Mountlucas 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 Mountlucas 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 Mountlucas 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 Mountlucas 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 Mountlucas 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 Mountlucas Bog will be conducted in adherence to the relevant planning guidelines and consultation with relevant authorities and will be considered within the framework of this rehabilitation plan.

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

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SUMMARY

Name of bog: Mountlucas Bog **Area:** 1226.5 ha

Site description:

- Mountlucas Bog is located approximately eight kilometres south-east of Daingean in Co Offaly.
- Peat production at Mountlucas commenced in the mid-1970's and finished in 2020.
- 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 residual 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 herb trials (Móna Herbs www.bordnamonaherbs.com).

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:

- Meeting conditions of the IPC License.
- Stabilisation or improvement in water quality parameters (e.g. suspended solids).
- Environmental stabilisation.
- The site has already developed a mosaic of pioneer cutaway habitats, notably wetland, Birch woodland, grassland and fen habitats and is largely stabilised (windfarm footprint). These areas will be assessed for potential for targeted actions to enhance existing wetland habitats and create small wetland features.
- Optimising hydrological conditions for **climate action benefits as part of PCAS** in the areas recently out of peat extraction. This will be achieved via **deep peat re-wetting** and the **development of wetlands, fen, Reed Swamp and wet woodland on shallow cutaway peat**, and eventually naturally functioning wetland/peatland habitats.
- Optimising hydrological conditions for the development of embryonic *Sphagnum*-rich vegetation communities in suitable deep residual peat areas.
- Integrating rehabilitation measures with current infrastructure and land-uses.
- Rehabilitation will support the National Policies on Climate Action and GHG mitigation by maintaining and enhancing the current condition peat storage capacity of the bog (locking the carbon into the ground). In time, it is expected that the bog will develop its carbon sink function, in part, as *Sphagnum* communities develop across the bog. It will also support Ireland's commitments towards Water Framework Directive and the National River Basin Management Plan 2018-2021 and future National River Basin Management Plans.

Scope of rehabilitation

The principal scope of this rehabilitation plan is defined by:

- The area of Mountlucas Bog.
- EPA IPC Licence - Ref. P0503-01. As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. The key objective of 'rehabilitation', as required by this licence, is achieved by the **environmental stabilisation** of the bog.

- **The proposed Scheme (PCAS)** includes enhanced measures which are designed to exceed/meet the standard stabilisation requirements and optimising **climate action benefits**.
- The local environmental conditions of this bog; Mountlucas Bog has variable environmental characteristics with a range of residual peat depths, hydrology and topography.
- The key goals and outcomes of rehabilitation at this bog outlined above.
- To minimise potential impacts on neighbouring land, some boundary drains around Mountlucas Bog will be left unblocked, as blocking boundary drains could affect adjacent land.
- Current Land-uses. Mountlucas has been partially developed for renewable energy and for other land-uses. It is not proposed to carry out any intensive rehabilitation actions to change or negatively affect any renewable energy infrastructure or existing land-uses.
- Other constraints including the proposed Water Supply Project- Eastern and Midlands Region route.

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 industrial peat production area 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 (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) (IPC Licence validation).
- Reducing pressure from peat production on the local river catchment (WFD) (IPC Licence validation).
- Optimising the extent of suitable hydrological conditions to optimise climate action (Climate action verification.
- Reduction in carbon emissions based on bog condition (Climate action verification).
- 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/partial carbon sink (Climate action verification). Some areas will naturally be dry and develop Birch woodland and other drier habitats. It will take some time for stable naturally functioning habitats to fully develop across the entirety of Mountlucas Bog.
- Improvement in biodiversity and ecosystem services. (Climate action verification).

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

Summary of measures:

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

- Planning actions, including developing a detailed site plan and carrying out 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 drain blocking, peat field re-profiling, cell bunding, wetland creation and fertiliser applications targeting 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.

Monitoring, after-care and maintenance

The monitoring, after-care and maintenance programme for Mountlucas 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. . Baseline monitoring (habitat condition) will be carried after rehabilitation is completed (during the Scheme). It is proposed that Mountlucas Bog can be monitored against this baseline in the future.

Validation and IPC Licence surrender

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

- The planned rehabilitation has been completed.
- Water quality monitoring demonstrates that water quality indicators are stabilising/improving.
- The site has been environmentally stabilised.

1. INTRODUCTION

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Allen 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 bog group (see Appendix II for details of the bog areas within the Allen Bog Group). Mountlucas 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 critical success factors required for successful rehabilitation;
- Proposed rehabilitation actions;
- Proposed timeframe to implement these actions;
- Budget and Costings; and
- Associated aftercare, maintenance and monitoring.

It is proposed by Government that Bord na Móna carry out a Peatlands Enhanced Decommissioning, Rehabilitation and Restoration Scheme on peatlands previously used for energy production. Note this proposal is also known colloquially as the 'Peatlands Climate Action Scheme' (PCAS). 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.

Bord na Móna have identified a footprint of 33,000 ha as peatlands suitable for enhanced rehabilitation. This proposed Scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations (Appendix VII & IX) under existing EPA IPC licence conditions. Interventions 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 PCAS will support activities, interventions, or measures across the Bord na Móna cutaway peatlands which accelerate the original timelines. Selected rehabilitation measures will take account of site environmental conditions, which can vary significantly. These measures potentially include:

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

These are collectively designed to optimise hydrological conditions (ideally and where possible water-levels <10 cm) for climate action benefits and to accelerate the trajectory of the site towards a naturally functioning ecosystem, and eventually a reduced carbon source/carbon sink again. In some areas of dry cutaway this trajectory will be significantly longer and it is not feasible in the short-term to re-wet some areas, 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.

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

1.1 Constraints and Limitations

This document covers the area of **Mountlucas Bog**

This rehabilitation plan takes account of the **current after-use** of Mountlucas 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.

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.

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

The site hosts medicinal herbs (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 Mountlucas and was subject to an independent closure audit in 2017. This area (5.3ha) is now excluded from the IPC License extent and is considered out of scope of the rehabilitation plan.

The proposed Irish Water Shannon Pipeline corridor traverses Mountlucas Bog.

Industrial peat extraction at Mountlucas Bog permanently ceased in 2020. 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 Mountlucas 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 Mountlucas 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 Mountlucas; 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 Mountlucas 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 recently published guidance issued by the EPA in 2020 – **Guidance on the process of preparing and implementing a bog rehabilitation plan**.

The ecological information and site information collected during the Bord na Móna ecological baseline survey, additional confirmatory site visits and monitoring and desktop analysis forms the basis for the development of the rehabilitation plan for the bog, along with:

- Experience of 40 years of research on the after-use development and rehabilitation of the Bord na Móna cutaway bogs (Clarke, 2010; Bord na Móna, 2016);
- Significant international engagement during this period with other counties in relation to best-practise regarding peatland rehabilitation and after-use through the International Peat Society and the Society for Ecological Restoration (Joosten & Clarke, 2002; Clarke & Rieley, 2010; Gann *et al*., 2019);
- Consultation and engagement with internal and external stakeholders;
- GIS Mapping;
- BNM drainage surveys;
- Bog topography and LIDAR data:
- Hydrological modelling; and
- The development of a **Methodology Paper (draft) outlining the 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 Mountlucas 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, Mountlucas Bog was surveyed in October 2010 and April 2011. Additional ecological walk over surveys and visits have taken place between 2011 and 2020 to inform rehabilitation planning and habitat maps have been updated, where required. This rehabilitation plan is informed by the original baseline survey as well as subsequent 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 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 Mountlucas Bog is contained in Appendix III.

3. SITE DESCRIPTION

Mountlucas Bog is located approximately eight kilometres south-east of Daingean in Co Offaly. It is within the Allen Bog complex that includes Ballycon and Derrycricket Bog to the east, Clonad Bog to the west and Cavemount Bog to the north See Figure 3.1). It can be divided into two main sections (See Figure 3.2):

1. an area that has been cutaway for some time and has developed a mosaic of typical cutaway habitats with Birch woodland prominent; and
2. an area towards the west of the bog that has been in active peat production until recently and is bare peat.

Bord na Móna has recently completed construction of a 28 turbine (80 MW) wind farm at Mountlucas. 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 Mountlucas Bog).

A BnM railway line runs through Mountlucas for trains carry peat from Mountlucas and other bogs in the Allen bog group towards the power station at Edenderry.

3.1 Status and Situation

3.1.1 Site history

Peat Production at Mountlucas 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 Briquette Factory during 1970s-1980s.

3.1.2 Current land-use

Industrial peat extraction at Mountlucas Bog permanently ceased in 2020. Peat production was focused on the western side of the site. The eastern part of the site is older cutaway, has been developing for over 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, was opened in 2015. The windfarm was built on cutaway that has been developing for over 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 Mountlucas 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 Mountlucas has been used for the development of a medicinal herbs trial herbs (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 Mountlucas 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 FÁS facility is subject to a grazing lease.

A current landuse map is shown as Figure 3.3

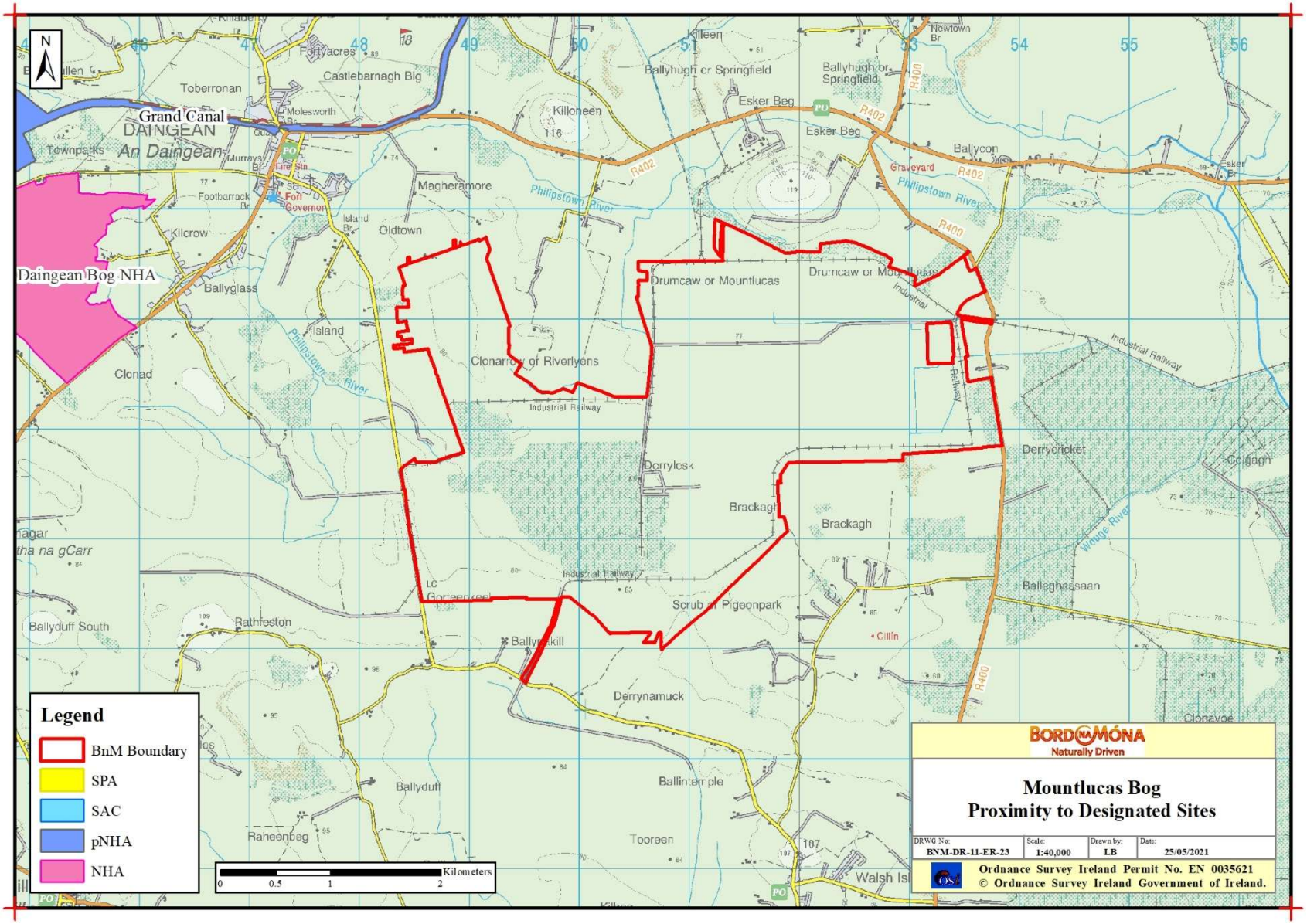

Figure 3.1 Location of Mountlucas in context to other Bord na Móna bogs and surrounding area.

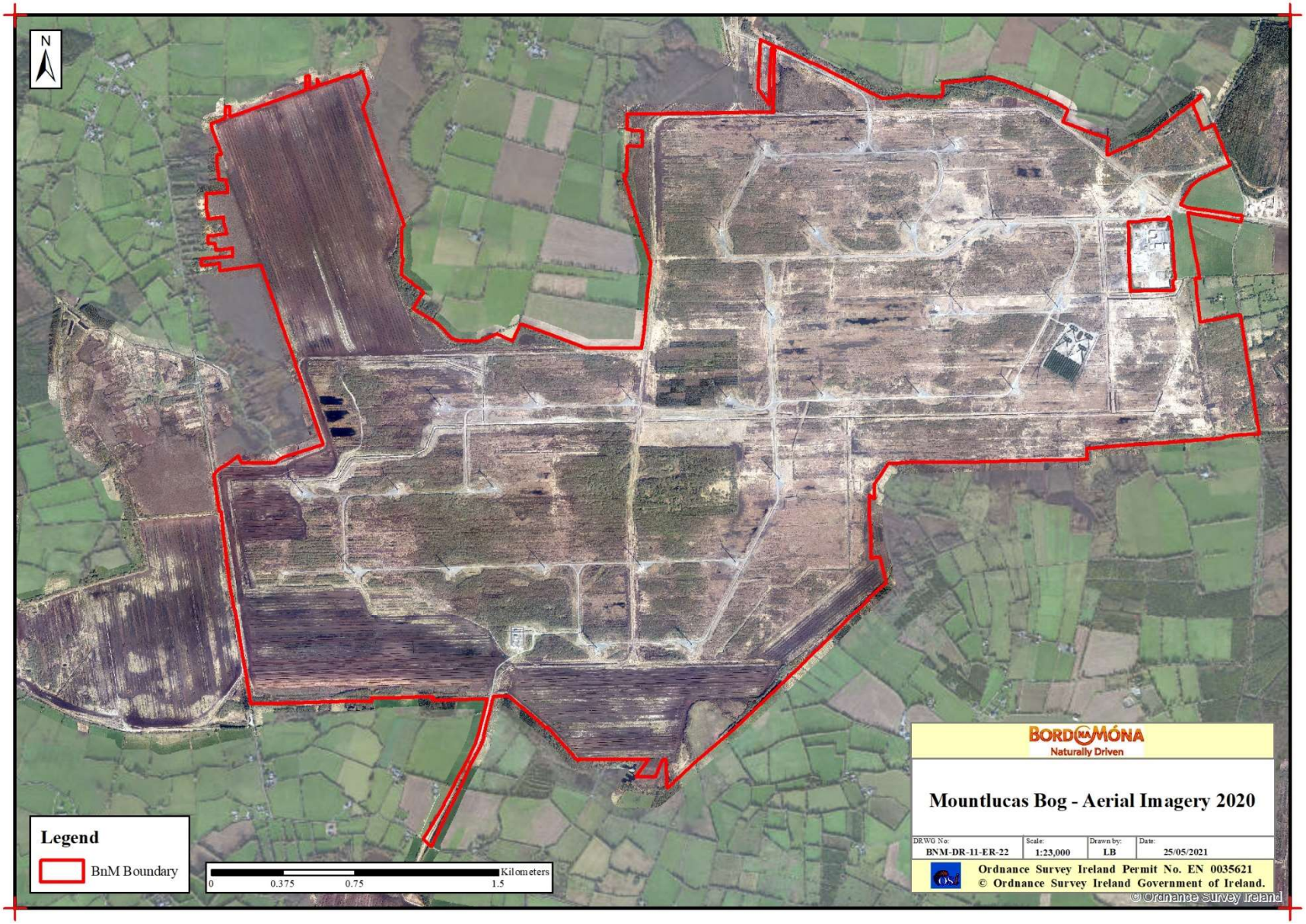

Figure 3.2. Aerial photo (2020) of Mountlucas Bog.

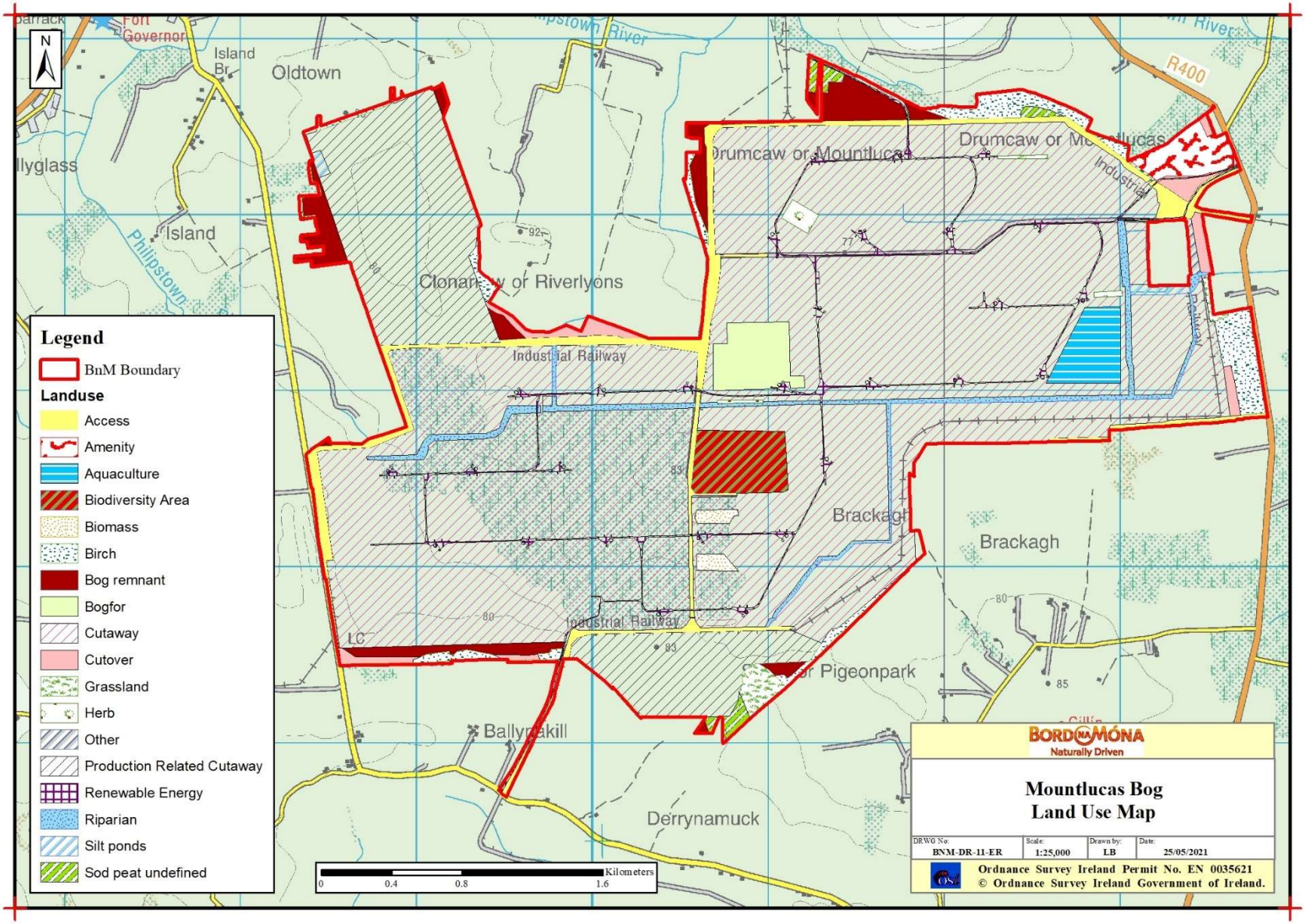

Figure 3.3 Current Land Use Map for Mountlucas

The proposed Water Supply Project- Eastern and Midlands Region, which will connect Parteen basin Co. Tipperary to a Termination Point Reservoir at Peamount, Co. Dublin, traverses the northern margin of Mountlucas Bog.This project is in its pre-planning stage.

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 (PCAS) will provide some employment for a team of workers at this site for a period of time (> 1 year).

3.2 Geology and Peat Depths

3.2.1 Sub-soil geology

According to GSI, the underlying geology at Mountlucas Bog comprises 'Oolitic limestone', along with 'Waulsortian Limestones' and 'Dark muddy limestone, shale' as part of the Ballysteen formation [2]. The underlying soils and sub-soils are classed as 'Raised Bog Cutover Peat', with the peat soils underlain mainly with 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.

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

3.2.2 Peat type and depths

Peat Production at Mountlucas bog commenced in the mid-1970's and finished in 2020. 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 3.2). 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

Parts of Mountlucas Bog have re-vegetated due to natural re-colonisation. The bog is relatively dry and developing Birch scrub/ woodland, although there are also some smaller wetlands with open water and a mosaic of poor fen and some Reed swamp vegetation. The areas that were in industrial peat production until recently and not included within the wind farm development comprise extensive bare peat. A habitat map of Mountlucas Bog is shown in Figure 3.4.

3.3.1 Current habitats

The baseline habitat survey divided Mountlucas into four uneven sections by the in-situ Bord na Móna road, drainage and rail network.

<u>South eastern section</u>

Since this part of Mountlucas 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.

Along the western edge a plot of forestry has been planted in the 1980's under the BOGFOR project. A short distance to the south of the BOGFOR forestry another woodland 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 dominated by Birch and some Scot's Pine (*Pinus sylvestris*). Domestic turf cutting is carried out here. Apart from the turf cutting areas, the remainder is re-vegetated cutaway with a mixture of Birch scrub and pioneer poor fen vegetation communities. Some small, drier habitats are 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 with some Bog Cotton-dominated poor fen colonising.

<u>North Eastern Section</u>

Birch woodland and remnant sections of raised bog 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 and Birch woodland. Domestic turf cutting is carried out along the northern boundary. One piece of intact high bog to the north and adjacent to the railway was in relatively good condition with relatively high *Sphagnum* cover (33-50% in places).

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*) and other breeding birds such as Skylark (*Alauda arvensis*) and Meadow Pipit (*Anthus pratensis*). Some rehabilitation was carried out in 2015 to level piles of spoil.

Dense Birch woodland has 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 grassland habitats.

South Western Section

This section of Mountlucas Bog 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. This section is bordered to the south by a mixture of remnant raised bog and Birch woodland

Part of the older cutaway has revegetated to such an extent that Birch scrub and woodland 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 with some Elder and Hawthorn present. There are also small wetlands with pioneer poor fen, Reed swamp, and open areas with pioneer dry heath dominated by Heather and grassland.

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

North Western Section

This section of Mountlucas Bog is separated from the south-western section by a large drainage ditch running east-west. It contains a large area of bare peat that was still in production until 2020.

The older cutaway is mostly vegetated with Birch scrub and woodland. There are several small wetlands to the west side, adjacent to the boundary that contain open water along with emergent Reedmace and fringing poor fen with Bog Cotton and Soft Rush.

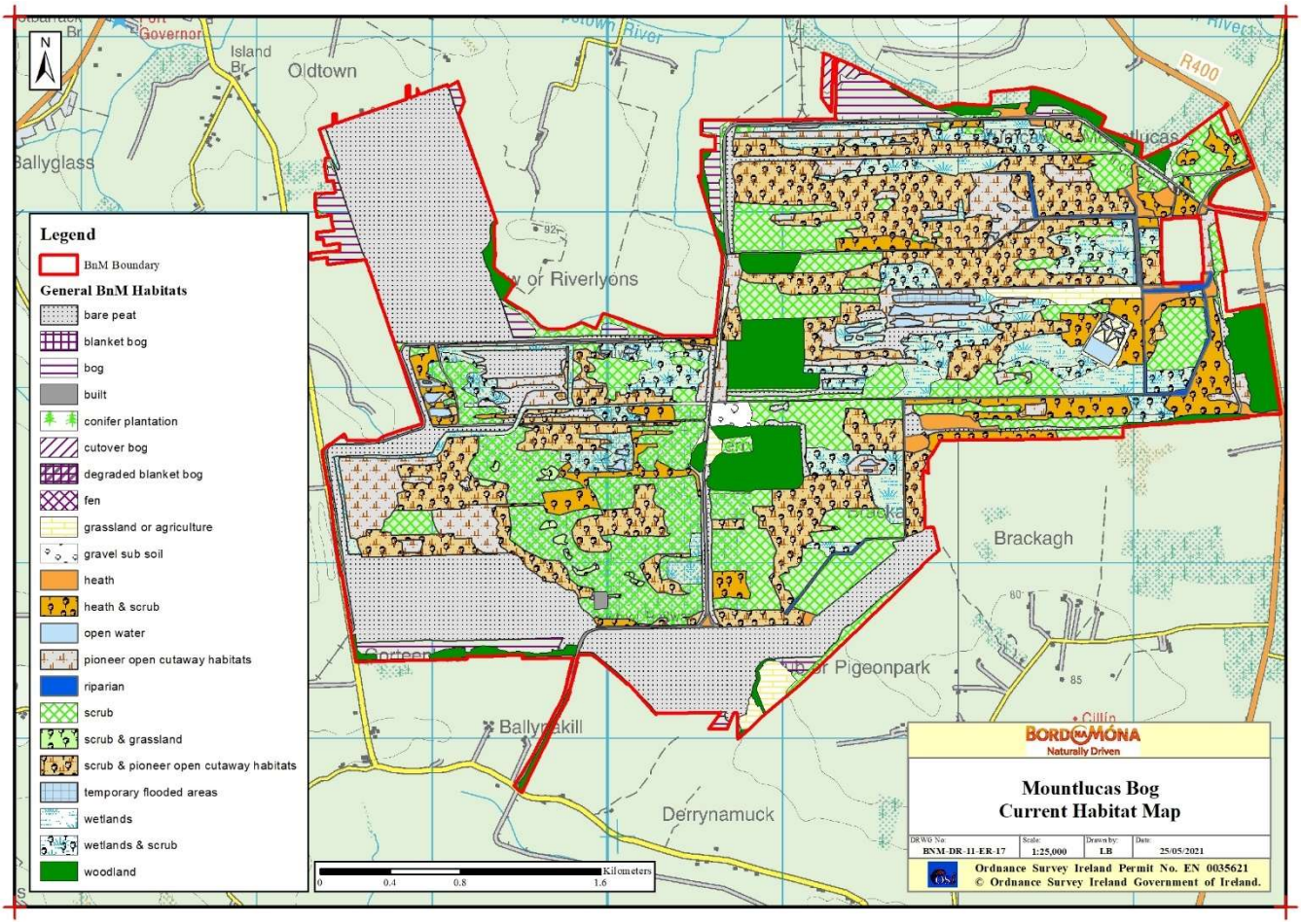

Figure 3.4 Habitat map of Mountlucas Bog showing Bord na Móna habitat categorisation.

Figure 3.5 Wetland vegetation at Mountlucas (November 2020)

Figure 3.6 Wetland habitats, pioneering Birch Woodland and scrub at Mountlucas (November 2020)

Figure 3.7 Grassland and wetland vegetation at Mountlucas Bog (November 2020)

3.3.2 Species of conservation interest

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 list (Wyse-Jackson *et al.* 2016) and Basil Thyme is also listed on the Flora Protection Order (FPO) (part of Wildlife Act). Blue Fleabane is widely scattered through the cutaways 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 (i.e. not typical bog plants) and are likely to have colonised Mountlucas during Bord na Móna operations via the railway.

Another rare plant species, Round-leaved Wintergreen (*Pyrola rotundifolia*), has recently been found at Mountlucas. This species is a nationally rare plant species listed in the Irish Red Data list (Wyse-Jackson *et al.* 2016) and was not recorded on Co. Offaly previously. It is found at several locations on the established cutaway at Mountlucas.

Bird surveys at Mountlucas Bog, including records from the NBDC website, from the EIS associated with Mountlucas Wind Farm and subsequent monitoring, and from additional surveys undertaken by the BnM ecological team have provided a substantial list of bird records for the site. Whooper Swan is known to move through the Mountlucas area from haunts in the vicinity of Geashill towards other feeding and roosting locations nearby, possibly the adjacent Ballycon or Cavemount Bogs. Most activity is likely to be around dawn and dusk as suitable habitats for this species are limited at Mountlucas. Lapwing, Snipe, Skylark and Woodcock are all of considered to be likely breeders within or on the periphery of Mountlucas Bog.

European Badger (Meles meles), Otter, Irish Stoat (*Mustela erminea hibernica*), Irish Hare (*Lepus timidus subsp. hibernicus*), Red Fox (*Vulpes Vulpes*), Fallow Deer (*Dama dama*), Pine Marten (*Martes martes*), Hedgehog (*Erinaceus europaeus*) and Rabbit (*Oryctolagus cuniculus*) are all known or likely to occur at Mountlucas Bog, 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 Mountlucas.

Common Frog (*Rana temporaria*) occurs at Mountlucas Bog in suitable habitat.

Marsh Fritillary (*Euphydryas aurinia*) have been recorded along the boundary of Mountlucas Bog. In the townland of Drumcaw or Mountlucas a single larval web was observed in August of 2018 and in the townland of Clonarrow or Riverlyons, just outside Mountlucas Bog, two further larval webs were observed (NBDC[3]).

Large Heath (*Coenonympha tullia*) iwas recorded within Mountlucas Bog, where one individual was reported in 2019 (NBDC[4]).). One notable species recorded at Mountlucas Wind Farm 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 Mountlucas Bog, is the only known invasive alien species 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 Mountlucas is Raheenmore Bog SAC (Site Code 000582) which is located ca.6.5km to the northwest of Mountlucas. 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 Mountlucas and is hydrologically downstream.

The closest NHA or proposed NHA to Mountlucas 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 Mountlucas. 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. 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] https://maps.biodiversityireland.ie/Map

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

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).

Mountlucas 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 3.8).

Wind farm internal drainage drains to one of the main IPC silt ponds in the east of Mountlucas 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 Mountlucas, 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[5]).

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 Mountlucas are described[6]:

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

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

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

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

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.

Mountlucas 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.

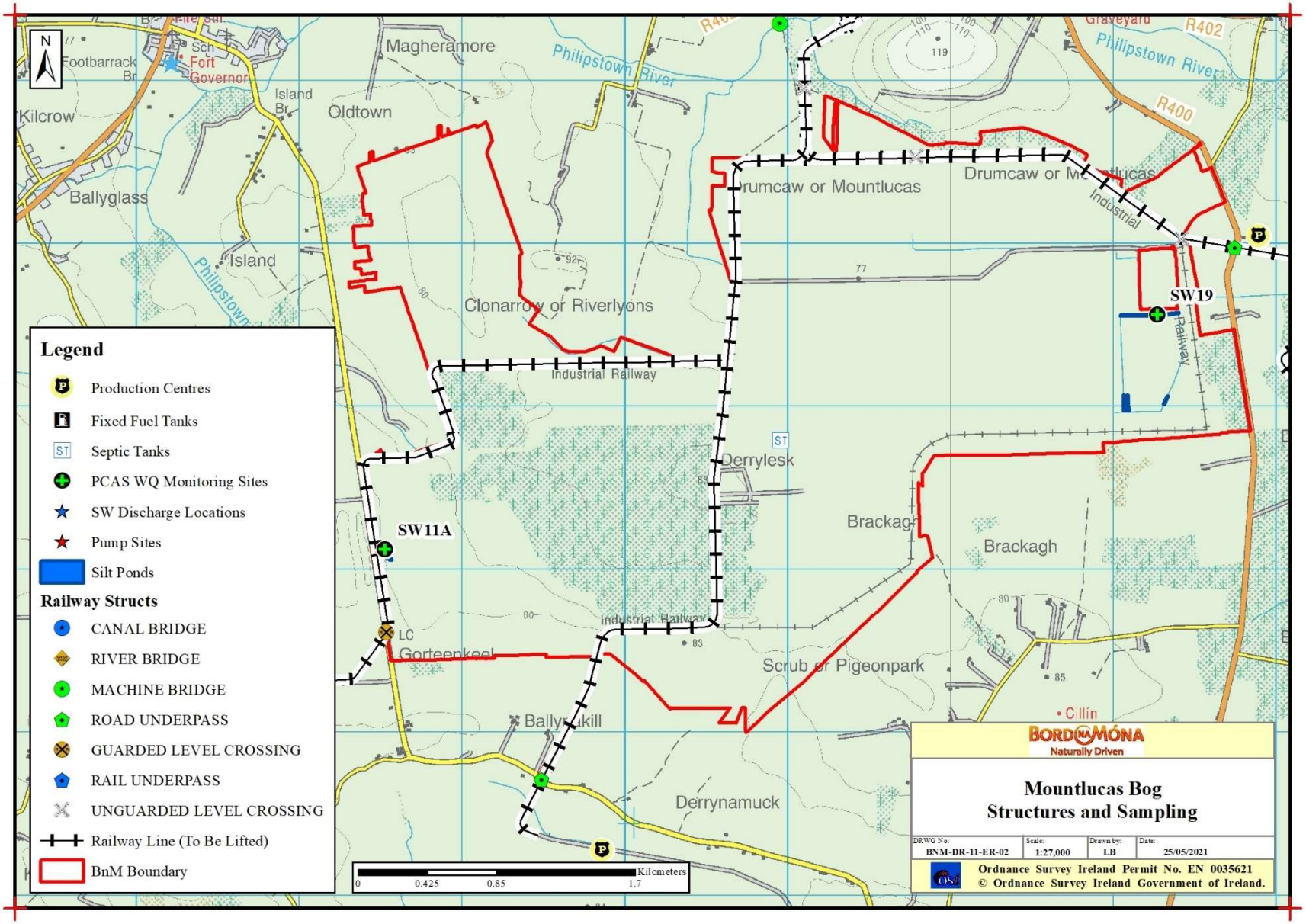

Figure 3.8 Map of Mountlucas Bog showing structures and designated emission points

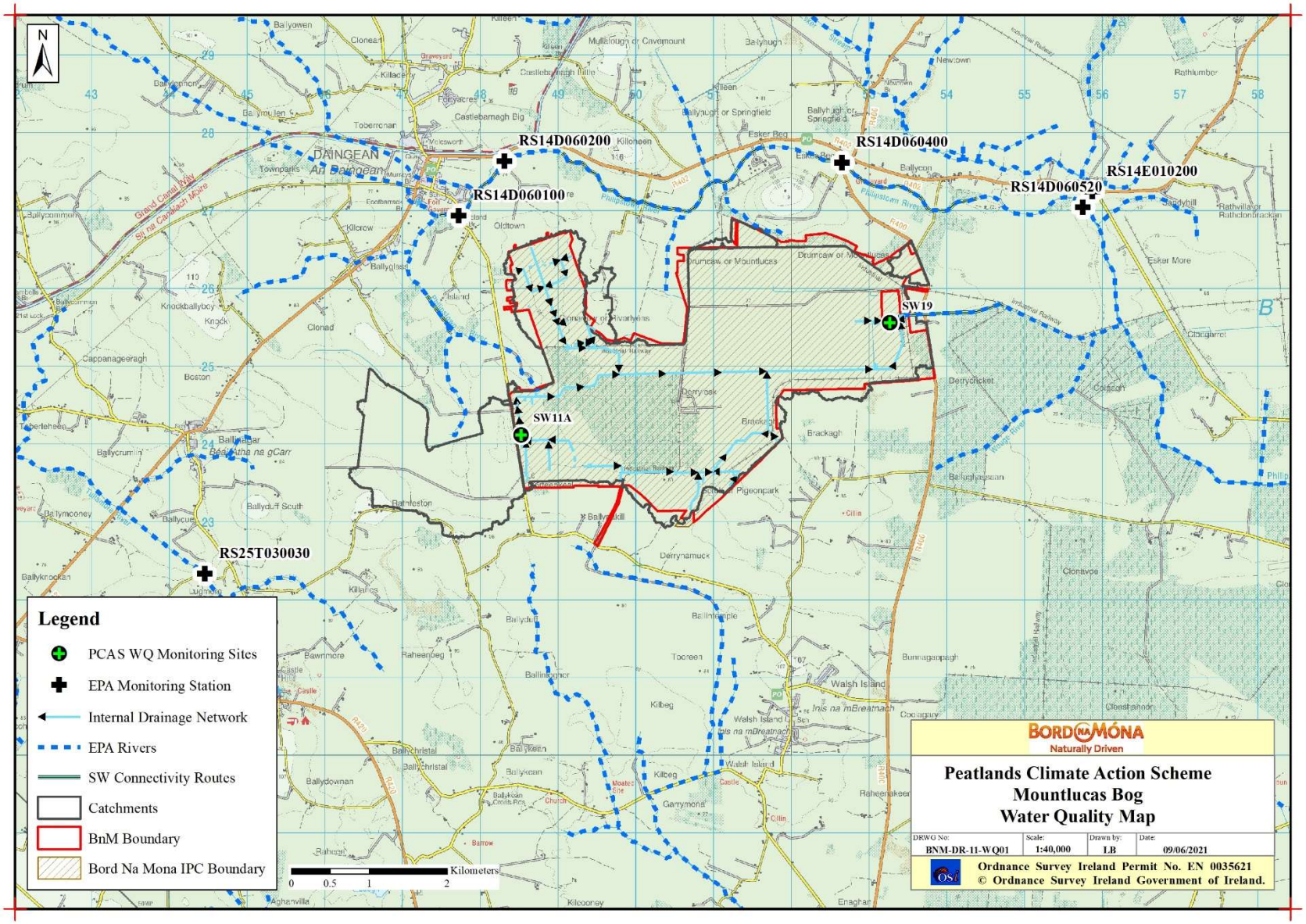

Figure 3.9A Map of Mountlucas Bog showing water management features and water quality monitoring points

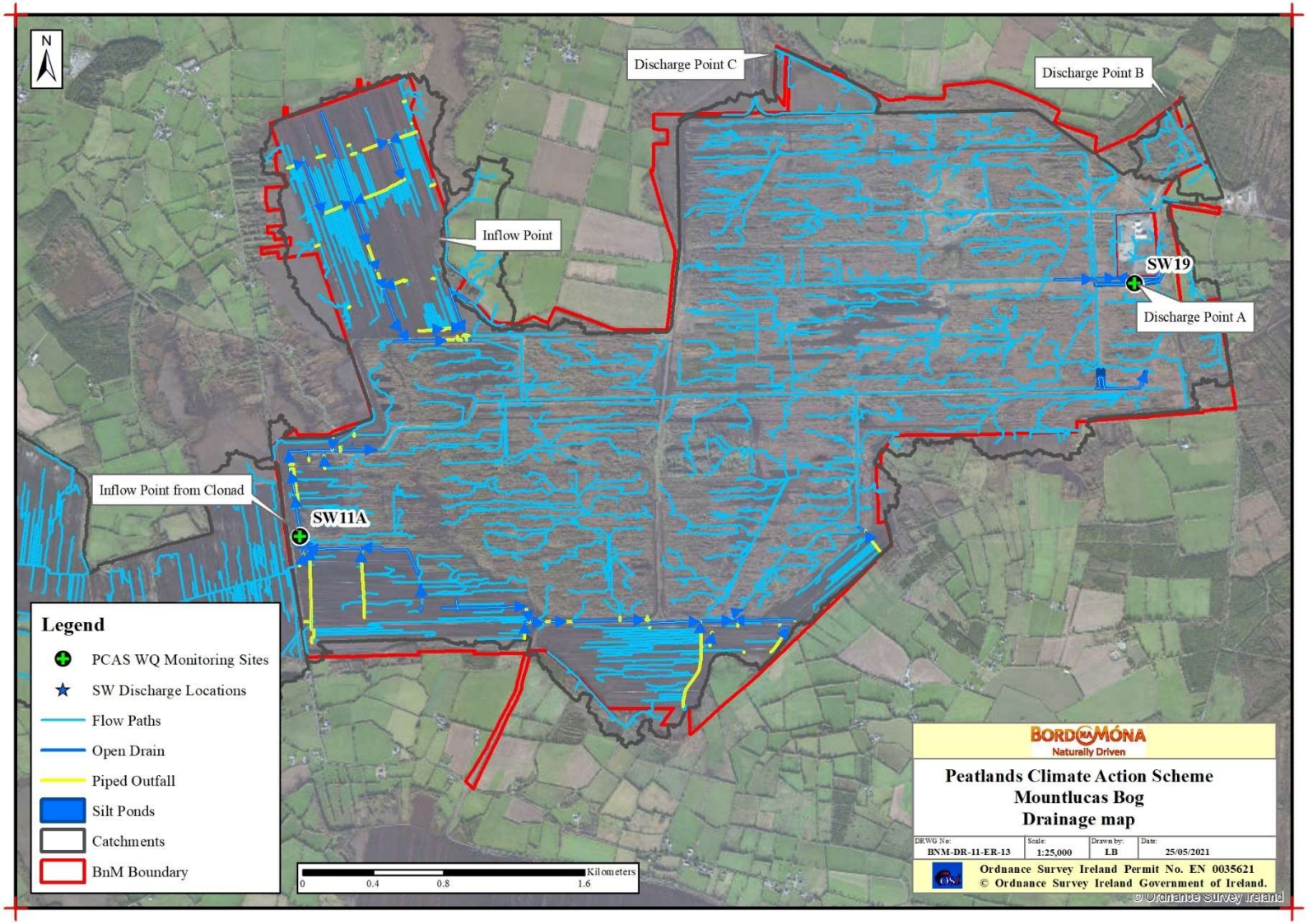

Figure 3.9B Map of Mountlucas Bog showing drainage routes

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 Mountlucas 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 Mountlucas Bog, 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 aids the primary objective of stabilizing peat, as when peat is re-wetted it is not vulnerable to wind erosion. Re-wetted peat and the development of wet peatland habitats can also act as sinks for silt and mobile peat, and increases additional retention time for solids, and the peatland vegetation can quickly stabilise this material within blocked drains on site (by acting like constructed wetlands).

Water quality of water discharges from restored peatlands normally improves as a result of bog restoration measures and the restoration of natural peatland processes (Bonn *et al.*, 20017). Bog restoration is also expected to improve water attenuation of the site as the drains are blocked, slowing water movement and water release

from the site. Restored peatlands help slow the release of water and aid the natural regulation of floods downstream (Minayeva *et al*., 2017). The National River Basin Management Plan (NRBMP) 2018-2021 (DHPCLG, 2017) is the key national plan for Ireland to achieve the objectives of the Water Framework Directive (WFD). The NRBMP outlines how key actions such as the Bord na Móna 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 Mountlucas 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

Mountlucas 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

Mountlucas 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 Mountlucas 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).**

It is expected that the overall ecological value of this site will increase in the future as the site re-vegetates, matures and forms semi-natural naturally functioning peatland habitats.

3.10 Mountlucas Bog Characterisation Summary

Mountlucas Bog is located approximately eight kilometres south-east of Daingean in Co. Offaly. Peat production permanently ceased at Mountlucas Bog in 2020. Mountlucas Bog had a gravity drainage system.

Bord na Móna has recently completed construction of a 28 turbine (80 MW) wind farm at Mountlucas. 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 Mountlucas Bog).

An aquaculture pilot trial/ venture was previously developed at Mountlucas 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 Mountlucas has been used for the development of a medicinal herbs trial herbs (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 Mountlucas 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.

Parts of Mountlucas Bog have re-vegetated due to natural re-colonisation. The bog is relatively dry and developing Birch scrub/ woodland, although there are also some smaller wetlands with open water and a mosaic of poor fen and some Reed swamp vegetation. The areas that were in industrial peat production until recently and not included within the wind farm development comprise extensive bare peat.

There are areas of former production area that are constrained from rehabilitation due to the proposed Water Supply Project- Eastern and Midlands Region route. This is indicated to run along the western side of the site and this development footprint, which is at pre-planning stage, is constrained out from rehabilitation.

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 Mountlucas Bog.

There has been ongoing consultation about rehabilitation, biodiversity and other general issues over the years at Mountlucas. 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 Bog 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 Mountlucas 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 Mountlucas 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.

To inform the current Plan, both national and local stakeholders, including neighbours whose land adjoins Mountlucas Bog and local representatives of national bodies (such as Regional National Parks and Wildlife Service staff) and relevant offices in County Councils (such as the Heritage or Environmental Offices) have been contacted. Any identified local interest groups have been sought and informed of the opportunity to engage with

this rehabilitation plan, and when identified have been invited to submit their comments or observations in relation to the proposed rehabilitation at Mountlucas Bog (see Appendix XI).

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

4.2 Issues raised by Consultees

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

4.2.1 Assessments of rehabilitation

Queries on pre-rehabilitation assessments were raised by NPWS, Offaly County Council and the National Museum of Ireland in relation to Appropriate Assessment, Environmental Impact Assessment and Strategic Environmental Assessment.

4.2.2 Restoration scope

Restoration/rehabilitation of marginal habitats was raised by IPCC, Irish Wildlife Trust and BCI as worthy of consideration within the rehabilitation measures to support carbon sequestration and biodiversity objectives.

4.2.3 Monitoring

Further details on monitoring of ecological metrics, including water quality, carbon sequestration and biodiversity, and how and where reporting on this monitoring would take place, was raised by the IPCC, Irish Wildlife Trust, Offaly County Council and Trinity College.

The ICMSA queried if a hydrological baseline was being established on surrounding private land in relation to assessing ex-situ impacts arising from re-wetting. Michael Fitzmaurice TD queried what monitoring was being undertaken to assess carbon emission reductions and storage within the bogs as part of PCAS.

4.2.4 Flooding of adjacent land

Michael Fitzmaurice TD, IFA and ICMSA queried likely impacts arising from the proposed re-wetting associated with the rehabilitation in general, in relation to flooding on adjoining lands and, specifically, with regards to the maintenance of drains. The IFA also raised the general issue of Health and Safety in relation to raising water levels as well as possible impacts on land and property prices.

4.2.5 Land Management

The ICMSA queried the long-term management of the Bord na Móna's estate, particularly in relation to maintenance of boundary fencing to exclude livestock from the bogs and maintenance of drainage.

The NARGC suggested that heather be established on large area of the cutaways as this is beneficial from biodiversity and pollinators. NARGC were also keen to minimise the spread of scrub and woodland habitats to

reduce habitats from predators (such as foxes) and were keen to seek control of so-called “vermin” species on the rehabilitated bogs.

4.2.6 Other issues (including amenity)

Opportunities to develop amenities on the bog to support local communities was raised by IPCC.

Other issues (raised by IPCC and Irish Wildlife Trust) included after use of the bog and turf cutting on the margins of the bog (outside of the area owned by Bord na Móna).

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

The Irish Wildlife Trust also raised the issue of statutory protection for PCAS sites following rehabilitation and the adoption of a re-wilding strategy, including species reintroductions (specifically mentioning Beaver).

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

4.3 Bord na Móna response to issues raised during consultation

4.3.1 Assessments of rehabilitation

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

An Archaeological Impact Assessment (AIA) is also being undertaken on all the bogs in PCAS. The aim for known archaeology on these bogs is to accomplish preservation in situ and we are taking steps to identify and avoid all known archaeology. We are doing this by including all known archaeology on our GIS from the AIA process, and either excluding or defining a buffer zone around these features, which will then be excluded from any ground works in these areas in the final plan. Currently there are no known archaeological sites within Mountlucas Bog. Nevertheless, it is anticipated that any archaeology will benefit hugely from the ultimate remit of the rehabilitation, in that water tables will be raised thereby preserving in-situ. There is also an identified procedure for managing reports of stray finds that may arise during rehabilitation works.

An archaeological end of life survey of all the bogs as requested by National Museum of Ireland and National Monuments Unit is not part of the current scope of the scheme. Bord na Móna would be happy to assist such a survey, where possible.

4.3.2 Restoration scope

The scope of this rehabilitation plan covers the former Mountlucas Bog industrial peat production area. As part of the PCAS, all restoration/rehabilitation options have been developed to support climate action and biodiversity objectives.

4.3.3 Monitoring

As part of the PCAS, a monitoring and verification plan has been developed to support climate action and biodiversity objectives. This will include stratified monitoring of bog condition, habitats and biodiversity at several different scales. Some fauna monitoring (pollinator transect) is proposed as part of the monitoring and verification at Mountlucas Bog during the period of the scheme (2021-2025). However, note that fauna typically take longer to respond to the changes in vegetation colonisation and habitats arising from the proposed rehabilitation measures identified for Mountlucas Bog.

Water monitoring is undertaken as part of Bord na Móna's IPC licence obligations, and this will continue until such a time as the licence can be surrendered.

4.3.4 Flooding of adjacent land

It is the intention of Bord na Móna that the re-wetting of the bogs will be carried out in such a manner that does not impact on third party lands including adjoining private turf banks.

External consultants have been appointed to carry out a hydrological assessment, to identify any potential impacts to neighbouring lands and, where required, the rehab design will be amended to prevent any identified impact. Please note that climate change is considered in the hydrological assessment. Information on these hydrological assessments will be made available through our website.

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

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

4.3.5 Land Management

Bord na Móna will continue to have responsibilities for managing the land in their ownership as any landowner would. In addition, land still under an IPC licence will need to be managed in accordance with that licence.

It is expected that re-wetting will reduce area being colonised by Birch and other scrub species as conditions will be more suitable for wetter species. However, in drier areas that cannot be re-wetted, particularly where there is shallow (or no) residual peat, it is inevitable that drier vegetation communities, including Birch woodland will develop. Heather is not expected to be an important part of the vegetation at Mountlucas Bog as site environmental conditions (wetland conditions, alkaline/ground-water influence) do not suit this species.

However, it is expected that as some naturally functioning peatland ecosystems develop that are analogous to embryonic raised bog (SW corner of the western side), these will colonise with Heather and other ericoid species in time and typical raised bog hummocks will re-develop.

4.3.6 Other issues (including amenity)

Creating amenity such as walking tracks is not part of the direct scope of PCAS. However, PCAS will enable and support future amenity development. Future additional amenity proposals can be positively aligned and integrated to after-use plans following the completion of the proposed rehabilitation at Mountlucas Bog. Rehabilitation measures proposed for Mountlucas Bog do not need to be amended to integrate any future amenity track positioned along the margin of the former production bog or along the former bog railway.

Other issues, including after-use and management issues outside the boundary of Mountlucas Bog, are acknowledged but are specifically outside the scope of this rehabilitation plan. This includes reference to the cessation of turf-cutting on private lands. Bord na Móna rehabilitation proposals will not impact on private turf-cutting and will have no impact on private turf-cutting outside Bord na Móna boundaries.

4.3.7 Concluding statement.

- No specific issues were raised during consultation that required significant changes to the substance of the rehabilitation plan.
- Issues raised by several consultees in relation to potential impacts on adjacent land had already been accounted for during the hydrological analysis. Several marginal drains will not be blocked to avoid impacts on adjacent lands or turf-banks.
- A small portion of cutaway bog (25 ha) will be constrained from re-wetting as it is part of the Proposed WaterSupply Project – Eastern and Midlands Region pipeline (Irish Water) route. It is anticipated that rehabilitation across the site will occur in advance of the construction of this pipeline. Constraining this area from re-wetting does not alter the overall substance of the rehabilitation plan (key goals and outcomes). There is expected to be ongoing consultation to further minimise the footprint of the constrained Irish Water footprint. This area will be allowed to colonise naturally in advance of the pipeline project.
- Bord na Móna do not propose to carry out any re-wetting within the footprint of the proposed Water Supply Project – Eastern and Midlands Region until a decision has been made by the relevant authorities in relation to the statutory consent applications for the project. It is expected that the footprint of the corridor will be rehabilitated post the construction of the proposed Water Supply Project – Eastern and Midlands Region.

5. REHABILITATION GOALS AND OUTCOMES

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

- Meeting conditions of IPC Licence.
- Stabilisation or reduction in water quality parameters of water discharging from the site (e.g. suspended solids).
- Reducing pressure on receiving water-bodies that have been classified as At Risk from peatlands and from peat extraction, via stabilization or improving water-quality from this bog, and therefore, reducing pressures.
- Optimising hydrological conditions for **climate action benefits as part of PCAS**.
- Optimising hydrology for the development of embryonic *Sphagnum*-rich vegetation communities on the **areas of residual deep peat**, and eventually naturally functioning peatland habitats.
- Optimising hydrological conditions for the development of Reed Swamp and fen on shallow more alkaline peat and other subsoils.
- A significant part of the site has already largely vegetated and stabilised and is used for a variety of land-uses. These areas are considered rehabilitated. 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.
- Supporting ongoing renewable energy, amenity and other land-uses. Integrating rehabilitation measures with current amenity infrastructure on site. It is not proposed to carry out any rehabilitation actions to change or negatively affect any amenity infrastructure.
- Optimising hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future, where possible.
- The main goal and outcome of this plan is the successful rehabilitation (environmental stabilisation) of peatlands used for industrial peat production at the bog in a manner that is acceptable to both external stakeholders and to Bord na Móna and which optimise climate action and other ecosystem service benefits.

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

- It will take some time for stable naturally functioning habitats to fully develop at Mountlucas Bog. This will happen over a longer time-frame than the implementation of this rehabilitation plan.
- Re-wetting residual peat will initially maintain and enhance the carbon storage capacity of the bog. There is scientific consensus that restoration of hydrology in damaged bog can improve carbon storage, water storage and attenuation and help support biodiversity both on the site and in the catchment (See Section 3.8). This will reduce carbon emissions from the site from a larger carbon source to a smaller carbon source. In time, the site has the capacity to develop in part as a carbon sink. PCAS is expected to deliver significant contributions to Ireland's climate action.
- It is not expected that the site has the potential to develop active raised bog (ARB) analogous to the priority EU Habitats Directive Annex I habitat within the foreseeable future (c.50 years). Furthermore, only a proportion of the bog has potential to develop *Sphagnum*-rich habitats in this timeframe. Nevertheless, re-wetting across the entire bog, as part of the Scheme, will improve habitat conditions of the whole bog. Other peatland habitats will develop in a wider mosaic that reflects underlying conditions.

- Rehabilitating former industrial peat production bog will also in the longer-term support other ecosystem services such as such the development of new habitat to support biodiversity and local attenuation of water flows from the bog.
- WFD status in receiving water bodies can be affected by peatlands and peat extraction, but is also affected by other sources such as agriculture. In addition, receiving water bodies that are assessed as At Risk from peatlands and from peat extraction are likely to have several contributary sources of impacts (private peat extraction and Bord na Mona).
- Bord na Móna are also planning rehabilitation measures in some adjacent bogs (e.g. Clonad) in 2021. There are expected to be cumulative water quality and other ecosystem service benefits to receiving water bodies such as the Philipstown River from rehabilitation more than one bog in the same catchment.
- Re-wetting in general will benefit the future preservation of most known and unknown archaeological features.

6. SCOPE OF REHABILITATION

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

- The area of Mountlucas 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. Mountlucas Bog is part of the Allen Bog group (Clonsast sub-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 Mountlucas 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 Mountlucas 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 Mountlucas Bog as **environmental stabilisation** and **deep peat re-wetting, and setting the site on a trajectory towards the development of embryonic peat-forming (*Sphagnum*-rich) vegetation communities on deep peat, and the development of Reed Swamp and fen on shallow more alkaline peat and other subsoils**
- Rehabilitation at Mountlucas Bog will support multiple national strategies of climate action, biodiversity action and other key environmental strategies such was the Water Framework Directive.
- **Time frame.** Rehabilitation measures will be carried out during the period of PCAS (2020-2025). The surrender of the licence is likely to extend beyond the PCAS timeframe.
- 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.

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), and there will therefore be different habitat outcomes (wetlands, fen, heathland, grassland and Birch woodland).
- In addition, Mountlucas 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.
- 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 Mountlucas is being carried out (Appendix IX). There are some known archaeological features present. The EIAR for the Mountlucas 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.
- **Proposed Water Supply Project – Eastern and Midlands Region (Irish Water).** This proposed Irish Water Project that is currently in the pre-planning stage also traverses the north-western headland of Mountlucas Bog. It is expected that the enhanced rehabilitation measures planned for Mountlucas will be carried out in advance of the construction of the pipeline, which is still subject to planning consent. Bord na Móna do not propose to carry out any rehabilitation works within the footprint of the proposed Water Supply Project – Eastern and Midlands Region until a decision has been made by the relevant authorities in relation to the statutory consent applications for the project. It is expected that the footprint of the corridor will be rehabilitated post the construction of the proposed Water Supply Project – Eastern and Midlands Region.

  The route of the proposed Water Supply Project is at a relatively high elevation close to the edge of the bog and the footprint also takes part of the low-lying basin. This route will not significantly alter any re-wetting objectives or outcomes at a site scale as it is located close the margin of the site.

6.2 Key Assumptions

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

6.3 Key Exclusions

The scope of this rehabilitation plan does not cover:

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

7. CRITERIA FOR SUCCESSFUL REHABILITATION

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

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

Rehabilitation is generally defined by Bord na Móna as

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

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

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

- Rewetting of residual peat in the former area of industrial peat production to offset potential silt run off and to encourage/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.
- Receiving water bodies have been classified under the River Basin Management Plan and this classification includes waters that are At Risk from peatlands and peat extraction. The success criteria will be that the At Risk classification will see improvements in the associated pressures from this peatland or if remaining At Risk, that there is an improving trajectory in the pressure from this peatland

With regard to predicting and estimating likely trends that might materialize or could be considered as a target, monitoring of surface water ammonia emissions from an adjoining Corlea bog in Mountdillon over the past 3 yrs., post cessation of peat extraction with ongoing rehabilitation, were considered. These are indicating a downward trend in Ammonia concentrations. As the monthly monitoring program at Mountlucas continues in 2021 during the rehabilitation works, and data from the 2020 monitoring program is compiled, further trending will be produced to verify any ongoing trends (Figure 7.1).

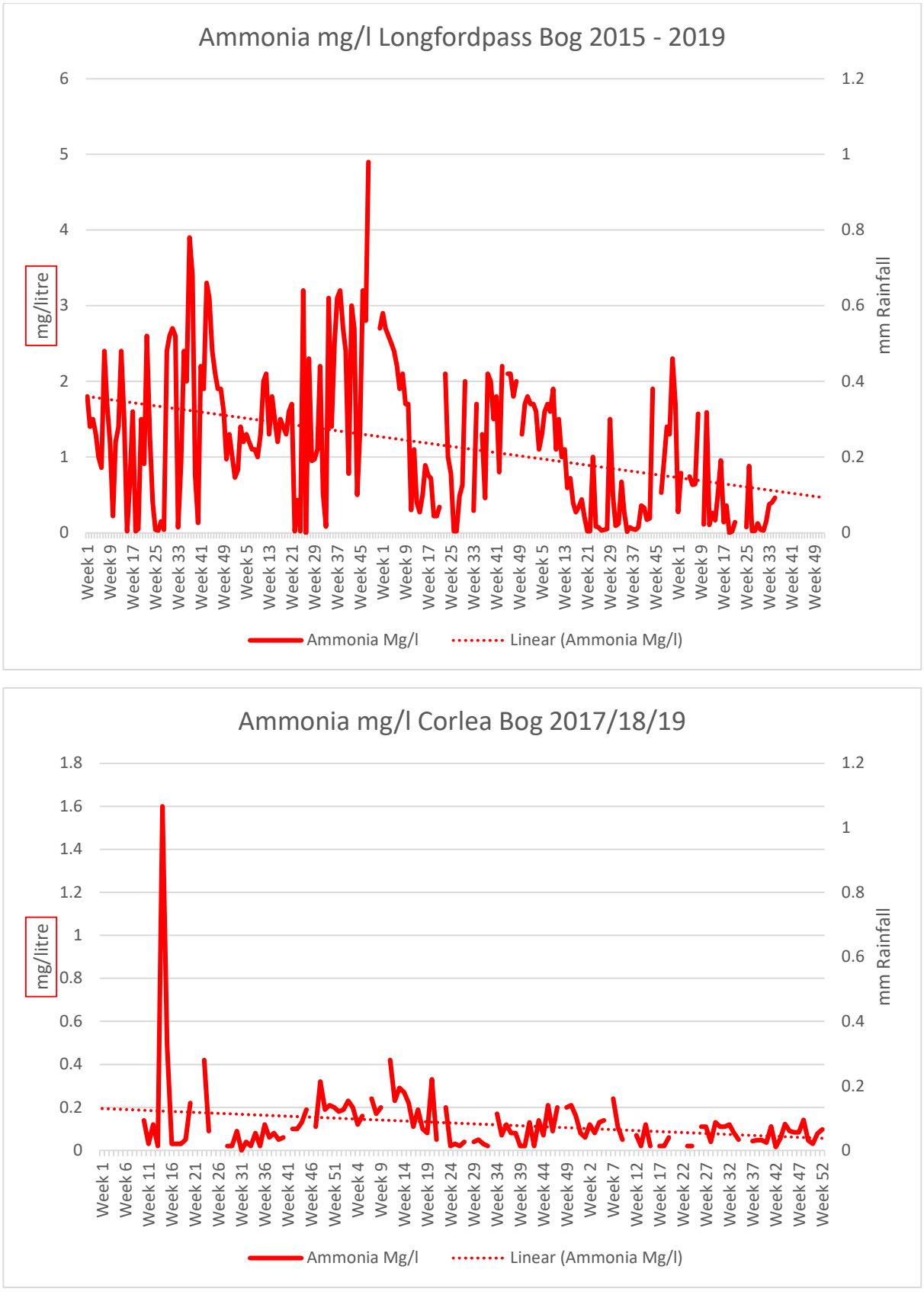

Figure 7.1. Ammonia levels over the period 2015-2019 at Longfordpass and Corlea.

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

- Optimising the extent of suitable hydrological conditions to optimise climate action and other ecosystem service benefits (optimising and maximising residual peat re-wetting). This will be measured by an aerial survey after rehabilitation has been completed.
- Accelerating the trajectory of the site towards becoming a reduced carbon source/carbon sink and eventually naturally functioning peatland habitats (heath, scrub, poor fen and embryonic *Sphagnum*-rich raised bog peatland communities, where conditions are suitable). These habitats will generally establish initially as pioneer vegetation. 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. 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.

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	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

	Breeding and wintering birds Pollinators			

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 3.2, 8.1, 8.2 & 8.3) 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 8.3) 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 Mountlucas bog will include**:**

- Re-wetting the deep peat areas of the bog using berms and field re-profiling. This enhanced measure seeks to create large (c. 45m x 60m) 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 suitable deep residual peat.
- Re-wetting some deep peat areas and some of the drier parts of the bog through more intensive field drain blocking using a dozer or excavator to create up to seven peat blockages every 100 m along each field drain
- Optimise water retention in wetland areas, including placement of berms where required and the introduction of Reeds and other Rhizomes, where needed.
- Re-wetting some areas of the bog through regular field drain blocking using a dozer to create three peat blockages every 100 m along each field drain;
- Blocking drains in targeted existing pioneering vegetation mosaics, to accelerate re-wetting, and/or manage water levels to the correct height to accelerate the current trajectory towards Reed swamp and fen, using a dozer/excavator.
- Targeted fertiliser applications to accelerate vegetation establishment on headlands and high fields.
- Modifying water levels at outfalls, as it may be desirable to change and control water levels at the site over time, e.g. to increase water levels as the site becomes increasingly vegetated. This will further slow the movement of water through and out of Mountlucas Bog. It may be desirable to change and control water levels at the site over time, e.g. to increase water levels as the site becomes increasingly vegetated.

Silt ponds will be retained and maintained during the rehabilitation phase. During the monitoring and verification phase silt ponds will be continually inspected and maintained, where appropriate. When it is deemed that silt ponds are not required, as the bog has been successfully stabilised and there is no silt run-off, the condition of the silt ponds will be reviewed. Silt ponds will either be de-watered (water levels lowered to a level where the silt pond will naturally develop as a small wetland feature), left in situ, or infilled (where discharges do not require silt control).

An indication of the areas for these various measures is shown in Table 8.1 and in Figure 8.4.

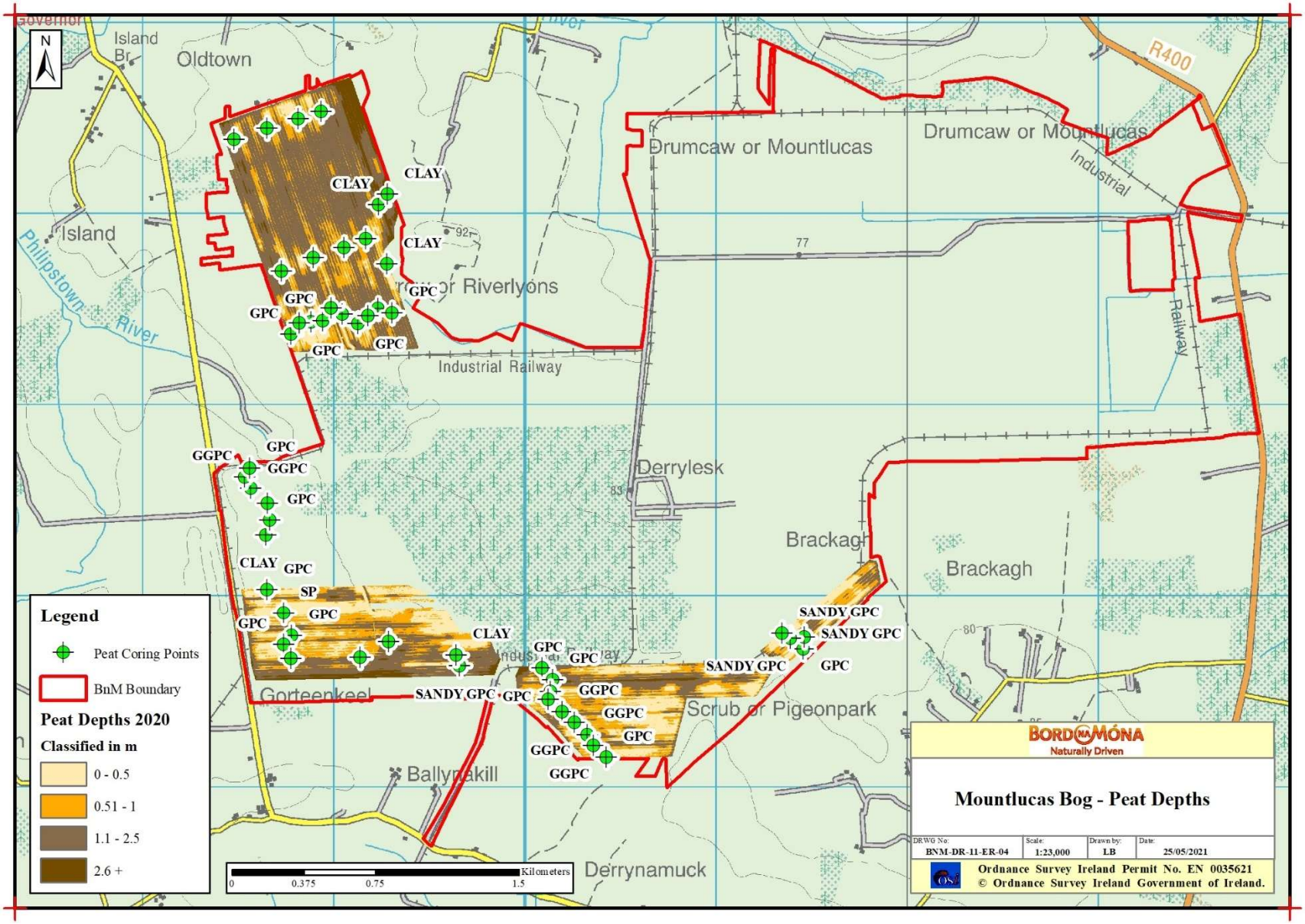

Figure 8.1. Peat Depth Map for Mountlucas Bog. Information for the majority of the site is not available as it has been cutaway for > 20 years.

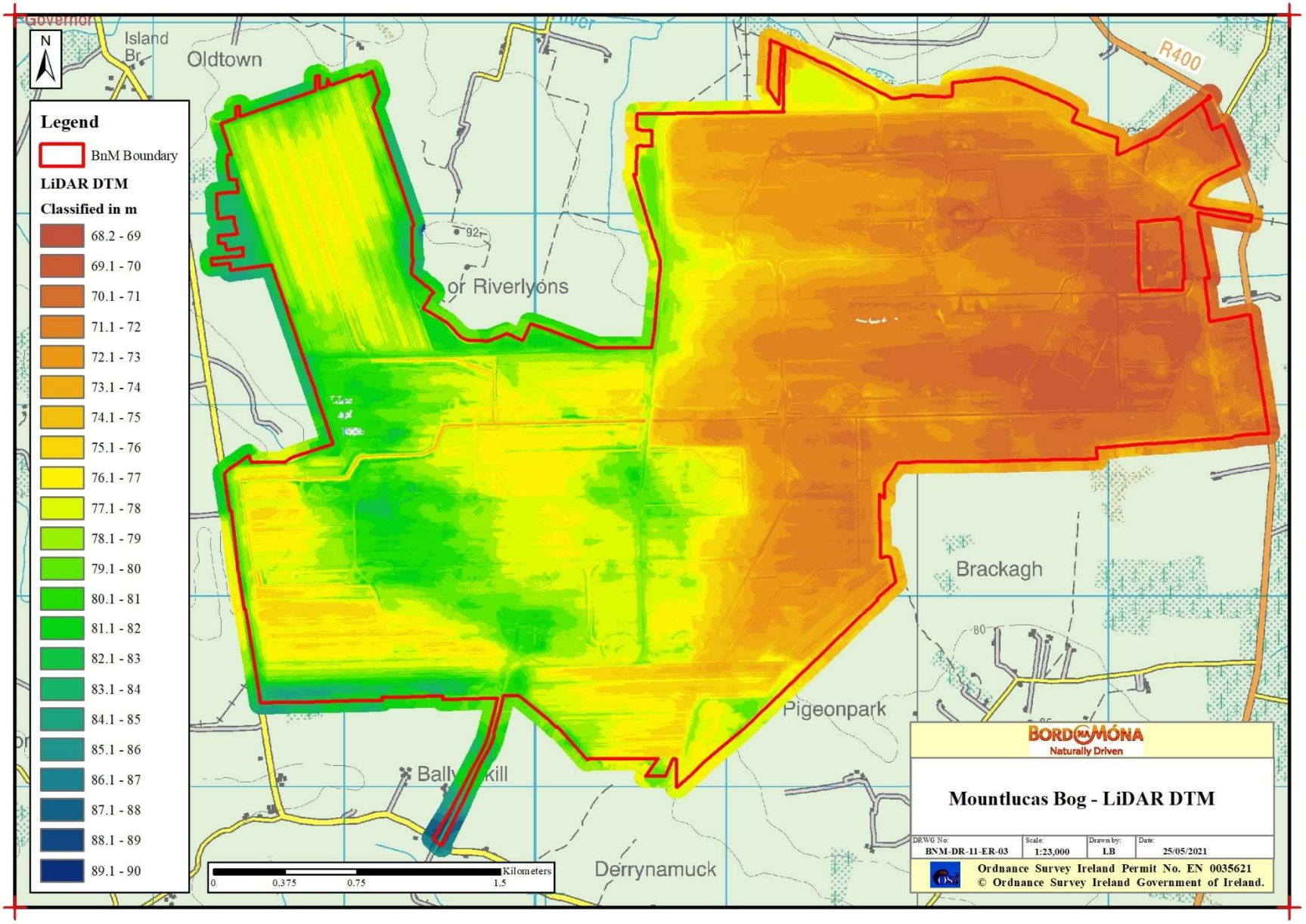

Figure 8.2. LIDAR topography map of Mountlucas Bog. Low areas and basins are orange-yellow, more elevated areas are blue-green.

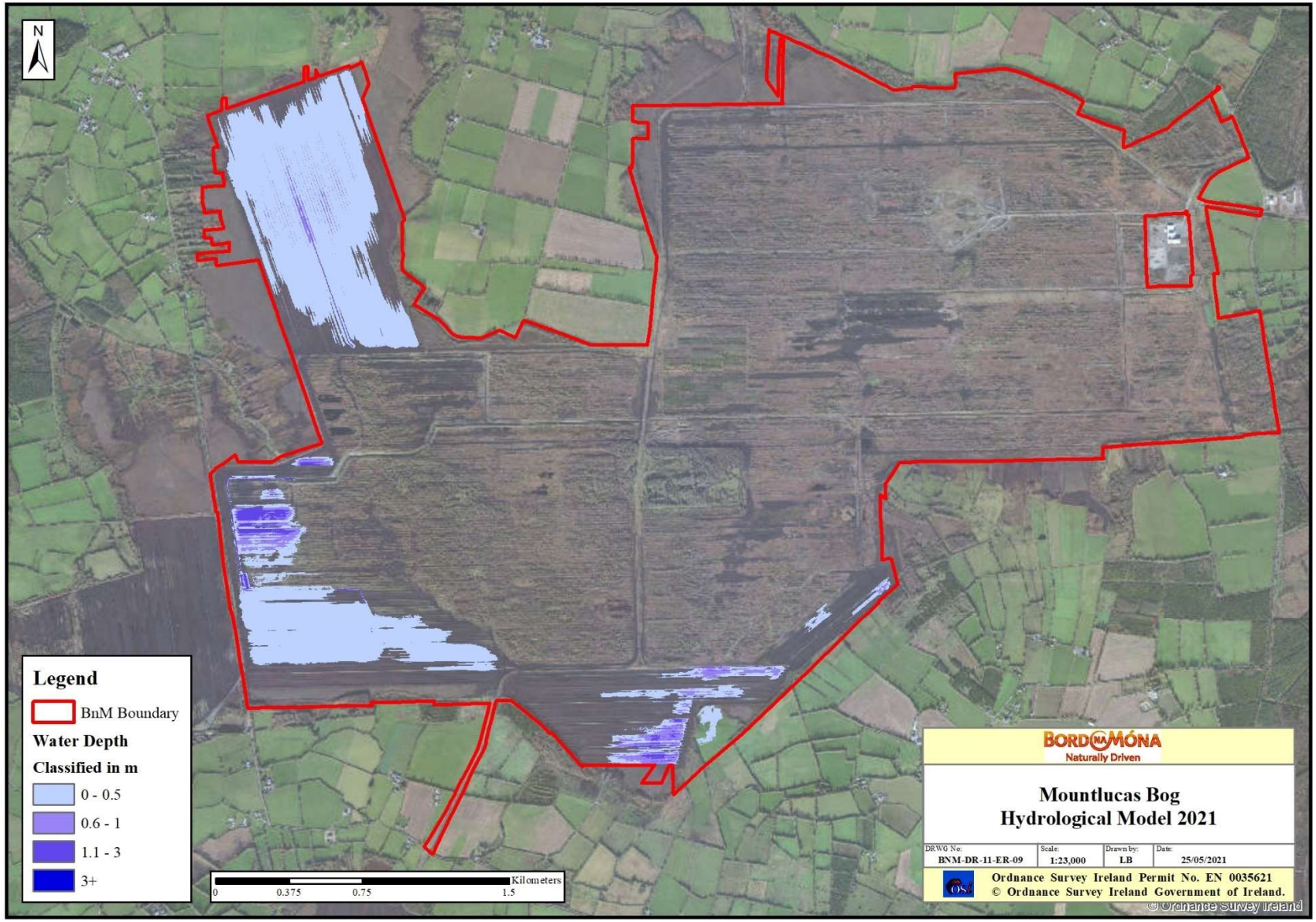

Figure 8.3. Hydrological modelling for Mountlucas Bog showing range of expected water depths based on current topography.

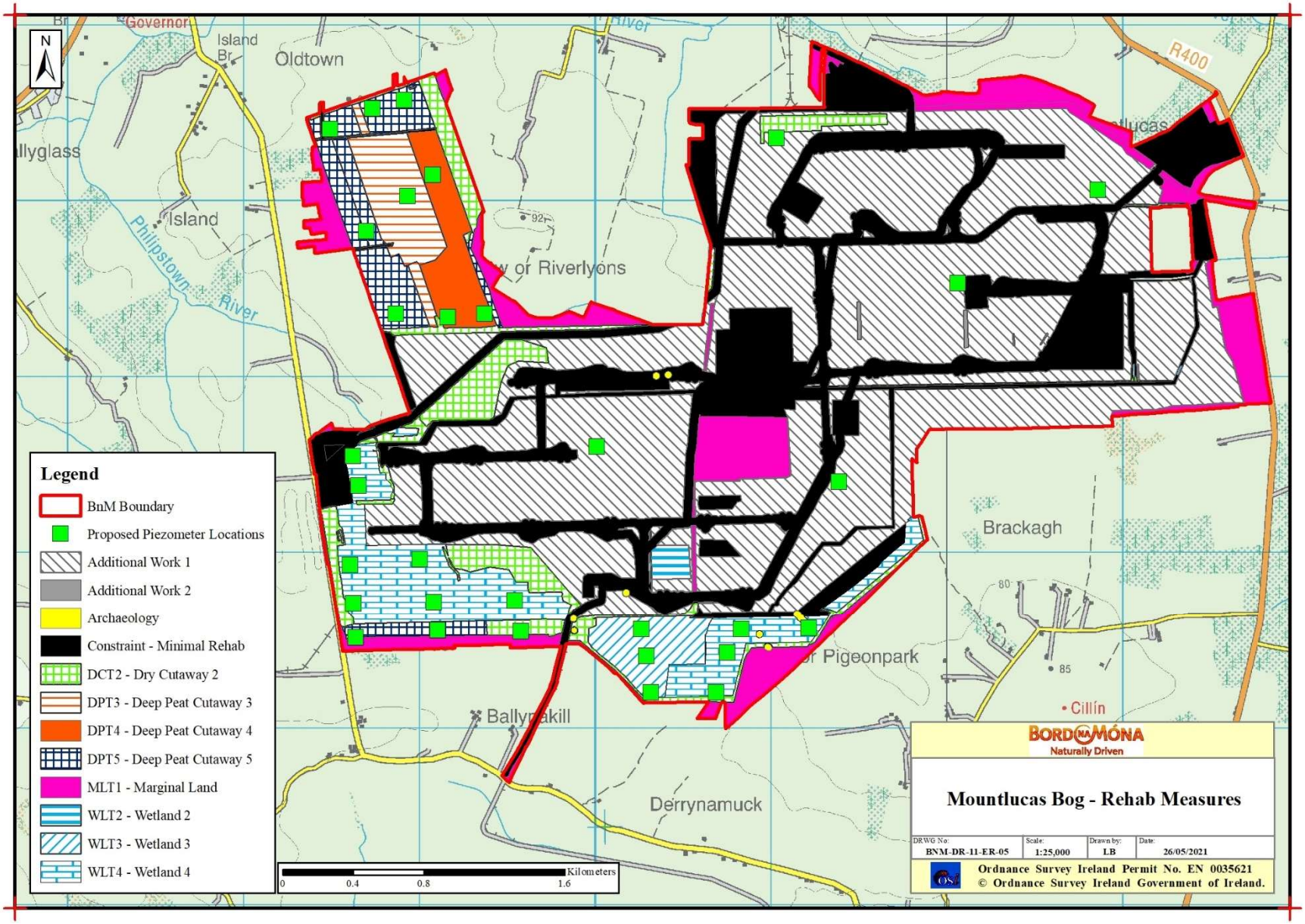

Figure 8.4. Indicative Enhanced Rehabilitation Plan for Mountlucas Bog.

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

Type		**Enhanced Rehabilitation Measure**	Extent (Ha)
Deep peat	DPT3	More intensive drain blocking (max 7/100 m), + field reprofiling + blocking outfalls and managing overflows	27.8
Deep peat	DPT4	Berms and field re-profiling (45m x 60m cell) + blocking outfalls and managing overflows + drainage channels for excess water + *Sphagnum* inoculation	23.9
Deep peat	DPT5	Cut and Fill cell bunding (30m x 30m cell) + blocking outfalls and managing overflows + drainage channels for excess water + *Sphagnum* inoculation	43.2
Wetland	WLT2		4.1
Wetland	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	21.4
Wetland	WLT4	More intensive drain blocking (max 7/100 m), + blocking outfalls and managing overflows + transplanting Reeds and other rhizomes	76.5
Dry Cutaway	DCT2	Regular drain blocking (max 3/100m) +blocking outfalls and managing water levels with overflow pipes+ targeted fertiliser treatment	65.5
Marginal land	MLT1	No work required	101.3
Marginal land	MLT2	More intensive drain blocking (max 7/100 m)	0
Silt ponds		Silt ponds	0.6
Additional land	Additional Land1	Additional land (windfarm cutaway). No work planned	554.8
Additional land	Additional Land2	Additional land (windfarm cutaway) Targeted re-wetting DCT2	1.0
Archaeology	Arch	Archaeology constraint	1.3
Constraint	Constraint	Other Constraints (Pipeline)	296.7
Total			

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

- Seek formal approval of the enhanced plan 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 PCAS) will be applied to Mountlucas Bog. This will take account of peat depths, topography, drainage and hydrological modelling. (See Figure 8.4 for an indicative view of the application of different rehabilitation methodologies);
- A hydrology and drainage management assessment of the proposed enhanced rehabilitation measures was carried out;

- A review of known archaeology and an archaeological impact assessment of the proposed rehabilitation was carried out. The results of this assessment into the rehabilitation plan to minimise known archaeological disturbance, were incorporated in the rehabilitation plan, where needed.
- A review of issues that may constrain rehabilitation such as known rights of way, turbary and existing land agreements (including the proposed Water Supply Project- Eastern and Midlands Region route) was carried out and incorporated into the rehabilitation plan.
- An ecological appraisal of the potential impacts of the planned rehabilitation such as the presence of sensitive ground-nesting bird breeding species (e.g. breeding waders) or larval webs of Marsh Fritillary butterfly, etc was carried out.
- Ensure all activities comply with the environmental protection requirements of the IPC Licence.
- Carry out Appropriate Assessment of the Rehabilitation Plan. (Note that an AA screening of Mountlucas has been carried out and the rehab plan has screened out at Stage 1).
- See Mountlucas Bog Decommissioning and Rehabilitation Plan – Addendum 1 for more details of the AA screening conclusion.
- Track implementation and enforcement of the relevant IPC Licence conditions, the mitigation measures (AA) and other environmental control measures during the implantation of the rehabilitation plan.

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

- Carry out proposed measures as per the detailed site plan. This will include a combination of drain blocking, peat field re-profiling, cell-bunding and fertiliser applications targeting headlands, high fields and other areas (where required). 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 inoculation of *Sphagnum*;
- Silt ponds will be monitored during this period and there will be continued maintenance and cleaning to prevent silt run-off from the site during the rehabilitation phase; and
- Submit an *ex post* report to the Scheme regulator to verify the eligible works 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 10.2 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 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).

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 after rehabilitation is completed using a cutaway bog condition assessment (similar to ecotope mapping). This assessment will include assessment of on environmental and ecological indicators such as vegetation cover, vegetation communities, presence of key species, *Sphagnum* cover, bare peat cover and water levels.
- The condition of the bog can be assessed using the condition assessment and suitable Greenhouse Gas (GHG) emission factors can be assigned to different habitats. GHG emission factors have been determined for various peatland habitats in Ireland (Wilson *et al.*, 2015) and are constantly being refined with more and more research. BnM is actively supporting research into GHG fluxes in different rehabilitated peatland habitats. This means that GHG emissions can be estimated from the site, identifying carbon savings 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. A breeding bird and Pollinator monitoring programme will be established. Specific pollinator indicators will be monitored (bees and butterflies). This will be further defined in relation to monitoring of the overall proposed 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 Mountlucas 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. Mountlucas bog is part of the Allen Bog group.
- The current condition of Mountlucas 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 Mountlucas Bog will be left unblocked as blocking boundary drains could affect adjacent land.

Rehabilitation goals and outcomes

The key rehabilitation goal and outcome for Mountlucas 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.
- A significant part of the site has already largely vegetated and stabilised and is used for a variety of land-uses. These areas are considered rehabilitated. 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.

- Supporting ongoing renewable energy, amenity and other land-uses. Integrating rehabilitation measures with current amenity infrastructure on site. It is not proposed to carry out any rehabilitation actions to change or negatively affect any amenity infrastructure.

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.

Table AP-1. Rehabilitation measures and target area.

Type	Code	Description	Area (Ha)
Deep Peat	DPT1	Regular drain blocking (3/100 m) + blocking outfalls and managing water levels with overflow pipes	94.9
Dry Cutaway	DCT1	Blocking outfalls and managing water levels with overflow pipes	65.5
Wetland cutaway	WLT1	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes	101.9
Marginal land	MLT1	No work required	101.3
Other		Other lands (no work required inc. constrained areas and silt ponds *)	297.3
Other		Archaeology	1.3
Completed		Naturally colonised and environmentally stable	555.78
Total			1218.9

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.

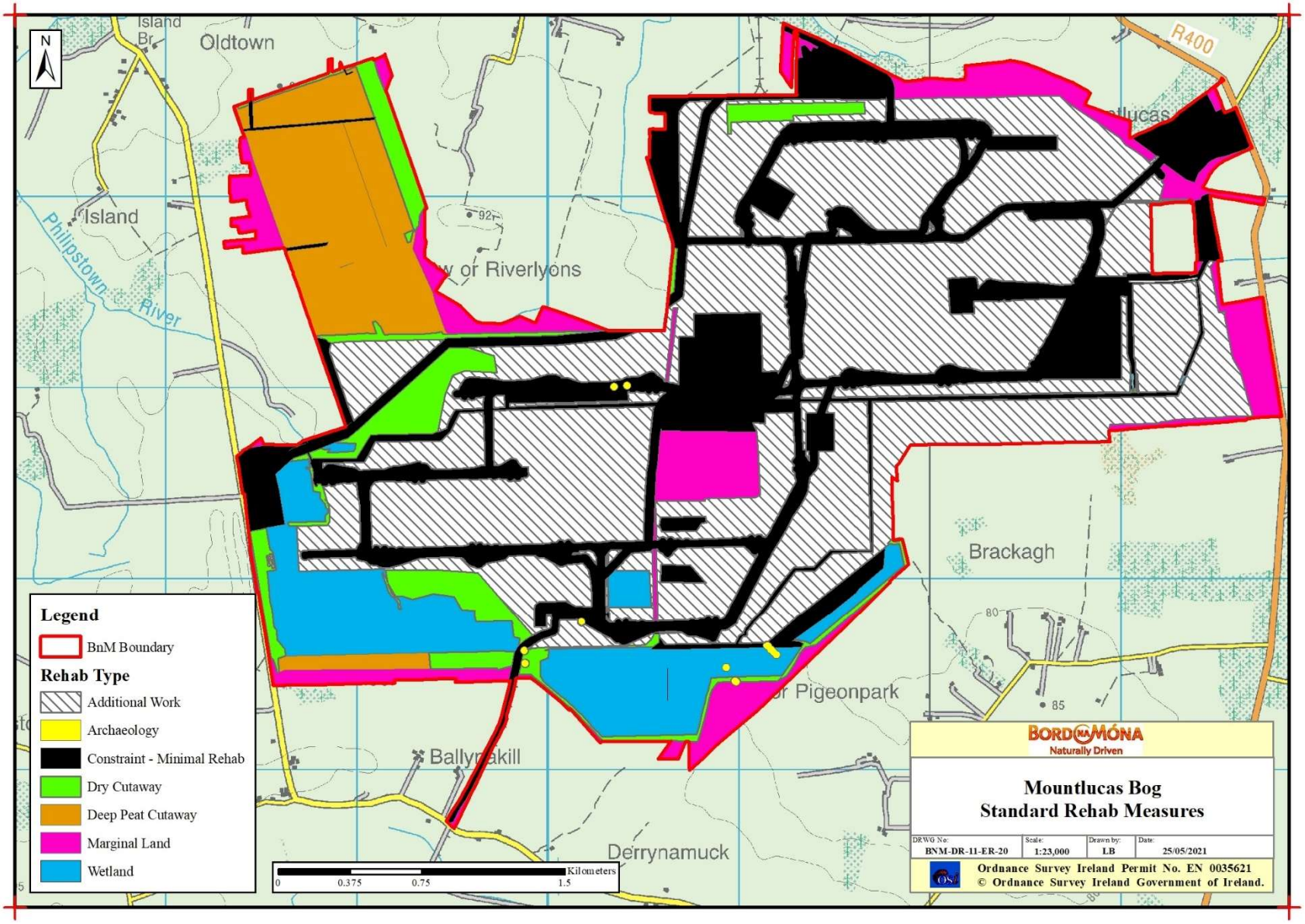

Figure Ap-1. Indicative standard rehabilitation plan for Mountlucas Bog.

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	Area (Ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Ballycon	281	Cutaway Bog Ballycon was first developed for industrial peat harvesting in the 1960's and the majority of peat has been removed. Ballycon is considered a shallow peat cutaway bog.	Rehabilitation works were carried out in 2006 that consisted of drain blocking and bund construction. Some headlands were fertilised in 2015 to encourage the development of pioneer dry cutaway habitats and there was follow-up drain blocking in 2018. The site is now a mosaic of cutaway wetland and woodland habitats and is a Biodiversity Area. BnM has also operated a workshop on site. Part of the site was developed for conifer forestry in the 1980s and is leased to Coillte. There is a rail transport link along the southern boundary of the site.	2001	Draft 2020
Ballykeane	451	Cutaway Bog	Part of the site is cutaway and has started to develop pioneer vegetation. The majority of the bog is still bare peat.	2020	Draft 2017

		Ballykeane Bog was developed for industrial peat production in the 1970's. Ballykeane is a shallow peat cutaway bog.	Part of Ballykeane Bog is being used as a herb production trial.		
Cavemount	499	Cutaway Bog Cavemount Bog was first developed for industrial peat production in the 1970's. Peat production ceased in 2015. Cavemount is a shallow peat cutaway bog.	Ongoing rehabilitation has been carried out across the site which is now developing as a wetland, holding nationally important numbers of wintering and breeding wetland birds. A portion of the site still has bare peat but is vegetating. Part of the site was developed for conifer forestry in the 1980s and is leased to Coillte. Flux tower and GHG monitoring onsite as part of the SmartBOG project. The site is a location for the CarePeat InterReg Project, of which BnM is an associated partner. There is a rail transport link through the site.	2015	Draft 2020
Clonad	447	Cutaway Bog Clonad Bog was first developed for industrial peat production in the 1970's.	The majority of the former production area is bare peat with some establishing cutaway habitats at various stages of development. There is a rail transport link through the site. The proposed Irish Water pipeline crosses this bog.	2020	Draft 2017
Cloncreen	1,009	Cutaway Bog Cloncreen Bog was first developed for industrial peat production in the 1970's. Peat production ceased in 2018 and the majority of peat has been cutaway. Cloncreen Bog is a shallow peat cutaway bog.	The site has developed a mosaic of pioneer cutaway habitats with some bare peat mosaics. Planning Permissions was granted in 2016 for Cloncreen Windfarm. Construction has started (summer 2020) on 22 turbines (Approx. 75 MW) at various locations around the site in association with linking road infrastructure, a sub-station and power-lines. There is a rail transport link through the site. The proposed Irish Water pipeline crosses this bog.	2018	Draft 2017
Clonsast	1,534	Cutover Bog Clonsast Bog was first developed for industrial peat production in the 1950's and was used for sod peat. Peat production ceased in 1980's. The majority of the bog was never converted to milled peat production and some relatively deep peat remains. Clonsast Bog is considered a deep peat cutover bog.	Clonsast has now established a mosaic of mature cutaway habitats. BnM formerly operated a farm at Clonsast. Farmland was developed on rehabilitated cutaway bog. The farm venture ceased in the 1980's and the farmland was sold. A significant portion of the site has been leased to Coillte and planted with conifer forestry in the 1980s. Some of the original research on establishing forestry on cutaway was established at Clonsast (Trench 14). BnM carried out a re-wetting trial in 2018. This site is largely stabilised. There is a rail transport link through the site.	1980's	Draft 2017
Clonsast Bulge	379	Cutover Bog Clonsast Bulge was first developed by BnM in the 1950's.	The majority of Clonsast Bulge used for peat extraction has been developed by Coillte for conifer forestry in the 1980's.	1960's	Draft 2017

			Part of the site is undeveloped (Clonavoe Bog remnant). This site is largely stabilised.		
Clonsast North	191	Cutaway Bog Clonsast North was first developed by BnM in the 1930's. The remaining peat deposits at Clonsast North are generally shallow and so the bog is considered a shallow peat cutaway bog.	The cutaway is naturally colonising with a mosaic of Birch woodland and wetland. The site was partially re-wetted in 2018. There is a rail transport link through the site.	2000's	Draft 2017
Daingean Derries	277	Cutover Bog Daingean Derries was first developed in the late 1980's. Deep peat reserves remain. Daingean Derries is considered a deep peat cutover bog.	Daingean Derries Bog formerly supplied both horticultural peat and fuel peat. The majority of former production area is bare peat. Some bog restoration on part of the site completed in 2017-2018. There is a rail transport link through the site.	2020	Draft 2017
Daingean Rathdrum	367	Cutover Bog Daingean Rathdrum was first developed in the late 1980's. Deep peat reserves remain. Daingean Rathdrum is considered a deep peat cutover bog.	Daingean Rathdrum Bog formerly supplied both horticultural peat and fuel peat. The majority of former production area is bare peat. There is a rail transport link through the site. A small area of development bog (32 ha) has been restored.	2020	Draft 2017
Daingean Townparks	90	This bog was never drained or developed but there is a transport link along the margin of the site	Daingean Bog NHA (intact raised bog) There is a rail transport link through the site. No rehabilitation required.	N/A	N/A
Daingean Raillink	5	N/A	N/A	N/A	N/A
Derrycricket	190	Derrycricket was originally developed for peat production in the 1950's-1960's. Peat production at Derrycricket ceased in the 1980's.	Coilte developed approximately 80% of the former production area for conifer forestry in the 1980's. This site is largely stabilised. Transport link.	N/A	N/A
Derrylea	665	Cutover Bog Derrylea bog was first developed for commercial peat production in the 1940's. However, peat production at Derrylea predates BnM and is believed to have commenced in the 19th century. Despite a long history of production, deep peat reserves on much of the site with some shallow pockets of peat on the western half of the former production area. Derrylea Bog is considered a deep peat cutover bog.	Some rehabilitation has been completed around the margins of the bog. There is a rail transport link through the site.	2020	Draft 2017
Derryounce	389	Cutover Bog Derryounce Bog was first developed prior to 1975. Derryounce is considered a deep peat cutover bog. Peat production at Derrycricket ceased in the 1980's.	Coilte have developed 80% of the former production area as conifer forestry. Rehabilitation was carried out to create a lake and wetland habitats in the 1990s. Derryounce Lake Amenity area is leased to Portarlington Community Development Association. This site is now largely stabilised. There is a rail transport link through the site.	1980's	Draft 2017

Esker	567	Cutover Bog Esker Bog was first developed in 1975. Peat production at Esker ceased in the 2020. There is deep peat remaining on the western side of the former production area but the eastern area is considered cutaway. Esker Bog is a deep peat cutover bog.	The majority of the site is bare peat. The eastern portion is establishing cutaway habitats. There is a rail transport link through the site. The proposed Irish Water pipeline crosses this bog.	2020	Draft 2021
Garryhinch	814	Cutover Bog Garryhinch Bog was first developed in 1950's. Peat production ceased at Garryhinch in 2020. There is some deep peat remaining on much of the former production area. Garryhinch Bog is considered a deep peat cutover bog.	The majority of the site is re-vegetated with a range of wetland and woodland habitats. Extensive sod peat production (private and licenced by BnM) has occurred across the site in the past few years and these areas are bare peat.	2020	Draft 2017
Garrymore	307	Cutover Bog Garrymore Bog was first developed in the 1980's. Peat production at Garrymore ceased in the 2020. There is deep peat remaining. Garrymore Bog is considered a deep peat cutover bog.	Garrymore Bog formerly supplied horticultural peat. Part of the site is used for sod turf. The former production area is bare peat.	2020	Draft 2017
Mount Lucas	1225	Cutover Bog Peat Production at Mount Lucas commenced in the mid-1970's and ceased in 2020. Most of Mount Lucas is cutaway with shallow residual peat depths. The north-west corner of the former production area retains some pockets of deep peat. Mount Lucas is considered a shallow peat cutover bog.	Peat production ceased across a significant part of the site before 2005 with ongoing peat extraction in the western side up to 2020. The cutaway area has developed a mosaic of cutaway habitats with Birch woodland dominant. The recently ceased production area is bare peat. Mountlucas windfarm is now operational (since 2014). Some rehabilitation was carried out in association with windfarm construction, specifically the creation of small wetland features. A public amenity walking route was developed on the existing windfarm. This was opened in 2015. BnM have developed an aquaculture project in partnership with Bord Iascaigh Mhara and have developed herb production trials on site. There is a rail transport link through the site. The proposed Irish Water pipeline crosses this bog.	2020	Draft 2021
Total	9687				

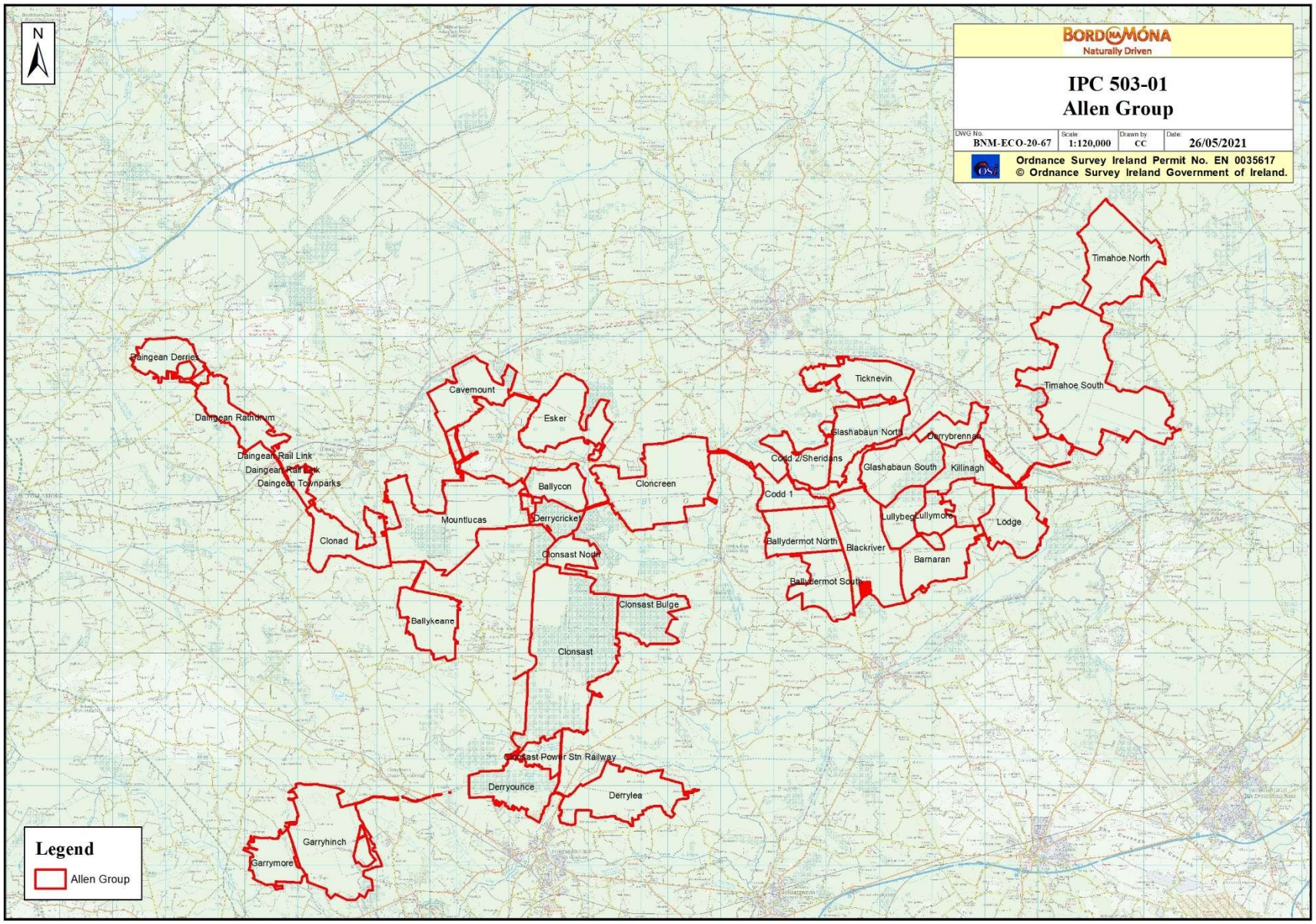

Figure Ap-2: Allen Bog Group

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:	**Mountlucas**	**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

Mountlucas 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 FĀS 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[7] and/or other aquatic IAS will be adhered with throughout all rehabilitation measures and activities.

[7] 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 Mountlucas is Raheenmore Bog SAC (Site Code 000582) which is located ca.6.5km to the northwest of Mountlucas. 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 Mountlucas and is hydrologically downstream.

The closest NHA or proposed NHA to Mountlucas 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 Mountlucas. 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 Mountlucas Bog.[8]

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

[8] 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 Mountlucas 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	Mountlucas 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	Mountlucas 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. 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 IX. EXTRACTIVE WASTE MANAGEMENT PLAN

(Minimisation, treatment, recovery and disposal)

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

Scope:
This plan covers IPPC Licence's Ref. P0503-01, Clonsast Group of Bogs in Counties Offaly and Kildare.

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

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

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

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

2.0 P0503-01 IPPC Licence Extractive Waste Conditions

2.1 Condition 7.5 Extractive Waste Management
The licensee shall draw up a Waste Management Plan (to be known as an Extractive Waste Management Plan) for the minimisation, treatment, recovery and disposal of extractive waste. This Plan shall meet the requirements of regulation 5 of the Waste Management (Management of Waste from the Extractive Industries) Regulations,2009. The Plan shall be submitted for agreement by the Agency by the 31' December2012. The Plan shall be reviewed at least once every five years thereafter in a manner agreeable to the Agency and amended in the event of substantial changes to the operation of a waste facility or to the waste deposited. Any amendments shall be notified to the Agency.
All extractive waste shall be managed in accordance with the Extractive Waste Management Plan. A report on the implementation of the Extractive Waste Management Plan shall be provided in the AER.

2.2 Condition 7.6 Waste Facility
(i) No new waste facility may be developed or an existing waste facility modified unless agreed by the Agency.
(ii) The licensee shall ensure that all existing waste facilities are managed and maintained to ensure their physical stability and to prevent pollution or contamination of soil, air, surface water or groundwater.
(iii) The licensee shall ensure that all new waste facilities are constructed, managed and maintained to ensure their physical stability and to prevent pollution or contamination of soil, air, surface water or groundwater.
(iv) Operational measures shall be continuously employed to prevent damage to waste facilities from personnel, plant or equipment.
(v) The licensee shall establish and maintain a system for regular monitoring and inspection of waste facilities.
(vi) All records of monitoring and inspection of waste facilities, as required under the licence, shall be maintained on-site in order to ensure the appropriate handover of information in the event of a change of operator or relevant personnel.

2.3 Condition 7.7 Excavation Voids
7.7.1 Unless otherwise agreed by the Agency, only extractive waste shall be placed in excavation voids.
7.7.2 When placing extractive waste into excavation voids for rehabilitation and construction purposes, the licensee shall, in accordance with regulation 10 of the Waste Management (Management of Waste from the Extractive Industries) Regulations, 2009, and the Extractive Waste Management Plan:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

7.0 Extractive Waste Management Plan

5 (2a)(i)
The vast majority of peat extraction bogs were all designed and drained for production prior to the 1960's and as such the production fields layout cannot' be altered. Under our Cleaner Reduction Procedures, various design changes have been implemented to the production machines and process to reduce lost peat which eventually is captured in the silt ponds and requires removal as waste peat silt. This along with training and ongoing research and development will continuously reduce waste peat and subsequently waste silt pond cleanings. Bog timbers are present naturally in various volumes and quantities in different bogs and as peat production involves stripping peat in layers, the exposure, generation and removal of these timbers is unavoidable. Work has been undertaken recently into project looking at grinding of these bog timbers in situ using a timber miller, and if this project becomes viable it will contribute to the reduction of bog timbers.

5 (2a)(ii)
Given the nature and expanse of peat bogs, the stockpiling and storage of these waste materials do not present a visual, storage or stability problem. As required under Condition 10 of the IPPC Licence, the silt pond excavations and screenings will be utilised to backfill the silt pond voids once the bogs have finished and stabilised in accordance with out Bog Rehabilitation Plan. Storage of these wastes in the interim, open to the elements does not present a change on the nature of these wastes that will threaten the environment or prevent their reuse during the bog rehabilitation process.

5 (2a)(iii)
Under Condition 10 of the IPPC Licence, all silt ponds will be decommissioned once the bog surface has stabilised, in agreement with the Agency. This will involve the removal of weirs and flow controls, returning the silt pond back to its original drain or removing the silt pond from the drainage system. Both of these activities will involve placing the silt pond extraction and cleaning material back into the excavation void.

5 (2a)(iv)
The peat bogs do not contain any topsoil, so this is not required.

5 (2a)(v)
Peat mineral resources do not undergo any treatment.

5 (2b)
These three extractive waste are all being reused and recovered back to their original extraction points and have not undergone any physical, chemical, or biological change.

5 (2c)(i, ii & iii)
These three extractive wastes, stored on the bog for reuse or recovery during the bog rehabilitation phase, do not require any management or monitoring during the operation of these bogs. Silt pond excavations and cleanings are stored adjacent to the silt pond and quickly revegetated and stabilise, the screenings are graded back into the bog at the agreed locations upon disposal and the bog timbers do not prevent any water or airborne danger to the environment.

5 (3)
The three extractive wastes arising from peat extraction operations at this site are classified wastes from mineral non-metalliferous excavation, with an EWC code of 0101 02. The materials are not classified as hazardous under Directive 91/689/EEC20, and do not contain substances or preparations classified as dangerous under Directives 67/548/EEC5 or 1999/45/EC6 above a certain threshold.
The peat excavations and cleanings are stored in locations and in a manner that they could not collapse, and are remote in their nature. The stockpiles are located adjacent to silt ponds that are cleaned regularly and as such these stockpiles are managed and levelled to facilitate further cleanings.
Therefore the material stored at these waste facilities would not be considered to be a Category A waste facility.

Classification in accordance Annex II.

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

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

Closure plan. (Bog Rehabilitation Plan).
Condition 10.1 – 10.3 of the IPPC Licence requires the following:

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

10.2 Cutaway Bog Rehabilitation Plan:

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

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

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

10.4 A final validation report to include a certificate of completion for the Rehabilitation Plan, for all or part of the site as necessary, shall be submitted to the Agency within six months of execution of the plan. The licensee shall carry out such tests, investigations or submit certification, as requested by the Agency, to confirm that there is no continuing risk to the environment. This plan including maps and ecological classifications are available on file at the Clonsast IPPC Licence Coordinators office.
The location in relation to the silt pond excavations and cleanings are adjacent to the silt ponds, which are considered under the Shannon River Basin Management Plan in accordance with the requirements of Directive 2000/60/EC.
Screenings and bog timbers are all naturally occurring elements of peatland and there placement back to the bog in smaller concentrated designated waste facilities does not constitute a risk to the prevention of water compliance.
The lands under where these materials are deposited are peatlands and are un-effected by the placing of this material.

Review.
This plan will be reviewed every five years, the first review to take place in September 2017. This review will entail an inspection of these waste facilities to ensure their placing, management, maintenance and stability comply with the requirements of the Extractive Waste Management requirements and condition 7.5, 7.6 and 7.7 of the Clonsast IPPC Licence P0503-01.

APPENDIX X. MITIGATION MEASURES FOR THE APPLICATION OF FERTILISER

- Any fertiliser used will be Rock Phosphate and will not be applied in the following conditions:
    1. The land is waterlogged;
    2. The land is flooded, or it is likely to flood;
    3. The land is frozen, or covered with snow;
    4. Heavy rain is forecast within 48 hours (forecasts will be checked from Met Éireann).
    5. The ground slopes steeply and there is a risk of water pollution, when factors such as surface run-off pathways, the presence of land drains, the absence of hedgerows to mitigate surface flow, soil condition and ground cover are taken into account.
- No fertiliser will be spread on land within 2 metres of a surface watercourse.
- Buffer zones in respect of waterbodies, as specified on https://www.epa.ie/about/faq/name,57156,en.html, will be adhered with at all times with regard to fertiliser application. Reproduced as follows:

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

APPENDIX XI. CONSULTATION SUMMARIES

Table APX -1 Consultees contacted

Bog Name	Contact Organisation	Contact Name	Date of Issue	Communication Format	Date Response Received	Response format
Mountlucas	Offaly County Council - Chief Executive	Anne-Marie Delaney	08/01/2021	E-mail		
Mountlucas	Offaly County Council - Senior Planner	Andrew Murray	08/01/2021	E-mail		
Mountlucas	Offaly County Council - Heritage Officer	Amanda Pedlow	08/01/2021	E-mail		
Mountlucas	Offaly County Council	Mary Hussey	08/01/2021	Email	11/02/2021	Email
Mountlucas	Offaly County Councillors - Edenderry District	Cllr. Mark Hackett	08/01/2021	E-mail		
Mountlucas	Offaly County Councillors - Edenderry District	Cllr. Noel Cribbin	08/01/2021	E-mail		
Mountlucas	Offaly County Councillors - Edenderry District	Cllr. Eddie Fitzpatrick	08/01/2021	E-mail		
Mountlucas	Offaly County Councillors - Edenderry District	Cllr. John Foley	08/01/2021	E-mail		
Mountlucas	Offaly County Councillors - Edenderry District	Cllr. Robert McDermott	08/01/2021	E-mail		
Mountlucas	Offaly County Councillors - Edenderry District	Cllr. Liam Quinn	08/01/2021	E-mail	24/01/2021	E-mail
Mountlucas	TD Laois/Offaly	Barry Cowen	08/01/2021	E-mail		
Mountlucas	TD Laois/Offaly	Charlie Flanagan	08/01/2021	E-mail		
Mountlucas	TD Laois/Offaly	Sean Fleming	08/01/2021	E-mail		
Mountlucas	TD Laois/Offaly	Carol Nolan	08/01/2021	E-mail	25/01/2021	E-mail
Mountlucas	TD Laois/Offaly	Brian Stanley	08/01/2021	E-mail		
Mountlucas	Eastern and Midland Regional Assembly		08/01/2021	E-mail		

Mountlucas	Environmental Protection Agency	Brian Meeney	08/01/2021	E-mail		
Mountlucas	National Parks and Wildlife Service	Brian Lucas	08/01/2021	E-mail		
Mountlucas	NPWS Regional Network	District Conservation Officer	12/01/2021	E-mail		
Mountlucas	Dept of the Housing Local Government and Heritage	Malcom Noonan (Minister of State at the Department of Housing, Local Government and Heritage)	08/01/2021	E-mail		
Mountlucas	National Monuments Service	Margaret Keane	08/01/2021	E-mail		
Mountlucas	National Museum of Ireland (Irish Antiquities Division)	Isabella Mulhall	08/01/2021	E-mail		
Mountlucas	Minister for Environment, Climate and Communications	Minister - Eamon Ryan	08/01/2021	E-mail		
Mountlucas	Minister of state for Agriculture with responsibility for Land use and Biodiversity	Pippa Hackett Minister of State for Land Use and Biodiversity	08/01/2021	E-mail		
Mountlucas	Inland Fisheries Ireland	General e-mail contact	08/01/2021	E-mail		
Mountlucas	Waterways Ireland	General e-mail contact	08/01/2021	E-mail	24/01/2021	E-mail
Mountlucas	The Heritage Council	Lorcán Scott	08/01/2021	E-mail	04/01/2021	E-mail
Mountlucas	An Forum Uisce (The Water Forum)	General e-mail contact	08/01/2021	E-mail		
Mountlucas	An Taisce	General e-mail contact	08/01/2021	E-mail		
Mountlucas	Friends of the Earth	Oisin Coughlan	08/01/2021	E-mail		
Mountlucas	Friends of the Irish Environment	General e-mail contact	08/01/2021	E-mail		
Mountlucas	Birdwatch Ireland	General e-mail contact	08/01/2021	E-mail		
Mountlucas	Irish Peatlands Conservation Council	General e-mail contact	08/01/2021	E-mail	25/01/2021	E-mail
Mountlucas	Irish Wildlife Trust	General e-mail contact	08/01/2021	E-mail	23/03/2021	E-mail
Mountlucas	Bat Conservation Ireland	General e-mail contact	08/01/2021	E-mail		
Mountlucas	Woodlands of Ireland	General e-mail contact	08/01/2021	E-mail		
Mountlucas	Butterfly Conservation Ireland	Jesmond Harding/info email	08/01/2021	E-mail		
Mountlucas	Community Wetlands Forum (part of Irish Rurallink)	General e-mail contact	08/01/2021	E-mail		

Mountlucas	Offaly Public Participation Network (PPN)	General e-mail contact	08/01/2021	E-mail		
Mountlucas	Sustainable Water Action Network (SWAN)	http://www.swanireland.ie/	08/01/2021	E-mail		
Mountlucas	Irish Farmers Association (Laois Offaly and Westmeath Office)	General e-mail contact	08/01/2021	E-mail	23/01/2021	E-mail
Mountlucas	Irish Farmers Association (Head Office)	General e-mail contact	08/01/2021	E-mail	23/01/2021	E-mail
Mountlucas	National Association of Regional Game Councils	Email - nargc@nargc.ie	08/01/2021	E-mail		
Mountlucas	Midlands National Shooting centre	General e-mail contact	08/01/2021	E-mail	24/01/2021	E-mail
Mountlucas	ICMSA (Irish Creamery Milk Suppliers Association)	General e-mail contact	08/01/2021	E-mail		
Mountlucas	ICSA (Irish Cattle and Sheep Farmers Association	General e-mail contact	08/01/2021	E-mail		
Mountlucas	Midlands & East Regional WFD Operational Committee	Ray Spain Co-ordinator Local Authority Water Programme	08/01/2021	E-mail		
Mountlucas	Shannon Flood Risk State Agency Co-ordination Working Group	Jackie Stewart - Flood Risk management Policy	08/01/2021	E-mail		
Mountlucas	CARO (Climate Action Regional Office) Eastern and Midlands	Alan Dunney	08/01/2021	E-mail		
Mountlucas	Dr. Catherine Farrell Trinity College	General e-mail contact	Contact Initiated by Stakeholder		22/01/2021	E-mail
Mountlucas	Francis Kenna OPW	General e-mail contact	Contact Initiated by Stakeholder		22-23/01/2021	E-mail
Mountlucas	Irish Raptor Study Group	General E-mail contact	12/01/2021	E-mail		

Table APX -2 Response summary from Consultees contacted

Organisation	Summary of Response by Stakeholder	BnM Response
Offaly County Council	Request for all draft rehabilitation plans in Co. Offaly.	BnM provided the requested documents. A virtual meeting, including a general PCAS presentation, was held for Offaly County Council on 10/02/2021
Offaly County Council	Offaly County Council e-mailed a submission to outline potential for integration of PCAS with opportunities regarding the Offaly County Council Inaugural Digital Strategy 2020-2022.	A meeting on Offaly's digital strategy was held between BnM and Offaly County Council on 04/03/2021.
Offaly County Council	Submission provided on behalf on Offaly County Council on a number of PCAS bogs including Mountlucas on 22/02/2021. Key points raised were; 1) Requested that details of security fencing to be identified and detailed on plans. 2) Long term rehabilitation plan to be provided addressing above areas of consideration post 2024 if required. 3) Public Rights of Way access locations are to be maintained with relevant stakeholders and marked on drawings. 4) A number of technical issues with draft rehabilitation plans. 5) Advised BnM to carefully consider after use of bogs as part of PCAS 6) Request that the impact of PCAS on surrounding roads be considered as part of rehabilitation plans. 7) Advised that long term management (post 2024) is considered by BnM. 8) Advised that Appropriate assessment and the habitats directive are taken into account by BnM. 9) Advised that BnM consider management of flooding & water pollution, fire risk, invasive species and waste management as part of PCAS.	A virtual meeting/general presentation on PCAS to between BnM and Offaly Councillors and OCC personnel was conducted on 10/02/2021. BnM provided further PCAS documentation on request, via e-mail on 27/01/2021. Refer to Section 4 for response on issues raised. Dialogue with Offaly County Council is ongoing.
Irish Peatlands Conservation Council	Responded to consultation regarding Mountlucas Bog and the PCAS project at large to express support for the project and list a number of comments on how the project might be improved; 1) Potential for inclusion of local environmental groups in species specific conservation plans 2) Requested that a map of potentially suitable areas for such projects should be included in rehab plans 3) Promoted the idea of creating a biodiversity action plan that considers the use of site by all relevant stakeholders 4) Recommended following the NPWS community engagement strategy as it was largely successful in	BnM responded 25/01/2021, all issues raised will be taken into account in future drafts of plan. Also advised that; 1) We have included DOC as an additional parameter on our suite of water monitoring analysis. 2) BnM are working with Lawco and WFD to align the BNM monitoring programme with the EPA's 2021 Monitoring programme 3) BnM have an extensive community consultation process ongoing with a dedicated Community Liaison Officer

	bring local communities along with restoration projects	communicating to affected and interested parties
NPWS Regional Network	NPWS responded through e-mail thread on the 02, 03,07,09/12/2020 in relation to all PCAS bogs. The main points discussed were to advise of the requirement to investigate if assessment under the SEA and Birds directives for each site.	BnM acknowledged via e-mail to address queries on 09/12/2021. Also, a phone conversation with local NPWS Conservation Ranger on 11/01/2021 discussed biodiversity and rehabilitation measures on PCAS bogs including Mountlucas.
National Museum of Ireland (Irish Antiquities Division)	Responded through e-mail 28/12/2020 in relation to all PCAS bogs. Issues raised were; 1) The request that due diligence be taken during works to protect any archaeologically significant findings or areas 2) The NMI reiterated the importance of peatlands for the preservation of archaeology and requested they be consulted as part of any EIA undertaken	BnM acknowledged and responded via e-mail on 28/12/2020 to assure BnM will give due cognisance to all points within all rehabilitation plans for Mountlucas Bog. A virtual meeting on PCAS between BnM and NMI was held on 18/01/2021
Irish Farmers Association	Responded to consultation regarding Mountlucas and the PCAS project at large on multiple dates throughout ongoing discourse. Specific submission on Mountlucas Bog received from Westmeath, Offaly and Laois IFA Office. Concerns raised were: 1) Potential for flooding on adjacent lands. 2) Health and Safety 3) Perceived potentially detrimental impact of PCAS on property value 4) Reiterated the desire of the IFA that people who have been cutting turf on bogs should retain this right.	A working group has been established at a high level between BnM and IFA on various issues including PCAS. A meeting was held between BnM and IFA representatives on 18/02/2021 to present details on PCAS. Dialogue is ongoing.
The Heritage Council	Responded to consultation via e-mail on 04/01/2021 asking for more information on PCAS in general and looking to be involved in any seminar or information events.	BnM responded via phone conversation on 11/01/2021. Dialogue is ongoing.
Dept. of Agriculture, Food & the Marine (DAFM)	Submission by e-mail to express support for PCAS in general. Submission recommended; 1) That local landowners and stakeholders be considered as part of the consultation process. 2) EIA assessment be carried out prior to PCAS works. 3) Hydrological assessments are carried out with a view to protecting adjoining lands from adverse impacts.	BnM acknowledged and responded via e-mail on 02/03/2021to assure that all points raised within the submission will be considered. A virtual meeting/PCAS presentation was held for DAFM on 11/12/2020.
The Irish Wildlife Trust	Responded to consultation via e-mail on 01/02/2021 to acknowledge receipt of PCAS plans and indicate desire to make a submission. Submission received on 23/03/2021 supporting the PCAS scheme and specifically requesting: 1. Cnosideration of statutory protection for rehabilitated bogs; 2. Consideration fo re-wilding in determining future habitats and species presence, incluing reintroductions; 3. Approporiate monitoring is established.	BnM responded via email and phone throughout February and March. A virtual meeting/PCAS presentation was held for IWT on 17/02/2021. Dialogue is ongoing.

APPENDIX XII. ARCHAEOLOGY

Role of the Archaeological Liaison Officer

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

Code of Practice

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Code of Practice

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

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

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

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

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

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

BORD NA MÓNA 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	13/09/2020	First release	EMcD
2			

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

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

Report For

Bord Na Móna Energy Ltd.

Author

Dr. Charles Mount

Bord Na Móna Project Archaeologist

Introduction

The EPA (2002) *Guidance on the process of preparing and implementing a bog rehabilitation plan* notes that the licensee should characterise the bog prior to embarking on detailed planning and implementation. This characterisation should detail how the land is classified in terms of statutory protections, e.g. as European sites, world heritage sites, RAMSAR sites, National Heritage Areas, national monuments, archaeological heritage, etc. This archaeological impact assessment report was prepared by Dr. Charles Mount for Bord na Móna Energy Ltd to fulfil this characterisation in relation to archaeological heritage. It represents the results of a desk-based assessment of the impact of proposed bog rehabilitation on c.1,226 hectares at Mount Lucas, Co. Offaly on the known archaeological heritage of the bog. The proposed rehabilitation actions will be a combination of measures to create wetlands and re-wet deep peat as outlined in the draft Methodology Paper for the proposed Bord na Móna Decommissioning, Rehabilitation and Restoration Scheme. These enhanced measures for Mount Lucas Bog will include:

- 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.

Mount Lucas Bog is located c.3km south-east of Daingean and north-east of the L402 road. The bog occupies the townlands of Ballynakill, Brackagh, Clonarrow or Riverlyons, Derrycricket, Drumcaw or Mount Lucas, Gorteenkeel, Island, Oldtown and Scrub or Pigeonpark, on OS 6 inch sheets Offaly 18 and 19.

Methodology

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

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

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

Desktop assessment

Recorded Monuments

The Record of Monuments and Places (RMP) for Co. Offaly which was established under Section 12 of the National Monuments (Amendment) Act, 1994 was examined as part of the assessment (DAHGI 1995). This record was published by the Minister in 1995 and includes sites and monuments that were known in

Mount Lucas Bog before that date. This review established that there are no RMPs situated in the proposed rehabilitation area (Fig. 1).

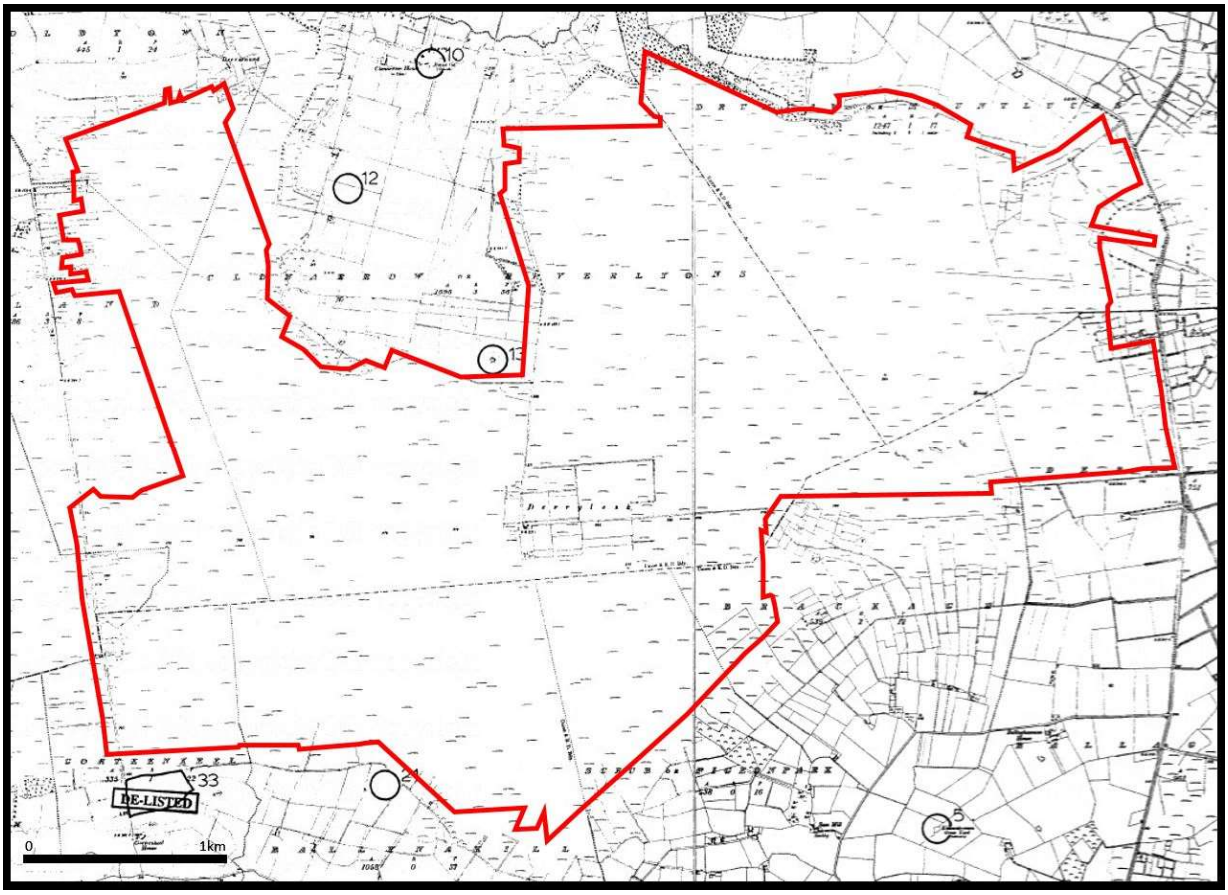

Fig. 1. Mount Lucas Bog, Co. Offaly, detail of the Record of Monuments and Places map sheets Nos. 18 and 19. The proposed rehabilitation area is outlined with the redline. There are no Recorded Monuments in the area.

Peatland survey

Mount Lucas Bog was surveyed by the Irish Archaeological Wetland Unit in 2002 as part of the Archaeological Survey of Ireland Peatland Survey Licence number 02E0839. A total of 159 sightings were identified and recorded and subsequently lodged in the records of the Archaeological Survey of Ireland (see Table 1). These consisted of 47 sightings of primary toghers, 26 of tertiary toghers, 17 of secondary toghers, 37 of worked and unworked wood, 20 post rows, 8 finds, one platform and one structure. The sightings were concentrated in three main groups in the north-western, south-western and south-central part of the bog. the southwest corner and at the centre of the bog. 14 sightings were resolved (archaeological material and artefacts recovered) during the survey.

SMR_NO	Cat._No.	Survey code	Site type	Townland	N.G.R. E	N.G.R. N	Depth BS
OF018-116----	OF-BNK0001a	02MLS0047a	Unworked wood	Ballynakill	249550	223697	0.00
OF018-117----	OF-BNK0002a	02MLS0044a	Unworked wood	Ballynakill	249539	223679	0.00
OF018-118----	OF-BNK0003a	02MLS0038a	Togher (tertiary)	Ballynakill	249304	223682	0.19
OF018-119----	OF-BNK0004a	02MLS0086a	Togher (tertiary)	Ballynakill	249566	223662	0.00

OF018-120----	OF-BNK0005a	02MLS0045a	Togher (tertiary)	Ballynakill	249553	223674	0.00
OF018-121----	OF-BNK0006a	02MLS0046a	Togher (tertiary)	Ballynakill	249560	223674	0.00
OF018-122----	OF-BNK0007a	02MLS0088a	Togher (tertiary)	Ballynakill	249628	223661	0.00
OF018-122----	OF-BNK0007a: ext	02MLS0088a: ext	Togher (tertiary)	Ballynakill	249622	223672	0.00
OF018-123----	OF-BNK0008a	02MLS0043a	Togher (tertiary)	Ballynakill	249494	223658	0.00
OF018-124----	OF-BNK0009a	02MLS0048a	Unworked wood	Ballynakill	249514	223658	0.01
OF018-125----	OF-BNK0010a	02MLS0085a	Togher (tertiary)	Ballynakill	249533	223658	0.00
OF018-126----	OF-BNK0011a	02MLS0087a	Worked wood	Ballynakill	249547	223658	0.00
OF018-127----	OF-BNK0012a	02MLS0037a	Togher (secondary)	Ballynakill	249348	223611	0.00
-	OF-BNK0012b	02MLS0037b	Togher (secondary)	Ballynakill	249324	223625	0.00
OF018-128----	OF-BNK0013a	02MLS0041a	Unworked wood	Ballynakill	249184	223600	0.00
OF018-129----	OF-BNK0014a	02MLS0035a	Worked wood	Ballynakill	249429	223609	0.40
OF018-130----	OF-BNK0015a	02MLS0039a	Worked wood	Ballynakill	249641	223613	0.30
OF018-131----	OF-BNK0016a	02MLS0040a	Worked wood	Ballynakill	249644	223613	0.00
OF018-132----	OF-BNK0017a	02MLS0032a	Togher (tertiary)	Ballynakill	249529	223581	0.73
OF018-133----	OF-BNK0018a	02MLS0033a	Togher (tertiary)	Ballynakill	249560	223582	1.10
OF018-134----	OF-BNK0019a	02MLS0050a	Togher (tertiary)	Ballynakill	250294	223610	0.00
OF018-135----	OF-BNK0020	02MLS0097a	No record	Ballynakill	2495	2238	-
OF018-136----	OF-CWR0001a	02MLS0008a	Togher (tertiary)	Clonarrow or Riverlyons	249203	225358	0.00
-	OF-CWR0001b	02MLS0008b	Togher (tertiary)	Clonarrow or Riverlyons	249191	225363	0.00
OF018-137----	OF-CWR0002a	02MLS0009a	Worked wood	Clonarrow or Riverlyons	249219	225310	0.00
OF018-138----	OF-CWR0003a	02MLS0007a	Worked wood	Clonarrow or Riverlyons	249210	225334	0.02
OF018-139----	OF-CWR0004a	02MLS0006a	Worked wood	Clonarrow or Riverlyons	249299	225491	0.00
OF018-140----	OF-CWR0005a	02MLS0001a	Togher (secondary)	Clonarrow or Riverlyons	249311	225519	0.00
OF018-140----	OF-CWR0005b	02MLS0001b	Togher (secondary)	Clonarrow or Riverlyons	249286	225504	0.00
OF018-141----	OF-CWR0006a	02MLS0013a	Worked wood	Clonarrow or Riverlyons	249351	225370	0.00
OF018-142----	OF-CWR0007a	02MLS0004a	Worked wood	Clonarrow or Riverlyons	249348	225381	0.00
-	OF-CWR0007b	02MLS0004b	Worked wood	Clonarrow or Riverlyons	249345	225389	0.00
OF018-143----	OF-CWR0008a	02MLS0010a	Worked wood	Clonarrow or Riverlyons	249369	225341	0.00
OF018-144----	OF-CWR0009a	02MLS0012a	Worked wood	Clonarrow or Riverlyons	249358	225366	0.00
OF018-145----	OF-CWR0010a	02MLS0002a	Worked wood	Clonarrow or Riverlyons	249314	225490	0.00
OF018-146----	OF-CWR0011a	02MLS0017a	Worked wood	Clonarrow or Riverlyons	249374	225342	0.00
OF018-147----	OF-CWR0012a	02MLS0003a	Worked wood	Clonarrow or Riverlyons	249368	225359	0.00
OF018-148----	OF-CWR0013a	02MLS0023a-i	Togher (primary)	Clonarrow or Riverlyons	249393	224888	0.00
-	OF-CWR0013b	02MLS0023b	Togher (primary)	Clonarrow or Riverlyons	249393	224900	0.00
-	OF-CWR0013c	02MLS0023c	Togher (primary)	Clonarrow or Riverlyons	249397	224910	0.00
-	OF-CWR0013d	02MLS0023d	Togher (primary)	Clonarrow or Riverlyons	249413	224939	0.00
-	OF-CWR0013e	02MLS0023e	Togher (primary)	Clonarrow or Riverlyons	249446	224992	0.00
-	OF-CWR0013f	02MLS0023f	Togher (primary)	Clonarrow or Riverlyons	249453	225005	0.00
-	OF-CWR0013g	02MLS0023g	Togher (primary)	Clonarrow or Riverlyons	249498	225062	0.00
-	OF-CWR0013h	02MLS0023h	Togher (primary)	Clonarrow or Riverlyons	249592	225175	0.00
-	OF-CWR0013i	02MLS0023i	Togher (primary)	Clonarrow or Riverlyons	249630	225225	0.00
---	OF-CWR0014a	02MLS0071a	Find	Clonarrow or Riverlyons	249218	225144	0.00
OF018-149----	OF-CWR0015a	02MLS0073a	Post row	Clonarrow or Riverlyons	249317	224903	0.00
-	OF-CWR0015b	02MLS0073b	Post row	Clonarrow or Riverlyons	249330	224924	0.00
-	OF-CWR0015c	02MLS0073c	Post row	Clonarrow or Riverlyons	249316	224903	0.00
OF018-150----	OF-CWR0016a	02MLS0028a	Worked wood	Clonarrow or Riverlyons	249284	224925	0.00
OF018-151----	OF-CWR0017a	02MLS0078a	Togher (tertiary)	Clonarrow or Riverlyons	249305	224905	0.00
OF018-152----	OF-CWR0018a	02MLS0062a	Togher (tertiary)	Clonarrow or Riverlyons	249389	224908	0.00
OF018-153----	OF-CWR0019a	02MLS0064a	Worked wood	Clonarrow or Riverlyons	249448	224908	0.00
OF018-154----	OF-CWR0020a	02MLS0027a	Togher (tertiary)	Clonarrow or Riverlyons	249472	224911	0.00
OF018-155----	OF-CWR0021a	02MLS0070a	Togher (tertiary)	Clonarrow or Riverlyons	249282	224912	0.00
OF018-156----	OF-CWR0022a	02MLS0075a	Togher (tertiary)	Clonarrow or Riverlyons	249342	224912	0.00
OF018-157----	OF-CWR0023a	02MLS0076a	Worked wood	Clonarrow or Riverlyons	249366	224914	0.00
OF018-158----	OF-CWR0024a	02MLS0077a	Worked wood	Clonarrow or Riverlyons	249384	224913	0.00
---	OF-CWR0025a	02MLS0096a	Find	Clonarrow or Riverlyons	2502	2243	-
OF018-159----	OF-CWR0026a	02MLS0074a	Worked wood	Clonarrow or Riverlyons	249338	224903	0.00
OF018-160----	OF-CWR0027a	02MLS0063a	Togher (secondary)	Clonarrow or Riverlyons	249400	224899	0.04
-	OF-CWR0027b	02MLS0063b	Togher (secondary)	Clonarrow or Riverlyons	249381	224887	0.16
-	OF-CWR0027c	02MLS0063c	Togher (secondary)	Clonarrow or Riverlyons	249390	224892	0.02
OF018-161----	OF-CWR0028a	02MLS0069a	Togher (tertiary)	Clonarrow or Riverlyons	249441	224904	0.00
OF018-162----	OF-CWR0029a	02MLS0067a	Togher (secondary)	Clonarrow or Riverlyons	249436	224892	0.00
-	OF-CWR0029b	02MLS0067b	Togher (secondary)	Clonarrow or Riverlyons	249448	224892	0.00
OF018-163----	OF-CWR0030a	02MLS0025a	Worked wood	Clonarrow or Riverlyons	249388	224900	0.00
OF018-164----	OF-CWR0031a	02MLS0065a	Togher (tertiary)	Clonarrow or Riverlyons	249413	224888	0.00
OF018-165----	OF-CWR0032a	02MLS0066a	Togher (tertiary)	Clonarrow or Riverlyons	249420	224890	0.00
OF018-166----	OF-CWR0033a	02MLS0026a	Unworked wood	Clonarrow or Riverlyons	249375	224875	0.00
---	OF-CWR0034a	02MLS0014a	Find	Clonarrow or Riverlyons	249470	224842	0.00
OF018-167----	OF-CWR0035a	02MLS0060a	Unworked wood	Clonarrow or Riverlyons	249349	224813	0.04
OF018-168----	OF-CWR0036a	02MLS0022a	Platform	Clonarrow or Riverlyons	249449	224782	0.00
OF018-169----	OF-CWR0037a	02MLS0072a	Togher (secondary)	Clonarrow or Riverlyons	249228	224692	0.00

OF018-170----	OF-CWR0038a	02MLS0020a	Worked wood	Clonarrow or Riverlyons	249215	224684	0.01
OF018-171----	OF-CWR0039a:north	02MLS0018a: north	Post row	Clonarrow or Riverlyons	249231	224655	0.00
OF018-171----	OF-CWR0039a:south	02MLS0018a:south	Post row	Clonarrow or Riverlyons	249223	224640	0.00
OF018-172----	OF-CWR0040a	02MLS0019a	Togher (tertiary)	Clonarrow or Riverlyons	249238	224668	0.00
-	OF-CWR0040b	02MLS0019b	Togher (tertiary)	Clonarrow or Riverlyons	249228	224666	0.00
---	OF-CWR0041a	02MLS0015a	Find	Clonarrow or Riverlyons	249336	224291	-
---	OF-CWR0042a	02MLS0011a	Find	Clonarrow or Riverlyons	251965	225380	0.00
---	OF-CWR0043a	02MLS0031a	Find	Clonarrow or Riverlyons	249238	224817	0.00
OF018-173----	OF-CWR0044 north	02MLS0092a	Wooden structure	Clonarrow or Riverlyons	2496	2251	-
OF018-174----	OF-CWR0045. North	02MLS0093a	Togher (primary)	Clonarrow or Riverlyons	249467	225270	-
-	OF-CWR0045. South	?	Togher (primary)	Clonarrow or Riverlyons	249835	224747	-
OF018-175----	OF-CWR0046. North	02MLS0094a	Togher (primary)	Clonarrow or Riverlyons	249405	224687	-
-	OF-CWR0046. South	?	Togher (primary)	Clonarrow or Riverlyons	249465	224017	-
-	OF-CWR0047	02MLS0095a	Find	Clonarrow or Riverlyons	2502	2243	-
OF018-176----	OF-GNK0001a	02MLS0079a	Worked wood	Gorteenkeel	249084	223581	0.00
-	OF-GNK0002.north	02MLS0030.north	Togher (primary)	Gorteenkeel	249091	224355	-1.00
OF018-027----	OF-GNK0002a	02MLS0030a	Togher (primary)	Gorteenkeel	249098	223555	0.70
-	OF-GNK0002b	02MLS0030b	Togher (primary)	Gorteenkeel	249098	223564	0.00
-	OF-GNK0002c	02MLS0030c	Togher (primary)	Gorteenkeel	249099	223579	0.00
-	OF-GNK0002d	02MLS0030d	Togher (primary)	Gorteenkeel	249100	223599	0.00
OF018-177----	OF-GNK0003a	02MLS0042a	Worked wood	Gorteenkeel	249124	223598	0.00
OF018-178----	OF-GNK0004a	02MLS0084a	Unworked wood	Gorteenkeel	249147	223599	0.00
---	OF-ILD 0001a	02MLS0016a	Find	Island	248854	225316	0.00
OF018-179----	OF-ILD 0002.east	02MLS0091a	Post row	Island	248835	225352	-
-	OF-ILD 0002.west	02MLS0091b	Post row	Island	248740	225352	-
OF018-180----	OF-SPP0001a	02MLS0082a	Togher (primary)	Scrub or Pigeonpark	251114	223612	0.34
-	OF-SPP0001b	02MLS0082b	Togher (primary)	Scrub or Pigeonpark	251107	223628	0.00
-	OF-SPP0001c	02MLS0082c	Togher (primary)	Scrub or Pigeonpark	251090	223660	0.00
-	OF-SPP0001e	02MLS0082e	Togher (primary)	Scrub or Pigeonpark	251066	223705	0.00
-	OF-SPP0001f	02MLS0082f	Togher (primary)	Scrub or Pigeonpark	251052	223731	0.00
-	OF-SPP0001g	02MLS0082g	Togher (primary)	Scrub or Pigeonpark	251041	223750	0.00
-	OF-SPP0001h	02MLS0082h	Togher (primary)	Scrub or Pigeonpark	251031	223769	0.00
-	OF-SPP0001i.n	02MLS0082i.n	Togher (primary)	Scrub or Pigeonpark	251025	223779	0.00
-	OF-SPP0001j.n	02MLS0082j.n	Togher (primary)	Scrub or Pigeonpark	251015	223794	0.00
-	OF-SPP0001k.n	02MLS0082k.n	Togher (primary)	Scrub or Pigeonpark	251007	223809	0.00
-	OF-SPP0001l	02MLS0082l	Togher (primary)	Scrub or Pigeonpark	251007	223809	0.00
-	OF-SPP0001l.s	02MLS0082l.s	Togher (primary)	Scrub or Pigeonpark	250993	223834	0.00
-	OF-SPP0001m	02MLS0082m	Togher (primary)	Scrub or Pigeonpark	250991	223839	0.00
-	OF-SPP0001n	02MLS0082n	Togher (primary)	Scrub or Pigeonpark	250985	223847	0.00
-	OF-SPP0001o	02MLS0082o	Togher (primary)	Scrub or Pigeonpark	250977	223860	0.00
-	OF-SPP0001p	02MLS0082p	Togher (primary)	Scrub or Pigeonpark	250965	223879	0.00
-	OF-SPP0001q	02MLS0082q	Togher (primary)	Scrub or Pigeonpark	250956	223895	0.00
-	OF-SPP001r	02MLS0082r	Togher (primary)	Scrub or Pigeonpark	250952	223901	0.00
-	OF-SPP0001s	02MLS0082s	Togher (primary)	Scrub or Pigeonpark	251099	223643	0.60
OF018-181----	OF-SPP0002a	02MLS0083a	Post row	Scrub or Pigeonpark	251093	223697	0.00
-	OF-SPP0002b	02MLS0083b	Post row	Scrub or Pigeonpark	251078	223712	0.00
-	OF-SPP0002c	02MLS0083c	Post row	Scrub or Pigeonpark	251060	223727	0.00
-	OF-SPP0002d	02MLS0083d	Post row	Scrub or Pigeonpark	251112	223681	0.00
-	OF-SPP0002e	02MLS0083e	Post row	Scrub or Pigeonpark	251123	223670	0.00
-	OF-SPP0002f	02MLS0083f	Post row	Scrub or Pigeonpark	251082	223714	0.00
-	OF-SPP0002g	02MLS0083g	Post row	Scrub or Pigeonpark	251073	223726	0.00
-	OF-SPP0002h	02MLS0083h	Post row	Scrub or Pigeonpark	251066	223739	0.00
-	OF-SPP0002i	02MLS0083i	Post row	Scrub or Pigeonpark	251048	223765	0.00
-	OF-SPP0002j	02MLS0083j	Post row	Scrub or Pigeonpark	251034	223785	0.00
-	OF-SPP0002k	02MLS0083k	Post row	Scrub or Pigeonpark	251022	223802	0.00
-	OF-SPP0002l	02MLS0083l	Post row	Scrub or Pigeonpark	251026	223756	0.00
	OF-SPP0002m	02MLS0083m	Post row	Scrub or Pigeonpark	251010.	223772	0.00
OF018-182----	OF-SPP0003a	02MLS0081a-d	Togher (secondary)	Scrub or Pigeonpark	251147	223644	0.00
-	OF-SPP0003b	02MLS81b	Togher (secondary)	Scrub or Pigeonpark	251175	223613	0.00
-	OF-SPP0003c	02MLS81c	Togher (secondary)	Scrub or Pigeonpark	251147	223643	0.00
-	OF-SPP0003d	02MLS81d	Togher (secondary)	Scrub or Pigeonpark	251190	223599	0.19
OF018-183----	OF-SPP0004a	02MLS0057a	Togher (tertiary)	Scrub or Pigeonpark	250883	223615	0.00
OF018-184----	OF-SPP0005a	02MLS0052a	Togher (primary)	Scrub or Pigeonpark	250980	223458	0.25
-	OF-SPP0005b	02MLS52b	Togher (primary)	Scrub or Pigeonpark	250979	223457	0.00
-	OF-SPP0005c	02MLS52c	Togher (primary)	Scrub or Pigeonpark	250972	223474	0.00
-	OF-SPP0005d	02MLS52d	Togher (primary)	Scrub or Pigeonpark	250967	223488	0.06
-	OF-SPP0005e	02MLS52e	Togher (primary)	Scrub or Pigeonpark	250957	223503	0.00
-	OF-SPP0005f.n	02MLS52f.n	Togher (primary)	Scrub or Pigeonpark	250946	223515	0.00
-	OF-SPP0005g.s	02MLS52g.s	Togher (primary)	Scrub or Pigeonpark	250933	223534	0.03

-	OF-SPP0005h	02MLS52h	Togher (primary)	Scrub or Pigeonpark	250923	223548	0.13
-	OF-SPP0005i	02MLS52i	Togher (primary)	Scrub or Pigeonpark	250911	223564	0.00
-	OF-SPP0005j	02MLS52j	Togher (primary)	Scrub or Pigeonpark	250905	223574	0.00
OF018-185----	OF-SPP0006a	02MLS0089a	Togher (secondary)	Scrub or Pigeonpark	251162	223613	0.00
OF018-186----	OF-SPP0007a	02MLS0056a	Togher (tertiary)	Scrub or Pigeonpark	250922	223579	0.49
OF018-187----	OF-SPP0008a	02MLS0058a	Unworked wood	Scrub or Pigeonpark	251207	223586	0.21
OF018-188----	OF-SPP0009a	02MLS0059a	Unworked wood	Scrub or Pigeonpark	251209	223586	0.18
OF018-189----	OF-SPP0010a	02MLS0051a	Togher (secondary)	Scrub or Pigeonpark	250843	223546	0.00
-	OF-SPP0010b	02MLS0051b	Togher (secondary)	Scrub or Pigeonpark	250835	223561	0.00
OF018-190----	OF-SPP0011a	02MLS0090a	Worked wood	Scrub or Pigeonpark	251224	223570	0.79
OF018-191----	OF-SPP0012a	02MLS0055a	Togher (tertiary)	Scrub or Pigeonpark	250847	223516	0.44
OF018-192----	OF-SPP0013a	02MLS0053a	Worked wood	Scrub or Pigeonpark	251050	223506	0.00
OF018-193----	OF-SPP0014a	02MLS0054a	Unworked wood	Scrub or Pigeonpark	251120	223506	0.59
OF018-194----	OF-SPP0015a	02MLS0080a	Worked wood	Scrub or Pigeonpark	251345	223725	0.00

Table 1. List of sites recorded by IAWU in Mount Lucas Bog.

Sites and Monuments Record

The Sites and Monuments Record (SMR) which is maintained by the Department of Housing, Local Government and Heritage was examined as part of the assessment on the 27th of January 2021. The SMR consists of records included in the RMP and sites and monuments notified to the Dept. since the publication of the RMP. This review established that there are 82 monuments entered in the SMR in the proposed rehabilitation area. The monuments are indicated in Table 2 and Fig. 2 below. These are all sightings identified by the Irish Archaeological Wetland Unit survey in 2002 that were notified to the Archaeological Survey of Ireland with no additions.

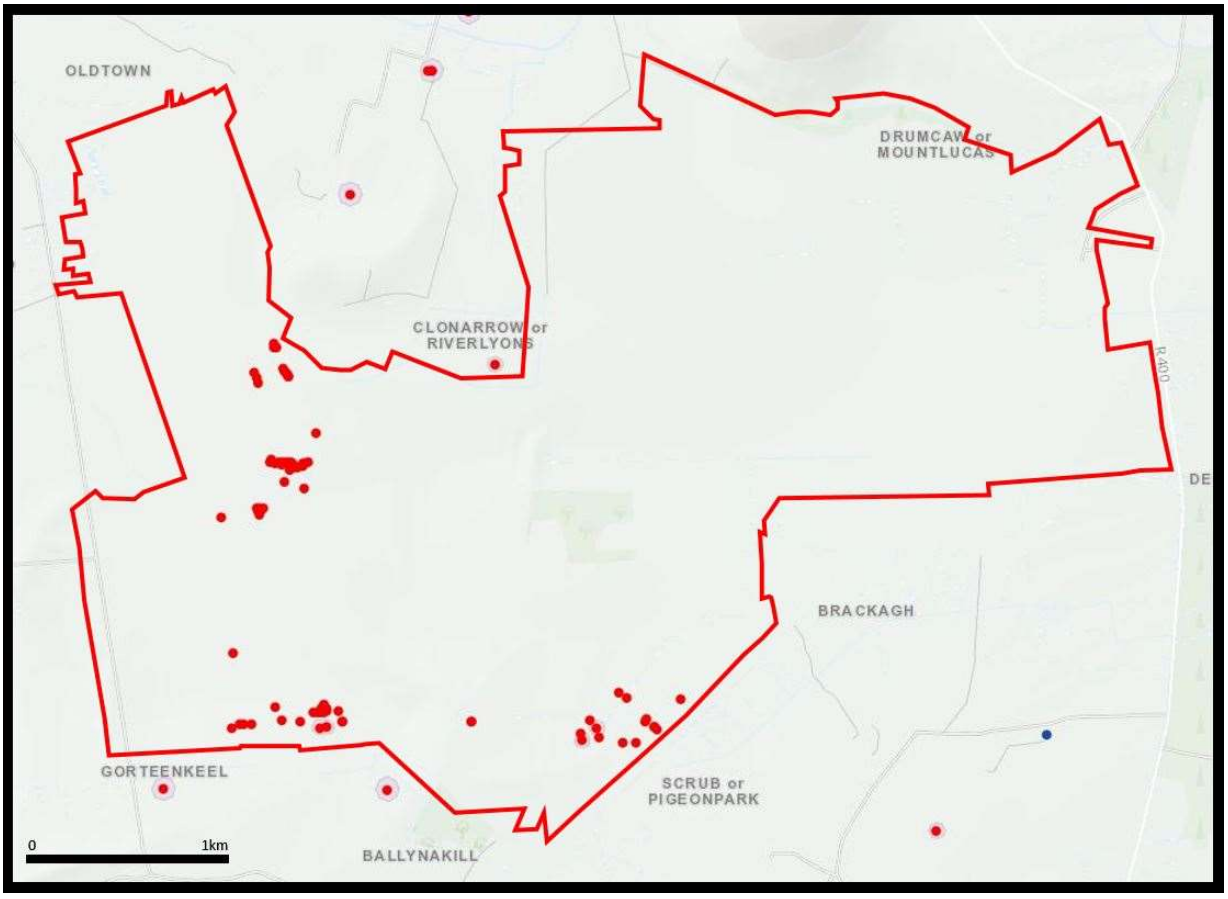

Fig. 3. Mount Lucas Bog, Co. Offaly, detail of the Sites and Monuments Record. The proposed rehabilitation area is outlined with the redline. There are a 82 SMRs in the area.

SMR_NO	Cat._No.	Survey code	SMR Class	Townland	N.G.R. E	N.G.R. N	Depth BS
OF018-116----	OF-BNK0001a	02MLS0047a	Unworked wood-Redundant record	Ballynakill	249550	223697	0.00
OF018-117----	OF-BNK0002a	02MLS0044a	Unworked wood-Redundant record	Ballynakill	249539	223679	0.00
OF018-118----	OF-BNK0003a	02MLS0038a	Togher (tertiary)-Redundant record	Ballynakill	249304	223682	0.19
OF018-119----	OF-BNK0004a	02MLS0086a	Road - class 3 togher	Ballynakill	249566	223662	0.00
OF018-120----	OF-BNK0005a	02MLS0045a	Road - class 3 togher	Ballynakill	249553	223674	0.00
OF018-121----	OF-BNK0006a	02MLS0046a	Road - class 3 togher	Ballynakill	249560	223674	0.00
OF018-122----	OF-BNK0007a	02MLS0088a	Road - class 2 togher	Ballynakill	249628	223661	0.00
OF018-123----	OF-BNK0008a	02MLS0043a	Road - class 2 togher	Ballynakill	249494	223658	0.00
OF018-124----	OF-BNK0009a	02MLS0048a	Unworked wood-Redundant record	Ballynakill	249514	223658	0.01
OF018-125----	OF-BNK0010a	02MLS0085a	Road - class 3 togher	Ballynakill	249533	223658	0.00
OF018-126----	OF-BNK0011a	02MLS0087a	Worked wood-Redundant record	Ballynakill	249547	223658	0.00
OF018-127----	OF-BNK0012a	02MLS0037a	Road - class 2 togher	Ballynakill	249348	223611	0.00
OF018-128----	OF-BNK0013a	02MLS0041a	Unworked wood-Redundant record	Ballynakill	249184	223600	0.00
OF018-129----	OF-BNK0014a	02MLS0035a	Worked wood-Redundant record	Ballynakill	249429	223609	0.40
OF018-130----	OF-BNK0015a	02MLS0039a	Worked wood-Redundant record	Ballynakill	249641	223613	0.30
OF018-131----	OF-BNK0016a	02MLS0040a	Worked wood-Redundant record	Ballynakill	249644	223613	0.00
OF018-132----	OF-BNK0017a	02MLS0032a	Road - class 3 togher	Ballynakill	249529	223581	0.73
OF018-133----	OF-BNK0018a	02MLS0033a	Road - class 3 togher	Ballynakill	249560	223582	1.10
OF018-134----	OF-BNK0019a	02MLS0050a	Road - class 3 togher	Ballynakill	250294	223610	0.00
OF018-135----	OF-BNK0020	02MLS0097a	No record-Redundant record	Ballynakill	2495	2238	-
OF018-136----	OF-CWR0001a	02MLS0008a	Road - class 3 togher	Clonarrow or Riverlyons	249203	225358	0.00
OF018-137----	OF-CWR0002a	02MLS0009a	Togher (tertiary)	Clonarrow or Riverlyons	249219	225310	0.00
OF018-138----	OF-CWR0003a	02MLS0007a	Worked wood-Redundant record	Clonarrow or Riverlyons	249210	225334	0.02
OF018-139----	OF-CWR0004a	02MLS0006a	Worked wood-Redundant record	Clonarrow or Riverlyons	249299	225491	0.00
OF018-140----	OF-CWR0005a	02MLS0001a	Worked wood-Redundant record	Clonarrow or Riverlyons	249311	225519	0.00
OF018-140----	OF-CWR0005b	02MLS0001b	Road - class 3 togher	Clonarrow or Riverlyons	249286	225504	0.00
OF018-141----	OF-CWR0006a	02MLS0013a	Worked wood-Redundant record	Clonarrow or Riverlyons	249351	225370	0.00
OF018-142----	OF-CWR0007a	02MLS0004a	Worked wood-Redundant record	Clonarrow or Riverlyons	249348	225381	0.00
OF018-143----	OF-CWR0008a	02MLS0010a	Worked wood-Redundant record	Clonarrow or Riverlyons	249369	225341	0.00
OF018-144----	OF-CWR0009a	02MLS0012a	Worked wood-Redundant record	Clonarrow or Riverlyons	249358	225366	0.00
OF018-145----	OF-CWR0010a	02MLS0002a	Worked wood-Redundant record	Clonarrow or Riverlyons	249314	225490	0.00
OF018-146----	OF-CWR0011a	02MLS0017a	Worked wood-Redundant record	Clonarrow or Riverlyons	249374	225342	0.00
OF018-147----	OF-CWR0012a	02MLS0003a	Worked wood-Redundant record	Clonarrow or Riverlyons	249368	225359	0.00
OF018-148----	OF-CWR0013a	02MLS0023a-i	Road - class 1 togher	Clonarrow or Riverlyons	249393	224888	0.00
OF018-149----	OF-CWR0015a	02MLS0073a	Post row - peatland	Clonarrow or Riverlyons	249317	224903	0.00
OF018-150----	OF-CWR0016a	02MLS0028a	Worked wood-Redundant record	Clonarrow or Riverlyons	249284	224925	0.00
OF018-151----	OF-CWR0017a	02MLS0078a	Road - class 3 togher	Clonarrow or Riverlyons	249305	224905	0.00
OF018-152----	OF-CWR0018a	02MLS0062a	Road - class 3 togher	Clonarrow or Riverlyons	249389	224908	0.00
OF018-153----	OF-CWR0019a	02MLS0064a	Worked wood-Redundant record	Clonarrow or Riverlyons	249448	224908	0.00
OF018-154----	OF-CWR0020a	02MLS0027a	Road - class 3 togher	Clonarrow or Riverlyons	249472	224911	0.00
OF018-155----	OF-CWR0021a	02MLS0070a	Road - class 3 togher	Clonarrow or Riverlyons	249282	224912	0.00
OF018-156----	OF-CWR0022a	02MLS0075a	Road - class 3 togher	Clonarrow or Riverlyons	249342	224912	0.00
OF018-157----	OF-CWR0023a	02MLS0076a	Worked wood-Redundant record	Clonarrow or Riverlyons	249366	224914	0.00
OF018-158----	OF-CWR0024a	02MLS0077a	Worked wood-Redundant record	Clonarrow or Riverlyons	249384	224913	0.00
OF018-159----	OF-CWR0026a	02MLS0074a	Road - class 2 togher	Clonarrow or Riverlyons	249338	224903	0.00

OF018-160----	OF-CWR0027a	02MLS0063a	Road - class 3 togher	Clonarrow or Riverlyons	249400	224899	0.04
OF018-161----	OF-CWR0028a	02MLS0069a	Road - class 2 togher	Clonarrow or Riverlyons	249441	224904	0.00
OF018-162----	OF-CWR0029a	02MLS0067a	Worked wood- Redundant record	Clonarrow or Riverlyons	249436	224892	0.00
OF018-163----	OF-CWR0030a	02MLS0025a	Road - class 3 togher	Clonarrow or Riverlyons	249388	224900	0.00
OF018-164----	OF-CWR0031a	02MLS0065a	Road - class 3 togher	Clonarrow or Riverlyons	249413	224888	0.00
OF018-165----	OF-CWR0032a	02MLS0066a	Unworked wood- Redundant record	Clonarrow or Riverlyons	249420	224890	0.00
OF018-166----	OF-CWR0033a	02MLS0026a	Road - class 2 togher	Clonarrow or Riverlyons	249375	224875	0.00
OF018-167----	OF-CWR0035a	02MLS0060a	Unworked wood- Redundant record	Clonarrow or Riverlyons	249349	224813	0.04
OF018-168----	OF-CWR0036a	02MLS0022a	Platform - peatland	Clonarrow or Riverlyons	249449	224782	0.00
OF018-169----	OF-CWR0037a	02MLS0072a	Road - class 2 togher	Clonarrow or Riverlyons	249228	224692	0.00
OF018-170----	OF-CWR0038a	02MLS0020a	Worked wood - Redundant record	Clonarrow or Riverlyons	249215	224684	0.01
OF018-171----	OF-CWR0039a:north	02MLS0018a: north	Post row - peatland	Clonarrow or Riverlyons	249231	224655	0.00
OF018-171----	OF-CWR0039a:south	02MLS0018a:sout h	Road - class 3 togher	Clonarrow or Riverlyons	249223	224640	0.00
OF018-172----	OF-CWR0040a	02MLS0019a	Unworked wood- Redundant record	Clonarrow or Riverlyons	249238	224668	0.00
OF018-173----	OF-CWR0044 north	02MLS0092a	House - Iron Age	Clonarrow or Riverlyons	2496	2251	-
OF018-174----	OF-CWR0045. North	02MLS0093a	Road - class 1 togher	Clonarrow or Riverlyons	249467	225270	-
OF018-175----	OF-CWR0046. North	02MLS0094a	Road - class 1 togher	Clonarrow or Riverlyons	249405	224687	-
OF018-176----	OF-GNK0001a	02MLS0079a	Worked wood- Redundant record	Gorteenkeel	249084	223581	0.00
OF018-027----	OF-GNK0002a	02MLS0030a	Road - class 1 togher	Gorteenkeel	249098	223555	0.70
OF018-177----	OF-GNK0003a	02MLS0042a	Worked wood- Redundant record	Gorteenkeel	249124	223598	0.00
OF018-178----	OF-GNK0004a	02MLS0084a	Unworked wood Redundant record	Gorteenkeel	249147	223599	0.00
OF018-179----	OF-ILD 0002.east	02MLS0091a	Post row peatland	Island	248835	225352	-
OF018-180----	OF-SPP0001a	02MLS0082a	Road - class 1 togher	Scrub or Pigeonpark	251114	223612	0.34
OF018-181----	OF-SPP0002a	02MLS0083a	Post row - peatland	Scrub or Pigeonpark	251093	223697	0.00
OF018-182----	OF-SPP0003a	02MLS0081a-d	Road - class 2 togher	Scrub or Pigeonpark	251147	223644	0.00
OF018-183----	OF-SPP0004a	02MLS0057a	Road - class 3 togher	Scrub or Pigeonpark	250883	223615	0.00
OF018-184----	OF-SPP0005a	02MLS0052a	Road - class 1 togher	Scrub or Pigeonpark	250980	223458	0.25
OF018-185----	OF-SPP0006a	02MLS0089a	Road - class 2 togher	Scrub or Pigeonpark	251162	223613	0.00
OF018-186----	OF-SPP0007a	02MLS0056a	Road - class 3 togher	Scrub or Pigeonpark	250922	223579	0.49
OF018-187----	OF-SPP0008a	02MLS0058a	Unworked wood- Redundant record	Scrub or Pigeonpark	251207	223586	0.21
OF018-188----	OF-SPP0009a	02MLS0059a	Unworked wood- Redundant record	Scrub or Pigeonpark	251209	223586	0.18
OF018-189----	OF-SPP0010a	02MLS0051a	Road - class 2 togher	Scrub or Pigeonpark	250843	223546	0.00
OF018-190----	OF-SPP0011a	02MLS0090a	Worked wood- Redundant record	Scrub or Pigeonpark	251224	223570	0.79
OF018-191----	OF-SPP0012a	02MLS0055a	Road - class 3 togher	Scrub or Pigeonpark	250847	223516	0.44
OF018-192----	OF-SPP0013a	02MLS0053a	Worked wood- Redundant record	Scrub or Pigeonpark	251050	223506	0.00
OF018-193----	OF-SPP0014a	02MLS0054a	Unworked wood- Redundant record	Scrub or Pigeonpark	251120	223506	0.59
OF018-194----	OF-SPP0015a	02MLS0080a	Worked wood- Redundant record	Scrub or Pigeonpark	251345	223725	0.00

Table 2. List of SMRs in Mount Lucas Bog.

Archaeological investigations

Fourteen of the sightings identified in the IAWU Survey 2002 (OF-BNK0006a, OF-SPP0001a, OF-CWR0036a, OF-BNK0018a, OF-CWR0020a, OF-BNK0008a, OF-CWR0040b, OF-CWR0021a, OF-SPP0005g, OF-CWR0013h, OF-GNK0002c, OF-CWR0008a, OF-CWR0005a) were investigated and resolved under excavation licence No. 02E0839.

Archaeological monitoring associated with the development of Mount Lucas Wind Farm was carried out in 2012-13 by Dominic Delaney and Associates and Shanarch. Some sites were identified during the course of this work and were subsequently excavated by Archaeological Development Services (Turrell 2012a-g and Turrell 2013a-h). These sites included seven toghers, three post rows, two fulacht fiadh, two structures and a platform (see Table 3). Six sites were excavated and resolved and seven sites were partly excavated

and partly remain *in situ* including RD23-3-1 and RD23-2. A togher RD14-1 extended for 25m and was excavated in three cuttings but there may be more timbers in the vicinity and monitoring of any future ground works was recommended. Visible remains of RD14-3 (three posts) were excavated but there may be more timbers in the vicinity and monitoring of any future ground works was recommended. 14m of togher RD23-3-7 were excavated but it continued beyond southern limit of excavation. RD23-3-3 was excavated but it may have continued beyond the northern limit of the excavation. RD23-3-9 was partly excavated and the structure continued beyond the southern, northern and western limits of excavation.

Site	Townland	licence	N.G.R. E	N.G.R. N	Site type	Result
Mountlucas Bog RD23-1	Ballynakill	12E0246	650069	723823	No archaeological significance	-
Mountlucas Bog RD23-2	Ballynakill	12E0247	650115	723796	Fulacht fiadh	Partly excavated. Report recommended that all future ground works in vicinity be monitored.
Mountlucas Bog RD17-6	Ballynakill	12E0248	650703	724202	Fulacht fiadh	Excavated and resolved.
Mountlucas Bog RD16-4	Ballynakill	12E0249	650236m	724111	Platform	Excavated and resolved.
Mountlucas Bog RD14-1	Clonarrow or Riverlyons	12E0349	650286	725030	Togher and post rows	Visible remains excavated in 3 cuttings extending over 25m Poss more timbers in vicinity.
Mountlucas Bog RD14-2	Clonarrow or Riverlyons	12E0350	650399	725032	No archaeological significance	-
Mountlucas Bog RD14-3	Clonarrow or Riverlyons	12E0351	650354	725036	Post row	Visible remains excavated. Poss more timbers in vicinity.
Mountlucas Bog RD23-3-1	Ballynakill	13E0086	649816	723646	Road – Class 2 Togher	Preserved *in situ*
Mountlucas Bog RD23-3-3	Ballynakill	13E0088	649816m	723646	Road – Class 2 Togher	Togher excavated but it may have continued beyond N limit of excavation.
Mountlucas Bog RD23-3-4	Ballynakill	13E0106	649813	723641	Road – Class 3 Togher	Excavated and resolved.
Mountlucas Bog RD23-3-8	Ballynakill	13E0140	649818	723646	Road – Class 2 Togher	18.5m of togher excavated and resolved.
Mountlucas Bog RD23-3-9	Ballynakill	13E0302	649820	723579	Structure – Peatland	Structure continued beyond S, N and W limited of excavation
Mountlucas Bog RD23-3-5	Ballynakill	13E0110	649813	723641	Structure – Peatland	Excavated and resolved.
Mountlucas Bog RD23-3-6	Ballynakill	13E0135	649804	723635	Road – Class 2 Togher	Excavated and resolved.
Mountlucas Bog RD23-3-7	Ballynakill	13E0136	649816	723646	Road – Class 2 Togher	14m togher excavated but it continued beyond S limit of excavation.
Mountlucas	Scrub or Pigeonpark	13E0450	651010	723760	Post row	No report in NMS archive

Table 3. List of licensed excavations carried out during the development of Mount Lucas Windfarm.

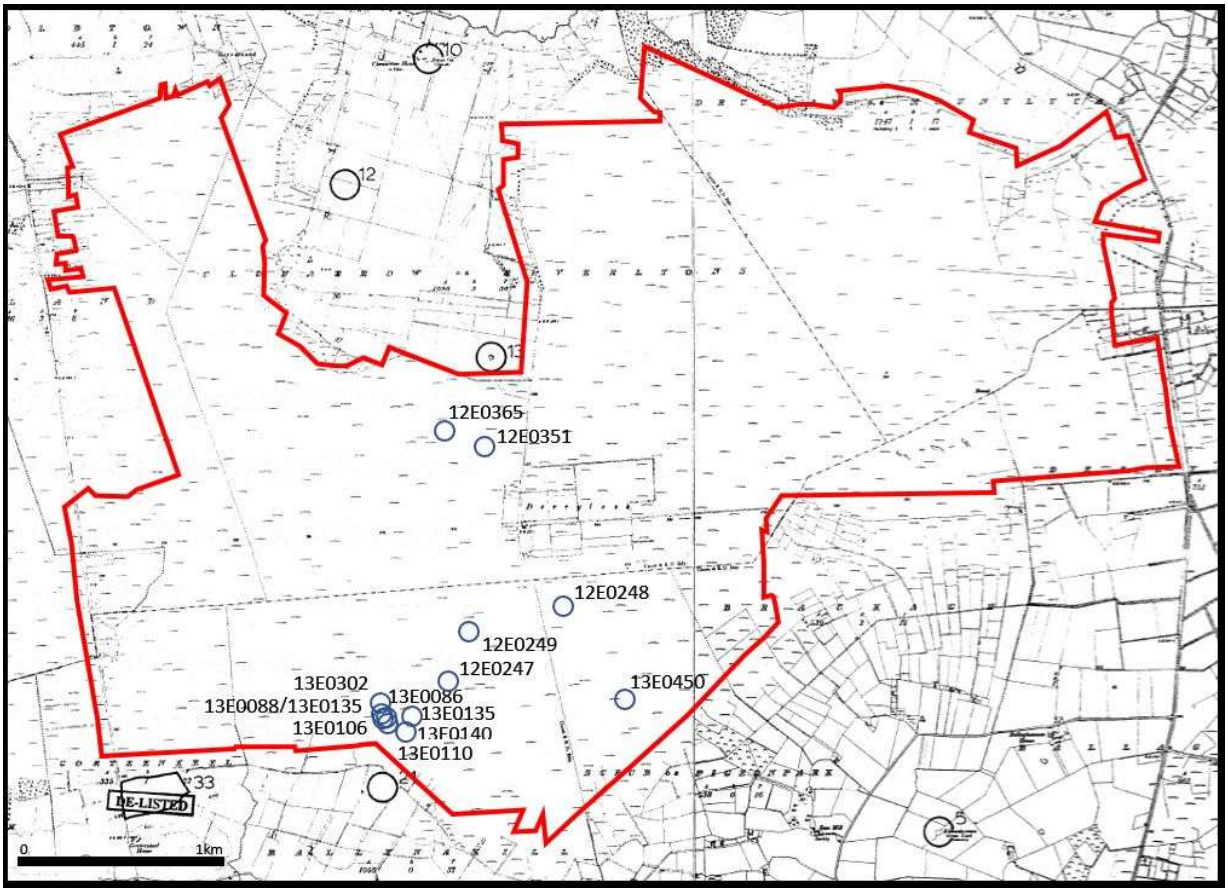

Fig. 3. Mount Lucas Bog, Co. Offaly, the locations of the sites excavated during the development of Mount Lucas Windfarm (blue circles).

Reported finds

A whetstone (1936:3453) is recorded from Mountlucas or Drumcaw townland, which takes in the northeastern corner of the bog. An incomplete wooden wheel, likely to be provenanced to Mount Lucas Bog, was recovered from Derrycricket townland. The wheel (1944:858) was found approximately 1m below the bog surface but its exact find spot is equivocal. A second wooden wheel was recovered from Clonarrow or Riverlyons townland. It was approximately 1m beneath the bog surface at a 30 º angle but its precise location is not recorded. It consists of a portion of a block-wheel (1963:88), which is c. 0.75m in diameter and has a c. 4.0cm thick rim. A stave-built wooden vessel (1974:35) was recovered from Clonarrow or Riverlyons townland, found in virgin bog under c. 2.4m of peat. Fourteen staves, seven pieces of binding strip and a base fragment survive. Although broken, it can be reconstructed and forms an almost intact vessel. The 2002 IAWU survey recovered 10 additional finds including consisting of leather, wood and stone artefacts (these are included in Table 1 and Table 3).

Accession No.	Artefact	Cat. No	Townland	NGR
02E0839:1a-b	Sole & stitching of leather shoe	OF-CWR0005	Clonarrow or Riverlyons	249311, 225504
02E0839:2	Leather fragment (part of find 1a-b)	OF-CWR0005	Clonarrow or Riverlyons	249311, 225508
02E0839:3	Kite-shaped flint arrowhead	OF-CWR0042	Clonarrow or Riverlyons	251965, 225380
02E0839:4a-c	Finely carved wooden object	OF-CWR0008	Clonarrow or Riverlyons	249369, 225341
02E0839:5	Upper of leather shoe	OF-ILD 0001	Island	248854, 225316
02E0839:6	Flint flake	OF-CWR0014	Clonarrow or Riverlyons	249218, 225144

02E0839:7a-l	Fragmented wooden artefact	OF-BNK0012	Ballynakill	249348, 223611
02E0839:8	Flint pebble	OF-CWR0043	Clonarrow or Riverlyons	249238, 224817
N/A*	Saddle quern	OF-CWR0034	Clonarrow or Riverlyons	249311, 225504
N/A*	Saddle quern	OF-CWR0041	Clonarrow or Riverlyons	249311, 225508

Table 3. List of IAWU finds from Mountlucas Bog.

Previous assessments

Mount Lucas Bog has been the subject of an Environmental Impact Assessment Report caried out by Irish Archaeological Consultancy LTD in 2018 for Bord na Móna Energy Limited in relation to IPC Licence P0500-01. The assessment noted the monuments identified in the IAWU 2002 survey and during the Windfarm monitoring works noted that there was a very high potential for archaeological features to be uncovered during the course of any future development works in Mountlucas Bog.

Impact assessment

There are 173 known sightings of archaeology in the rehabilitation area. There is data regarding the depths of peat extracted from a 2020 drone survey in relation to 49 sightings. 47 of these sightings have been removed and two possibly survive. Table 4 lists all the known sightings in the rehabilitation area with the drone depth data.

SMR_NO	Cat._No.	Survey code	Site type	Townland	N.G.R. E	N.G.R. N	Depth BS	Depth peat since 2008	Status
OF018-116----	OF-BNK0001a	02MLS0047a	Unworked wood	Ballynakill	249550	223697	0	1.11	Gone
OF018-117----	OF-BNK0002a	02MLS0044a	Unworked wood	Ballynakill	249539	223679	0	0.99	Gone
OF018-118----	OF-BNK0003a	02MLS0038a	Togher (tertiary)	Ballynakill	249304	223682	0.19	1.57	Gone
OF018-119----	OF-BNK0004a	02MLS0086a	Togher (tertiary)	Ballynakill	249566	223662	0	0.8	Gone
OF018-120----	OF-BNK0005a	02MLS0045a	Togher (tertiary)	Ballynakill	249553	223674	0	0.77	Gone
OF018-121----	OF-BNK0006a	02MLS0046a	Togher (tertiary)	Ballynakill	249560	223674	0	1.22	Gone
OF018-122----	OF-BNK0007a	02MLS0088a	Togher (tertiary)	Ballynakill	249628	223661	0	0.68	Gone
OF018-122----	OF-BNK0007a:ex	02MLS0088a	Togher (tertiary)	Ballynakill	249622	223672	0		Gone
OF018-123----	OF-BNK0008a	02MLS0043a	Togher (tertiary)	Ballynakill	249494	223658	0	0.42	Gone
OF018-124----	OF-BNK0009a	02MLS0048a	Unworked wood	Ballynakill	249514	223658	0.01	0.73	Gone
OF018-125----	OF-BNK0010a	02MLS0085a	Togher (tertiary)	Ballynakill	249533	223658	0	0.84	Gone
OF018-126----	OF-BNK0011a	02MLS0087a	Worked wood	Ballynakill	249547	223658	0	1.01	Gone
OF018-127----	OF-BNK0012a	02MLS0037a	Togher (secondary)	Ballynakill	249348	223611	0	0.22	Gone
-	OF-BNK0012b	02MLS0037b	Togher (secondary)	Ballynakill	249324	223625	0		Gone
OF018-128----	OF-BNK0013a	02MLS0041a	Unworked wood	Ballynakill	249184	223600	0	1.72	Gone
OF018-129----	OF-BNK0014a	02MLS0035a	Worked wood	Ballynakill	249429	223609	0.4	1.42	Gone
OF018-130----	OF-BNK0015a	02MLS0039a	Worked wood	Ballynakill	249641	223613	0.3	1.78	Gone
OF018-131----	OF-BNK0016a	02MLS0040a	Worked wood	Ballynakill	249644	223613	0	1.53	Gone
OF018-132----	OF-BNK0017a	02MLS0032a	Togher (tertiary)	Ballynakill	249529	223581	0.73	1.21	Gone
OF018-133----	OF-BNK0018a	02MLS0033a	Togher (tertiary)	Ballynakill	249560	223582	1.1	0.41	Gone
OF018-134----	OF-BNK0019a	02MLS0050a	Togher (tertiary)	Ballynakill	250294	223610	0	1	Gone

OF018-135----	OF-BNK0020	02MLS0097a	No record	Ballynakill	2495	2238	-	1	Gone
OF018-136----	OF-CWR0001a	02MLS0008a	Togher (tertiary)	Clonarrow or Riverlyons	249203	225358	0	1.33	Gone
-	OF-CWR0001b	02MLS0008b	Togher (tertiary)	Clonarrow or Riverlyons	249191	225363	0		Gone
OF018-137----	OF-CWR0002a	02MLS0009a	Worked wood	Clonarrow or Riverlyons	249219	225310	0	1.19	Gone
OF018-138----	OF-CWR0003a	02MLS0007a	Worked wood	Clonarrow or Riverlyons	249210	225334	0.02	1.09	Gone
OF018-139----	OF-CWR0004a	02MLS0006a	Worked wood	Clonarrow or Riverlyons	249299	225491	0	1.08	Gone
OF018-140----	OF-CWR0005a	02MLS0001a	Togher (secondary)	Clonarrow or Riverlyons	249311	225519	0	0.92	Gone
OF018-140----	OF-CWR0005b	02MLS0001b	Togher (secondary)	Clonarrow or Riverlyons	249286	225504	0		Gone
OF018-141----	OF-CWR0006a	02MLS0013a	Worked wood	Clonarrow or Riverlyons	249351	225370	0	0.45	Gone
OF018-142----	OF-CWR0007a	02MLS0004a	Worked wood	Clonarrow or Riverlyons	249348	225381	0	0.65	Gone
-	OF-CWR0007b	02MLS0004b	Worked wood	Clonarrow or Riverlyons	249345	225389	0		Gone
OF018-143----	OF-CWR0008a	02MLS0010a	Worked wood	Clonarrow or Riverlyons	249369	225341	0	0.97	Gone
OF018-144----	OF-CWR0009a	02MLS0012a	Worked wood	Clonarrow or Riverlyons	249358	225366	0	0.81	Gone
OF018-145----	OF-CWR0010a	02MLS0002a	Worked wood	Clonarrow or Riverlyons	249314	225490	0	0.87	Gone
OF018-146----	OF-CWR0011a	02MLS0017a	Worked wood	Clonarrow or Riverlyons	249374	225342	0	0.97	Gone
OF018-147----	OF-CWR0012a	02MLS0003a	Worked wood	Clonarrow or Riverlyons	249368	225359	0	1.19	Gone
OF018-148----	OF-CWR0013a	02MLS0023a-i	Togher (primary)	Clonarrow or Riverlyons	249393	224888	0		Gone
-	OF-CWR0013b	02MLS0023b	Togher (primary)	Clonarrow or Riverlyons	249393	224900	0		Gone
-	OF-CWR0013c	02MLS0023c	Togher (primary)	Clonarrow or Riverlyons	249397	224910	0		Gone
-	OF-CWR0013d	02MLS0023d	Togher (primary)	Clonarrow or Riverlyons	249413	224939	0		Gone
-	OF-CWR0013e	02MLS0023e	Togher (primary)	Clonarrow or Riverlyons	249446	224992	0		Gone
-	OF-CWR0013f	02MLS0023f	Togher (primary)	Clonarrow or Riverlyons	249453	225005	0		Gone
-	OF-CWR0013g	02MLS0023g	Togher (primary)	Clonarrow or Riverlyons	249498	225062	0		Gone
-	OF-CWR0013h	02MLS0023h	Togher (primary)	Clonarrow or Riverlyons	249592	225175	0		Gone
-	OF-CWR0013i	02MLS0023i	Togher (primary)	Clonarrow or Riverlyons	249630	225225	0		Gone
---	OF-CWR0014a	02MLS0071a	Find	Clonarrow or Riverlyons	249218	225144	0		Gone
OF018-149----	OF-CWR0015a	02MLS0073a	Post row	Clonarrow or Riverlyons	249317	224903	0		Gone
-	OF-CWR0015b	02MLS0073b	Post row	Clonarrow or Riverlyons	249330	224924	0		Gone
-	OF-CWR0015c	02MLS0073c	Post row	Clonarrow or Riverlyons	249316	224903	0		Gone
OF018-150----	OF-CWR0016a	02MLS0028a	Worked wood	Clonarrow or Riverlyons	249284	224925	0		Gone
OF018-151----	OF-CWR0017a	02MLS0078a	Togher (tertiary)	Clonarrow or Riverlyons	249305	224905	0		Gone
OF018-152----	OF-CWR0018a	02MLS0062a	Togher (tertiary)	Clonarrow or Riverlyons	249389	224908	0		Gone
OF018-153----	OF-CWR0019a	02MLS0064a	Worked wood	Clonarrow or Riverlyons	249448	224908	0		Gone
OF018-154----	OF-CWR0020a	02MLS0027a	Togher (tertiary)	Clonarrow or Riverlyons	249472	224911	0		Gone
OF018-155----	OF-CWR0021a	02MLS0070a	Togher (tertiary)	Clonarrow or Riverlyons	249282	224912	0		Gone
OF018-156----	OF-CWR0022a	02MLS0075a	Togher (tertiary)	Clonarrow or Riverlyons	249342	224912	0		Gone
OF018-157----	OF-CWR0023a	02MLS0076a	Worked wood	Clonarrow or Riverlyons	249366	224914	0		Gone
OF018-158----	OF-CWR0024a	02MLS0077a	Worked wood	Clonarrow or Riverlyons	249384	224913	0		Gone
---	OF-CWR0025a	02MLS0096a	Find	Clonarrow or Riverlyons	2502	2243	-		Gone
OF018-159----	OF-CWR0026a	02MLS0074a	Worked wood	Clonarrow or Riverlyons	249338	224903	0		Gone
OF018-160----	OF-CWR0027a	02MLS0063a	Togher (secondary)	Clonarrow or Riverlyons	249400	224899	0.04		Gone
-	OF-CWR0027b	02MLS0063b	Togher (secondary)	Clonarrow or Riverlyons	249381	224887	0.16		Gone
-	OF-CWR0027c	02MLS0063c	Togher (secondary)	Clonarrow or Riverlyons	249390	224892	0.02		Gone
OF018-161----	OF-CWR0028a	02MLS0069a	Togher (tertiary)	Clonarrow or Riverlyons	249441	224904	0		Gone
OF018-162----	OF-CWR0029a	02MLS0067a	Togher (secondary)	Clonarrow or Riverlyons	249436	224892	0		Gone

-	OF-CWR0029b	02MLS0067b	Togher (secondary)	Clonarrow or Riverlyons	249448	224892	0		Gone
OF018-163----	OF-CWR0030a	02MLS0025a	Worked wood	Clonarrow or Riverlyons	249388	224900	0		Gone
OF018-164----	OF-CWR0031a	02MLS0065a	Togher (tertiary)	Clonarrow or Riverlyons	249413	224888	0		Gone
OF018-165----	OF-CWR0032a	02MLS0066a	Togher (tertiary)	Clonarrow or Riverlyons	249420	224890	0		Gone
OF018-166----	OF-CWR0033a	02MLS0026a	Unworked wood	Clonarrow or Riverlyons	249375	224875	0		Gone
---	OF-CWR0034a	02MLS0014a	Find	Clonarrow or Riverlyons	249470	224842	0		Gone
OF018-167----	OF-CWR0035a	02MLS0060a	Unworked wood	Clonarrow or Riverlyons	249349	224813	0.04		Gone
OF018-168----	OF-CWR0036a	02MLS0022a	Platform	Clonarrow or Riverlyons	249449	224782	0		Gone
OF018-169----	OF-CWR0037a	02MLS0072a	Togher (secondary)	Clonarrow or Riverlyons	249228	224692	0		Gone
OF018-170----	OF-CWR0038a	02MLS0020a	Worked wood	Clonarrow or Riverlyons	249215	224684	0.01		Gone
OF018-171----	OF-CWR0039a:n	02MLS0018an	Post row	Clonarrow or Riverlyons	249231	224655	0		Gone
OF018-171----	OF-CWR0039a:s	02MLS0018as	Post row	Clonarrow or Riverlyons	249223	224640	0		Gone
OF018-172----	OF-CWR0040a	02MLS0019a	Togher (tertiary)	Clonarrow or Riverlyons	249238	224668	0		Gone
-	OF-CWR0040b	02MLS0019b	Togher (tertiary)	Clonarrow or Riverlyons	249228	224666	0		Gone
---	OF-CWR0041a	02MLS0015a	Find	Clonarrow or Riverlyons	249336	224291	-		Gone
---	OF-CWR0042a	02MLS0011a	Find	Clonarrow or Riverlyons	251965	225380	0		Gone
---	OF-CWR0043a	02MLS0031a	Find	Clonarrow or Riverlyons	249238	224817	0		Gone
OF018-173----	OF-CWR0044 n	02MLS0092a	Wooden structure	Clonarrow or Riverlyons	2496	2251	-		Gone
OF018-174----	OF-CWR0045. N	02MLS0093a	Togher (primary)	Clonarrow or Riverlyons	249467	225270	-		Gone
-	OF-CWR0045. S	?	Togher (primary)	Clonarrow or Riverlyons	249835	224747	-		Gone
OF018-175----	OF-CWR0046. N	02MLS0094a	Togher (primary)	Clonarrow or Riverlyons	249405	224687	-		Gone
-	OF-CWR0046. S	?	Togher (primary)	Clonarrow or Riverlyons	249465	224017	-		Gone
-	OF-CWR0047	02MLS0095a	Find	Clonarrow or Riverlyons	2502	2243	-		Gone
OF018-176----	OF-GNK0001a	02MLS0079a	Worked wood	Gorteenkeel	249084	223581	0	1.48	Gone
-	OF-GNK0002.n	02MLS0030.n	Togher (primary)	Gorteenkeel	249091	224355	-1		Gone
OF018-027----	OF-GNK0002a	02MLS0030a	Togher (primary)	Gorteenkeel	249098	223555	0.7		Gone
-	OF-GNK0002b	02MLS0030b	Togher (primary)	Gorteenkeel	249098	223564	0		Gone
-	OF-GNK0002c	02MLS0030c	Togher (primary)	Gorteenkeel	249099	223579	0		Gone
-	OF-GNK0002d	02MLS0030d	Togher (primary)	Gorteenkeel	249100	223599	0		Gone
OF018-177----	OF-GNK0003a	02MLS0042a	Worked wood	Gorteenkeel	249124	223598	0	1.76	Gone
OF018-178----	OF-GNK0004a	02MLS0084a	Unworked wood	Gorteenkeel	249147	223599	0	1.83	Gone
---	OF-ILD0001a	02MLS0016a	Find	Island	248854	225316	0	1.01	Gone
OF018-179----	OF-ILD0002.e	02MLS0091a	Post row	Island	248835	225352	-		Gone
-	OF-ILD0002.w	02MLS0091b	Post row	Island	248740	225352	-		Gone
OF018-180----	OF-SPP0001a	02MLS0082a	Togher (primary)	Scrub or Pigeonpark	251114	223612	0.34		Gone
-	OF-SPP0001b	02MLS0082b	Togher (primary)	Scrub or Pigeonpark	251107	223628	0		Gone
-	OF-SPP0001c	02MLS0082c	Togher (primary)	Scrub or Pigeonpark	251090	223660	0		Gone
-	OF-SPP0001e	02MLS0082e	Togher (primary)	Scrub or Pigeonpark	251066	223705	0		Gone
-	OF-SPP0001f	02MLS0082f	Togher (primary)	Scrub or Pigeonpark	251052	223731	0		Gone
-	OF-SPP0001g	02MLS0082g	Togher (primary)	Scrub or Pigeonpark	251041	223750	0		Gone
-	OF-SPP0001h	02MLS0082h	Togher (primary)	Scrub or Pigeonpark	251031	223769	0		Gone
-	OF-SPP0001i.n	02MLS0082i.n	Togher (primary)	Scrub or Pigeonpark	251025	223779	0		Gone
-	OF-SPP0001j.n	02MLS0082j.n	Togher (primary)	Scrub or Pigeonpark	251015	223794	0		Gone
-	OF-SPP0001k.n	02MLS0082k.n	Togher (primary)	Scrub or Pigeonpark	251007	223809	0		Gone
-	OF-SPP0001l	02MLS0082l	Togher (primary)	Scrub or Pigeonpark	251007	223809	0		Gone

-	OF-SPP0001l.s	02MLS0082l.s	Togher (primary)	Scrub or Pigeonpark	250993	223834	0		Gone
-	OF-SPP0001m	02MLS0082m	Togher (primary)	Scrub or Pigeonpark	250991	223839	0		Gone
-	OF-SPP0001n	02MLS0082n	Togher (primary)	Scrub or Pigeonpark	250985	223847	0		Gone
-	OF-SPP0001o	02MLS0082o	Togher (primary)	Scrub or Pigeonpark	250977	223860	0		Gone
-	OF-SPP0001p	02MLS0082p	Togher (primary)	Scrub or Pigeonpark	250965	223879	0		Gone
-	OF-SPP0001q	02MLS0082q	Togher (primary)	Scrub or Pigeonpark	250956	223895	0		Gone
-	OF-SPP001r	02MLS0082r	Togher (primary)	Scrub or Pigeonpark	250952	223901	0		Gone
-	OF-SPP0001s	02MLS0082s	Togher (primary)	Scrub or Pigeonpark	251099	223643	0.6		Gone
OF018-181----	OF-SPP0002a	02MLS0083a	Post row	Scrub or Pigeonpark	251093	223697	0		Gone
-	OF-SPP0002b	02MLS0083b	Post row	Scrub or Pigeonpark	251078	223712	0		Gone
-	OF-SPP0002c	02MLS0083c	Post row	Scrub or Pigeonpark	251060	223727	0		Gone
-	OF-SPP0002d	02MLS0083d	Post row	Scrub or Pigeonpark	251112	223681	0		Gone
-	OF-SPP0002e	02MLS0083e	Post row	Scrub or Pigeonpark	251123	223670	0		Gone
-	OF-SPP0002f	02MLS0083f	Post row	Scrub or Pigeonpark	251082	223714	0		Gone
-	OF-SPP0002g	02MLS0083g	Post row	Scrub or Pigeonpark	251073	223726	0		Gone
-	OF-SPP0002h	02MLS0083h	Post row	Scrub or Pigeonpark	251066	223739	0		Gone
-	OF-SPP0002i	02MLS0083i	Post row	Scrub or Pigeonpark	251048	223765	0		Gone
-	OF-SPP0002j	02MLS0083j	Post row	Scrub or Pigeonpark	251034	223785	0		Gone
-	OF-SPP0002k	02MLS0083k	Post row	Scrub or Pigeonpark	251022	223802	0		Gone
-	OF-SPP0002l	02MLS0083l	Post row	Scrub or Pigeonpark	251026	223756	0		Gone
	OF-SPP0002m	02MLS0083m	Post row	Scrub or Pigeonpark	251010	223772	0		Gone
OF018-182----	OF-SPP0003a	02MLS0081a	Togher (secondary)	Scrub or Pigeonpark	251147	223644	0	0	Poss extant
-	OF-SPP0003b	02MLS81b	Togher (secondary)	Scrub or Pigeonpark	251175	223613	0		Gone
-	OF-SPP0003c	02MLS81c	Togher (secondary)	Scrub or Pigeonpark	251147	223643	0		Gone
-	OF-SPP0003d	02MLS81d	Togher (secondary)	Scrub or Pigeonpark	251190	223599	0.19		Gone
OF018-183----	OF-SPP0004a	02MLS0057a	Togher (tertiary)	Scrub or Pigeonpark	250883	223615	0	1.07	Gone
OF018-184----	OF-SPP0005a	02MLS0052a	Togher (primary)	Scrub or Pigeonpark	250980	223458	0.25	0	Poss extant
-	OF-SPP0005b	02MLS52b	Togher (primary)	Scrub or Pigeonpark	250979	223457	0		Gone
-	OF-SPP0005c	02MLS52c	Togher (primary)	Scrub or Pigeonpark	250972	223474	0		Gone
-	OF-SPP0005d	02MLS52d	Togher (primary)	Scrub or Pigeonpark	250967	223488	0.06		Gone
-	OF-SPP0005e	02MLS52e	Togher (primary)	Scrub or Pigeonpark	250957	223503	0		Gone
-	OF-SPP0005f.n	02MLS52f.n	Togher (primary)	Scrub or Pigeonpark	250946	223515	0		Gone
-	OF-SPP0005g.s	02MLS52g.s	Togher (primary)	Scrub or Pigeonpark	250933	223534	0.03		Gone
-	OF-SPP0005h	02MLS52h	Togher (primary)	Scrub or Pigeonpark	250923	223548	0.13		Gone
-	OF-SPP0005i	02MLS52i	Togher (primary)	Scrub or Pigeonpark	250911	223564	0		Gone
-	OF-SPP0005j	02MLS52j	Togher (primary)	Scrub or Pigeonpark	250905	223574	0		Gone
OF018-185----	OF-SPP0006a	02MLS0089a	Togher (secondary)	Scrub or Pigeonpark	251162	223613	0	1.02	Gone
OF018-186----	OF-SPP0007a	02MLS0056a	Togher (tertiary)	Scrub or Pigeonpark	250922	223579	0.49	1.04	Gone
OF018-187----	OF-SPP0008a	02MLS0058a	Unworked wood	Scrub or Pigeonpark	251207	223586	0.21	0.49	Gone
OF018-188----	OF-SPP0009a	02MLS0059a	Unworked wood	Scrub or Pigeonpark	251209	223586	0.18	0.43	Gone
OF018-189----	OF-SPP0010a	02MLS0051a	Togher (secondary)	Scrub or Pigeonpark	250843	223546	0	1.3	Gone
-	OF-SPP0010b	02MLS0051b	Togher (secondary)	Scrub or Pigeonpark	250835	223561	0		Gone
OF018-190----	OF-SPP0011a	02MLS0090a	Worked wood	Scrub or Pigeonpark	251224	223570	0.79	1.3	Gone
OF018-191----	OF-SPP0012a	02MLS0055a	Togher (tertiary)	Scrub or Pigeonpark	250847	223516	0.44	1.27	Gone
OF018-192----	OF-SPP0013a	02MLS0053a	Worked wood	Scrub or Pigeonpark	251050	223506	0	0.96	Gone

OF018-193----	OF-SPP0014a	02MLS0054a	Unworked wood	Scrub or Pigeonpark	251120	223506	0.59	1.03	Gone
OF018-194----	OF-SPP0015a	02MLS0080a	Worked wood	Scrub or Pigeonpark	251345	223725	0	0.95	Gone

Table 4. all the known sightings in the rehabilitation area with the drone depth data.

The remaining sites, for which there is no drone survey information, were mostly found on the surface with 12 between 0.1m and 0.7m in depth. This part of Mountlucas Bog was subject to 12 harvests after 2002 which removed on average 100mm each harvest for an average of 1.2m. This has removed all of the remaining sightings. The conclusion is that of the 161 IAWU sightings of which 82 are now in the Sites and Monuments Record all but two (OF018-182---- and OF018-184----) have definitely been removed.

14 significant archaeological sites identified and investigated during the Mount Lucas Windfarm development. Seven of these RD23-3-1, RD23-2, RD14-1, RD14-3, RD23-3-7, RD23-3-3 and RD23-3-9 were either preserved *in situ* or may have continued beyond the limits of excavation and should all be avoided by the rehabilitation works (see Table 2 and Fig. 3).

All surviving sightings in the rehabilitation area listed in Table 5 should be avoided.

The proposed works also have the potential to impact previously unknown archaeological material.

Site	Townland	licence	N.G.R. E	N.G.R. N	Site type	Result
OF-SPP0003a	Scrub or Pigeonpark	-	251147	223644	Togher	Possible extant
OF-SPP0003b	Scrub or Pigeonpark	-	251175	223613	Togher	Possible extant
OF-SPP0003c	Scrub or Pigeonpark	-	251147	223643	Togher	Possible extant
OF-SPP0003d	Scrub or Pigeonpark	-	251190	223599	Togher	Possible extant
OF-SPP0005a	Scrub or Pigeonpark	-	250980	223458	Togher	Possible extant
Mountlucas Bog RD23-2	Ballynakill	12E0247	650115	723796	Fulacht fiadh	Partly excavated. Report recommended that all future ground works in vicinity be monitored.
Mountlucas Bog RD14-1	Clonarrow or Riverlyons	12E0349	650286	725030	Togher and post rows	Visible remains excavated in 3 cuttings extending over 25m Poss more timbers in vicinity.
Mountlucas Bog RD14-3	Clonarrow or Riverlyons	12E0351	650354	725036	Post row	Visible remains excavated. Poss more timbers in vicinity.
Mountlucas Bog RD23-3-1	Ballynakill	13E0086	649816	723646	Road – Class 2 Togher	Preserved *in situ*
Mountlucas Bog RD23-3-3	Ballynakill	13E0088	649816m	723646	Road – Class 2 Togher	Togher excavated but it may have continued beyond N limit of excavation.
Mountlucas Bog RD23-3-9	Ballynakill	13E0302	649820	723579	Structure – Peatland	Structure continued beyond S, N and W limited of excavation
Mountlucas Bog RD23-3-7	Ballynakill	13E0136	649816	723646	Road – Class 2 Togher	14m togher excavated but it continued beyond S limit of excavation.

Table 5. All surviving sightings in the rehabilitation area.

Recommendations

Of the 159 IAWU sightings, of which 82 are now in the Sites and Monuments Record, all but two (OF018-182---- and OF018-184----) have definitely been removed. Seven of the sites identified in the 2013-13 windfarm development,RD23-3-1, RD23-2, RD14-1, RD14-3, RD23-3-7, RD23-3-3 and RD23-3-9, should be preserved *in situ* and be avoided by the rehabilitation works. All surviving sightings in the rehabilitation area listed in Table 5 should be avoided.

Should any previously unknown archaeological material be uncovered during the rehabilitation works, it should also be avoided and reported to the Bord na Móna Archaeological Liaison Officer and the National Museum of Ireland.

Conclusion

This is a desk-based archaeological assessment and includes a collation of existing written and graphic information to identify the likely archaeological potential of the proposed rehabilitation area. There are 173 known known sightings of archaeological heritage in the rehabilitation area and at least nine of these survive *in situ*. All the surviving sightings of archaeology identified in 2012-13 should be preserved *in situ* and be avoided by the rehabilitation works. All surviving sightings in the rehabilitation area listed in Table 5 should be avoided.

Should any previously unknown archaeological material be uncovered during the rehabilitation works, it should be avoided and reported to the Bord na Móna Archaeological Liaison Officer and the National Museum of Ireland.

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