rehabilitation will support the National Policies on Climate Action and GHG mitigation by maintaining and enhancing the current peat storage capacity of the bog (locking the carbon into the ground). It is expected that the bog will have reduced emissions (reduced source) and in time develop its carbon sink function, in part, as some peat-forming habitats develop on site. 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 Mount Lucas 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. Mount Lucas bog is part of the Allen Bog group.
- The proposed Scheme is designed to exceed the stabilisation requirements as defined by the IPC Licence. This scheme is designed to enhance the ecosystem services of Mount Lucas 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 Mount Lucas Bog identify wetland creation and residual peat re-wetting as the most suitable rehabilitation approach for this site.
- The key objective of rehabilitation, as defined by this licence, is **environmental stabilisation** of the bog. Bord na Móna have defined the key goal and outcome of rehabilitation at Mount Lucas Bog as **environmental stabilisation** of the site via **optimising climate action benefits, where possible, and integrating rehabilitation with the existing renewable energy infrastructure, and other site infrastructure and land-uses**. The re-wetting of residual peat in the area recently out of peat extraction will be optimised, **setting the site on a trajectory towards the development of embryonic peat-forming (*Sphagnum*-rich) vegetation communities on residual deep peat, and the development of wetlands/Reed Swamp and fen on shallow more alkaline peat and other subsoils.**
- Enhanced Rehabilitation of Mount Lucas Bog will support multiple national strategies of climate action, biodiversity action and other key environmental strategies such was the Water Framework Directive.
- The time frame for the delivery of the planned rehabilitation will be undertaken according to available resources and appropriate constraints.

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, encouraging development of vegetation cover via natural colonisation, and reducing the area of bare exposed peat through the creation of further wetland or fen habitat (IPC Licence validation). The target will be the delivery of measures and this will be measured by an aerial survey after rehabilitation is completed. (IPC Licence validation).
- Stabilising/improving key emissions to water (e.g. potential silt-run-off). This will be measured via water quality monitoring (suspended solids and ammonia) for at least 2 years after the rehabilitation has been completed. (IPC Licence validation).
- Reducing pressure from peat production on the local river catchment (WFD) (IPC Licence validation). This will be measured by the EPA WFD monitoring programme.
- Optimising the extent of suitable hydrological conditions for climate action (Climate action verification). This will be measured by an aerial survey after rehabilitation has been completed.
- Reduction in carbon emissions based on bog condition (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 wetland, fen, Reed swamp, wet woodland, heath, embryonic *Sphagnum*-rich peat forming communities, scrub and Birch woodland communities, where conditions are suitable, and eventually towards a reduced Carbon source (Climate action verification). Some areas will naturally be dry and develop Birch woodland and other drier habitats/or have already been stabilised. It will take some time for stable naturally functioning habitats to fully develop across the entirety of Mount Lucas Bog.
- Improvement in biodiversity and ecosystem services. (Climate action verification).

Meeting climate action verification criteria and monitoring of these criteria after the Scheme is completed is dependent on support from the Climate Action Fund or other sources of funding.

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 to have sufficient resources (staff and machinery) to deliver the planned rehabilitation.
- Weather conditions to be within normal limits over the rehabilitation plan timeframe
- Natural colonisation of vegetation to develop semi-natural habitats at a rate within the normal limits.

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 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 be a combination of hydrological management, drain blocking, peat field re-profiling, wetland creation and fertiliser applications targeting bare peat on headlands, high fields and other areas.
- Phase 2 measures may include seeding of targeted vegetation and inoculation of *Sphagnum*.
- 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:

- 2020-2021: Short-term planning actions.
- 2021: Short-term practical actions.
- 2021-2024: Any Long term practical actions; Evaluate success of short-term rehabilitation measures outlined above and remediate, where necessary.
- 2024: Decommission silt-ponds, if necessary.

Budget and Costing

- The rehabilitation plan outlined in this document is predicated on the understanding that it is the Minister's intention to support, via the Climate Action Fund, Bord na Móna in developing a package of measures, 'the proposed 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.*

- In relation to the pre-existing Condition 10 IPC Licence requirement to carry out what can be termed the 'standard' decommissioning and rehabilitation, Bord na Móna maintains a Provision on its balance sheet to pay for these future costs when industrial peat extraction ceases. This is updated every year. For more information see the Bord na Móna Annual Report (Bord na Móna 2020). Bord na Móna is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.
- For the avoidance of doubt, should the proposed Scheme and the associated support via the Climate Action Fund 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 only the 'standard' decommissioning and rehabilitation measures required under Condition 10 (see Appendix I) and for which financial provisions have been made, to comply with that element of the Licence.

Monitoring, after-care and maintenance

The monitoring, after-care and maintenance programme for Mount Lucas 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, asses the progress of natural colonisation, monitoring of any potential impacts on neighbouring land and general land security. The number of site visits will reduce after 2 years to bi-annually. These site visits will assess the need to 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 and conductivity.
- 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 appropriate 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 remote sensing 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.
- Monitoring as part of Climate Action Verification is dependent on support from the Climate Action Fund or other external funding.

Validation and IPC Licence surrender

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

- The planned rehabilitation has been completed.
- Water quality monitoring demonstrates that water quality 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 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. The subject bog is part of the Allen bog group (see Appendix II for details of the bog areas within the Allen Bog Group). Mount Lucas Bog is located in Co. Offaly.

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 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.

It is proposed by Government that Bord na Móna carry out a Peatlands Enhanced Decommissioning, Rehabilitation and Restoration Scheme (PCAS) on peatlands previously used for energy production. Note this proposal is also known colloquially as the 'Peatlands Climate Action Scheme'. The additional costs of the proposed Scheme will be supported by Government through the Climate Action Fund. Bord na Móna have identified a footprint of 33,000 ha (a subset of the BnM estate that has been used for energy production) as peatlands suitable for enhanced rehabilitation. This proposed Scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations (Appendix VII) 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. However, it is important for all stakeholders to understand that 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 proposed Scheme. Bord na Móna have now announced the complete cessation of industrial peat production across its estate (January 2021).

It is expected that the proposed 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 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 hydrological management, drain-blocking;
- 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, which will develop other habitats. Other areas will naturally have deeper water). 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.

Mount Lucas Bog is proposed to be part of this this proposed Scheme (PCAS) and this rehabilitation plan outlines the approach taken. In the event that additional external funding is not secured, Bord na Móna will revert to a standard rehabilitation plan (outlined in Appendix I). This adapted rehabilitation plan will also meet rehabilitation and decommissioning obligations under existing EPA IPC licence conditions.

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 **Mount Lucas**

This rehabilitation plan takes account of the **current after-use** of Mount Lucas Bog.

An operational wind farm (Mountlucas Wind Farm[1]) is located on the bog and a pedestrian access plan has been carried out by Bord na Móna to create a public amenity walking route through the windfarm, using existing infrastructure. This was opened in 2015. Planning permission was since granted by the local authority for a service building at Mountlucas (2015) to facilitate wind farm operations. Rehabilitation has been planned to integrate with the current windfarm infrastructure. Much of the cutaway between the windfarm infrastructure has been left to develop naturally functioning woodland and wetland habitats.

[1] https://www.mountlucaswindfarm.ie/

Part of the former IPC license extent adjacent to Ballycon Workshop is now leased by FĀS who run a construction skills training facility at this location. This area is considered out of scope of the rehabilitation plan.

The site hosts medicinal herbs (Bord na Móna Herbs www.bordnamonaherbs.com) trial plots (12.6 ha). These areas are considered out of scope of the rehabilitation plan.

An aquaculture pilot trial/ venture was previously developed at Mount Lucas and was subject to an independent closure audit in 2017. This area(5.3ha) is now excluded from the IPC License extent. This area is considered out of scope of the rehabilitation plan.

The proposed Irish Water Shannon Pipeline corridor traverses Mount Lucas Bog.

Peat production activities have the potential to impact the habitats and environment of a bog. The ecological processes involved in the creation and maintenance of functioning, active bog systems are complex, happen over very long time periods (>1,000 years) and not all are fully understood. Nevertheless, the basis for the proposed approaches and implementation outlined in the document is the experience gained in 40 years of research and implementation of the after-use development, rehabilitation and restoration of the Bord na Móna cutaway bogs as well as best practise internationally (see reference documents).

Industrial peat extraction at Mount Lucas Bog permanently ceased in 2019. Currently the former peat production area comprises a mosaic of various different pioneering habitats, in addition to bare peat and exposed gravel sub-soil. It is anticipated that the combination of active enhanced rehabilitation measures and natural colonisation will quickly accelerate environmental stabilisation. Nevertheless, it will take some time (30-50 years) for naturally functioning peatland ecosystems to fully re-establish.

Parts of the greater Mount Lucas Bog (outside the areas owned and under the control of Bord na Móna) are currently used for private turf cutting. 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 Mount Lucas 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.

Rehabilitation in other areas of the bog may also be constrained due to other turbary rights, property issues or issues such as rights of way, known to be present. There is Archaeology evidence present also at Mount Lucas; this is similarly treated as a constraint.

Bord na Móna will continue to review the future after-use of its land-bank. Any consideration of any other future after-uses for Mount Lucas Bog, will be conducted in adherence to the relevant planning legislation and consultation with relevant authorities and will be considered within the framework of this rehabilitation plan.

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 proposed Scheme (PCAS). The development of this enhanced rehabilitation plan also considered guidance issued by the EPA in 2020 – **Guidance on the process of preparing and implementing a bog rehabilitation plan**.

The ecological information and information collected during the Bord na Móna ecological baseline survey (2010/2011), additional monitoring visits (monitoring regularly carried out in 2012, 2013, 2014, 2015 and 2016) with a final confirmatory site visit in November of 2020, and desktop analysis forms the basis for the development of the rehabilitation plan for the bog, along with:

- Experience of 40 years of research on the after-use development and rehabilitation of the Bord na Móna cutaway bogs (Clarke, 2010; Bord na Móna, 2016);
- Significant international engagement during this period with other counties in relation to best-practise regarding peatland rehabilitation and after-use through the International Peat Society and the Society for Ecological Restoration (Joosten & Clarke, 2002; Clarke & Rieley, 2010; Gann *et al*., 2019);
- Consultation and engagement with internal and external stakeholders;
- GIS Mapping;
- BNM drainage surveys;
- Bog topography and LIDAR data:
- Hydrological modelling; and
- The development of a **Methodology Paper (draft) outlining the proposed 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 Mount Lucas Bog, in particular, optimising **climate action benefits**.

2.1 Desk Study

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

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

- Joosten & Clarke (2002). Wise Use of mires and peatlands – Background and Principles including a framework for Decision-making.
- Lindsay (2010). Peatbogs and Carbon: a Critical Synthesis to Inform Policy Development in Oceanic Peat Bog Conservation and Restoration in the Context of Climate Change.
- Mackin *et al*. (2017). Best practice in raised bog restoration in Ireland. Irish Wildlife Manuals, No. 99. National Parks and Wildlife Service,
- McBride *et al*. (2011). The Fen Management Handbook (2011), Scottish Natural Heritage.
- McDonagh (1996). Drain blocking by machines on Raised Bogs. Unpublished report for National Parks and Wildlife Service.
- NPWS (2017a). National Raised Bog Special Areas of Conservation management plan. Department of Arts, Heritage and the Gaeltacht.
- 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.

In addition to the above, other reports reviewed included previous baseline surveys commissioned by Bord na Móna; reporting prepared to inform the planning application for Mountlucas Wind Farm, and an Appropriate Assessment Stage 1 Screening Report in respect of the Peataqua project.

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, Mount Lucas Bog was surveyed in October of 2010 and April of 2011. Additional visits have taken place in the interim as described above, with a review of habitats undertaken also in 2017. Mount Lucas was subject to a final confirmatory site visit in November of 2020 to inform rehabilitation planning and habitat maps have been updated over time, where required. This rehabilitation plan is informed by the original baseline survey as well as subsequent confirmatory site walk-over surveys and visits, and updates to baseline data.

Habitat mapping followed best-practise guidance from Smith *et al.* (2011). Map outputs including all habitat maps and target notes were produced using GIS software application packages (ArcGIS). General marginal habitats and other habitats that had not been modified significantly by industrial peat extraction were classified using Fossitt *et al*. (2000). Plant nomenclature for vascular plants follows Stace (2010), while mosses and liverworts nomenclature follows identification keys published by the British Bryological Society (2010). A more detailed Bord na Móna classification system was 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 detailed ecological survey report for Mount Lucas Bog is contained in Appendix II.

3. SITE DESCRIPTION

Mount Lucas Bog is located approximately eight kilometres south-east of Daingean in Co Offaly. It is situated in a group of bogs within the Allen complex that includes Ballycon and Derrycricket Bog to the east, Clonad Bog to the west and Cavemount Bog to the north. It can be divided into two main sections: an area that has been cutaway for some time and has developed a mosaic of typical cutaway habitats with Birch woodland prominent, and an area towards the west of the bog that has been in active peat production until recently, and is bare peat (Figure 3.5 & 8.1).

Bord na Móna has recently completed construction of a 28 turbine (80 MW) wind farm at Mount Lucas. This wind farm is now operational since 2014. Turbines have been constructed at various locations on the cutaway and are connected via a series of roads (21 km constructed) and other infrastructure such as underground cabling. The overall footprint of the new infrastructure is relatively small (4% of the overall area of Mount Lucas Bog).

A BnM railway line runs through Mount Lucas and is active with trains crossing a number of times a day. These trains carry peat from Mount Lucas and other production bogs in the Allen bog group towards the power station at Edenderry.

See Figure 3.1, overleaf for bog context.

3.1 Status and Situation

3.1.1 Site history

Peat Production at Mount Lucas commenced in the mid-1970's, and finished in 2020. The peat was formerly used as fuel peat to supply the Edenderry Power Station. Peat was also supplied to Rhode Power Station and Croghan Brickette Factory during 1970s-1980s.

3.1.2 Current land-use

Industrial peat extraction at Mount Lucas Bog permanently ceased in 2019. Peat production was focused on the western side of the site. The eastern part of the site is older cutaway, has been developing for > 20 years and has largely vegetated and is developing woodland, grassland and wetland habitats.

An operational wind farm (Mountlucas Wind Farm is located on the bog and a pedestrian access plan has been carried out by Bord na Móna to create a public amenity walking route through the windfarm, using existing infrastructure. This was opened in 2015. The windfarm was built on cutaway that has been developing for > 20 years and has developed a mosaic of habitats. Planning permission was since granted by the local authority for a service building at Mountlucas (2015) to facilitate wind farm operations. Bord na Móna plan to upgrade some signage in association with amenity and public awareness/engagement.

An aquaculture pilot trial/ venture was previously developed at Mount Lucas and was subject to an independent closure audit in 2017. This area (5 ha) is now excluded from the IPC License extent.

A portion of Mount Lucas has been used for the development of a medicinal herbs trial herbs (Bord na Móna Herbs www.bordnamonaherbs.com). This constitutes 12.6 ha in total, across four plots distributed throughout the bog.

A forestry trial has also been planted on a small portion of Mount Lucas in the 1990's under the BOGFOR project. Part of the north-east corner of the bog is subject to a community lease in respect of Mountlucas Gun Club. Some grassland immediately east of the FĀS facility is subject to a grazing lease.

A current landuse map is shown as Figure 3.2.

The proposed Irish Water Shannon Pipeline corridor traverses the northern margin of Mount Lucas Bog.This project is in its pre-planning stage.

An industrial railway crosses the site and other site infrastructure is outlined in Figure 3.7.

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

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

These job numbers have now declined with the cessation of peat extraction at this bog. It is anticipated that the proposed scheme (EDDRS) 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 Mount Lucas Bog comprises 'Oolitic limestone', along with 'Waulsortian Limestones' and 'Dark muddy limestone, shale' as part of the Ballysteen formation. Subsoils at Mount Lucas comprise mainly mixed Limestone till and gravel. Some marl (blue silty clay) was noted previously in the subsoil around the bog in the horizons of deep drains.

3.2.2 Peat type and depths

Peat Production at Mount Lucas bog commenced in the mid-1970's, and finished in 2018. Peat depths across the older cutaway section are shallow for the most part (< 0.5 m), with sections being almost completely cutaway, having exposed sub-soils (Figure 8.2). The western part of the site that has been in peat production until recently has residual peats in the NW up to 2-3m in depth, and the SW portion where some remaining peat up to 2m deep is present.

3.3 Key Biodiversity Features of Interest

Part of Mount Lucas has re-vegetated due to natural re-colonisation. The bog is relatively dry and developing Birch (*Betula* spp.) scrub/ woodland. There are also some smaller wetlands with open water and a mosaic of poor fen and some Reed swamp vegetation.

The areas that are still in industrial peat production and not included within the wind farm development comprise extensive bare peat and were maintained for peat production until very recently (2018).

There are records of Blue Fleabane (*Erigeron acer*) and Basil Thyme (*Clinopodium acinos*) along the northern railway track. 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). Blue Fleabane is widely scattered through the cutaway, on areas of exposed gravel associated with an old gravel pit towards the north of the bog and on the new windfarm infrastructure. Both species are esker plants and not typical bog plants, and are likely to have colonised Mount Lucas during Bord na Móna operations via the railway.

Another rare plant species, Round-leaved Wintergreen (*Pyrola rotundifolia*), has recently been found at Mount Lucas. This species is a nationally rare plant species listed in the Irish Red Data Book (Curtis and McGough 1988) and was not recorded on Co. Offaly previously. It is found at several locations on the established cutaway at Mount Lucas.

The old gravel pit area, formerly used by Bord na Móna for material for railway construction, is now developing into grassland habitat of high botanical diversity with seven different species of orchid present. This area is also used by breeding waders such as Lapwing (*Vanellus vanellus*) (Red list) and other breeding birds such as Skylark (*Alauda arvensis*) and Meadow Pipit (*Anthus pratensis*), the latter also Red listed.

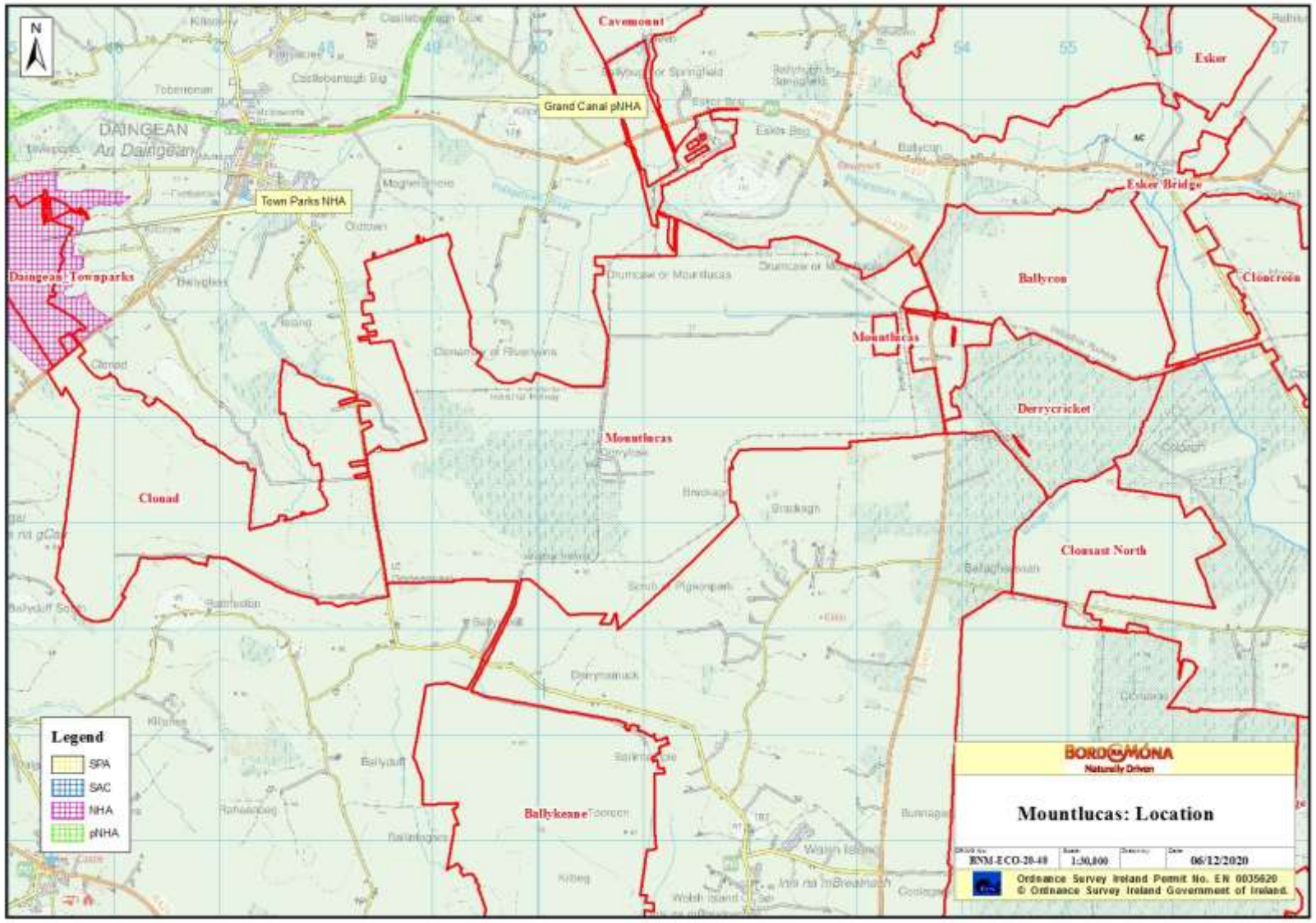

Figure 3.1 Location of Mount Lucas in context to other Bord na Móna bogs and surrounding area

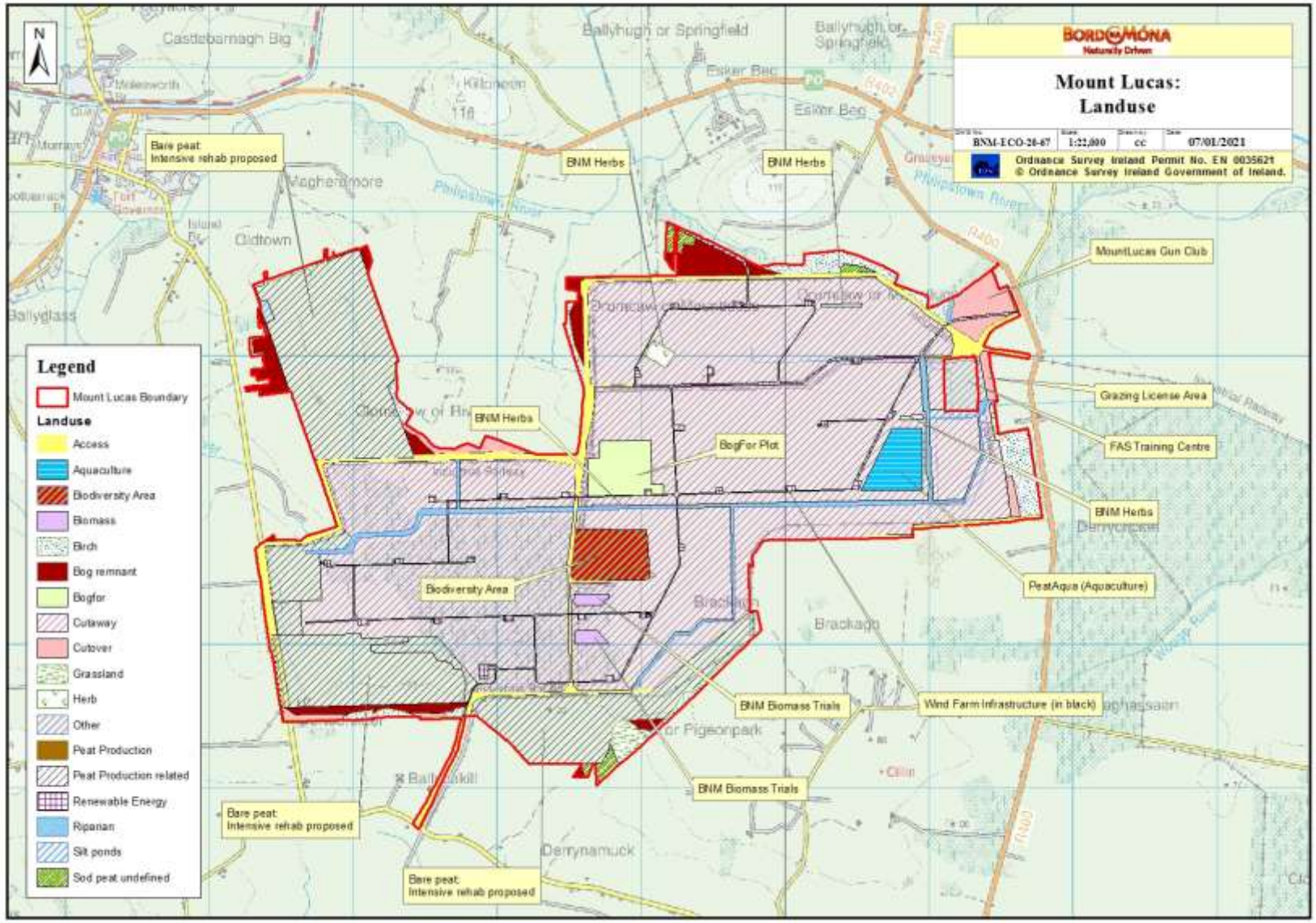

Figure 3.2 Current Land Use Map for Mount Lucas

3.3.1 Current habitats

For the purpose of the baseline habitat survey this bog has been divided into four uneven sections that were divided by the in-situ Bord na Móna road, drainage and rail network. Habitats are described accordingly. A habitat map of Mount Lucas Bog is shown in Figure 3.6. Unless otherwise specified any habitats not identified with a corresponding Fossitt Code fall into the general category of Cutaway Bog (PB4) however Bord na Móna derived categories of colonising or pioneering vegetation may be provided.

South eastern section

Since this part of Mount Lucas Bog came out of peat production it appears to have revegetated quite rapidly, apart from some small areas, mainly toward the centre, that were slower to re-vegetate. An extensive network of drains associated with the windfarm infrastructure has been installed and supported good levels of water flow. European Otter (*Lutra lutra* hereafter Otter) evidence has been recorded here previously. A network of roads (BL3) and other infrastructure such as wind turbine hardstanding areas is present, in addition to supporting ancillary drainage and underground cabling.

Along the western edge a plot of forestry has been planted in the 1980's under the BOGFOR project. Tree species including Sitka Spruce (*Picea sitchensis*), Norway Spruce (*Picea abies*), Larch (*Larix* sp.), Sycamore (*Acer pseudoplatanus*), Oak (*Quercus* sp.), Birch (*Betula* sp.), Alder (*Alnus* sp.) and Popular (*Populus* sp.) are present.

A short distance to the south of the BOGFOR forestry another woodland (Fossitt Code WN2) has developed with Common Ash (*Fraxinus excelsior*), Birch, Wild Cherry (*Prunus avium*), Willow (*Salix* sp.), Blackthorn (*Prunus spinosa*), Hawthorn (*Crataegus monogyna*), Elder (*Sambucus nigra*) and Aspen (*Populus* sp.) present. Most of this woodland is over 35 years old and has developed in an area that was formerly farmland.

The south-western part of this section is a mixture of Birch scrub (WS1) and wetlands (PB4/PF1). Developing wetlands include open water, Birch scrub and pioneer poor fen. Some areas of bare peat (PB4) still persist.

The eastern part of this section contains a relatively large section of bog woodland (WN7) that is dominated by Birch and also contains some Scot's Pine (*Pinus sylvestris*). Domestic turf cutting is carried out here. Apart from the turf cutting areas that were bare peat (PB4) the remainder is re-vegetated cutaway (PB4) with a mixture of Birch scrub (WS1) and poor fen (PF1) pioneer vegetation communities. Some small, drier pioneer habitats were also present with elements of dry heath and Purple Moorgrass-dominated grassland.

The middle-north of this section contained a mosaic of wet and dry habitats with the largest areas of open water on the bog. There are several permanent pools present as well as areas that have been drained recently but still appear prone to inundation with temporary water. These open water areas are surrounded by mostly bare peat (PB4) with some Bog Cotton-dominated poor fen (PF1) colonising.

North Eastern Section

Birch woodland (WN7) and remnant sections of raised bog (PB1) are to be found along the northern, eastern and western margins of this section. Most of the remnant fragments of raised bog are relatively dry and degraded with encroaching scrub (WS1) and Birch woodland (WN7). Domestic turf cutting is carried out at one location along the northern boundary. One piece of intact high bog (PB1) to the north and adjacent to the railway was in relatively good condition with relatively high *Sphagnum* cover (33-50% in places).

An old sand and gravel quarry is located within the central part. Material was formerly quarried from here for developing access roads and railway embankments (1980s). This area has naturally colonised with a mosaic of diverse dry grassland and some wet pools. Some rehabilitation was carried out in 2015 to level piles of spoil.

Dense Birch woodland (WN7) is developed on several parts of this area, mainly along the eastern boundary and along the southern access road. This ground is somewhat higher that the surrounding cutaway and the Birch scrub is sometimes found in mosaic with drier pioneer vegetation communities such as Purple Moorgrass dominated grassland and grassland with Bentgrass (*Agrostis* sp.), Yorkshire Fog (*Holcus lanatus*) and Horsetail (*Equisitum* sp.).

South Western Section

This section of Mount Lucas bog is separated from the north-western section by a large drainage ditch (FW4) that runs in north eastward direction, while a railway line separates it from the south-eastern section. Otter spraints were noted along this long drain. This section is bordered to the south by a mixture of remnant raised bog (PB1) and Birch woodland (WN7).

Part of the older cutaway has revegetated to such an extent that Birch scrub (WS1) and woodland (WN7) is the dominant habitat type, especially on a raised ridge that runs through the centre in a north south orientation. Open areas occur throughout the Birch scrub and are made up of a mixture of open patches of dry grassland and Bramble thickets. Elder and Hawthorn are present. There are also small wetlands with pioneer poor fen, Reed swamp, and open areas with pioneer dry heath dominated by Heather (*Calluna vulgaris)* and pioneer grassland with Purple Moor-grass.

Some areas further west have only come out of production relatively recently and contain significant areas of bare peat (PB4).

North Western Section

This section of Mount Lucas is separated from the south-western section by a large drainage ditch (FW4)(east-west). It contains a large area of bare peat (PB4) that was still in production until 2018.

The older cutaway is mostly vegetated with Birch scrub and woodland. There are several small wetlands to the west side, adjacent to the boundary. These areas contain open water along with emergent Reedmace (*Typha latifolia*) (and fringing poor fen (PF1) with Bog Cotton (*Eriophorum* sp.) and Soft Rush (*Juncus effusus*).

Figure 3.3 Wetland vegetation at Mount Lucas (November 2020)

Figure 3.4 Wetland habitats, pioneering Birch Woodland and scrub at Mount Lucas (November 2020)

Figure 3.5 Grassland and wetland vegetation at Mount Lucas Bog (November 2020)

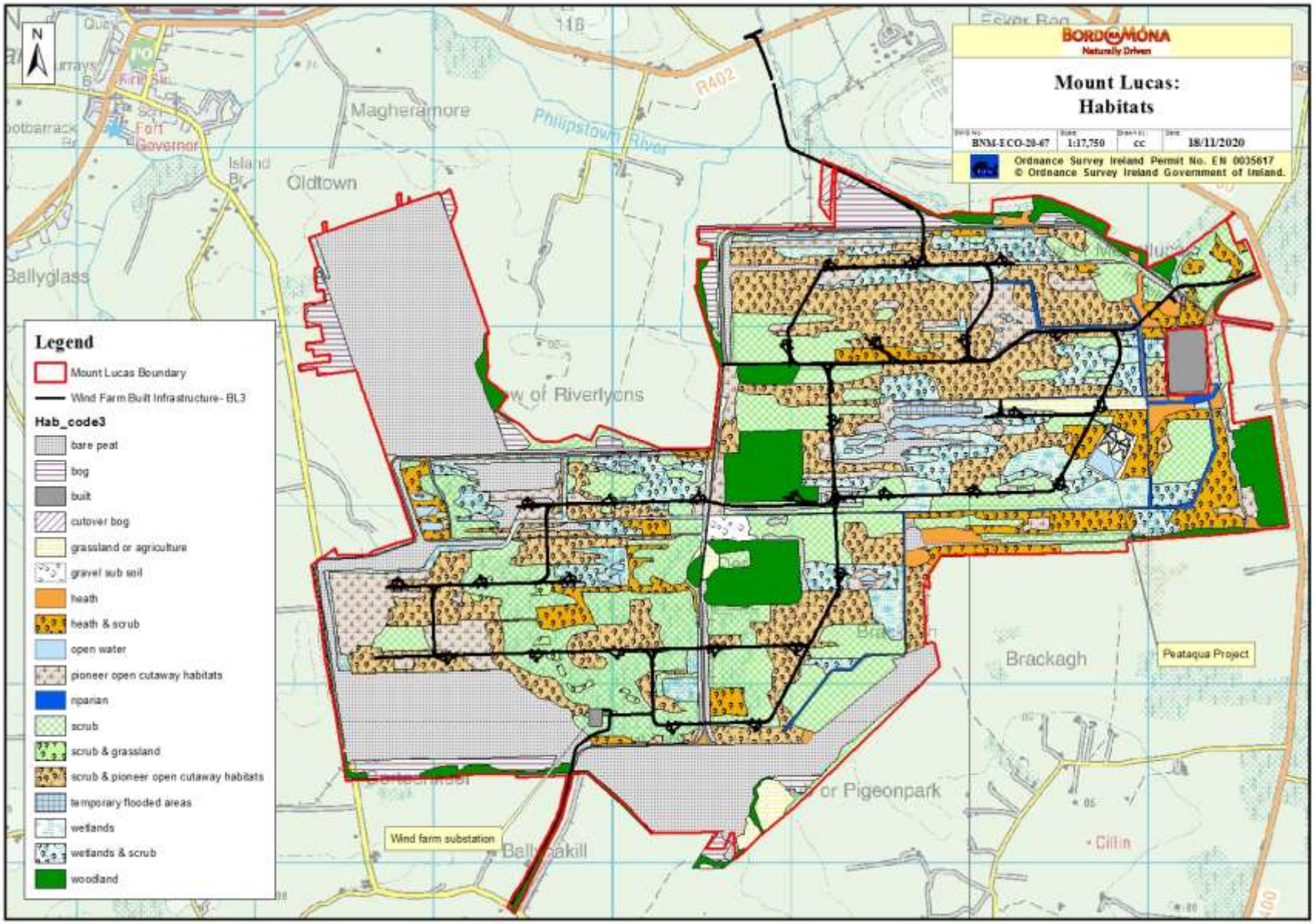

Figure 3.6 Habitat map of Mount Lucas Bog showing Bord na Móna habitat categorisation.

Figure 3.7. Map of Mountlucas Bog showing structures and designated emission points

3.3.2 Species of conservation interest

A review of available Biodiversity records from the National Biodiversity Data Centre (hereafter NBDC) of bird records from the recent 2007-2011 Bird Atlas, found 82 no. species of birds have been recorded at or near Mount Lucas Bog (i.e. up to and within the 10km squares which includes Mount Lucas).

This includes 6 no. Red-listed species, namely Black-headed Gull (*Larus ridibundius*), Common Redshank (*Tringa tetanus*), Eurasian Curlew (*Numerius arquata*), European Golden Plover (*Pluvialis apricaria*), Northern Lapwing (*Vanellus vanellus*) and Yellowhammer (*Emberiza citronella*). A total of 23 no. Amber listed species are similarly described including Barn Swallow (*Hirundo rustica*), Common Grasshopper Warbler (*Locustella naevia*), Common Kingfisher (*Alcedo atthis*), Common Linnet (*Carduelis cannabina*), Common Snipe (*Gallinago gallinago*), Common Starling (*Sturnus vulgaris*), Common Swift (*Apus apus*), Eurasian Teal (*Anas crecca*), Eurasian Tree Sparrow (*Passer montanus*), Eurasian Woodcock (*Scolopax rusticola*), Hen Harrier (*Circus cyaneus*), House Martin (*Delichon urbicum*), House Sparrow (*Passer domesticus*), Little Grebe (*Tachybaptus ruficollis*), Mute Swan (*Cygnus olor*), Ringed Plover (*Charadrius hiaticula*), Sand Martin (*Riparia riparia*), Skylark (*Alauda arvensis*), Spotted Flycatcher (*Muscicapa striata*), Stock Pigeon (*Columba oenas*),Tufted Duck (*Aythya fuligula*), Water Rail (*Rallus aquaticus*) and Whooper Swan (*Cygnus cygnus*).

In addition, bird surveys across the period 2006-2008 to inform the planning application in respect of the operational Mountlucas wind farm have been reviewed. Transect methodologies carried out in the Winter season (February) recorded 18 no. species, mainly Green listed, but did include Common Snipe and Skylark. Additional species noted in the winter period included raptors such as Common Kestrel (*Falco tinnunculus*), Merlin (*Falco columbarius*) and Common Buzzard (*Buteo buteo*). Two Whooper Swans were noted in the vicinity.

Whooper Swan is known to move through the Mount Lucas area from haunts in the vicinity of Geashill towards other feeding and roosting locations nearby, possibly the adjacent Ballycon Bog. Most activity is likely to be around dawn and dusk. Suitable habitats for this species are limited at Mount Lucas.

Similarly, transect methodologies carried out in the Bird breeding season (two visits in June) recorded 28 no. species, including Common Snipe, Skylark and Eurasian Woodcock – all of which can be evaluated as likely breeders. Lapwing was evaluated as 'likely nesting' at Derrylesk in this study.

Bird species recorded during site surveys/visits by Bord na Móna ecologists to inform rehab planning include additional species such as Eurasian Jay (*Garrulus glandarius*), and Golden Plover (*Pluvialis apricaria*), in the latter case a flock of ca.200 were observed roosting in the former production area in the NW of the Bog.

European Badger (Meles meles), Otter, Irish Stoat (*Mustela erminea hibernica*), Irish Hare (*Lepus timidus subsp. hibernicus*), Red Fox (*Vulpes Vulpes*), and Rabbit (*Oryctolagus cuniculus*) are all known to occur at Mount Lucas, with evidence recorded on visits to inform Rehab planning. Information from desktop review suggests that Fallow Deer (*Dama dama*), Pine Marten (*Martes martes*) and West European Hedgehog (*Erinaceus europaeus*) are likely to occur in suitable habitat. Wood mouse (*Apodemus sylvaticus*) was observed during bat surveys to inform the Mountlucas wind farm EIS.

Bat surveys to inform the Mountlucas wind farm EIS recorded two species of Bats utilising the study area or its immediate environs, Common pipistrelle (Pipistrellus pipistrellus) and Soprano pipistrelle (*Pipistrellus pygmaeus*). Evidence was greater along public roads to the east and west of Mount Lucas.

Common Frog (*Rana temporaria*) occurs at Mount Lucas in suitable habitat.

Marsh Fritillary (*Euphydryas aurinia*) have been recorded along the boundary of Mount Lucas, in the townland of Drumcaw or Mount Lucas (NBDC)- a single larval web was observed in August of 2018. In the townland of Clonarrow or Riverlyons, just outside Mount Lucas, 2 no. further larval webs were observed (NBDC[2]).

Other NBDC records for the locality include Brimstone (*Gonepteryx rhamni*), Common Blue (*Polommatus Icarus*), Green Hairstreak (*Callophrys rubi*), Green Veined White (Pieris napi), Holly Blue (*Celastrina argiolus*), Large Heath (*Coenonympha tullia*), Large White (*Pieris brassicae*), Meadow Brown (*Maniola jurtina*), Painted Lady (*Vanessa cardui),* Peacock *(Inachis io),* Red Admiral *(Vanessa Atalanta), Small Copper (Lycaena phlaeas), Small Heath (Coenonympha pamphilus),* Small Tortoiseshell (*Aglais uticae*), Small White (*Pieris rapae*), Speckled Wood (*Pararge aegeria*) and Wood White (*Leptidea* sp.) Butterflies. The Large Heath record cited above is from within Mount Lucas, where 1 no. individual was reported in 2019. One notable species recorded at Mountlucas Windfarm in the recent past is Wall Brown (*Lasiommata megera*).

Five species of Dragonfly including Emperor Dragonfly (*Anax imperator*) have been recorded in the vicinity, based on NDBC records.

3.3.3 Invasive species

Invasive alien species known to occur at the subject bog (or desktop review suggests presence is likely), and for which reasonably foreseeable source impact pathways for dispersal may result from the proposed PCAS are described here. Butterfly-bush (*Buddleja davidii*), known records from Mount Lucas, is the only known IAS currently present whose range may be increased during PCAS activities. 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. American Mink (*Mustela vison*) and Fallow Deer (*Dama dama)* have been recorded on the site but are unlikely to be further dispersed during or as a result of PCAS activities.

3.4 Statutory Nature Conservation Designations

The closest European Site (SPA or SAC) to Mount Lucas is Raheenmore Bog SAC (Site Code 000582) which is located ca.6.5km to the northwest of Mount Lucas. The Long Derries, Edenderry SAC (Site Code 000925) is ca.12km to the north east. The River Barrow and River Nore SAC (Site Code 002162) is ca.11km to the south of Mount Lucas and is hydrologically downstream.

The closest NHA or proposed NHA to Mount Lucas Bog is the Grand Canal (Site Code 002104) which is 1.23km to the north of the bog boundary (Figure 3.1). Daingean Bog NHA (Site Code 002033) is 2.3km west of Mount Lucas. Raheen Lough NHA (Site Code 000917) is ca.5km to the south west. The above mentioned Raheenmore Bog and Long Derries are also NHA's.

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.

[2] https://maps.biodiversityireland.ie/Map

There are no Ramsar Sites in the local vicinity of Mountlucas Bog (i.e. within 3km) The closest Ramsar Sites to Mountlucas Bog include Pollardstown Fen (Kildare) and Raheenmore Bog (Offaly).

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

3.5 Hydrology and Hydrogeology

Mountlucas Bog has a gravity drainage regime. Initial hydrological modelling indicates the areas of production bog that have recently been in industrial peat production has basins that are expected to develop a mosaic of wetland habitats when pumping is reduced or stopped (Figure 8.4).

Mount Lucas Bog is located in the Barrow catchment. The bog has a gravity-based drainage system and the older cutaway in general is relatively dry (reflected by the extent of Birch scrub and woodland development). Much of the bog is drained via field drains to the Daingean_010, Daingean_030 or Figile_040 sub-catchments via watercourses including the Derrycricket (EPA Code 14D13), the Esker_Beg (EPA Code 14E06), the Clonad (EPA Code 14C55) and the Philipstown_Trib_1 (EPA Code 14P34).

Silt ponds are present around the margins of the bog to manage discharges into the watercourses/drainage networks which drain the bog (Figure 3.6).

Wind farm internal drainage drains to one of the main IPC silt ponds in the east of Mount Lucas Bog which are maintained as part of ongoing license required maintenance.

Field drains in the remaining production fields run east-west in the southern part of Mount Lucas, and north west to south east in the north-westernmost production area.

The bog is located in an area with a number of Aquifers, namely, a) a Locally Important Aquifer - Bedrock which is Generally Moderately Productive, b) a Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones, c) a Locally Important Aquifer - Karstified and also d) a Regionally Important Aquifer - Karstified (diffuse) (source GSI spatial resources[3]).

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.

Regionally important aquifers can supply regionally important abstractions (e.g. large public water supplies). The continuous aquifer unit generally has an area of >25 km^2. Groundwater flow predominantly occurs through fractures, fissures and joints.

Locally important aquifers comprise bedrock aquifer units capable of supplying locally important abstractions (e.g. smaller public water supplies, group schemes), or 'good' yields (100-400 m3/d). Groundwater flow occurs predominantly through fractures, fissures and joints. The following types which occur at Mount Lucas are described[4]:

- Ll Locally Important Bedrock Aquifer, Moderately Productive only in Local Zones:

[3] https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aaac3c228

[4] https://www.gsi.ie/documents/GSI%20Aquifer%20Category%20Descriptions.pdf

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

Due to the low permeability and poor storage capacity, the aquifer has a low 'recharge acceptance'. Some recharge in the upper, more fractured/weathered zone is likely to flow along the relatively short flow paths and rapidly discharge to streams, small springs and seeps. Groundwater discharge to streams ('baseflow') can significantly decrease in the drier summer months.

- Lk Locally Important Karstified Bedrock Aquifer:

Essentially similar to the Regionally Important Karstified Bedrock Aquifer (Rk), but with a smaller continuous area (<c. 25 km2). Although the properties imply that this aquifer can supply 'excellent' yields, the smaller size limits the amount of recharge available to meet abstractions.

- Lg Locally Important Sand/Gravel Aquifer:

Similar to a Regionally Important Sand/Gravel Aquifer (Rg), but with a smaller continuous area (c. 1-10 km2) and/or less consistent permeability. Although the aquifer may supply 'excellent' yields, the smaller size limits the amount of recharge available to meet abstractions.

Mount Lucas bog is located in an area mapped by GSI as largely of low groundwater vulnerability (GSI Mapviewer), however a centrally located portion of the bog is ranked as of medium vulnerability. Overall the bog is ranked as medium vulnerability.

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

The peat is underlain by glacial deposits interbedded with glacio-fluvial deposits over limestone bedrock. The glacial deposits generally consist of limestone till and gravel. The EIS produced for Mountlucas wind farm describes sub-soils as follows:

"*Immediately underlying the peat layer is generally soft to firm, grey, sandy, gravelly silt or occasionally silty, sandy, cobbly gravel. The soil has a thickness of at least 3m although the base of the strata was not reached during the site investigation and it is known that this quaternary strata can reach considerable thicknesses in this area (typically 20m or more).*"

The bog water table across the site is expected to be higher when bog drains are blocked, and perched above the underlying regional groundwater table. The ability of the shallow peat water to interact with the underlying regional groundwater flows is limited by the permeability of the underlying glacial deposits.

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 Mount Lucas 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.

Mountlucas bog has two treated surface water outlets, one to the Figile River IE_SE_14F010300 direct and the other via the Daingean IE_SE_14D060200. Peat extraction was identified as a pressure in both rivers in the second cycle of the river basin management plan and is indicated as remaining so in the third cycle, currently under preparation.

In respect of Mount Lucas, there are no exceedances in the IPC Licence limits for Suspended solids and Ammonia resulting from the surface water monitoring programme (as of 2019 AER). The main emission limit value associated with this bog is 35mg/l suspended solids, with trigger levels for ammonia of 3.00mg/l and COD 100mg/l. From an analysis if any available monitoring over the past 5 yrs. of the IPC licence environmental monitoring programme, indicate that results were under the ELV for SS and the trigger level for Ammonia, and within the trigger level for COD (Table 3.1).

Table 3.1.

Bog	SW	Monitoring	Sample Date	pH	SS	TS	Ammonia	TP	COD	Colour
Mountlucas	SW-11A	Q3 19	29/07/2019	7.9	5	456	0.41	0.07	31	45
Mountlucas	SW-19	Q3 19	30/07/2019	7.6	5	420	0.02	0.08	57	48
Mountlucas	SW-11A	Q1 18	21/03/2018	7.9	5	370	1.1	0.05	35	70
Mountlucas	SW-19	Q1 18	21/03/2018	7.8	5	304	0.68	0.05	61	122
Mountlucas	SW-11A	Q4 20	13/10/2020	7.9	6	408	0.125	0.05	46	269
Mountlucas	SW-19	Q4 20	14/10/2020	7.6	3	336	0.029	0.05	47	88

Rehabilitation of cutaway peatland is closely linked with control of emissions. One of the criteria for successful rehabilitation is stabilisation through re-vegetation, which will stabilise all substrates and in turn remove the need for further silt control measures. This site is already largely vegetated. Re-wetted peat also aid 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 raised bog restoration programme is expected to have a positive impact on water quality and help the NWBMP deliver its objectives in relation to the WFD.

Water will still discharge from designated emission points when rehabilitation at Mount Lucas 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 receptors, and is expected to support the future status of these receptors.

3.7 Fugitive Emissions to air

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

3.8 Carbon emissions

The bog is likely to be currently 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 Carbon-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 CO_2 and a source for Methane) 6 years after bog restoration was carried out (Renou-Wilson et al. 2018).

It is expected that Mount Lucas Bog will become a reduced Carbon source following rehabilitation. The site does have potential to become a carbon sink, in part, in the longer-term. This depends on the success of the rehabilitation measures, the extent of development of *Sphagnum*-rich habitats, the balance of carbon fluxes from different cutaway habitats (some of the cutaway is expected to develop Reed Swamp and fen habitats with fen GHG emission factors), the development of woodland on areas of very shallow or no residual peat, which is expected to be a carbon sink due to the development of woody biomass, and future climatic conditions. This site is already developing a mosaic of scrub and woodland, grassland and patches of wetland (fen, Reed swamp and open water) habitats in the older cutaway. Woodland is expected to develop on the drier mounds and peripheral headlands.

3.9 Current ecological rating

(Following NRA (2009) Evaluation Criteria)

The majority of the cutaway can be rated as having a **high local ecological value (D)** as it is dominated by a relatively large area of developing semi-natural habitats. The cutaway areas with rare plant species such as Blue Fleabane and Round-leaved wintergreen, and Invertebrate species such as Marsh Fritillary have somewhat higher ecological value and are of **County Importance (C)**. The area of the site recently out of peat extraction is rated as having low **local ecological value (E).**

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

There has been ongoing consultation about rehabilitation, biodiversity and other general issues over the years at Mount Lucas. Specific consultation relating to the wind farm development, amenity walkway, proposed aquaculture trials and medicinal herb trials is not listed here, although there has been detailed consultation with stakeholders in relation to these issues and overlap with rehabilitation and biodiversity. In addition, there has been development of rehabilitation and biodiversity-focused signage at Mountlucas Visitor Centre as part of the development of The Learning Hub (https://www.mountlucaswindfarm.ie/amenities/), telling the story of Mountlucas Bog from its original development, peat harvesting by Bord na Móna, and numerous visits to the Learning Hub from school children and others. Ongoing consultation with community groups in relation to wind farm operation and community fund in continuing (Bord na Móna Powergen). There was extensive consultation between Bord na Mona and the local community prior to the development and opening of the Mountlucas wind farm amenity walkway in 2015.

General consultation including peatland rehabilitation and biodiversity at Mountlucas can be summarised as follows:

- Open consultation with range of stakeholders at annual Bord na Mona Biodiversity Action Plan review days 2010-2018. A field visit was made during the 2013 BAP review day to Mount Lucas to examine the windfarm construction;
- Midlands & East Regional WFD Operational Committee (River Basin Management Plans).
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).
- Site visit with BAP attendees December 2013;
- Field visit during International Peat Society conference June 2015. Delegates to the conference visited Mount Lucas to learn more about cutaway peatland development and rehabilitation, and the development of other land-uses such as wind farm construction on cutaway;
- Site visit and field trip with Offaly Naturalists Field Club in July 2016.
- Site visit with Botanical Society of Britain and Ireland county recorder in summer 2016.
- Site visit with the Irish Peat Society in 2019.

Local stakeholders will continue to be identified through ongoing engagement with neighbours whose land adjoins Mount Lucas Bog. Additionally, local representatives of national bodies (such as Regional National Parks and Wildlife staff) and relevant offices in County Councils (such as the Heritage or Environmental Offices) will be contacted. Any identified local interest groups will also be sought and informed of the opportunity to engage with

this rehabilitation plan, and when identified will be invited to submit their comments or observations in relation to the proposed rehabilitation at Mount Lucas Bog.

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

4.2 Issues raised by Consultees

N/A. Not issued to consultees yet.

4.3 Bord na Móna response to issues raised during consultation

N/A

5. REHABILITATION GOALS AND OUTCOMES

The key rehabilitation goal and outcomes for Mount Lucas Bog is the overall **environmental stabilisation** of the site via **optimising climate action benefits, where possible, and integrating rehabilitation with the existing renewable energy infrastructure and other site infrastructure and land-uses**. This is defined as:

- Carrying out an intensive rehabilitation measures in the area that is recently out of peat extraction (including hydrological management, drain-blocking, re-profiling, wetland creation, fertiliser application, seeding of vegetation &, inoculation of *Sphagnum,* where appropriate),
- Optimising hydrological conditions for the development of embryonic *Sphagnum*-rich vegetation communities on deep residual peat recently out of peat extraction,
- Optimising hydrological conditions for the development of Reed Swamp and fen on shallow more alkaline peat and other subsoils, in the area recently out of peat extraction,
- Enhancing existing wetlands and re-wetting peat in the older cutaway, where possible,
- Integrating rehabilitation measures with current infrastructure and land-use on site,
- Stabilisation or reduction in water quality parameters (e.g. suspended solids),
- Environmental stabilisation,
- A significant part of the site has already largely vegetated and stabilised (See Figure 3.2-3.5 & 8.1). The aerial photo demonstrates the contrast between the older vegetated cutaway and areas at the western part of the site that have recently come out of peat extraction.
- Setting particular areas on an appropriate trajectory to develop naturally functioning peatland and wetland habitats over time. It is not expected that the former production bog has the potential to develop active raised bog (ARB) analogous to the priority EU Habitats Directive Annex I habitat within the foreseeable future (c.50 years). Furthermore, only a proportion of the bog has potential to develop *Sphagnum*-rich habitats in this timeframe. A significant portion of the site is relatively dry and is developing Birch scrub and woodland. Nevertheless, re-wetting, as part of the enhanced Scheme, will improve habitat conditions, making the overall bog wetter. Other peatland and wetland habitats such as fen, wet woodland, Reed Swamp and embryonic *Sphagnum*-rich vegetation will develop in a wider mosaic that reflects underlying conditions. It will take some time for stable naturally functioning habitats to fully develop at Mount Lucas Bog.

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 (Grand-Clement *et al*., 2015; Anderson *et al*., 2017; Minayeva *et al*., 2017). 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 reduced carbon source/carbon sink. The site will improve in condition after re-wetting and also have the capacity to develop as a reduced Carbon source as Reed Swamp, fen, scrub and bog woodland habitats develop.

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 Carbon sink function.

The main deliverable of this enhanced 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, is integrated with the current infrastructure and lane-uses, and which optimise climate action and other ecosystem service benefits.

6. SCOPE OF REHABILITATION

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

- The area of Mount Lucas Bog (Figure 3.1).
- 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. Mount Lucas bog is part of the Allen Bog group.
- The proposed Scheme is designed to exceed the stabilisation requirements as defined by the IPC Licence. This scheme is designed to enhance the ecosystem services of Mount Lucas Bog, optimising **climate action benefits,** particularly in the area recently out of peat extraction. 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 the area recently out of peat production at Mount Lucas Bog identify wetland creation and deep peat re-wetting as the most suitable rehabilitation approach.
- The older cutaway is relatively dry in general and is already developing a mosaic of woodland, grassland and some wetland habitats. This area has largely stabilised. Targeted rehabilitation is proposed to enhance residual peat re-wetting in these areas while taking account of the current infrastructure and land-uses.
- The key objective of rehabilitation, as defined by this licence, is **environmental stabilisation** of the bog. Bord na Móna have defined the key goal and outcome of rehabilitation at Mount Lucas Bog as **environmental stabilisation** of the site via **optimising climate action benefits, where possible, and integrating rehabilitation with the existing renewable energy infrastructure, and other site infrastructure and land-uses**. The re-wetting of residual peat in the area recently out of peat extraction will be optimised, **setting the site on a trajectory towards the development of embryonic peat-forming (*Sphagnum*-rich) vegetation communities on residual deep peat, and the development of wetlands/Reed Swamp and fen on shallow more alkaline peat and other subsoils.**
- Enhanced Rehabilitation at Mount Lucas Bog will support multiple national strategies of climate action, biodiversity action and other key environmental strategies such was the Water Framework Directive.
- The time frame for the delivery of the planned rehabilitation will be undertaken according to available resources and appropriate constraints.
- It is not proposed to carry out rehabilitation in the majority of the marginal cutover bog zone. Generally, these bog remnants are narrow, or are subject to turbary, and do not have positive bog restoration prospects. One area of remnant raised bog will be examined for potential raised bog restoration measures.

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). Peat Production at Mount Lucas bog commenced in the mid 1970's, and finished in 2018. As a result, peat depths are shallow for the most part (i.e. < 0.5m).

- In addition, Mount Lucas contains an operational windfarm. Rehabilitation will be integrated with this infrastructure and with this land-use. There will be a setback distance applied to avoid negative impacts on the windfarm infrastructure. For example, there are health and safety issues around re-wetting in close proximity to wind farm infrastructure/high voltage cabling.
- The areas used for medicinal herb trials (12.5 ha) will continue to be used in this way and are not in scope of this rehabilitation plan.
- The proposed Irish Water Shannon Pipeline corridor also traverses Mount Lucas Bog. This project is in the pre-planning stage. The footprint of the Irish Pipeline corridor traverses the northern margin of the site. It is not proposed to carry out any rehabilitation within the corridor in advance of this project. It is expected that this footprint will be rehabilitated after the construction of the proposed pipeline.
- These are local factors that will influence the future trajectory of this bog, which need to be considered as part of the wider rehabilitation work.
- **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, as well as potential changes to the hydrology of surrounding designated sites. It is anticipated that the work proposed here (blocking drains and re-wetting cutaway peatlands) will not have any flooding impacts on adjacent land.
- **Archaeology**. The discovery of monuments or archaeological objects during peatland rehabilitation may potentially constrain the rehabilitation measures proposed for a particular area. If this occurs, rehabilitation measures will be reviewed and adapted. An archaeological impact assessment of the proposed rehabilitation at Mount Lucas is being carried out (Appendix IX). There are some known archaeological features present. The EIAR for the Mount Lucas Windfarm also identified several archaeological features. Rehabilitation in these zones will be avoided or minimised (peat barriers located to avoid damage to any archaeological features) (Figure 8.5).
- **Public Rights of Way**. Where a public right of way or similar burden exists on Bord na Móna property, consideration will be given to ensuring that this remain intact where possible. In some instances, depending upon previous land uses and management, alternative solutions may be required. These will be explored in consultation with local communities and statutory bodies during the consultation work associated with the decommissioning and rehabilitation work described here.

6.2 Key Assumptions

- It is assumed that Bord na Móna will have all resources required to deliver this project. For the avoidance of doubt, should the proposed 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 only the 'standard' decommissioning and rehabilitation required under Condition 10, and for which financial provisions have been made, to comply with that element of the Licence.
- It is expected that weather conditions will be within normal limits over the rehabilitation plan timeframe. Long periods of wet weather have the capacity to significantly affect ground conditions and constrain drain blocking and other ground activities.

6.3 Key Exclusions

The scope of this rehabilitation plan does not cover:

- The PeatAqua aquaculture trial was removed from the IPC Licence and is not part of the scope of this rehabilitation plan.
- Part of the former bog is leased by FĀS who have developed a construction skills training facility at this location. This is not part of the scope of the rehabilitation plan.
- The areas used for conifer forestry (BOGFOR trials) are not in scope of this rehabilitation plan.
- The areas leased as part of a grazing licence and under licence to Mountlucas Gun Club are not in scope of this Rehabilitation Plan.
- The longer-term raised bog restoration trajectory of the site. The plan covers the short-term rehabilitation **actions** and **an additional monitoring and after-care programme** to monitor the rehabilitation during the Scheme and to respond to any needs. It is expected that this rehabilitation plan will set the site on an enhanced and accelerated trajectory towards stabilisation and residual peat re-wetting. The plan does not set any goals or outcomes, for example, the extent (specific area) of active raised bog habitat (ARB) that may develop at this site in the long-term. This is beyond the scope of this rehabilitation plan.
- This plan is not intended to be an after-use or future land-use plan for Mount Lucas Bog.
- The longer-term management of this site for other uses in the future.

7. CRITERIA FOR SUCCESSFUL REHABILITATION

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

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

Rehabilitation is generally defined by Bord na Móna as

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

In addition, Bord na Móna wish to optimise climate action and other ecosystem service benefits via enhanced rehabilitation measures. Enhanced rehabilitation will significantly go beyond what is required to meet rehabilitation and decommissioning obligations under existing EPA IPC licence conditions. The proposed interventions will mean that environmental stabilization is achieved (meaning IPC obligations are met) and, in addition, significant other benefits particularly for climate action will be accrued.

In general, the key objective will be to optimise the area of suitable hydrological conditions for climate action benefits (re-wetting peat and keeping water levels close to the peat surface) across this heterogeneous cutaway landscape to accelerate the trajectory of establishment of embryonic *Sphagnum*-rich peat-forming habitats on suitable deep peat areas and optimise water levels in the shallow cutaway areas for the development of Reed swamp and fen habitats.

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 silt run off 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 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) 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 WFD monitoring programme.

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 former area of industrial peat extraction towards becoming a reduced carbon source/carbon sink. A mosaic of compatible habitats including wetland, Reed Swamp, poor fen, wet woodland, Birch woodland, heath, scrub, poor fen and embryonic *Sphagnum*-rich peatland communities are expected to develop, where conditions are suitable. The majority of these habitats have already establishing in the older cutaway. It will take some time for stable naturally functioning habitats to fully develop at Mount Lucas Bog. 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.
- Improvement in biodiversity and ecosystem services. This will be demonstrated by metrics outlined in Section 9.1 that can be used to measure changes in ecosystem services (e.g. water quality parameters, development of pioneer habitats, breeding bird monitoring). This will be measured by collecting a range of scientific data that can then quickly be adapted and into metrics that can be used to measure changes in various ecosystem services. Baseline monitoring will be carried after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future. These metrics will be defined in the context of the overall Scheme resources and after consultation with stakeholders.

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

Criteria type	Criteria	Target	Measured by	Expected Time-frame
IPC validation	Rewetting in the former area of industrial peat production	Delivery of rehabilitation measures Reduction in bare peat.	Aerial photography after rehabilitation has been completed – to demonstrate measures (drain-blocking) Establishment of a baseline for future monitoring of bare peat, vegetation establishment and habitat condition.	2021-2025
IPC validation	Key water quality parameters Ammonia, Phosphorous, Suspended solids, pH and conductivity	Reduction or stabilisation of key water quality parameters	Water quality monitoring. Started in advance of the proposed rehabilitation.	2021-2023
IPC validation	Reducing pressure from peat production on the local water body catchment (WFD)	No decline in the WFD status of the local river catchment	EPA WFD monitoring programme	WFD schedule
Climate action verification	Optimising the extent of suitable hydrological conditions to optimise climate action	Optimal extent of suitable hydrological conditions	Aerial photography and Habitat mapping to map extent of suitable hydrological conditions. Baseline monitoring to be carried out during the scheme when rehabilitation is complete. Sites can be re-monitored in the future and compared against this baseline.	2021-2025

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.	2021-2025
Climate action verification	Biodiversity and ecosystem services. Habitat establishment Presence of key species – Sphagnum Breeding and wintering birds Pollinators	Improvement in biodiversity and ecosystem services.	Metrics that relate to selected biodiversity and ecosystem services Presence of key species – Sphagnum – Walkover survey Breeding birds – Breeding bird survey Pollinators – Pollinator walk	2021-2025

Meeting climate action verification criteria and monitoring of these criteria after the scheme has been completed is dependent on support from the Climate Action Fund or other sources of funding. Note that monitoring and verification of the overall scheme will be stratified – not all these criteria will be measured at each individual site.

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

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

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

- **Rehabilitation measures to be effective.** The rehabilitation measures proposed in this plan are based on 40 years of Bord na Móna experience of peatland management and best practise applied internationally in peatland management. Measures proposed in this plan have already been shown to be affective at other sites. Bord na Móna will apply a flexible and adaptable approach to the more innovative rehabilitation measures proposed in this plan**.** If measures are not initially effective, Bord na Móna will review any requirement for additional practical rehabilitation.
- **Natural colonisation of vegetation to develop semi-natural habitats at a rate within the normal limits.** The development of naturally functioning semi-natural habitats on cutaway peatland takes time. Pioneer vegetation can develop relatively quickly (3-10 years) and wetland habitats can develop relatively quickly. Birch woodland make take 20-30 years to develop. However, it may take 50 years for active raised bog vegetation to re-develop on ground that was previously cutaway. Different environmental conditions will have a significant impact on the rate of natural colonisation, and as a result of the combination of different environmental conditions and the application of different rehabilitation measures, there will be a variety of habitat outcomes.
- Rehabilitation measures have been designed to accelerate and work with natural colonisation and other natural processes. Bord na Móna experience of rehabilitation has shown that re-wetting improves conditions for natural colonisation and that natural colonisation is accelerated where the environmental conditions are most suitable. Rehabilitation measures have been designed to modify the conditions of areas within sites where conditions are less suitable for natural colonisation (modifying hydrology, topography, nutrient status or availability of potential seed sources).
- **Monitoring to be robust and effective.** Rehabilitation Monitoring will be established to validate the success of rehabilitation as required by Condition 10 of the IPC Licence and to verify the benefits of the proposed enhanced measures to optimise climate action. This will focus on a collecting a range of scientific data that can then quickly be adapted and into metrics that can be used to measure changes in various ecosystem services.

8. REHABILITATION ACTIONS AND TIME FRAME

Peatland rehabilitation requires detailed planning and the use of data from desktop surveys and field surveys. This data in association with topographical and hydrological modelling (Figure 8.3 & 8.4) 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 (Figure 8.4) 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).

The rehabilitation actions will be a combination of PCAS measures to re-wet peat. The distribution of these measures is provisionally outlined in Figure 8.5. (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 areas out of recent peat extraction at Mountlucas bog will include**:**

- Re-wetting the deep peat areas of the bog using screw leveller to take the existing camber off fields, drain blocking, cross bunds and finger bunds along the existing high fields. This enhanced measure seeks to create large flat areas or cells of shallow (< 10 cm) water conditions on bare peat, across multiple fields that are enclosed by shallow berms to retain shallow surface water;
- Inoculation of *Sphagnum* on compatible residual deep peat areas;
- Initial hydrological modelling indicates that a significant part of the area that has recently come out of peat extraction will develop a mosaic of wetland habitats. Hydrological management will look to optimise summer water levels to maximise the development of wetland vegetation (by looking to set water depths close to the peat surface and at < 0.5 m, where possible). Water-levels will be adjusted at outfalls and by adjusting piped drainage. More sustainable permanent gravity drainage solutions will be examined.
- Targeted fertiliser applications to accelerate vegetation establishment on bare peat sections of headlands and high fields; (It is noted that the application of fertiliser may need additional assessment and approval as per the IPC Licence),

Measures for other areas at Mountlucas bog will look to integrate rehabilitation with existing site infrastructure and land-use. Any rehabilitation will look to balance residual peat re-wetting and enhancement of wetland habitats with needs of the infrastructure and land-uses. These will include**:**

- Targeted drain blocking around existing wetlands or standing water to create/promote the spread of wetland habitats;
- Optimising water retention in wetland areas, including placement of berms where required;
- Regular drain blocking (3/100) on some dry cutaway adjacent to wetland mosaics, along with the blocking of outfalls and management of water levels;
- Intensive blocking of drains in targeted marginal (degraded) high bog area and re-wetting, where possible, using an excavator to install peat blockages. Some other bog remnants are too small to benefit from this approach;

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 proposed Scheme not materialise, from the EPA;
- Agree an *ex ante* budget of eligible costs (based on the approved enhanced plan) with the Scheme regulator;
- Develop a detailed site plan with detailed site drawings outlining how the various rehabilitation methodologies (The proposed Scheme PCAS) will be applied to Mount Lucas Bog. This will take account of existing infrastructure and associated drainage, peat depths, topography, drainage and hydrological modelling. (See map for an indicative view of the application of different rehabilitation methodologies);
- Carry out a drainage management assessment of the proposed enhanced rehabilitation measures;
- Carry out a review of known archaeology and an archaeological impact appraisal of the proposed rehabilitation. Incorporate the results of this assessment into the rehabilitation plan to minimise known archaeological disturbance, where possible;
- Carry out a review of issues that may constrain rehabilitation such as known rights of way, archaeology, turbary, other projects onsite and existing land agreements.
- Carry out a review of remaining milled peat stocks. It is expected that all peat stocks will eventually be removed or decommissioned.
- Carry out an ecological appraisal of the potential impacts of the planned rehabilitation, if needed, such as the presence of sensitive ground-nesting bird breeding species (e.g. Lapwing) or larval webs of Marsh Fritillary butterfly, rare plants such as Blue Fleabane etc. The scheduling of rehabilitation operations will be adapted, and
- Ensure all activities comply with the environmental protection requirements of the IPC Licence.

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

- Carry out proposed measures as per the detailed site plan. This will include a combination of hydrological management, drain blocking, peat field re-profiling, and fertiliser applications targeting 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 environmental control measures (Appendix IV);
- Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions;
- Carry out the proposed monitoring, as outlined.
- While natural colonisation is expected to commence almost immediately once peat production ceases, Phase 2 actions will be carried out in targeted areas to accelerate re-vegetation and colonisation of target species. Phase 2 actions 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 silt run-off from the site during the rehabilitation phase; and

- 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 proposed 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 9.2 below);
- Decommissioning of silt-ponds will be assessed and carried out, where required; and
- Reporting to the EPA will continue until the IPC License is surrendered.

8.4 Timeframe

- **2020-2021**: Short-term planning actions.
- **2021**: Short-term practical actions.
- **2021-2024**: Long term practical actions. Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- **2024**: Decommission silt-ponds, if necessary

8.5 Budget and costing

Bord na Móna (BnM) appreciates the Minister's intention to support, via the Climate Action Fund, Bord na Móna in developing a package of measures, 'the proposed 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 proposed 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 licence compliance costs of mandatory standard rehabilitation and decommissioning when industrial peat extraction ceases. This is updated every year - for more information see the Bord na Móna Annual Report (Bord na Móna 2020). Bord na Móna is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

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

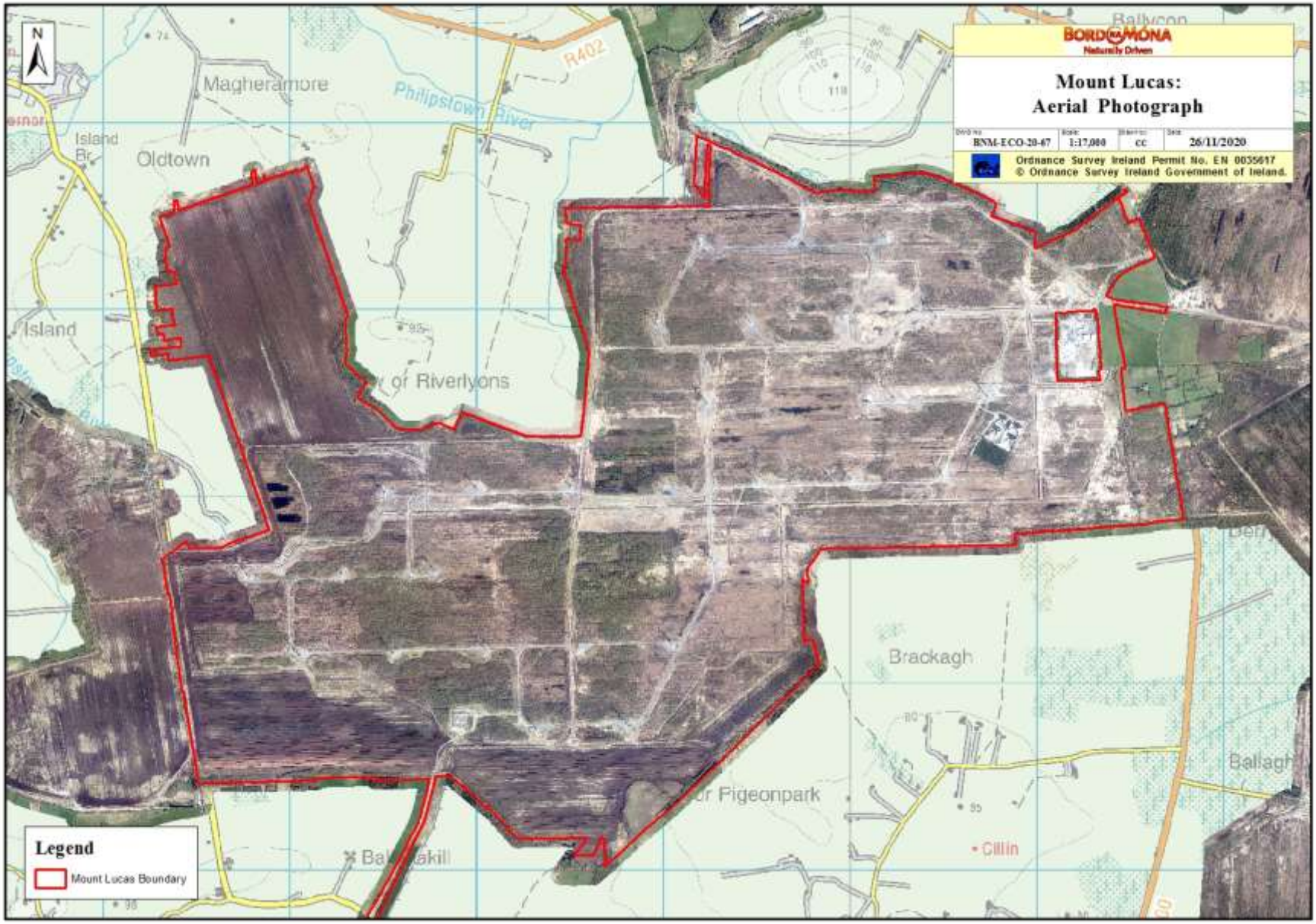

Figure 8.1. Aerial photo (2020) of Mount Lucas Bog.

Figure 8.2. Peat Depth Map for Mount Lucas Bog. Information for the majority of the site is not available as it has been cutaway for > 20 years.

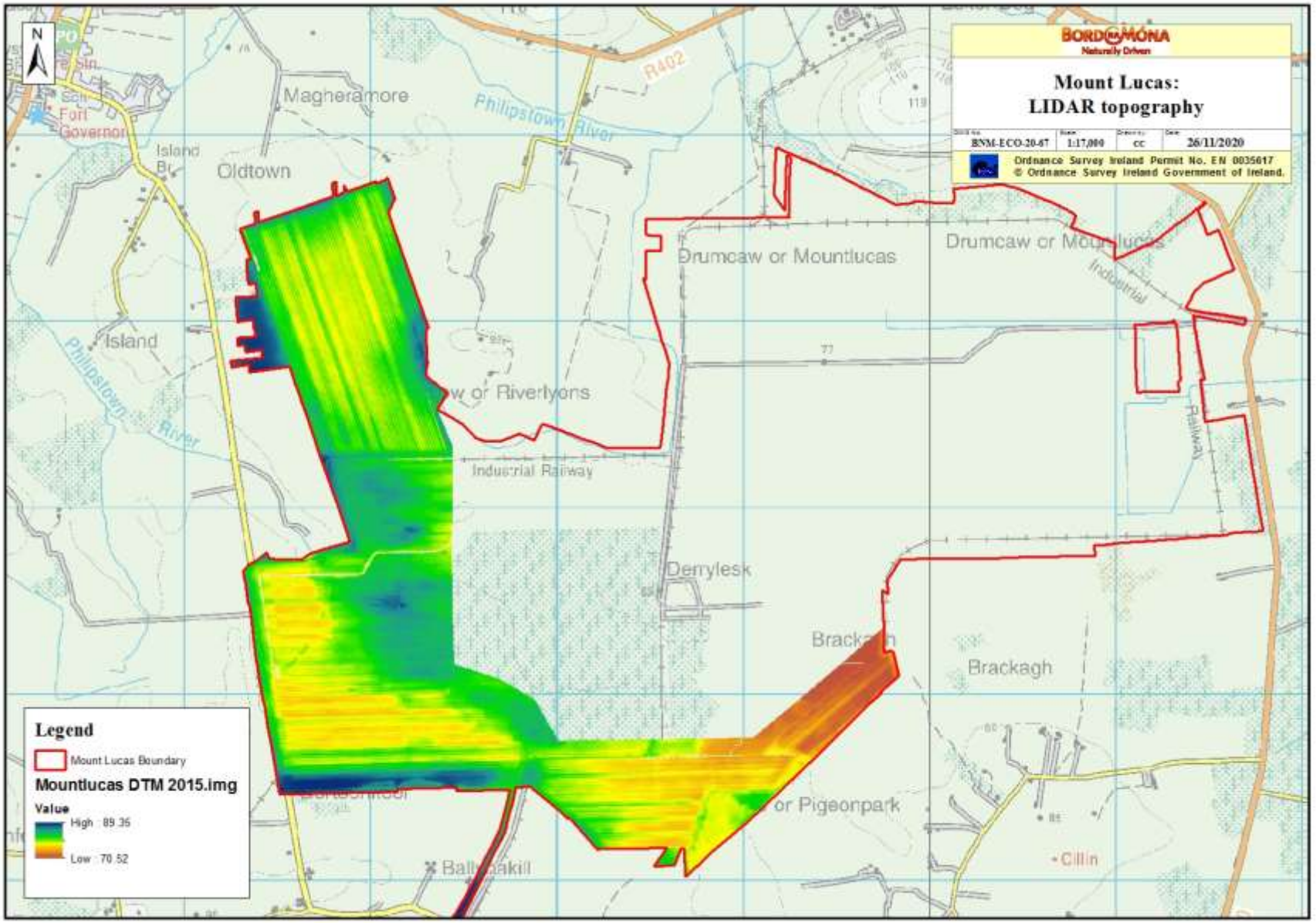

Figure 8.3. LIDAR topography map of Mount Lucas Bog. Low areas and basins are orange-yellow, more elevated areas are blue-green.

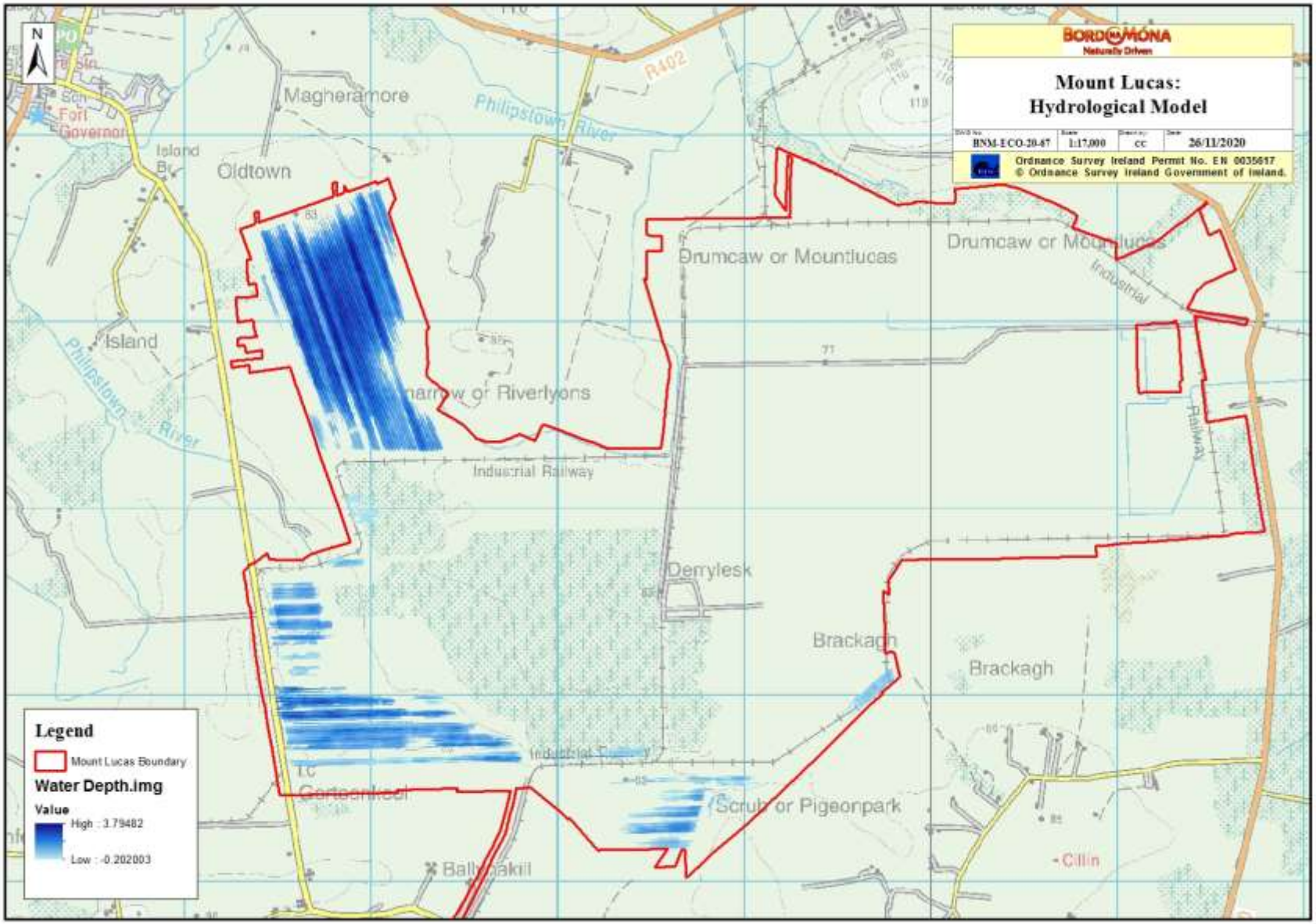

Figure 8.4. Hydrological modelling for Mount Lucas Bog showing range of expected water depths based on current topography.

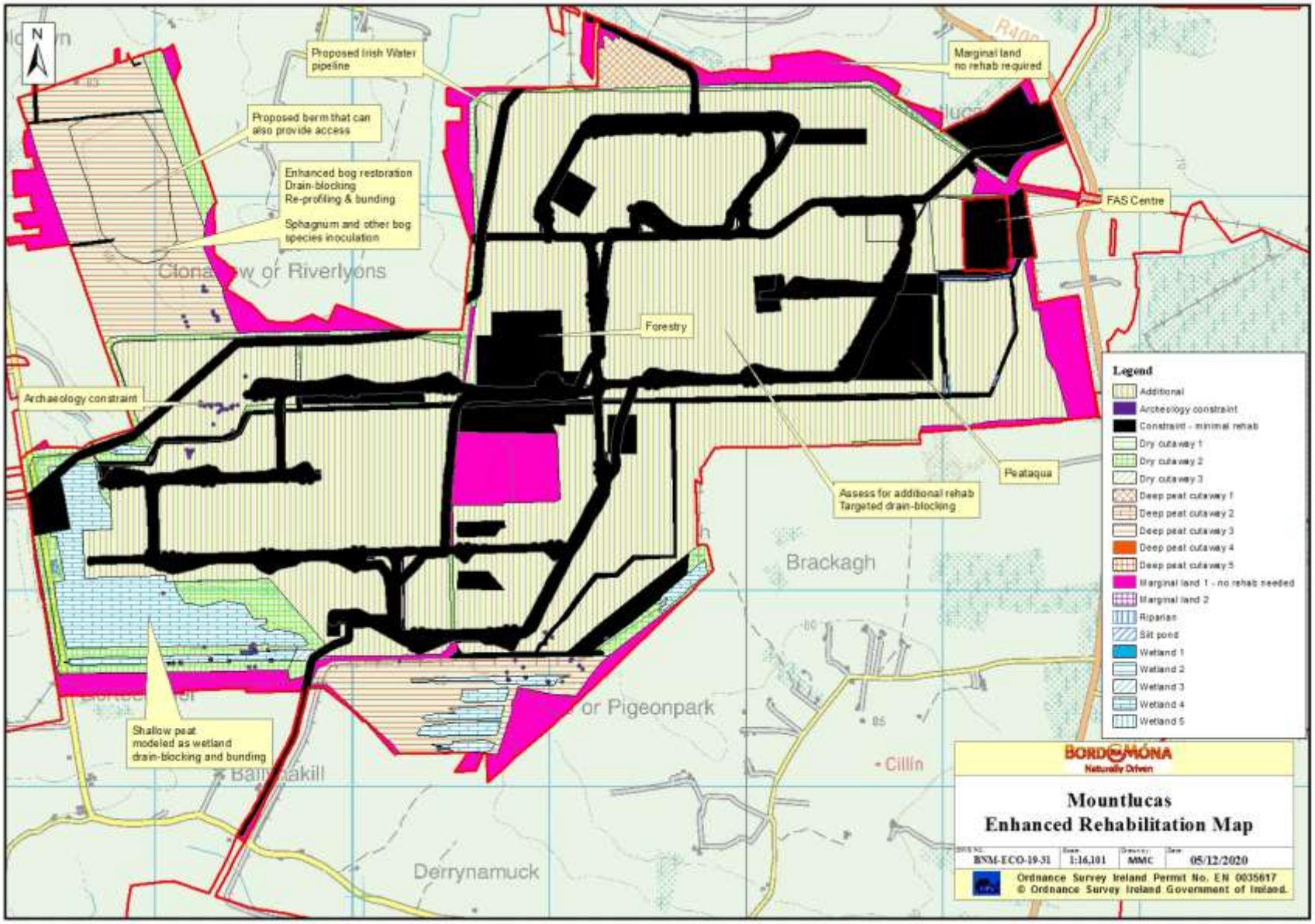

Figure 8.5. Indicative Enhanced Rehabilitation Plan for Mount Lucas Bog.

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.
- **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 three 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, Flow, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD.
- 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 appropriate 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 Scheme or additional other funding. Monitoring of climate action and other ecosystem service benefits will be designed to take account of the requirements of monitoring benefits of the overall Scheme and will be stratified; that is not all monitoring will be carried out in each site. These are defined as:

- Vegetation and habitat monitoring will be carried out using a condition assessment (similar to ecotope mapping). This assessment will include assessment of on environmental and ecological indicators such as vegetation cover, vegetation communities, presence of key species, *Sphagnum* cover, bare peat cover and water levels.
- The condition of the bog can be assessed using the condition assessment and suitable Greenhouse Gas (GHG) emission factors can be assigned to different habitats. GHG emission factors have been determined for various peatland habitats in Ireland (Wilson *et al*., 2015) and are constantly being refined with more and more research. BnM is actively supporting research into GHG fluxes in different rehabilitated peatland habitats. This means that potential GHG emissions can be estimated from the site, as the site continues along its trajectory towards a naturally functioning peatland ecosystem.
- It is proposed to monitor the improvement of some biodiversity ecosystem services. To be defined in relation to monitoring of the overall Scheme and after consultation with stakeholders.

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 proposed 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 improvements will be eligible for funding by government through the Climate Action Fund.

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 Mount Lucas Bog (Figure 3.1).
- 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. Mount Lucas bog is part of the Allen Bog group.
- The current condition of Mount Lucas Bog. Woodland, grassland and wetland habitats are already established across a significant part of the site.
- Current site infrastructure and land-use. The bog has conifer forestry (BOGFOR), an aquaculture project (PeatAqua), medicinal herb trials and a FAS training facility. These areas are out of scope of the rehabilitation plan. Rehabilitation will be integrated with the current renewable energy infrastructure.
- The key objective of rehabilitation, as defined by this licence, is **environmental stabilisation** of the bog.
- To minimise potential impacts on neighbouring land, some boundary drains around Mount Lucas Bog will be left unblocked as blocking boundary drains could affect adjacent land.

Rehabilitation goals and outcomes

The key rehabilitation goal and outcome for Mount Lucas Bog is environmental stabilisation of former peat production areas peat re-wetting and encouraging natural colonisation. This is defined as:

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

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

Criteria for successful rehabilitation:

- Rewetting of residual peat in the former area of industrial peat production to offset potential silt run off and to encourage development of vegetation cover via natural colonisation, and reducing the area of bare exposed peat.
- That there is a stabilising/improving concentration of suspended solids and ammonia associated with the measures undertaken to stabilise the peat surface by the blocking of the internal drainage system and the maximised rewetting of the peat surface. This will be demonstrated by developing a stable or downward trajectory of water quality indicators (suspended solids and ammonia) towards what would be typical of a re-wetted cutaway bog. This will be measured via water quality monitoring (suspended solids and ammonia).
- That the main water body associated with surface water from this bog continues to be excluded in the EPA's list of peat pressure water bodies as reported in the River Basin Management Plans. Where the water body has been identified as under pressure from peat extraction, that the intervening EPA monitoring programme associated with its Programme of Measures for this water body shows positive improvements in water quality impacts that were attributable to the original peat extraction activity.

Rehabilitation targets

- Demonstrating the delivery of the rehabilitation through site visits and through updated aerial photography (indicating presence of peat 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: (see Figure Ap-1)

- Blocking field drains in the former industrial production area using a dozer/excavator 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 wetlands;
- No measures are planned for the other 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:

- 2021. 1st phase of rehabilitation. Field drain blocking and water-level management.
- 2021. 2nd phase. Further realignment of piped drainage and other re-wetting measures dependent on success of 1st phase re-wetting, as determined by ongoing monitoring of water levels and re-vegetation.
- Other enhancement measures such as fertiliser treatment will be carried out, if needed. These will be determined by ongoing monitoring.

- 2023-2024. Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- 2023-2024. Decommission silt-ponds, if necessary.

Budget and Costing

- Bord na Móna maintains a Provision on its balance sheet to pay for the future costs of rehabilitation and decommissioning when industrial peat extraction ceases. This is updated every year. For more information see the Bord na Móna Annual Report (Bord na Móna 2020). Bord na Móna is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.
- At this time, a standard rehabilitation provision has been allocated to the site based on the area of different cutaway types across the bog.

Table AP-1. Rehabilitation measures and target area.

Type	Code	Description	Area (Ha)
Deep peat	Deep Peat Excavator	Regular drain blocking (3/100 m) + blocking outfalls and managing water levels with overflow pipes	25.8
Deep Peat	Deep Peat Dozer	Drain blocking, use of dozer to take camber off field, filling in drains	125.4
Dry cutaway	Dry Cutaway	Blocking outfalls and managing water levels with overflow pipes	94.4
Wetland	Wetland	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes	58.0
Marginal Land	Marginal	No work required	63.4
Other	Other	Other lands (no work required inc. constrained areas and silt ponds *	253.5
Completed	Complete	Naturally colonised and environmentally stable	606.2
Total			**1226.5**

Monitoring, after-care and maintenance

- There will be initial quarterly monitoring assessments of the site to determine the general status of the site, the condition of the silt-ponds, assess the condition of the rehabilitation work, asses the progress of natural colonisation, monitoring of any potential impacts on neighbouring land and general land security. The number of site visits will reduce after 2 years to bi-annually. These site visits will assess the need to 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 appropriate 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.

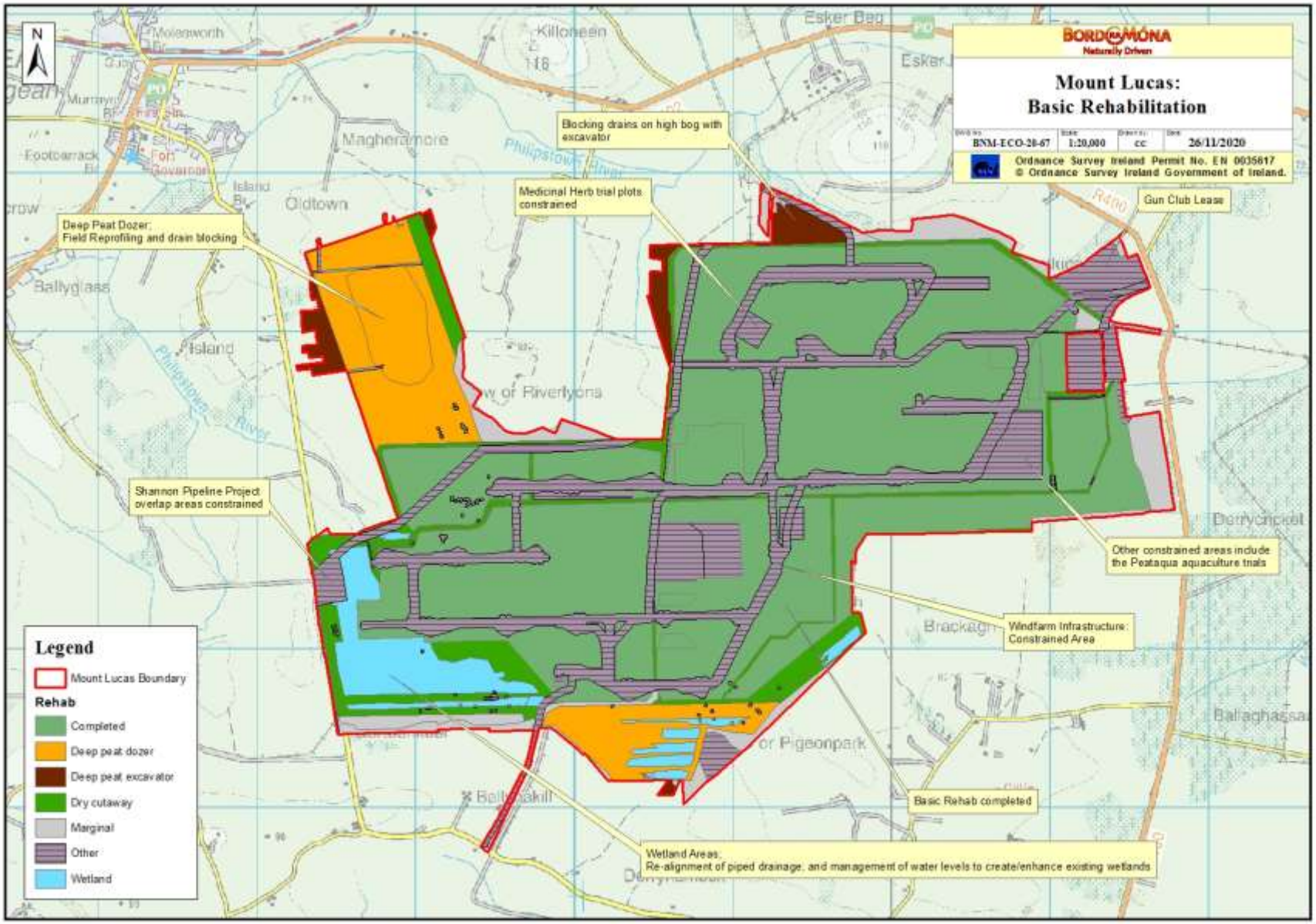

Figure Ap-1. Indicative standard rehabilitation plan for Mount Lucas Bog.

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. P0503-01, 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 Name	Area (ha)	Indicative Peat Production Status and land-use
Ballycon	281	Industrial peat harvesting ceased in 2001. Rehabilitation works were carried out in 2006 that consisted of drain blocking and bund construction, which has resulted in the creation of wetland habitat. Some headlands in the north of the site were fertilised in 2015 to encourage the development of pioneer dry cutaway habitats. Part of the site was developed for conifer forestry in the 1980s and is leased to Coillte. This site is a BnM Biodiversity Area. Additional enhanced rehabilitation being considered for this site 2021-2024. There is a rail transport link along the southern boundary of the site.
Ballykeane	451	Production bog. Milled peat production is anticipated to continue at Ballykeane Bog for the foreseeable future, depending on future milled peat resource requirements, (subject to current substitute consent applications and future planning applications for industrial peat production). Part of the site is cutaway and has started to develop pioneer vegetation. Part of Ballykeane Bog is being used as a herb production trial. Rehabilitation at Ballykeane to start when peat production ceases. 2021-2024
Cavemount	499	Industrial milled peat production at Cavemount completely ceased in 2015.

		Rehabilitation has been carried out across a portion of the site which is now developing as a wetland, holding nationally important numbers of wintering and breeding wetland birds. Rehabilitation at this site is ongoing. 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. There is a rail transport link through the site.
Clonad	447	Production bog. Milled peat production is anticipated to continue at Clonad Bog for the foreseeable future, depending on future milled peat resource requirements, (subject to current substitute consent applications and future planning applications for industrial peat production). Part of the site is cutaway and has started to develop pioneer vegetation. There is a rail transport link through the site. Rehabilitation at this site to start when peat production ceases. 2021-2024 The proposed Irish Water pipeline crosses this bog.
Cloncreen	1,009	Industrial milled peat production ceased at Cloncreen in 2018. The site has developed a mosaic of pioneer cutaway habitats. Cloncreen Windfarm. Planning Permissions was granted in 2016. Construction has stared (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. Rehabilitation at this site to start when windfarm construction is completed. 2022-2024 The proposed Irish Water pipeline crosses this bog.
Clonsast	1,534	Industrial peat production on Clonsast ceased in the 1980s. There are still a railway, travel paths, silt-ponds and drainage channels maintained on site. Clonsast has now established a mosaic of mature cutaway habitats. A significant portion of the site has been leased to Coillte and planted with conifer forestry in the 1980s. BnM re-wetted a section of bog in 2018. Additional enhanced rehabilitation being considered for this site. 2021-2024 Bord na Móna 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. There is a rail transport link through the site.
Clonsast Bulge	379	Industrial peat production on Clonsast ceased in the 1980s. Cutaway and Bog remnant. 80% developed for conifer forestry in the 1980s – Coillte. Bog remnant – Clonavoe Bog – biodiversity area. Additional enhanced rehabilitation being considered for this site. 2021-2024
Clonsast North	191	Industrial milled peat was last produced on Clonsast North in the 1990s Cutaway – naturally colonising – mosaic of Birch woodland and wetland The site was partially rehabilitated in 2018. Additional enhanced rehabilitation being considered for this site. There is a rail transport link through the site.
Daingean_Derries	277	Production bog. Some bog restoration on part of the site completed in 2017-2018. Milled peat production is anticipated to continue at Daingean Derries Bog for the foreseeable future, depending on future milled peat resource

		requirements, (subject to current substitute consent applications and future planning applications for industrial peat production). Rehabilitation at this site to start when peat production ceases. 2021-2024 There is a rail transport link through the site.
Daingean_Rathdrum	367	Production bog. Milled peat production is anticipated to continue at Daingean Rathdrum Bog for the foreseeable future, depending on future milled peat resource requirements, (subject to current substitute consent applications and future planning applications for industrial peat production). Rehabilitation at this site to start when peat production ceases. 2021-2024 There is a rail transport link through the site.
Daingean_Townparks	90	Daingean Bog NHA (intact raised bog) There is a rail transport link through the site. No rehabilitation required.
Daingean Raillink	5	Transport link
Derrycricket	190	Cutaway – Peat extraction at Derrycricket ceased in the 1980s. 80% developed for conifer forestry in the 1980s – Coillte. No rehabilitation required Transport link.
Derrylea	665	Production bog. Derrylea bog was developed in 1998 and has deep peat reserves. Some rehabilitation has been completed around the margins of the bog. Milled peat production is anticipated to continue at Derrylea Bog for the foreseeable future, depending on future milled peat resource requirements, (subject to current substitute consent applications and future planning applications for industrial peat production). Rehabilitation at this site to start when peat production ceases. 2021-2024. There is a rail transport link through the site.
Derryounce	389	Cutaway – Peat extraction at Derryounce ceased in the 1980s. 80% developed for conifer forestry in the 1980s – Coillte. Rehabilitation carried out to create a lake. Derryounce Lake Amenity area – leased to Portarlington Community Development Association. Transport link.
Esker	567	Production bog. Milled peat production is anticipated to continue at Esker Bog for the foreseeable future, depending on future milled peat resource requirements, (subject to current substitute consent applications and future planning applications for industrial peat production). Rehabilitation at this site to start when peat production ceases. 2021-2024 There is a rail transport link through the site. The proposed Irish Water pipeline crosses this bog.
Garryhinch	814	Large areas cutaway, mostly vegetated. Peat production at Garryhinch ceased in the 1980s. Extensive sod peat production across the site in the past few years. Rehabilitation anticipated to start in 2021-2024.
Garrymore	307	Production bog. Milled peat production is anticipated to continue at Garrymore Bog for the foreseeable future, depending on future milled peat resource requirements, (subject to current substitute consent applications and future planning applications for industrial peat production). Rehabilitation at this site to start when peat production ceases. 2021-2024

Mountlucas	1225	Peat production ceased across a significant part of the site before 2005. This area has developed a mosaic of cutaway habitats with Birch woodland dominant. Part of the site was in milled peat production until 2019. Mount Lucas 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. Bord na Móna have developed an aquaculture project in partnership with Bord Iascaigh Mhara and have developed herb production trials on site. Rehabilitation anticipated to start in 2021-2024. There is a rail transport link through the site. The proposed Irish Water pipeline crosses this bog.
Total	9687	

The Lullymore Bogs sub-group is mostly situated in west Co. Kildare and overlaps with Co. Offaly. The core area extends across an area between Rathangan and Edenderry. A second section of peatland is found further east (Timahoe North and South Bogs) and is separated from the core area by the Grand Canal. The core area of the Lullymore Bogs sub-group is very much a continuous area of bogland (Bog of Allen) that has developed according to the local topography and been sub-divided by Bord na Móna for administrative purposes. The Edenderry-Rathangan Road crosses the main section and is bordered by milled peat production bog.

The Lullymore Bogs sub-group has also had a long industrial peat production history. Sod peat for fuel was originally produced at Lullymore and in the Timahoe Bogs, which then supplied at old power station at Allenwood (now demolished). Much of the peatland around Lullymore is now cutaway. An agricultural research station was also established at Lullymore by An Foras Talúntais to investigate the potential future after-uses of cutaway bog. Agricultural grassland was also established in this area by Bord na Móna. This grassland has now been sold to local farmers. A large area of cutaway at Lullymore was also developed for conifer forestry by Coillte. Part of Timahoe South Bog has been re-developed as a waste disposal and composting facility (Drehid). Bord na Móna is currently developing a project with ESB to develop solar energy at Timahoe North bog. This project has recently got planning permission. Wetlands have been created in part of Lullymore Bog. An amenity area has also been created at Lullymore that has now been leased to the Lullymore Heritage and Discovery Centre. Bord na Móna have also transferred ownership of two separate parcels of land to the Irish Peatland Conservation Council. The first section was an intact remnant of raised bog at Lodge Bog. The second was an area of cutaway called Lullymore West. Both areas are now being managed as nature reserves by the IPCC. A small section of Lullybeg cutaway is currently being managed by Butterfly Conservation Ireland for butterfly conservation and to maintain the status of Marsh Fritillary (butterfly species of conservation interest) on the site. Bord na Móna also maintains transport links and an industrial railway through some of the cutaway that has developed in the Lullymore Bogs sub-group.

There are three land units within the Clonsast Bogs sub-group that are active (Daingean_Rail_Link, Daingean_Townparks) or inactive (Clonsast Power Stn Railway) transport links. Timahoe McNally in the Lullymore Bogs sub-group is also a transport link with associated farmland.

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

Bog Name	Area (ha)	Indicative Peat Production Status and land-use
Ballydermot	885	Production bog, emerging naturally colonising cutaway. Peat production is anticipated to continue at Ballydermot Bog for the foreseeable future, depending on future milled and sod peat resource requirements, (subject to current substitute consent applications and future planning applications for industrial peat production). There is a rail transport link through the site. Under consideration for future renewable energy development. Rehabilitation at this site to start when peat production ceases. 2021-2024
Barnaran	491	Production bog, emerging naturally colonising cutaway. Peat production is anticipated to continue at Barnaran Bog for the foreseeable future, depending on future milled and sod peat resource requirements, (subject to current substitute consent applications and future planning applications for industrial peat production). There is a rail transport link through the site. Under consideration for future renewable energy development. Rehabilitation at this site to start when peat production ceases. 2021-2024
Blackriver	728	Production bog, emerging naturally colonising cutaway. Peat production is anticipated to continue at Blackriver Bog for the foreseeable future, depending on future milled peat resource requirements, (subject to current substitute consent applications and future planning applications for industrial peat production). There is a rail transport link through the site. Under consideration for future renewable energy development. Rehabilitation at this site to start when peat production ceases. 2021-2024
Codd	557	Production bog, Peat production is anticipated to continue at Codd Bog for the foreseeable future, depending on future milled and sod peat resource requirements, (subject to current substitute consent applications and future planning applications for industrial peat production). There is a rail transport link through the site. Under consideration for future renewable energy development. Rehabilitation at this site to start when peat production ceases. 2021-2024 The proposed Irish Water pipeline crosses this bog.
Derrybrennan	194	Cutaway emerging – naturally colonising. Peat production has ceased. BnM Coillte forestry trial. Under consideration for future renewable energy development. Rehabilitation anticipated to start in 2021-2024. The proposed Irish Water pipeline crosses this bog.
Glashabaun North	505	Production bog, emerging naturally colonising cutaway Peat production is anticipated to continue at Glashabaun North Bog for the foreseeable future, depending on future milled and sod peat resource requirements, (subject to current substitute consent applications and future planning applications for industrial peat production). Part developed for conifer forestry in the 1980s – Coillte. There is a rail transport link through the site. Long Derries SAC – Some rehabilitation (bog restoration in a remnant) was carried out on the margins of Long Derries in 2018. Under consideration for future renewable energy development. Rehabilitation at this site to start when peat production ceases. 2021-2024

Glashabaun South	560	Fragmented milled peat production, emerging naturally colonising cutaway. Peat production is anticipated to continue at Glashabaun South Bog for the foreseeable future, depending on future milled and sod peat resource requirements, (subject to current substitute consent applications and future planning applications for industrial peat production). Part developed for conifer forestry in the 1980s – Coillte. There is a rail transport link through the site. Cutaway emerging – naturally colonising. Under consideration for future renewable energy development. Rehabilitation at this site to start when peat production ceases. 2021-2024 The proposed Irish Water pipeline crosses this bog.
Killinagh	243	Cutaway – mosaic of cutaway habitats developing. Peat production has ceased. Forestry trial. There is a rail transport link through the site. Under consideration for future renewable energy development. Rehabilitation anticipated to start in 2021-2024.
Lodge	429	Production bog, emerging naturally colonising cutaway Peat production is anticipated to continue at Lodge Bog for the foreseeable future, depending on future milled and sod peat resource requirements, (subject to current substitute consent applications and future planning applications for industrial peat production). There is a rail transport link through the site. Wetlands cutaway rehab trial. BeadaMoss Sphagnum inoculation trial. Under consideration for future renewable energy development. Rehabilitation at this site to start when peat production ceases. 2021-2024
Lullybeg	267	Cutaway – mosaic of cutaway habitats developing. Peat production has ceased. Butterfly Conservation Ireland Area. Under consideration for future renewable energy development. Rehabilitation anticipated to start in 2021-2024.
Lullymore	175	Peat production has ceased. Part developed for conifer forestry in the 1980s – Coillte. Cutaway – mosaic of cutaway habitats developing – Biodiversity Area. Wetlands rehabilitation trial. Carbon Flux research. Part-leased to Lullymore Heritage and Discovery Park – amenity. Additional enhanced rehabilitation being considered for this site. 2021-2024
Ticknevin	458	Cutaway - Peat production has ceased. There is a rail transport link through the site. Cloncannon bog – biodiversity area. Under consideration for future renewable energy development. Rehabilitation anticipated to start in 2021-2024.
Timahoe McNally	43	There is a rail transport link through the site. Farmland.
Timahoe North	798	Former industrial sod peat bog – peat production ceased in 1980s – site has established a mosaic of cutaway habitats. Sod peat production for domestic use in parts. BnM Solar energy project – Planning permission granted 2020 Rehabilitation anticipated to start in 2021-2024. The proposed Irish Water pipeline crosses this bog.

Timahoe South	1703	Former industrial sod peat bog – peat production ceased in 1980s – site has established a mosaic of cutaway habitats. Resource Recovery (Drehid Facility). Rehabilitation anticipated to start in 2021-2024. The proposed Irish Water pipeline crosses this bog.
Total	8036	

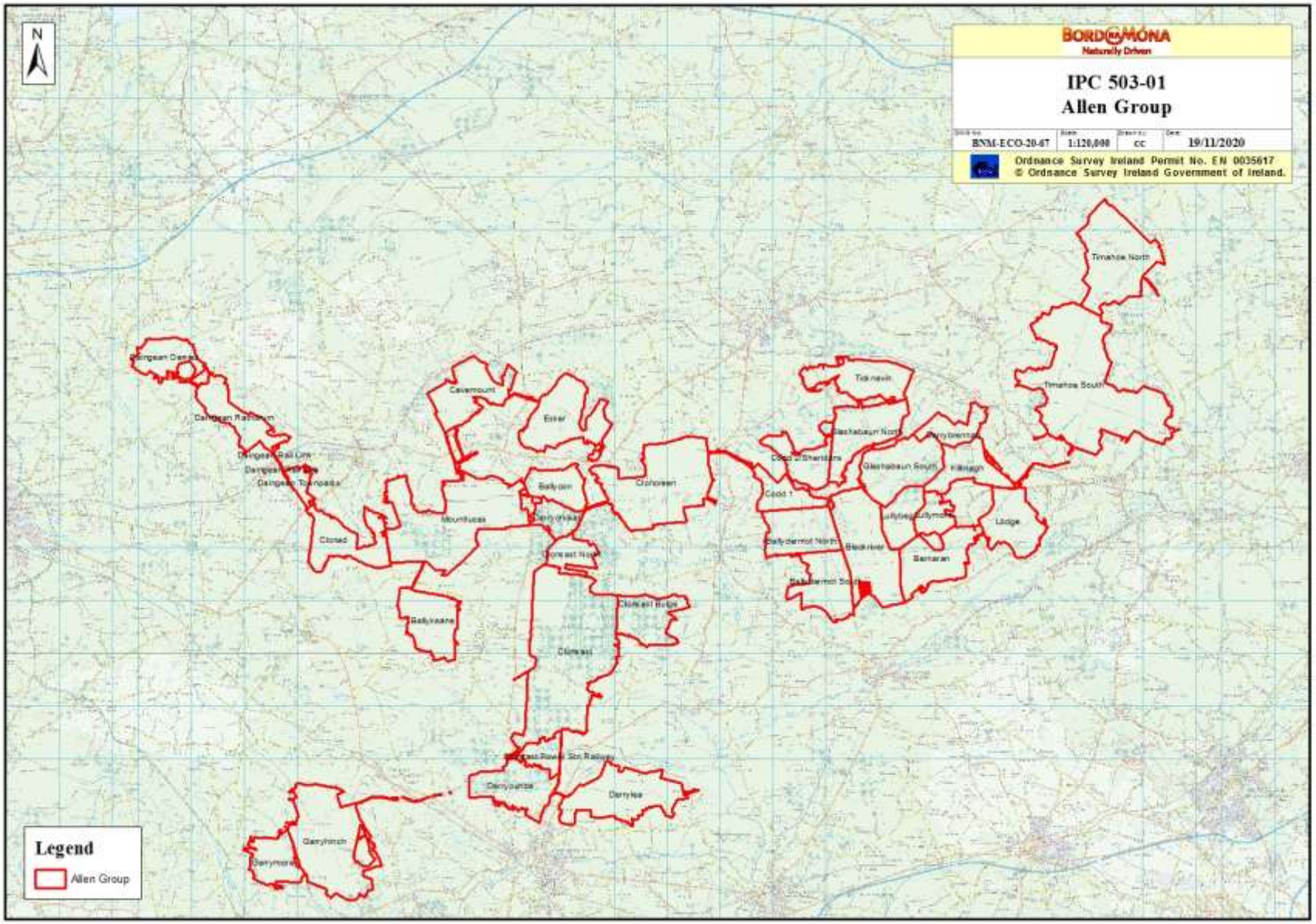

Figure Ap-2: Allen Bog Group

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:	**Mount Lucas**	**Area (ha):**	1230 Ha
Works Name:	Derrygreenagh	**County:**	Offaly
Recorder(s):	MMC & DF	**Survey Date(s):**	7th and 8th October 2010

Habitats present (in order of dominance)

The most common habitats present at this site include:

- Bare peat (BP) (Codes refer BnM classification of pioneer habitats of production bog. See Appendix II).
- Pioneer poor fen communities dominated by Soft Rush, Marsh Arrowgrass or Bog Cotton (pJeff, pTrig pEang) frequently in mosaic with Birch scrub.
- Emerging, open and closed Birch scrub (eBir, oBir, cBir)
- Oak-Ash-Hazel woodland (WN2)
- Dry Heath (dHeath)
- Dry grassland dominated by Purple Moorgrass (gMol)
- Dry grassland with Cocksfoot and Sweet Vernal Grass (gDa-An)
- Dry calcareous grassland (gCal)
- Dry grassland with Bentgrass, Yorkshire Fog and Horsetail (gAn-H-Eq)
- Disturbed vegetation (DisWill, DisCF)
- Access routes (rail lines and tracks including gravel embankments and associated habitats such as dry grassland communities (GS2) and scrub)
- Silt-pond areas (Silt) with silt ponds and associated spoil heaps and access tracks
- Reedbeds dominated by Reedmace (pTyp) and Common Reed (pPhrag)

The most common habitats found around the margins and in other parts of the site include:

- Birch woodland (WN7) (Codes refer to Heritage Council habitat classification, Fossitt 2000),
- Scrub (WS1) – Gorse and Birch scrub
- Conifer woodland (WD4)
- Wet grassland (GS4) and improved grassland (GA1)
- Raised bog remnants (PB1)
- Cutover bog (PB4) (other BnM properties)

Description of site

Mount Lucas Bog is located approximately eight kilometres south-east of Daingean in Co Offaly. It is situated in a group of bogs within the Derrygreenagh complex that includes Ballycon and Derrycricket to the east of the site, Clonad to the west and Cavemount to the north of the site. The majority of the site has been out of production for some time and has developed typical cutaway habitats with portions of the site still in the pioneer colonisation

phase and some active peat production still ongoing. The bog was underlain with glacial till, mainly limestone gravel, and several former excavation pits are located on the site. There is a small glacial mound towards the centre of the site that formerly had mineral soils and was farmed pre-BNM but now is developing Ash woodland (WN2). This area is designated as a BNM Biodiversity Area.

A section of the site close to the eastern edge of the bog is owned by FÁS who run a construction skills training facility at this location including a number of high rise cranes that are clearly visible on the site. Bord na Mona has received planning permission for the construction of a wind farm at this location. This project will involve erecting 32 wind turbines along with associated road and cable network.

For the purpose of the site survey this bog has been divided into four uneven sections that are divided by the road and rail network on the site.

South eastern section

This area is bounded by the access road and FAS site to the north and by the railway to the west. This is the largest section on the site and has only a small amount of industrial peat production in operation towards the southern end. The FAS training centre is located in the north eastern corner of this section and an area of ground surrounding the training centre had been planted with ornamental trees and shrubs. Since this section came out of peat production the site appears to have revegetated quite rapidly in most areas apart from some small areas, mainly toward the centre of the section, that appear to be slow in re-vegetating and still contain areas of bare peat that are prone to wind erosion. An extensive network of drains has been installed throughout this section and appear to have been recently been maintained. The main drains had a good flow of water through then and Otter spraint was located along side one of the main drains, Otter footprints were also found along the southern boundary of the site.

Along the western edge of this section a section of forestry has been planted in the 1980's under the BOGFOR project. This plot appears to have exterminated with many different tree species including Sitka Spruce, Norway Spruce, Larch, Sycamore, Oak, Birch, Alder and Popular. This section of forestry has for the most part developed well as a result access was difficult as no inspection path has been cut. The Oak and Larch appeared to have been doing best at this location.

A short distance to the south of the BOGFOR forestry an area of woodland (WN2) has developed with Ash, Birch, Wild Cherry, Willow, Blackthorn, Hawthorn, Elder and Aspen. Most of this woodland is over 35 years old but some younger sections were also present within it. The area on which it is located is visible on the OSI 6 inch map (called Derrylesk) as having field boundaries, therefore it is unlikely that this area ever contained peat. Some wet areas within this woodland contained dense Bramble, Bracken, Meadow Sweet and Rosebay Willow Herb. The ground flora of the woodland was not well developed and contained Bracken, Bramble and Hart's Tongue Fern, along with abundant emergence of tree seedlings.

Further to the south of the woodland, more recent, forest establishment appears to have been carried out. Alder and Birch were planted but have not been doing particularly well with the majority of the Birch in poor condition. The Alder was doing somewhat better, however the natural regenerated Birch was out performing the planted trees. This area is mapped as immature woodland (WS2). This area could have been planted as part of a biomass plantation.

The south western part of this section is a mixture of Birch scrub and wetlands. Some sections of wetland are developing with sections of open water, Birch scrub and poor fen (pEang, pRos). Some areas of bare peat still persist within these areas and these areas of bare peat appear to be prone to wind erosion.

The eastern boundary of the site contains a relatively large section of bog woodland (WN7) that is dominated by Birch and also contains some Scot's Pine. Domestic turf cutting is carried out in this section of the site. Apart from the turf cutting areas that were bare peat the remainder of the eastern part of this section is well re-vegetated with a mixture of Birch scrub and poor fen pioneer vegetation communities (pEang, pPhrag and pJeff). Some small, drier pioneer habitats were also present such as dry heath and Purple Moorgrass-dominated grassland.

The middle-northern area in this section contained a mosaic of wet and dry habitats with the largest areas of open water on the site. There are several permanent pools present as well as one section that have been drained recently but still are prone to inundation with temporary water. These open water areas are surrounded by mostly bare peat with some Bog Cotton-dominated poor fen colonising. This is the largest area of bare peat left unvegetated in the cutaway area. Wetland development is poor with only a small amount of Reed cover, emergent Bottle Sedge and Bog Cotton-dominated vegetation around the margins. The wetland vegetation is better

developed towards the west side and there is a diverse mosaic of poor fen communities (pRos, pEang, pJeff) and some Reedbeds (pTyph) developing in this area (pictures taken).

A low ridge with drier habitat development is situated to the east of this area. Typical habitats include Birch scrub with some dry grassland communities. The northern section along a deep drain is notable for the development of pioneer dry calcareous grassland (with Blue Fleabane) on this higher ground. Further south-east the ground falls again and there is a large area of mostly wetter poor fen vegetation (pEang, pRos, pJeff) with scattered small areas of open water and some Reedbeds (pictures taken). Towards the southern boundary of this section some Stoneworts were recorded adjacent to the deep drain. The OSI 6 inch map indicates that some soak systems were found in this area prior to the development of the bog and the presence of the Stoneworts may be one indication of possible spring-fed groundwater influence.

North Eastern Section

This is one of the smallest sections within the site and is bounded by the site boundary to the north and the access road and the FAS centre to the south. Birch woodland (WN7) and remnant sections of raised bog (PB1) are to be found along the northern, eastern and western margins of this section. Most of the remnant sections of raised bog are relatively dry and degraded with encroaching scrub and Birch woodland. Domestic turf cutting is also carried out at one location along the northern boundary of the site. One section of intact high bog (PB1) to the north of the site and adjacent to the railway was in relatively good condition with relatively high *Sphagnum* cover 33-50% in places). The bog was still firm-spongy and the *Sphagnum* cover may have been as a result of recent regeneration. It was dominated by *S. capillifolium* and S. *papillosum* hummocks with only a very small amount of *S. cuspidatum* and *S. magellanicum* in small hollows present. Deergrass was relatively frequent within the vegetation and this is one indication of previous disturbance and degradation. There were other signs of degradation with former pools now revegetated with Bog Asphodel and other species.

An old sand and gravel quarry is located along the central part of this section. Material was quarried for developing access roads and railway embankments. This whole area is quite disturbed with various old pits containing open water and some aquatic vegetation, recent piles of spoil and exposed gravel with varying development of pioneer vegetation communities. Some sections have a little more peat and were being recolonising with Soft Rush (Poor Fen). Other sections were drier and there being recolonising with species typical of pioneer dry calcareous grassland (Knapweed, Yarrow, Wild Carrot, Glaucous Sedge), Some drier sections were recolonising with Purple Moorgrass. Blue Fleabane was widely scattered other parts of this area. Further west in the more established cutaway communities there is also some influence of the underlying gravel/sub-soil and pioneer dry calcareous grassland (gCal) and dry grassland with Bentgrass, Yorkshire Fog and Horsetail (gAn-H-Eq) are both present in mosaic with Birch scrub and some Soft Rush-dominated vegetation.

Dense Birch woodland is developed on several parts of this area, mainly along the eastern boundary and along the southern access road. The LIDAR map indicates that this ground is somewhat higher that the surrounding cutaway and the Birch scrub is sometimes found in mosaic with drier pioneer vegetation communities such as Purple Moorgrass dominated grassland (gMol) and grassland with Bentgrass, Yorkshire Fog and Horsetail (gAn-H-Eq). The northern side along the railway is somewhat wetter and more open. This area contains Bog Cotton-dominated vegetation (Poor Fen) with small amounts of Birch scrub appearing.

South Western Section

This section of the site is separated from the north western section by a large drainage ditch that runs in north eastward direction, while a railway line separates it from the south eastern section. Otter spirants were noted along this long drain. This section is bordered to the south by a mixture of remnant raised bog (PB1) and Birch woodland (WN7).

The majority of this section of the site has revegetated to such an extent that Birch scrub is the dominant habitat type, especially on a raised ridge that runs through the centre line of this section in a north south orientation. Open areas occur throughout the Birch scrub and are made up of a mixture of open patches of dry grassland and Bramble thickets. Elder and Hawthorn are present but are rare. Some of the dry grassland is rank and dominated by tall grasses such as Cocksfoot and Sweet Vernalgrass (gDa-An) and more acidic vegetation dominated by Bentgrass (*Agrostis capillaris*) (GS3). These areas also contain patches of Willowherb-dominated vegetation (DisWll).

The south and south western areas of this section are still in production apart from a narrow piece of remnant raised bog that runs along the southern boundary of the site. This area of raised bog was dry and degraded with Birch woodland encroaching on it.

The topography of the site slopes into to a slight depression east of the main ridge with Birch scrub. A diverse wetland has developed in this depression with poor fen (pEang, pJeff and pRos) Reedbeds (pTyph) and open water, along with large areas of open Birch scrub (oBir). Along the north eastern boundary substantial areas of maturing Birch woodland were established. Within and around the fringes of these wooded sections there are some open areas where Purple Moorgrass-dominated vegetation (gMol) has developed in association with Heather-dominated sections (dHeath) and some disturbed vegetation and dry grassland (DisWill, gDa-An)

To the west of the site the vegetation was younger and the main habitat consisted of open Birch with pioneer poor fen species such as various pioneer poor fen communities (pEang, pTrig and pJeff). Some areas to the west of this section had only come out of production in the past few years and contained significant areas of bare peat. Some areas appeared to have been out of production for many years even though these areas were raised and appeared to have significant areas of peat remaining, possibly due to the unearthing of large amounts of fossil timber.

An aerial/mast had been erected in this section for the purpose of measuring wind speed for the planned wind farm on the site.

North Western Section

This section of the site is separated from the south western section by a large drainage (east-west). This section contains a large area of bare peat that is still in production. This area was being used by roosting Golden Plover.

The cutaway is mostly vegetated. There are several small wetlands to the west side, adjacent to the boundary of the site. These areas contain open water along with emergent Reedmace (pTyph) and fringing poor fen with Bog Cotton and Soft Rush (pEang and pJeff). An adjacent ridge is vegetated with Birch scrub. Further east there is some more open cutaway with bare peat that has come out of production more recently. This area is being vegetated with mainly Bog Cotton. Further east the cutaway is mainly vegetated with a mosaic of Bog Cotton-dominated poor fen and Birch scrub.

Forestry and potential forestry on site

A small area of the cutaway was planted with a BOGFOR forestry trial in the 1990's. The BOGFOR trial site is made up of Popular, Sitka Spruce, Norway Spruce, Oak, Sycamore, Larch, Birch and Alder. This section of forestry appears to be doing moderately well with Oak and Larch displaying best development. No management appears to have been carried out on this forestry in recent years and there are no inspection paths.

A small area of Oak-Ash-Hazel woodland (WN2) is located towards the centre of the site. This woodland has developed within the past 40 years and was previously mapped as farmland on the OS 6" map. This area is located on mineral soil and the woodland is still quite young and structurally poor in terms of canopy closure. The dominant tree species found here is Ash, with Birch also featuring regularly. Other trees/shrubs included Wild Cherry, Hawthorn, Blackthorn, Elder and Aspen. In the past some areas within this woodland suffered soil rutting and these areas are now prone to water logging and contain Bramble and wet grassland species such as Meadowsweet. This woodland did not have a very diverse ground flora but natural regeneration of tree species such as Ash in the ground and shrub layers of the woodland was high.

The majority of the cutaway has already re-vegetated with large areas with dense scrub, which would be unsuitable for forestry establishment. There are other areas on the site still in production have could be more suitable for afforestation once production ceases. Some marl (blue silty clay) was noted in the subsoil around the site in the horizons of deep drains. Development of conifer forestry in adjacent sites, Ballycon and Derrycricket, has had mixed success with significant portions of these plantations failing.

Blue Fleabane distribution

This rare species (whose status is listed as endangered) was recorded at several locations around the site. It has not been recorded at this site before. Blue Fleabane (*Erigeron acer)* is an annual species that is found in dry pastures and sandy or gravely places such as eskers and its distribution is mainly confined to the central and south-eastern parts of Ireland (Webb *et al.* 1992). It has been recorded in several 10 km grid squares in Offaly in

the past and has recently been recorded from several other BnM sites in Derrygreenagh such as Ballycon, Ballybeg, Derryarkin and Drumman.

Several populations were recorded on the site. It was widely distributed in parts of the old gravel pit in the centre of the site and had spread into the adjacent cutaway around this low mound.

This species is not likely to have been present on the site prior to the development of the cutaway. Subsequent development of the site including construction of railways on gravel embankments, construction of drains and silt ponds, and more recently the development of the quarry have created suitable exposed gravel banks made up of calcareous rich material that this species prefers. In the long-term, it could be expected that these spoil heaps and exposed gravel patches will re-vegetate with grassland and scrub, which will not favour this species.

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

None

Adjacent habitats and land-use

Adjacent habitats include conifer plantation (WD4), wet grassland (GS4), improved agricultural grassland (GA1), raised bog (PB1), cutover bog (PB4) and Birch woodland (WN7)

Watercourses (major water features on/off site)

- Tributaries of the Philipstown River are located next to the western and northern (two) edges of the site.
- The Wouge River flows along a section of the south eastern corner of the site.
- The Cushina River flows within 100m of the south western boundary of the site.
- All of the watercourses on the site are part of the South Eastern Barrow water region.

Peat type and sub-soils

The sub-soils are mainly limestone till. Some blue-silty clay and marl was also exposed during the construction of deep drains on the site. .

Fauna biodiversity

Birds

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

- Numerous Snipe were using the site (>30)
- Buzzard was spotted at two locations on the site.
- Mallard (11) using various wetlands and drains around site
- Flock of about 200 Golden Plover roosting on bare peat production area towards NW of the site.
- Jay
- Skylark
- Starling (14)
- Linnet in numerous locations on the site
- Other more common bird species included Blackbird, Grey Crow, Wren, Reed Bunting, Pheasant, Rook, Magpie, Blue Tit, Wood Pigeon, Pied Wagtail and Meadow Pipit.

Mammals

Signs of several mammals were noted on the site.

- Badger tracks and foraging signs at several locations on the site
- Otter track and spraint found at two locations on the site along drains. Spraint recorded on large concrete pipes providing culverts under tracks.
- Stoat spraint
- Indications of Fox, Hare and Rabbit.

Other species

- Frog

Fungal biodiversity

Brown Birch Bolete,

References

European Commission (1996). Interpretation manual of European Union habitats. Brussels. European Commission, DGXI.

Fossitt, J. (2000). A guide to habitats in Ireland. Kilkenny. The Heritage Council.

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

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

APPENDIX V. BIOSECURITY

The potential for importation or introduction of non-native plant species (such as Japanese Knotweed, Himalayan Balsam, etc.) or the dispersal of known in-situ IAS, during future rehabilitation management, such as drain-blocking using excavators, has the potential to result in/or increase the establishment of invasive alien 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, accessed on the Environment Agency's website on the 11th of July 2016).

In addition to the above, Best Practise measures around the prevention and spread of Crayfish plague[5] and/or other aquatic IAS 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 have now announced the complete cessation of industrial peat production across its estate (January 2021).

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. 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 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) appreciates the Minister's intention to support, via the Climate Action Fund, Bord na Móna in developing a package of measures, 'the proposed Scheme', for the enhanced decommissioning, rehabilitation and restoration of cutaway peatlands, referred to as the 'Peatlands Climate Action Scheme'. The proposed Scheme includes lands previously used to supply peat for electricity generation within the State. The enhanced decommissioning, rehabilitation and restoration of the peatlands funded by the proposed 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.

It is envisaged that Bord na Móna carry out an enhanced decommissioning, rehabilitation and restoration scheme, (PCAS), across a footprint of 33,000 ha (a subset of the BnM estate that has been used for energy production). This proposed 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 costs associated with the additional and enhanced measures, i.e., those which go beyond the existing decommissioning and rehabilitation requirements arising from Condition 10, will be eligible for support under the proposed Scheme.

The proposed enhanced rehabilitation measures detailed in this document, are predicated on the understanding that the element of the rehabilitation, over and above the 'standard' measures necessary to comply with pre-existing Condition 10 IPC Licence requirements, will be deemed eligible costs for the Scheme regulator.

For the avoidance of doubt, should the proposed 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. 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 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.

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

The National River Basin Management Plan (2018-2021) (Department of Housing, Planning, Community and Local Government 2017) is the key national plan for Ireland to achieve the objectives of the Water Framework Directive (WFD). In broad terms, the objectives of the WFD are (1) to prevent the deterioration of water bodies and to protect, enhance and restore them with the aim of achieving at least good status and (2) to achieve compliance with the requirements for designated protected areas.

The NRBMP outlines how peat extraction can be a potentially significant pressure on various water quality parameters. Peatland rehabilitation of Bord na Móna cutaway (in addition to other measures) is part of the WFD

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

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

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.

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.

The closest European Site (SPA or SAC) to Mount Lucas is Raheenmore Bog SAC (Site Code 000582) which is located ca.6.5km to the northwest of Mount Lucas. The Long Derries, Edenderry SAC (Site Code 000925) is ca.12km to the north east. The River Barrow and River Nore SAC (Site Code 002162) is ca.11km to the south of Mount Lucas and is hydrologically downstream.

The closest NHA or proposed NHA to Mount Lucas Bog is the Grand Canal (Site Code 002104) which is 1.23km to the north of the bog boundary. Daingean Bog NHA (Site Code 002033) is 2.3km west of Mount Lucas. Raheen Lough NHA (Site Code 000917) is ca.5km to the south west. The above mentioned Raheenmore Bog and Long Derries are also NHA's.

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.

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 2015-2020

The All-Ireland Pollinator Plan 2015-2020 outlines key objectives and actions to protect and support pollinating insects and the habitats they rely on. There are several Bord na Móna specific actions in this plan including 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, wind energy, and economy/enterprise.

No zoning information is available on the online resource myplan.ie in respect of the location of Mount Lucas Bog.[6]

11 National Archaeology Code of Practise

Bord na Móna operates under an agreed Code of Practice regarding archaeology with the Department of Arts, Heritage and the Gaeltacht and the National Museum of Ireland which provides a framework to enable the

[6] https://myplan.ie/zoning-map-viewer/

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 endeavour to adhere to this code of practise during the peatland rehabilitation phase and appropriate archaeology mitigation is carried out before and during cutaway peatland rehabilitation. An Archaeological Impact Assessment is being carried out for the proposed rehabilitation at this site (Appendix IX). The recommendations of this assessment will be incorporated into the rehabilitation plan to minimise impacts on known archaeology. In addition, Bord na Móna will adhere to the Archaeology Code of Practise relating to management of stray 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 Mónas responses can be found in the Bord na Móna Biodiversity Action Plan (Bord na Móna 2016). Both policy documents highlight targets such as reducing pressure on biodiversity, promoting sustainability, habitat restoration and benefits of ecosystem services.

One example of a key CBD target is:

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

The EUs headline target for progress by 2020 is to:

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

The Mount Lucas Bog Rehabilitation Plan is aligned to the CBD target and the EU Biodiversity Strategy target and will help Ireland meet its commitment to these international Biodiversity polices.

13 Bord na Móna commitments

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

The company announced that 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 will 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 has also committed to a significantly larger rehabilitation target. This is 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 plan to restore a further 1,000 hectares of raised bog habitat by 2025. These targets are significant in both timing and scale and are indicative of Bord na Móna's increased new ambition in this area.

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.

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

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. 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, 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	Mount Lucas 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	Peat Stockpile Management via Levelling
4	Decommissioning or Removal of Buildings and Compounds	Not relevant
5	Decommissioning Fuel Tanks and associated facilities	Decommissioning and De-Gassing Mobile Fuel Tanks
6	Decommissioning and Removal of Bog Pump Sites	Not Applicable
7	Decommissioning or Removal of Septic Tanks	De-sludge Septic Tank

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	Mount Lucas Decommissioning Plan
1	Removal of Railway Lines	Removal of Railway Lines
2	Decommissioning Bridges and Underpasses	Not Applicable
3	Decommissioning Railway Level Crossing	Decommissioning Railway Level Crossing
4	Restricting Access (bogs and silt ponds)	Restricting Access to Bog.
5	Removal of High Voltage Power Lines	Not Applicable

APPENDIX VIII. ENHANCED REHABILITATION MEASURES AND TARGET AREA.

Table AP-3. Enhanced rehabilitation measures & target area.

Type	Code	Description	Area (Ha)
Deep peat cutover bog	DPT1	Regular drain blocking (3/100 m) + blocking outfalls and managing water levels with overflow pipes	25.87
	DPT2	More intensive drain blocking (7/100 m) + blocking outfalls and managing overflows	0
	DPT3	More intensive drain blocking (7/100 m), + field reprofiling + blocking outfalls and managing overflows	125.39
	DPT4	Berms and field re-profiling (45m x 60m cell) + blocking outfalls and managing overflows + drainage channels for excess water + *Sphagnum* inoculation	0
	DPT5	Cut and Fill cell bunding (30m x 30m cell) + blocking outfalls and managing overflows + drainage channels for excess water + *Sphagnum* inoculation	0
Dry cutaway	DCT1	Blocking outfalls and managing water levels with overflow pipes	0
	DCT2	Regular drain blocking (3/100 m) + blocking outfalls and managing water levels with overflow pipes + targeted fertiliser treatment	102.21
	DCT3	More intensive drain blocking (7/100 m) + blocking outfalls and managing overflows + targeted fertiliser treatment	0
Wetland cutaway	WLT1	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes	0
	WLT2	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes + Targeted blocking of outfalls within a site	0
	WLT3	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes + Targeted blocking of outfalls within a site + constructing larger berms to re-wet cutaway + transplanting Reeds and other rhizomes	0.51
	WLT4	More intensive drain blocking (7/100 m), + blocking outfalls and managing overflows + transplanting Reeds and other rhizomes	60.19
	WLT5	More intensive drain blocking (7/100 m), + field reprofiling + blocking outfalls and managing overflows + transplanting Reeds and other rhizomes	0
Marginal land	MLT1	No work required	91.99
	MLT2	More intensive drain blocking (7/100 m)	0
	MLT3	More intensive drain blocking (7/100 m) + blocking outfalls and managing overflows + boundary berm	0
Other		Silt-ponds	0.64
Additional		Basic Rehab Completed but additional enhancements could be made	616.43
Archaeology			2.15
Constrained areas			201.17
Total			1226.54

APPENDIX IX. GLOSSARY

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

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

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

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

Enhanced rehabilitation: This is defined as rehabilitation carried out under proposed 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 proposed 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 proposed Scheme.

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

Rehabilitation: Rehabilitation is defined in general by Bord na Móna as environmental stabilisation of the former cutaway. This is generally achieved via re-wetting, where possible, and natural colonisation of the former cutaway, with or without intervention. It is not possible to restore raised bog habitats on BnM cutaway in general

in the short-term. In general, most of the peat mass has been removed from many BnM cutaway sites and the environmental characteristics of these areas have therefore changed radically (peat depths, hydrology, water chemistry, substrate type, nutrient status. This means there will therefore be different habitat outcomes (wetlands, fen, heathland, grassland and Birch woodland). Other after-use development may also serve to act as rehabilitation.

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

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

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

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

APPENDIX X. ARCHAEOLOGY

Archaeological Impact Assessment of Proposed Bog Rehabilitation at Mountlucas Bog, Co. Offaly. Dr. Charles Mount. Nov 2020.

Role of the Archaeological Liaison Officer

1. To communicate this Code of Practice and the *Archaeological Protection Procedures* (Appendix IV) to all personnel operating on the bog.

2. To ensure that all notices relating to the *Archaeological Protection Procedures* are posted and maintained at appropriate locations on the bog.

3. To report any stray finds, presented to the Liaison Officer from his/her group of bogs, to the Duty Officer of the National Museum of Ireland.

4. To provide for the appropriate protection of the stray find, whether in-situ or removed from the bog, as directed by the Duty Officer of the National Museum of Ireland.

Code of Practice

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Code of Practice

5. To arrange for the delivery or collection of the stray find, as directed by the Duty Officer of the National Museum of Ireland.

6. To complete the Report of Discovery of Archaeological Object(s) in Bogs (Appendix V), as directed by the Duty Officer of the National Museum of Ireland.

7. To maintain a file of all stray finds and associated documentation and provide copies to the Project Archaeologist.

8. To provide assistance, where required, to the Department during archaeological surveys.

9. To provide assistance, where required, to Bord na Móna's Consultant Archaeologists, during investigation and mitigation of monuments.

10. To report to the Bord na Móna members on the Archaeology Management Liaison Committee any planned developments or new activities on cutaway peatland areas within his/her group of bogs.

BORD NA MÓNA Naturally Driven	**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	13/19/2020	First release	EMcD
2			