Oughter Bog

Cutaway Bog Decommissioning and Rehabilitation Plan 2020

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

> "*The licensee shall prepare, to the satisfaction of the Agency, a fully detailed and costed plan for permanent rehabilitation of the cutaway boglands within the licensed area.*"

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

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

Industrial peat production has now permanently ceased at Oughter Bog.

In addition, to preparing this document to comply with Condition 10 of IPC Licence Ref. P0500-01, due regard was also given to the proposed 'Peatlands Climate Action Scheme' 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 the Oughter 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 Oughter Bog as environmental stabilisation, re-wetting and setting the bog on a trajectory towards development of naturally functioning peatland habitats.

Any consideration of any other future after-uses for Oughter Bog, such as amenity, will be conducted in adherence to the relevant planning guidelines and consultation with relevant authorities and will be considered within the framework of this rehabilitation plan.

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SUMMARY

Name of bog: Oughter **Area:** 358 ha

Site description:

- Oughter Bog was drained and developed for industrial peat production in the 1960s. Industrial peat production ceased in 2012 and Bord na Móna have made the decision to permanently cease peat extraction at this site.
- The former peat production footprint now comprises bare peat along with mosaics of pioneering vegetation and includes active drainage channels.
- Peat depths are limited on site with most peat depths at 0.5-2.5m. Oughter is considered a **shallow peat** cutover bog.
- Oughter bog lies to the south of the River Brosna and is drained by a number of its tributaries. The Grand Canal is located to the north of Oughter.
- A portion of the former bog is now a Native Woodland Scheme and is no longer in the ownership of BNM. Part of the southern portion of Oughter Bog cutaway has been developed as The Midlands National Shooting Centre of Ireland.

Rehabilitation goals and outcomes

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

Being cognisant of the proposed Scheme for supporting enhanced decommissioning, rehabilitation and restoration measures (PCAS), the primary rehabilitation goal and outcome for Oughter Bog is **environmental stabilisation** of the site and **optimising climate action benefits**. This will be achieved via intensive **re-wetting**. This is defined as:

- Carrying out enhanced rehabilitation with the application of enhanced peat rehabilitation measures to re-wet peat and slow water movement across the site.
- Optimising hydrological conditions for the development of fen and Reedswamp on shallow cutaway peat, and eventually naturally functioning peatland habitats.
- Stabilisation or improvement in water quality parameters (e.g. suspended solids).
- Environmental stabilisation.
- Rehabilitation will support the National Policies on Climate Action and GHG mitigation by maintaining and enhancing the current 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*-rich 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.

Scope of rehabilitation

The principal scope of this rehabilitation plan is defined by:

- The area of Oughter Bog.
- EPA IPC Licence - Ref. P0500-01. As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. The key objective of 'rehabilitation', as required by this licence, is achieved by the **environmental stabilisation** of the bog.
- The **Methodology Paper (draft) outlining the proposed Scheme (PCAS)** includes enhanced measures defined in the Methodology Paper which are designed to exceed/meet the standard stabilisation

requirements as defined by the IPC Licence and to enhance the ecosystem services of Oughter Bog, in particular, optimising **climate action benefits**.
- The local environmental conditions of this bog.
- The key goals and outcomes of rehabilitation at this bog outlined above.
- Minimising potential impacts on neighbouring land. Some boundary drains around Oughter Bog will be left unblocked as blocking boundary drains could affect adjacent land – in particular the adjacent Native Woodland Scheme and Midlands Rifle Range.
- Land-use. Bord na Móna have identified the main land-use at this site as biodiversity and ecosystem services.

Criteria for successful rehabilitation:

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

- Rewetting of peat in the former area of industrial peat production to slow water movement across the site to retain silt, accelerating the development of vegetation cover via natural colonisation, and reducing the area of bare exposed peat (IPC Licence validation) through the creation of compatible fen, Reed swamp and other wetland and peatland habitats.
- Stabilising or reducing key emissions to water (e.g. 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 (Climate action verification).
- Setting the site on a trajectory towards establishment of a mosaic of compatible habitats including fen, Reed swamp, heath, scrub, Birch woodland and peatland communities, where conditions are suitable, and eventually towards a carbon sink (Climate action verification). These habitats will generally establish initially as pioneer vegetation. It will take some time for stable naturally functioning habitats to fully develop at Oughter Bog.
- Improvement in biodiversity and ecosystem services. (Climate action verification).

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

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

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

- Funding to pay for resources required to deliver the planned rehabilitation (Bord na Móna and external).
- Bord na Móna to have sufficient resources (staff and machinery) to deliver the planned rehabilitation.
- Rehabilitation measures to be effective.
- Natural colonisation of vegetation to develop semi-natural habitats at a rate within the normal limits.

Summary of measures:

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

- Planning actions, including developing a detailed site plan and carrying out a drainage management appraisal.
- Carry out an ecological appraisal of the potential impacts of the planned rehabilitation.
- Carry out proposed measures, which will be a combination of targeted drain blocking, peat field re-profiling, blocking outfalls, water level management.

- Phase 2 measures may include fertiliser application targeting bare peat on headlands, high fields and other areas, and further water level management.
- Silt ponds will continue to be maintained during the rehabilitation and decommissioning schedule.
- Evaluate success of short-term rehabilitation measures outlined above and remediate, where necessary.
- Decommissioning of silt-ponds will be assessed and carried out, where required.

Timeframe:

- 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.

Budget and Costing

- The rehabilitation plan outlined in this document is predicated on the understanding that it is the Minister's intention to support, via the Climate Action Fund, Bord na Móna in developing a package of measures, 'the proposed Scheme', for enhanced decommissioning, rehabilitation and restoration of cutaway peatlands referred to as, the Peatlands Climate Action Scheme'. *However, only the additional costs associated with the additional and enhanced rehabilitation, i.e, measures which go beyond the existing standard mandatory decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support.*
- In relation to the pre-existing Condition 10 IPC Licence requirement to carry out what can be termed the 'standard' decommissioning and rehabilitation, Bord na Móna maintains a Provision on its balance sheet to pay for these future costs when industrial peat extraction ceases. This is updated every year. For more information see the Bord na Móna Annual Report (Bord na Móna 2020). Bord na Móna is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.
- For the avoidance of doubt, should the proposed Scheme and the associated statutory obligation on Bord na Móna not materialise, Bord na Móna will not carry out the enhanced decommissioning, rehabilitation and restoration measures described in this plan. Bord na Móna will instead plan to complete only the 'standard' decommissioning and rehabilitation required under Condition 10, see Appendix I, and for which financial provisions have been made, to comply with that element of the Licence.

Monitoring, after-care and maintenance

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

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

Additional Monitoring:

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

Validation and IPC Licence surrender

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

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

1. INTRODUCTION

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

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

- Description of site management and status;
- Main issues and approaches to rehabilitation;
- Consultation to date with interested parties;
- Interaction with other policy and legislative frameworks (Appendix VI);
- The planned rehabilitation goals and outcomes:
- The scope of the rehabilitation plan;
- Criteria which define the successful rehabilitation and 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 Climate Action Scheme (PCAS) to carry out decommissioning, rehabilitation and restoration on peatlands previously used for energy production. Note this proposal is also known colloquially as the 'Peatlands Climate Action Scheme'. The additional costs of the proposed Scheme will be supported by Government through the Climate Action Fund. Bord na Móna have identified a footprint of 33,000 ha (a subset of the BnM estate that has been used for energy production) as peatlands suitable for enhanced rehabilitation. This proposed Scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations (Appendix VII) under existing EPA IPC licence conditions. Improvements supported by the Scheme will ensure that environmental stabilisation is achieved (meaning IPC obligations are met), and importantly, significant additional benefits, particularly relating to climate action and other ecosystem services, will also be delivered. However, it is important for all stakeholders to understand that only the costs associated with the additional, enhanced and accelerated rehabilitation, i.e. those measures which go beyond the existing decommissioning and rehabilitation requirements arising from Condition 10, will be eligible for support under the proposed Scheme.

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

It is envisaged that the proposed Scheme will support a combination of activities, interventions, or measures which accelerate the original timelines including:

- more intensive management of water levels through 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.

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

1.1 Constraints and Limitations

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

> "*The licensee shall prepare, to the satisfaction of the Agency, a fully detailed and costed plan for permanent rehabilitation of the cutaway boglands within the licensed area.*"

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

This document only covers the area of Oughter Bog.

Biodiversity and ecosystem services have been identified as the current primary land-use at Oughter. The southern portion of Oughter Bog has previously been developed as The Midlands National Shooting Centre of Ireland. Bord na Móna will continue to review the future after-use of its land-bank. Any consideration of any other future after-uses for Oughter 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.

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

Industrial peat extraction at Oughter Bog ceased in 2012. Bord na Móna do not intend to carry out any industrial peat production at this site in the future, so industrial peat extraction is permanently ceased. Currently the former peat production area comprises both bare peat and re-vegetated areas. The combination of active rehabilitation measures and natural colonisation will quickly establish and/or increase the extent of pioneer

vegetation and will be planned to accelerate environmental stabilisation. Nevertheless, it will take some time (30-50 years) for naturally functioning peatland ecosystems to fully re-establish.

Parts of Oughter Bog (outside the areas owned and under the control of Bord na Móna) are currently used by domestic turf cutters to harvest peat. These areas are ecologically and hydrologically linked to the area owned by Bord na Móna where rehabilitation is planned. It is beyond the scope of this rehabilitation plan to address turf cutting issues on the margins of Oughter 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.

The area of Oughter Bog leased to The Midlands National Shooting Centre of Ireland is not considered part of the scope of this rehabilitation plan.

Rehabilitation in other areas of the bog may also be constrained due to other property issues or issues such as rights of way. For example, there is a grazing agreement covering a small part of the site.

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 rehabilitation plan considered **recently published** guidance issued by the EPA in 2020 – **Guidance on the process of preparing and implementing a bog rehabilitation plan**.

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

- Experience of 40 years of research on the after-use development and rehabilitation of the Bord na Móna cutaway bogs (Clarke, 2010; Bord na Móna, 2016);
- Significant international engagement during this period with other counties in relation to best-practise regarding peatland rehabilitation and after-use through the International Peat Society and the Society for Ecological Restoration (Joosten & Clarke, 2002; Clarke & Rieley, 2010; Gann *et al*., 2019);
- Consultation and engagement with internal and external stakeholders;
- GIS Mapping;
- BNM drainage surveys;
- Bog topography and LIDAR data:
- Hydrological modelling; and
- The development of a **Methodology Paper (draft) outlining the 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 Oughter 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.
- Renou-Wilson *et al*. (2011). BOGLAND - Sustainable Management of Peatlands in Ireland. STRIVE Report No 75 prepared for the Environmental Protection Agency.
- Schouten (2002). Conservation and Restoration of Raised Bogs: Geological, Hydrological and Ecological Studies. Dúchas - The Heritage Service of the Department of the Environment and Local Government, Ireland;
- Thom (2019). Conserving Bogs – Management Handbook.
- Wheeler & Shaw (1995). Restoration of Damaged Peatlands – with Particular Reference to Lowland Raised Bogs Affected by Peat Extraction.
- Wittram *et al*. (2015). A Practitioners Guide to Sphagnum Reintroduction. Moors for the Future Partnership.

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

- Boora Integrated Pollution Control Licence;
- Boora Annual Environmental Reports;
- Review of the National Biodiversity Data Centre (NBDC) webmapper;
- Inland Fisheries Ireland (IFI) Reports;
- Environmental Protection Agency database (www.epa.ie);
- EPA Guidance on Requests for Alterations to a Licensed Industrial or Waste Activity;
- BirdWatch Ireland online data (including I-WeBS and CBS datasets; www.birdwatchireland.ie);
- Geological Survey of Ireland - National Draft Bedrock Aquifer map;
- Geological Survey of Ireland - Groundwater Database (www.gsi.ie);
- National Parks & Wildlife Services Public Map Viewer (www.npws.ie);
- Water Framework Directive catchments.ie/maps/ Map Viewer (www.catchments.ie);
- OPW Indicative Flood Maps (www.floodmaps.ie);
- CFRAM Preliminary Flood Risk Assessment (PFRA) maps (www.cfram.ie);
- River Basin Management Plan for Ireland 2018 – 2021;
- Bord na Móna Annual Report 2020;
- Spatial data in respect of Article 17 reporting, available online at https://www.npws.ie/maps-and-data/habitat-and-species-data/article-17.

2.2 Consultation

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

2.3 Field Surveys

Bord na Móna carried out a baseline ecological survey of all of its properties in 2009-2012 and developed habitat maps. As part of this exercise Oughter Bog was originally surveyed in September of 2009, and re-surveyed in July of 2013. Additional ecological walk-over surveys and visits have taken place at Oughter Bog between 2012-2020 to inform rehabilitation planning and habitat maps have been updated, where required. The latest confirmatory visit took place in September of 2020 (date 16/09/2020). This rehabilitation plan is informed by the original baseline survey as well as subsequent site walk-over surveys and visits, and updates to baseline data.

Habitat mapping followed best-practise guidance from Smith et al. (2011). Map outputs including all habitat maps and target notes were produced using GIS software application packages (ArcGIS). General marginal habitats and other habitats that had not been modified significantly by industrial peat extraction were classified using Fossitt *et al*. (2000). Plant nomenclature for vascular plants follows Stace (2010), while mosses and liverworts nomenclature follows identification keys published by the British Bryological Society (2010). A more detailed Bord na Móna classification system was developed for classifying pioneer cutaway habitats as Fossitt categories were deemed not to be detailed enough for cutaway bog (much of cutaway bog could be classified as Cutover Bog - PB4). Much of the pioneer cutaway vegetation is still at an early stage of its development and cannot be assigned to Fossitt Level 3 categories yet.

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

3. SITE DESCRIPTION

Oughter Bog is located adjacent to the R357 in Co. Offaly, circa 3km to the west of Blueball (see Figure 3.1 &3.2).

The surrounding landscape is a mosaic primarily consists of low-lying agricultural land (pasture) interspersed with other raised bogs, many of which have also been managed by Bord na Móna for peat production with some areas utilised for domestic turf-cutting. Lough Boora Discovery Park is ca.2km south west of Oughter.

Oughter bog lies to the south of the River Brosna and is drained by a number of its tributaries. The Grand Canal is located to the north of Oughter. Oughter is linked to the adjacent Turraun Bog (also owned by Bord na Móna) to the northwest by a railway line and machinery travel path, which provides the main access also to Oughter. Within the bog, the railway line broadly divides Oughter into two main sections.

Industrial peat production ceased at Oughter Bog in 2012. The majority of the bog is developing a suite of pioneer habitats (Figure 3.1 & 8.1).

A portion of the original site has been taken up with a Native Woodland Scheme and is no longer in the ownership of BNM – this area is now outside of the Oughter Bog boundary. Part of the southern portion of Oughter Bog has previously been developed as The Midlands National Shooting Centre of Ireland.

There is a small tea centre in the south west of the bog, ca.200m along an access track from the R357. A telecommunications mast (Vodaphone) is also present ca.60m from the R357 with access from the same location.

There are several other adjacent BNM bogs nearby including Pollagh/Cornalaur, Boora, Derries, the aforementioned Turraun and Killaranny. Killaranny, which is due north east of Oughter is connected via a machinery travel path and rail line.

3.1 Status and Situation

3.1.1 Site history

Oughter Bog has not been in peat production since 2012. It formerly provided peat for use in the Derrinlough Briquette factory and also as fuel peat for West Offaly Power (WOP) in Shannonbridge, Offaly. The existing east-west rail line through Oughter is still in use however and has been utilised as recently as 2020 to transport peat-from adjacent sites.

3.1.2 Current land-use

Industrial peat production has now permanently ceased at Oughter Bog. Biodiversity and ecosystem services have been identified as the primary land use at Oughter Bog by Bord na Móna. Part of the southern portion of Oughter Bog has previously been developed as The Midlands National Shooting Centre of Ireland and ownership of some cutaway was transferred. Existing structures and site infrastructure is mapped in Figure 3.6.

There are no known right of ways on this bog. A grazing agreement is in place for a small portion of cutaway at the northern end of the bog.

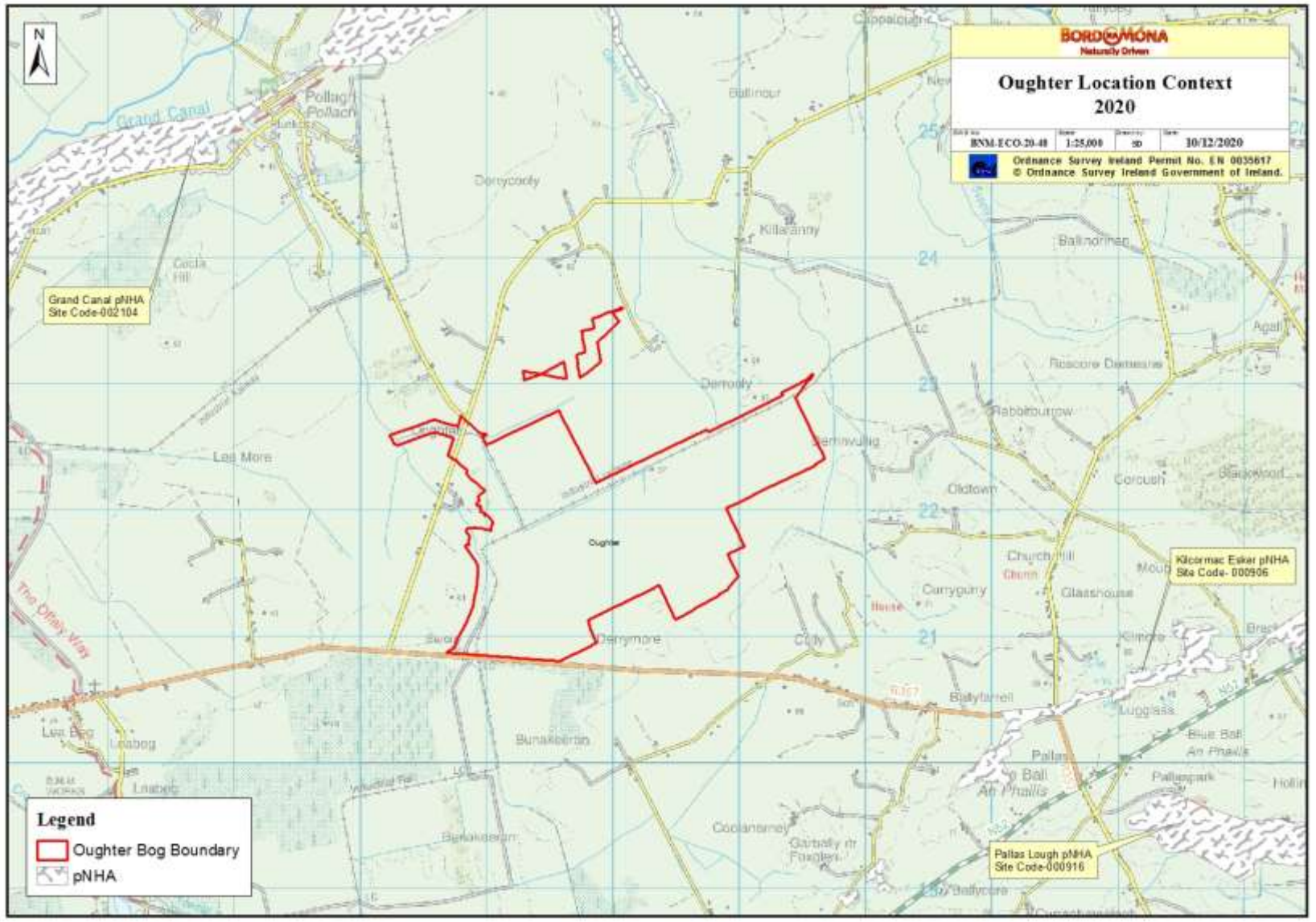

Figure 3.1 Location of Oughter in context to the surrounding area and conservation sites.

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 oughter 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

The underlying geology at Oughter Bog is limestone (Visean Limestones (Undifferentiated) with some Waulsortian Limestones also) [1]. The underlying soils and sub-soils are classed as 'Cutover/Cutaway Peat'.

3.2.2 Peat type and depths

Commercial peat extraction was undertaken at Oughter Bog up until 2012. As a result, peat depths are limited on site with most peat depths at 0.5-2.5m. The majority of the site is shallow cutaway bog (Figure 8.1). The peat on site was used as fuel peat recently supplying West Offaly Power and Derrinlough Brickette Factory.

3.3 Key Biodiversity Features of Interest

The bog is currently developing pioneer cutaway habitats (production-related cutaway) and is primarily divided into two main sections by a rail-line orientated NE-SW.

3.3.1 Current habitats

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

The site contains a significant areas of pioneer Poor Fen vegetation dominated by Bog Cotton and Marsh Arrowgrass. There are also some patches of Birch-dominated scrub to the east. There was some open water present but it was minor in extent and some of this habitat may be transient. Some small mounds and ridges along the western margin contain dry grassland and disturbed vegetation communities. The oldest area out of production is located adjacent to the east side of the shooting range. This area has almost completely re-vegetated and contains a diverse mosaic of vegetation communities including some indicators of Rich Fen (PF1).

The majority of the area north of the rail-line has been classified as cutaway and a large part of it has been taken over by a private Native Woodland Scheme with ownership now transferred from Bord na Móna. Habitats associated with the Native Woodland Scheme include pioneer Soft Rush-dominated vegetation and Birch scrub. A range of tree species were planted in 2008 including Scot's Pine, Birch and Alder.

A habitat map of Oughter Bog is shown in Figure 3.5, illustrative figures are shown overleaf in respect of a sample of habitats present at Oughter.

Figure 3.3. View of the revegetating milled peat surface (2020) with existing drainage across Oughter bog.

3.3.2 Species of conservation interest

Oughter Bog attracts breeding wildfowl including Northern Lapwing *Vanellus vanellus* (now Red-listed on the Birds of Conservation Concern in Ireland list[2] and highlighted as a conservation priority in the Government's Prioritised Action Framework 2014-2020[3]). Up to five breeding pairs have been recorded. Common Ringed Plover *Charadrius hiaticula* (up to 5 breeding pairs) and Common Snipe *Gallinago gallinago* (Amber listed) (potentially up to 20 pairs) have also been recorded. Territorial or 'Roding' Woodcock *Scolopax rusticola* (Amber listed) have previously been recorded in suitable habitat immediately adjacent to the west of Oughter and this species is considered a possible breeder at Oughter. Black-headed Gull *Chroicocephalus ridibundus* (Red listed for breeding

[2] Colhoun, K. & Cummins, S. (2013). Birds of Conservation Concern in Ireland 2014–2019. *Irish Birds* 9: 523-544

[3] https://www.npws.ie/sites/default/files/general/PAF-IE-2014.pdf

birds) has bred at Oughter, in the area north of the railway line in the past and a small colony has existed in the SW of Oughter. Both Whimbrel *Numenius phaeopus* and Black-tailed Godwit *Limosa limosa* have been recorded overflying Oughter on Spring passage. Wheatear *Oenanthe oenanthe* occurs on Autumn passage.

Figure 3.4 Pioneering, Cladium dominated vegetation at Oughter Bog (September 2020)

Grey Partridge Pe*rdix perdix* (Red listed) occurs at Oughter given the bogs' proximity to the conservation programme for this species at nearby Lough Boora. Other breeding birds in the area include Kestrel *Falco tinnunculus* (Amber listed) and Meadow Pipit *Anthus pratensis* (Red listed), whilst Sand Martin *Riparia riparia* (Amber listed) have been observed nesting in the face banks of nearby cutaway high bog. Four Common Buzzard *Buteo buteo* were present in September 2020. Eurasian Jay *Garrulus glandarius* has been recorded in the adjacent Native Woodland Scheme woodland.

Part of Oughter becomes wet during the winter and attracts Whooper Swan *Cygnus cygnus* (Amber listed in Ireland and also on Annex I of the EU Birds Directive) along with other species of waterfowl such as Greylag Geese *Anser anser* and Golden Plover *Pluvialis apricaria.* Whooper Swan, Greylag Geese may also overfly Oughter at dawn and dusk when commuting between the various feeding and roosting areas present in the locale (such as Boora and Turraun). In addition to utilising inundated areas within Oughter bog, wintering Whooper Swan are known to have used a number of fields in the past outside but immediately adjacent to the north-east corner of Oughter at Derrinvullig.

Merlin *Falco columbarius* (Amber listed) has previously been recorded at Oughter (C.Cullen, personal observation) during the winter months and wintering individuals continue to utilise Oughter into early Spring.

Hen Harrier *Circus cyaneus* (Amber listed) is known to roost communally at a number of locations in the hinterland of Oughter, and whilst no roosting has been confirmed at Oughter itself, individuals of this species have been observed commuting through Oughter at dawn or dusk whilst *en route* to or from nearby communal roosts.

A review of available Biodiversity records from the National Biodiversity Data Centre (hereafter NBDC) on the 4 no. tetrads (N22A, N22B,N22G,N22F) which overlap Oughter Bog found further bird records for species such as

Common Kingfisher *Alcedo atthis* (recorded from N22A during the winter period of the 2007-2011 Bird Atlas), and Common Raven *Corvus corax* and Water Rail *Rallus aquaticus* (also recorded in N22A during the winter period of the 2007-2011 Bird Atlas).

Along with Birds, nineteen species of Butterfly, have been recorded in the same four tetrads, including Brimstone *Gonepteryx rhamni*, Dingy Skipper *Erynnis tages,* Large Heath *Coenonympha tullia,* Small Heath *Coenonympha pamphilus*, Wall *Lasiommata megera* and Wood White *Leptidea sp.* Fifteen species of dragonfly are also noted. At Oughter itself, prior to 2020, two species of Butterfly, Painted lady *Vanessa cardui* and Speckled Wood *Pararge aegeria* have been recorded within the bog boundary, however site visits in 2020 to inform the current plan also recorded Large White *Pieris brassicae*, Red Admiral *Vanessa atalanta* and Small Tortoiseshell *Aglais urticae*. Emperor Dragonfly *Anax imperator* was recorded at Oughter Bog in September 2020.

Regarding mammals BNM ecologists have recorded evidence of Rabbit *Oryctolagus cuniculus*, Irish Hare *Lepus timidus hibernicus,* Pine Marten *Martes martes*, Badger *Meles meles* and Red Fox *Vulpes vulpes* at Oughter. Lesser Noctule *Nyctalus leisleri*, Pipistrelle *Pipistrellus pipistrellus sensu lato* and Soprano Pipistrelle *Pipistrellus pygmaeus* bats have been recorded in tetrad N22A and may utilise suitable habitats within Oughter.

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. There are no such instances in the case of Oughter bog.

A broad range of common garden escapes are occasionally present around the margins of Bord na Mona bogs, and although spatial overlap with the PCAS is expected to be limited, these are, where necessary, to be treated in line with Best Practice during PCAS activities.

3.4 Statutory Nature Conservation Designations

There are no European Sites (SAC or SPA) located within 5km of Oughter Bog (Figure 3.1). Due to its location within the Lower River Shannon catchment, Oughter is hydrologically connected to at least two downstream European Sites namely the Middle Shannon Callows SPA (Site Code 004096 -17km due west as the crow flies), and the River Little Brosna Callows SPA (Site Code 004086 - ca.22km south west as the crow flies). Both Sites would be further via hydrological links.

The nearest SAC is Clara Bog (Site Code 000572), which is ca.6km to the north east. Charleville Wood SAC (Site Code 000571) is ca.7km to the east of Oughter. T

The Grand Canal pNHA (Site Code 002104) is <2km to the North of Oughter at its closest, whilst Kilcormac Esker pNHA (Site Code 000906) is ca.2.5km to the south east.

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 Oughter Bog (i.e. within 3km) The closest Ramsar Sites to Oughter Bog include Mongan Bog, Clara Bog, and Raheenmore Bog.

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

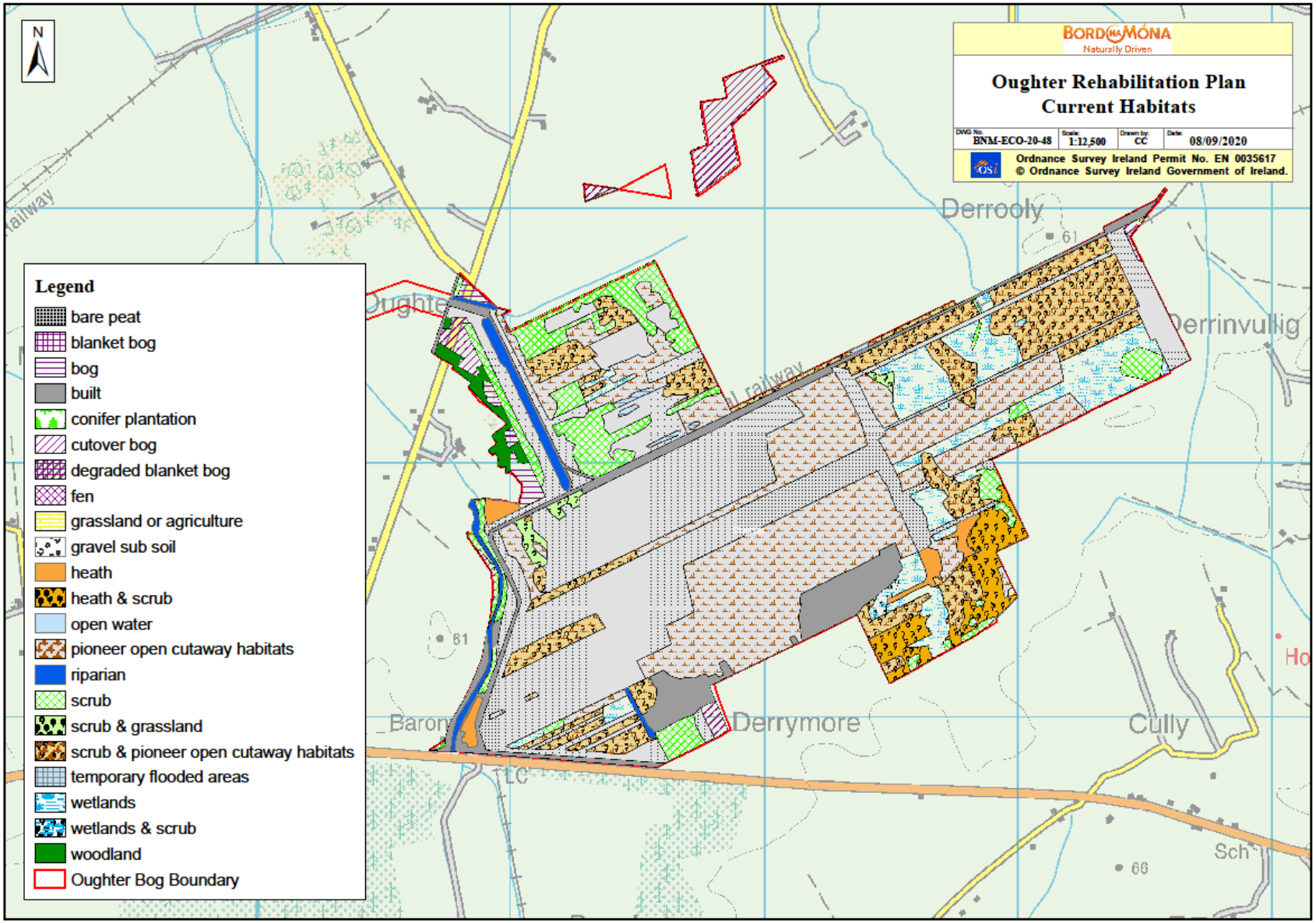

Figure 3.5. *Habitat map of Oughter Bog showing Bord na Móna habitat categorisation (November 2018*

Figure 3.6. *Map of Oughter Bog displaying structures, silt ponds and discharge points.*

3.5 Hydrology and Hydrogeology

Oughter Bog is a gravity-drained bog. Hydrological modelling (Figure 8.3 & 8.4) indicates that the majority of bog is a natural basin with significant potential for re-wetting. Anecdotally, Oughter Bog has always had a significant spring influence and was difficult to drain in places. There are also significant ecological indicators (rich fen species) that there is a strong alkaline influence on the water chemistry of the ground water of this site. The main basin also contains low-lying areas of peat that are still quaky.

Oughter Bog is located in the Lower River Shannon Catchment (Shannon_Lwr). It is mainly drained to the west by the Derrooly Stream (EPA Code 25D91) and the Oughter stream (EPA Code 25012), which converge west of Oughter to form the Pollagh Stream (EPA Code 25P05). The Pollagh Stream proceeds to flow northwards to join the Brosna River (EPA Code 25B09) just outside Pollagh Village.

The eastern extremity of Oughter is drained by both the Derrycooley Stream (EPA Code25D13) and the Killaranny Stream (EPA Code 25Q16), the latter converges with the Derrycooley north of Oughter from whence it then flows northwards into the Clodiagh (Tullamore) (EPA Code 25C06) which in turn flows into the Brosna shortly thereafter- however onsite gravity drainage directs the former peat extraction area towards the Pollagh Stream.

Silt ponds (3 no.) are present in the west of Oughter to manage discharges into the Pollagh Stream and in turn the Brosna. The bog has field drains running in a general north-northwest to south-southeast orientation.

The bog is located in an area with a regionally important (karstified (diffuse)) bedrock aquifer. An aquifer is an underground body of water-bearing rock or unconsolidated materials (gravel or sand) from which groundwater can be extracted in useful amounts. GSIs Aquifer classes are divided into three main groups based on their resource potential, and further subdivided based on the type of openings through which groundwater flows. There are nine aquifer categories in total. Locally important aquifers are capable of supplying locally important abstractions (e.g. smaller public water supplies, group schemes), or good yields (100-400 m3/d). This data gives an indication of sub-surface deposits (bedrock and unconsolidated materials) in terms of their groundwater resource potential and dominant groundwater flow type.

The bog is located in an area mapped by GSI as of low groundwater vulnerability (GSI Mapviewer). Groundwater Vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. 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 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 grey gravelly clay/silt (present on an adjacent cutaway site). Lacustrine deposits in the site generally consist of shell marl. The bog water table across the site is expected to be high when bog drains are locked, 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. As such the potential for bog rehabilitation to interact or impact on underlying groundwater is very low.

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 Oughter Bog.

Silt ponds are the key silt control infrastructure to control potential emissions from industrial peat production sites. As require under licence, BNM have a number of procedures for how it manages and maintains its silt pond network. The silt that builds up in silt ponds is excavated on a regular basis by Bord na Móna to facilitate an efficient level of silt control. Silt ponds will continue to be maintained during the rehabilitation and decommissioning period. Silt pond decommissioning will be considered when sites are deemed to be on a trajectory of environmental stability and peatland rehabilitation has been completed. There are three silt ponds at Oughter Bog, all located in the west of the bog. Water exits the three silt ponds towards the Pollagh Stream. This stream discharges into the River Brosna catchment.

Oughter bog has one surface water outlet to the Pollagh Stream which then flows to the Brosna river IE_SH_25B090761. Peat extraction was identified as a pressure in the second cycle of the river basin management plan but is not indicated as remaining so in the third cycle, currently under preparation, in relation to both the Pollagh Stream and Brosna River.

There are no exceedances in the IPC Licence limits for Suspended solids and Ammonia resulting from ongoing surface water monitoring. As part of the rehabilitation plan and validation, surface water quality will be monitored to establish an expected stabilisation or improvement in water quality parameters. The main emission limit value associated with this bog is 35mg/l suspended solids, with trigger levels for ammonia of 3.7 mg/l and COD 100mg/l. From an analysis of any monitoring over the past no of yrs. of the IPC licence environmental monitoring of some of the discharges from this bog indicate that results were under the ELV for SS and trigger level for ammonia and COD (Table 3.1).

Table 3.1.

Bog	SW	Monitoring	Sampled	pH	SS	TS	Ammonia	TP	COD	Colour
Oughter	SW-18	Q3 19	10/09/2019	7.1	<2	424	0.188	<0.05	36	110
Oughter	SW-18	Q4 17	13/12/2017	7.4	8	288	0.46	0.05	64	223

Rehabilitation of cutaway peatland is closely linked with control of emissions. One of the criteria for successful rehabilitation is stabilisation through re-vegetation, which will stabilise all substrates and in turn remove the need for further silt control measures. Re-wetted peat also aid the primary objective of stabilizing peat, as when peat is re-wetted it minimises risk to wind erosion. Re-wetted peat and the development of wet peatland habitats can also act as sinks for silt and mobile peat, and increases additional retention time for solids, and the peatland vegetation can quickly stabilise this material within blocked drains on site (by acting like constructed wetlands).

Water quality of water discharges from restored/rehabilitated peatlands normally improves as a result of bog rehabilitation and restoration measures and the restoration of natural peatland processes (Bonn *et al*., 20017). Peatland rehabilitation is also expected to improve water attenuation of the site as the drains are blocked, slowing water movement and water release from the site. Restored peatlands help slow the release of water and aid the natural regulation of floods downstream (Minayeva *et al*., 2017). The National River Basin

Management Plan (NRBMP) 2018-2021 (DHPCLG, 2017) is the key national plan for Ireland to achieve the objectives of the Water Framework Directive (WFD). The NRBMP outlines how key actions such as the Bord na Móna Raised Bog Restoration Project and ongoing Bord na Móna rehabilitation is expected to have a positive impact on water quality and help the NWBMP deliver its objectives in relation to the WFD.

Water will still discharge from designated emission points when rehabilitation at Oughter Bog has been completed (See Figure 3.6). Existing silt ponds will continue to be maintained and operated as long as required or such point as they can be decommissioned, with no change in outfall type This discharge will have improving water quality and there will be increased wetland attenuation, meaning slower release of water. This is expected to have a positive impact on status of the key downstream water body receptors, and is expected to support the retention of the current and future status of Pollagh Stream as being of Good Status.

3.7 Fugitive Emissions to air

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

3.8 Carbon emissions

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

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

It is expected that Oughter Bog can become a reduced carbon source with sections having potential to develop as a carbon sink (albeit in the longer term) following rehabilitation. The potential of any cutaway site to develop as a reduced carbon source/carbon sink in the longer-term depends on the success of the rehabilitation measures, the extent of development of any *Sphagnum*-rich or other peat-forming habitats, the balance of carbon fluxes from different cutaway habitats and future climatic conditions. This bog is expected to develop a mosaic of fen, Reed swamp, wet woodland, scrub and is known to have strong alkaline spring influence on the ground-water. Birch woodland is expected to develop on the drier mounds and peripheral headlands.

3.9 Current ecological rating

(Following NRA (2009) Evaluation Criteria)

The majority of the site can be rated as having a **low-high local ecological value (E).** Bare peat and other intensively managed areas are assessed as having a low local ecological value (although some bare peat and wet areas attract breeding waders).

Some sections of cutaway have developed areas of poor fen and scrub and can be rated as having **Moderate value, locally important (D).**

The area to the west of the rifle range has developed an area that, potentially develop rich fen (PF1). This area can be rated as having a **High value, locally important (D).**

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

4. CONSULTATION

4.1 Consultation to date

Consultation will seek to engage an audience of relevant stakeholders at both a national and local level. National stakeholders have been identified from varied bog restoration and rehabilitation efforts undertaken by Bord na Móna over the past 40 years, with particular emphasis on engagement with stakeholdesr 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. All national stakeholders will 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 Oughter Bog.

There has been ongoing consultation about rehabilitation and other general issues over the years about Oughter Bog with various stakeholders in relation to:

- General consultation with range of stakeholders at annual Bord na Mona Biodiversity Action Plan review days 2010-2018.
- Midlands & East Regional WFD Operational Committee (River Basin Management Plans).
- Sub-committee on Shannon Flooding Work Programme and Measures (OPW, Waterways Ireland, ESB, LA's, Fisheries Ireland, NPWs etc).
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).
- The development of Lough Boora Discovery Park (Offaly County Council);
- Bird surveys carried out by Birdwatch Ireland for Bord na Móna
- Development of the Midlands National Shooting Centre of Ireland.

Local stakeholders will also be identified through ongoing engagement with neighbours whose land adjoins Oughter Bog. Additionally, local representatives of national bodies (such as Regional National Parks and Wildlife staff) and relevant offices in County Councils (such as the Heritage or Environmental Offices) will be contacted. Any identified local interest groups will also be sought and informed of the opportunity to engage with this rehabilitation plan, and when identified will be invited to submit their comments or observations in relation to the proposed rehabilitation at Oughter Bog.

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

4.2 Issues raised by Consultees

N/A. Not issued to consultees yet.

4.3 Bord na Móna response to issues raised during consultation

N/A

5. REHABILITATION GOALS AND OUTCOMES

The key rehabilitation goal and outcomes for Oughter Bog are **environmental stabilisation** of the site via **optimising climate action benefits**. This is defined as:

- Carrying out intensive rehabilitation with the application of a combination of enhanced rehabilitation measures (including drain-blocking, re-profiling, cell-bunding, fertiliser application).
- Optimising hydrological conditions for the development of Reed Swamp and fen on shallow more alkaline peat and other subsoils.
- Stabilisation or reduction in water quality parameters (e.g. suspended solids).
- Environmental stabilisation.
- Setting the site on an appropriate trajectory to develop naturally functioning peatland habitats over time. 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). Nevertheless, re-wetting across the entire bog, as part of the proposed Scheme, will improve habitat conditions of the whole bog, making the overall bog wetter. Other peatland habitats such as fen and associated Reed swamp will develop in a wider mosaic that reflects underlying conditions. It will take some time for stable naturally functioning habitats to fully develop at Oughter Bog.

Re-wetting residual peat will initially maintain and enhance the carbon storage capacity of the bog. There is a scientific consensus that restoration of hydrology in damaged bog can improve carbon storage, water storage and attenuation and help support biodiversity both on the site and in the catchment (Grand-Clement *et al*., 2015; Anderson *et al*., 2017; Minayeva *et al*., 2017). This will reduce carbon emissions from the site from a larger carbon source to a smaller carbon source.

Sections of the site will improve in condition after re-wetting and also have the capacity to develop as a reduced Carbon source as Reed Swamp, fen, scrub and bog woodland habitats develop. The EPA-funded CarbonRestore Project (Renou-Wilson *et al*., 2012) found that rewetting of drained peatlands can lead to restoration of functional peatland, such as the return of typical plant and animal species, which in turn may lead to the restoration of peat-formation and the Carbon sink function.

The main deliverable of this 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.

6. SCOPE OF REHABILITATION

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

- EPA IPC Licence - Ref. P0500-01. As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the cutaway boglands within the licensed area. Oughter bog is part of the Boora Bog group.
- The proposed Scheme is designed to exceed the stabilisation requirements as defined by the IPC Licence. This Scheme is designed to enhance the ecosystem services of Oughter Bog, in particular, optimising **climate action benefits**. The proposed interventions will mean that environmental stabilisation is achieved (meaning IPC obligations are met) and, in addition, significant other ecosystem service benefits particularly for climate action will be accrued.
- The area of Oughter Bog is defined by Figure 3.1
- The local environmental conditions of Oughter Bog identify cutaway re-wetting as the most suitable rehabilitation approach for this site. There is a strong alkaline influence on the ground-water at this site. This means that re-wetting will lead to the development of fen, Reed Swamp and other associated wetland/peatland habitats.
- Bord na Móna have defined the key goal and outcome of rehabilitation at Oughter Bog as **environmental stabilisation** and **optimising suitable hydrological conditions, and setting the site on a trajectory towards the development of naturally functioning peatland habitats (fen, Reed swamp and other associated wetland habitats).**
- Rehabilitation of Oughter Bog will support multiple National strategies of climate action, biodiversity action and other key environmental strategies such was the Water Framework Directive.
- The time frame for the delivery of the planned rehabilitation will be undertaken according to available resources and appropriate constraints.
- It is not proposed to carry out any rehabilitation in the marginal cutover bog zone as this is quite fragmented by private turbary.

6.1 Key constraints

- **Bog conditions.** Rehabilitation outcomes of sites are constrained by the environmental characteristics of these particular areas. For example, there is potential for raised bog restoration at some bogs where there has not been significant industrial peat extraction and the peat body is largely intact (deep peat sites that are drained). At other bogs, most of the peat mass has been removed, the environmental characteristics of these areas have therefore changed radically (peat depths, hydrology, water chemistry, substrate type, nutrient status), and there will therefore be different habitat outcomes (wetlands, fen, heathland, grassland and Birch woodland).
- At Oughter Bog, commercial peat extraction was undertaken up until 2012. As a result, peat depths are limited on site with most peat depths at 0.5-2.5m. In addition, due to the cessation of peat extraction activities portions of the bog have since naturally colonised with pioneering vegetation. There are also significant ecological indicators (rich fen species) that there is a strong alkaline influence on the water chemistry of the ground water of this site. There are local factors that will influence the future trajectory of this site (such as it was always a relatively 'wet' bog which was never pumped nor potentially fully drained) which need to be considered as part of the wider rehabilitation work.

- **Surrounding landscape and neighbours.** Another key constraint is the interaction between the Bord na Móna sites and the surrounding landscape. Care has to be taken that no active rehabilitation management is carried out that could negatively and knowingly impact on surrounding land. This includes any hydrological management on neighbouring farmland. It is anticipated that the work proposed here (blocking drains and re-wetting cutaway peatlands) will not have any flooding impacts on adjacent land.
- **Archaeology**. 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 Oughter Bog was carried out (Appendix X). There are no known archaeological features. Rehabilitation will take account of stray archaeological finds (Appendix VI).
- **Other Constrained areas**. A grazing agreement covers a small area of bog at the northern end of the site. It is proposed to maintain current water levels in this area.

6.2 Key Assumptions

- It is assumed that Bord na Móna will have all resources required to deliver this project. For the avoidance of doubt, should the proposed Scheme and the associated statutory obligation on Bord na Móna not materialise, Bord na Móna will not carry out the enhanced decommissioning, rehabilitation and restoration measures described in this plan. Bord na Móna will instead plan to complete only the 'standard' decommissioning and rehabilitation measures required under Condition 10, and for which financial provisions have been made, to comply with that element of the Licence.
- It is expected that weather conditions will be within normal limits over the rehabilitation plan timeframe. Long periods of wet weather have the capacity to significantly affect ground conditions and constrain practical rehabilitation.

6.3 Key Exclusions

The scope of this rehabilitation plan does not cover:

- The longer-term restoration trajectory of the site. The plan covers the short-term rehabilitation **actions** (see the Methodology Paper and Table AP-3) and **an additional monitoring and after-care programme** to monitor the rehabilitation and to respond to any needs. It is expected that this rehabilitation plan will set the site on an enhanced and accelerated trajectory towards the development of naturally functioning peatland habitats (fen and Reed swamp). The plan does not set any goals or outcomes, for example, the extent (specific area) of active raised bog habitat (ARB) that may develop at this site. This is beyond the scope of this rehabilitation plan.
- This plan is not intended to be an after-use or future land-use plan for Oughter Bog.
- The longer-term management of this site, potentially as a nature conservation site, or for amenity, or for other uses in the future.
- The Midlands National Shooting Centre of Ireland area.
- The former area of Oughter Bog, which is now a private Native Woodland Scheme.

7. CRITERIA FOR SUCCESSFUL REHABILITATION

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

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

Rehabilitation is generally defined by Bord na Móna as

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

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

In general, the key objective will be to optimise the area of suitable hydrological conditions for climate action benefits (re-wetting peat and keeping water levels close to the peat surface) across this heterogeneous cutaway landscape to accelerate the trajectory of peat re-wetting towards the establishment of naturally functioning peatland habitats (fen and Reed swamp).

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 development of vegetation cover via natural colonisation, and reducing the area of bare exposed peat. See Table 7.1 for a summary of the criteria for successful rehabilitation and associated monitoring. The target will be the delivery of measures and this will be measured by an aerial survey after rehabilitation is completed.
- That there is a stabilising/improving concentration of suspended solids and ammonia associated with the measures undertaken to stabilise the peat surface by the blocking of the internal drainage system and the maximised rewetting of the peat surface. This will be demonstrated by developing a stable or downward trajectory of water quality indicators (suspended solids and ammonia) towards what would be typical of a re-wetted cutaway bog. This will be measured via water quality monitoring (suspended solids and ammonia) for at least 2 years after the rehabilitation has been completed.
- Where the section of the water body that this bog drains to, continues not to be identified as under pressure from peat extraction, that the intervening EPA monitoring programme associate with its Programme of Measures for this water body shows positive improvements in water quality impacts that can be attributable to the rehabilitation works undertaken on this bog. This will be measured by the EPA WFD monitoring programme.

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

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

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 (silt), pH and conductivity	Reduction or stabilisation of key water quality parameters associated with this bog	Water quality monitoring. Started in advance of the proposed rehabilitation.	2020-2023
IPC validation	Reducing pressure from peat production on the local river catchment (WFD)	Where the section of the water body that this bog drains to, continues not to be 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 can be attributable to the rehabilitation	EPA WFD monitoring programme	WFD schedule

Criteria type	Criteria	Target	Measured by	Expected Time-frame
		works undertaken on this bog.		
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	Reduction in carbon emissions.	Reduction in carbon emissions	Carbon emissions – estimated using a high bog condition assessment and appropriate carbon emission factors.	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, permanent vegetation monitoring quadrats	2021-2025
Climate action verification	Biodiversity and ecosystem services. Habitat establishment Presence of key species – Sphagnum Breeding birds Pollinators	Improvement in biodiversity and ecosystem services.	Metrics that relate to selected biodiversity and ecosystem services (to be defined). Presence of key species – Sphagnum – Walkover survey Breeding birds – Breeding bird survey Pollinators – Pollinator walk	2021-2025

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

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

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

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

- **Funding to pay for resources required to deliver the planned rehabilitation (Bord na Móna and external).** Bord na Móna maintains a Provision on its balance sheet to pay for these future costs when industrial peat extraction ceases. Bord na Móna is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence. It is expected that additional costs of enhanced rehabilitation will be supported by Government through the Climate Action Fund.
- **Bord na Móna to have sufficient resources (staff and training) to deliver the planned rehabilitation with required associated skills and competencies.**
- **Bord na Móna to have sufficient resources (suitable machinery) and staff to maintain this machinery.**
- **Weather conditions to be within normal limits over the rehabilitation plan timeframe.** Long periods of wet weather have the capacity to significantly affect ground conditions and constrain the delivery of rehabilitation. The potential impact of wet weather on ground conditions can be reduced by appropriate planning and management. Bord na Móna have significant experience of managing these issues through 70 years of working in these peatland environments.
- **Rehabilitation measures to be effective.** The rehabilitation measures proposed in this plan are based on 40 years of Bord na Móna experience of peatland management and best practise applied internationally in peatland management. Measures proposed in this plan have already been shown to be affective at other sites. Bord na Móna will apply a flexible and adaptable approach to the more innovative rehabilitation measures proposed in this plan**.** If measures are not initially effective, Bord na Móna will review any requirement for additional practical rehabilitation.
- **Natural colonisation of vegetation to develop semi-natural habitats at a rate within the normal limits.** The development of naturally functioning semi-natural habitats on cutaway peatland takes time. Pioneer vegetation can develop relatively quickly (3-10 years) and wetland habitats can develop relatively quickly. Birch woodland make take 20-30 years to develop. However, it may take 50 years for active raised bog vegetation to re-develop on ground that was previously cutaway. Different environmental conditions will have a significant impact on the rate of natural colonisation, and as a result of the combination of different environmental conditions and the application of different rehabilitation measures, there will be a variety of habitat outcomes.
- Rehabilitation measures have been designed to accelerate and work with natural colonisation and other natural processes. Bord na Móna experience of rehabilitation has shown that re-wetting improves conditions for natural colonisation and that natural colonisation is accelerated where the environmental conditions are most suitable. Rehabilitation measures have been designed to modify the conditions of areas within sites where conditions are less suitable for natural colonisation (modifying hydrology, topography, nutrient status or availability of potential seed sources).
- **Monitoring to be robust and effective.** Rehabilitation Monitoring will be established to validate the success of rehabilitation as required by Condition 10 of the IPC Licence and to verify the benefits of the proposed measures to optimise climate action. This will focus on a collecting a range of scientific data

that can then quickly be adapted and into metrics that can be used to measure changes in various ecosystem services.

8. REHABILITATION ACTIONS AND TIME FRAME

Peatland rehabilitation requires detailed planning and the use of data from desktop surveys and field surveys. This data in association with topographical and hydrological modelling (Figure 8.3 & 8.4) will be important in planning the future peatland landscapes and planning the use of the most appropriate rehabilitation methodologies to maximise climate action benefits. Hydrological modelling (Figure 8.4) indicates those areas that are likely to re-wet when drains are blocked, based on the current topography, and areas where water levels may have to be modified, where needed. Enhanced rehabilitation measures will look to optimise hydrological conditions for re-wetting peat in other areas. This planning is also essential for matching the most sustainable rehabilitation methodology to the most suitable cutaway environment to maximise the benefits of the resource outlay (maximising cost/benefit).

The rehabilitation actions will be a combination of PCAS measures to re-wet peat. The distribution of these measures is provisionally outlined in Figure 8.5. (Note that the actual distribution of these measures may be subject to change in response to stakeholder consultation and refinement of the enhanced rehabilitation measures.)

These enhanced measures for Oughter Bog will include**:**

- Re-wetting residual peat areas on the bog using berms and field re-profiling. This 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.
- In some areas, a cut-and-fill cell bunding technique is proposed. The cut and fill cell bunding approach aims to create 'saucers' or flat bunded areas (cells) on peat with berms to hold shallow water at appropriate levels.
- Re-wetting some areas of the bog through regular field drain blocking using a dozer/excavator to create three peat barriers every 100 m along each field drain.
- Re-alignment of piped drainage.
- Blocking drains in targeted existing pioneering vegetation mosaics, to accelerate re-wetting, and/or manage water levels to the correct height to accelerate the current trajectory towards Reed swamp and fen, using a dozer/excavator.
- Targeted fertiliser applications to accelerate vegetation establishment on headlands and high fields. (It is noted that the application of fertiliser may need additional assessment and approval as per the IPC Licence).
- 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 Oughter 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).
- Seedling of vegetation is not required at this site as natural colonisation and the development of pioneer habitats is already significantly progressed.

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

Type	Code	Enhanced Rehabilitation Measure	Extent (Ha)
Dry cutaway	DCT1	Blocking outfalls and managing water levels with overflow pipes	18.8
Dry cutaway	DCT2	Regular drain blocking (max 3/100 m) + blocking outfalls and managing water levels with overflow pipes + targeted fertiliser treatment	44.9
Wetland	WLT1	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes	65.5
Wetland	WLT4	More intensive drain blocking (max 7/100 m), + blocking outfalls and managing overflows + transplanting Reeds and other rhizomes	120.5
Marginal land	MLT1	No work required (Marginal land including Silt Ponds)	59.7
Constrained areas		Rehabilitation aligned to constraints	48.5
Silt ponds		Silt ponds	
Total			357.9

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

- Seek formal approval of the enhanced plan, noting the alternative adapted standard plan should funding from the proposed Scheme not materialise, from the EPA.
- Agree an *ex ante* budget of eligible costs (based on the approved enhanced plan) with the Scheme regulator.
- Develop a detailed site plan with detailed site drawings outlining how the various rehabilitation methodologies (The proposed Scheme PCAS) will be applied to Oughter Bog. This will take account of peat depths, topography, drainage and hydrological modelling. (See map for an indicative view of the application of different rehabilitation methodologies).
- Carry out a drainage management assessment of the proposed rehabilitation measures.
- Carry out a review of known archaeology and an archaeological impact assessment of the proposed rehabilitation. Incorporate the results of this assessment into the rehabilitation plan to minimise known archaeological disturbance, where possible. There are no known archaeological features at this bog (Appendix X);
- Carry out a review of issues that may constrain rehabilitation such as known rights of way, turbary and existing land agreements. A known right of way exists along across one of the Bord na Móna margins.
- Carry out an ecological appraisal of the potential impacts of the planned rehabilitation, such as the presence of sensitive ground-nesting bird breeding species (e.g. Curlew or Lapwing) or larval webs of Marsh Fritillary butterfly, etc. The scheduling of rehabilitation operations will be adapted, if needed. Surreys will be scoped and carried out based on the baseline ecological survey and previous knowledge of sites.
- Ensure all activities comply with the environmental protection requirements of the IPC Licence.

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 and cell-bunding. All rehabilitation will be carried out with regard to best practice environmental control measures (Appendix IV);
- Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions.
- Carry out the proposed monitoring, as outlined.
- While natural colonisation is expected to commence almost immediately once peat production ceases, Phase 2 actions will be carried out in targeted areas to accelerate re-vegetation and colonisation of target species. Phase 2 actions will include fertiliser application on high fields and headlands (where there is bare peat).
- Silt-ponds will be monitored during this period and there will be continued maintenance and cleaning to prevent silt run-off from the site during the rehabilitation phase.
- Submit an *ex post* report to the Scheme regulator to verify the eligible measures to be carried out in year 1 of the Scheme, and an *ex ante* estimate for year 2 of the Scheme; and so on for each year of the 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.
- 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.

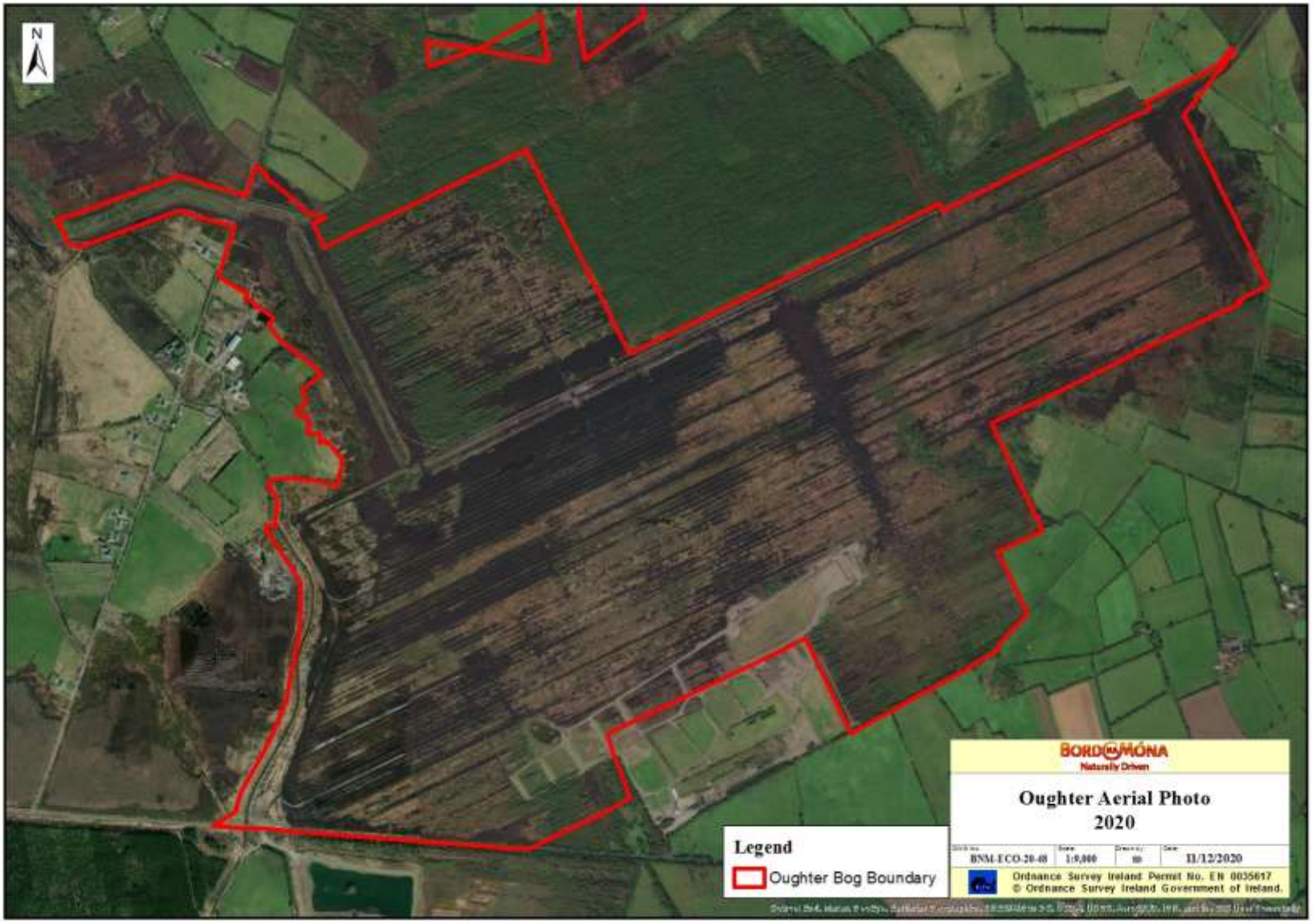

Figure 8.1. Aerial photo of Oughter Bog. The majority of the bog is wet pioneer vegetation. The Midlands National Shooting Centre of Ireland is out of scope of the rehabilitation plan.

Figure 8.2. Peat Depth Map for Oughter Bog. The majority of the bog is cutaway.

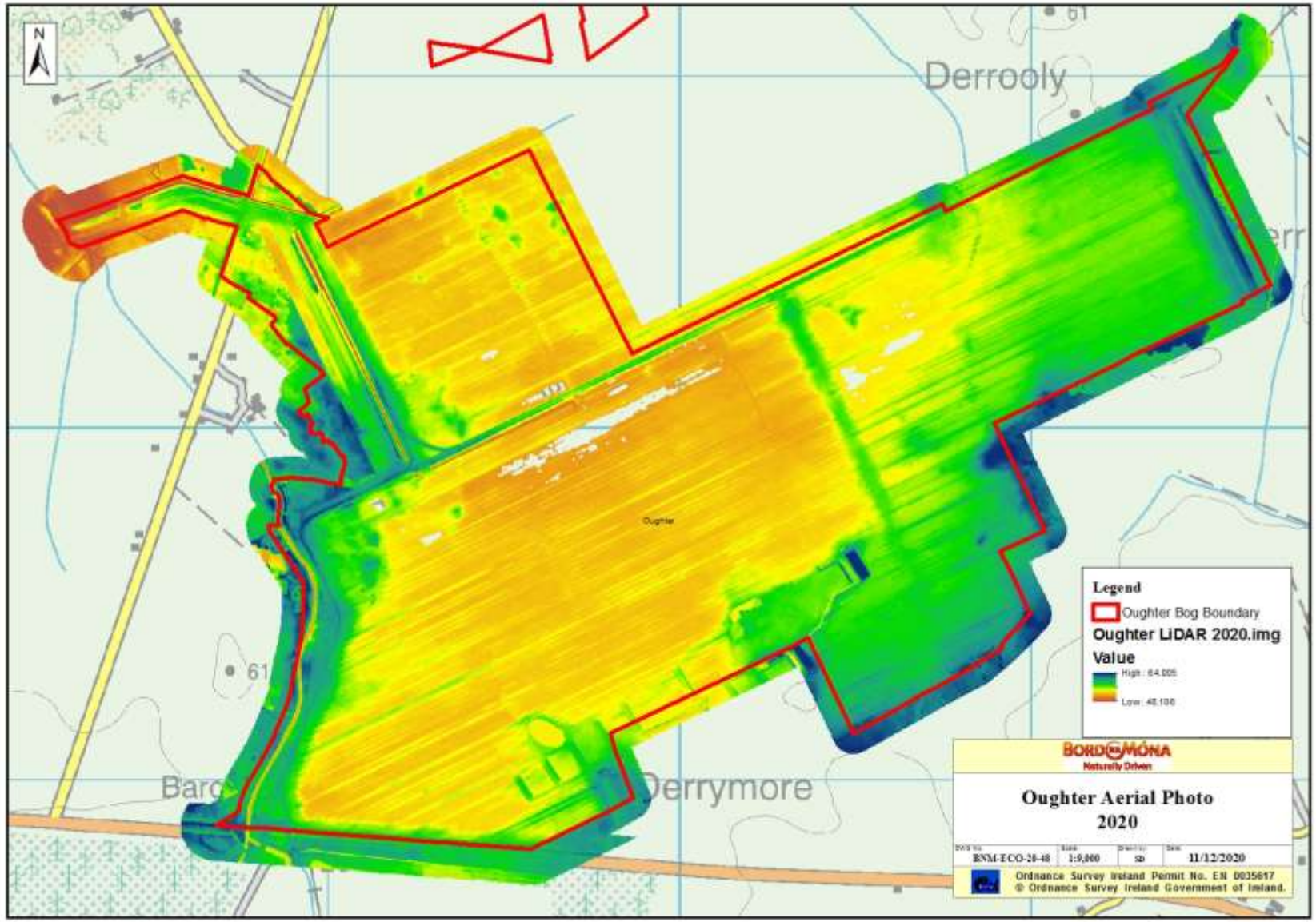

Figure 8.3. LIDAR topography map of Oughter Bog. Low areas and basins are orange-yellow, more elevated areas are blue-green.

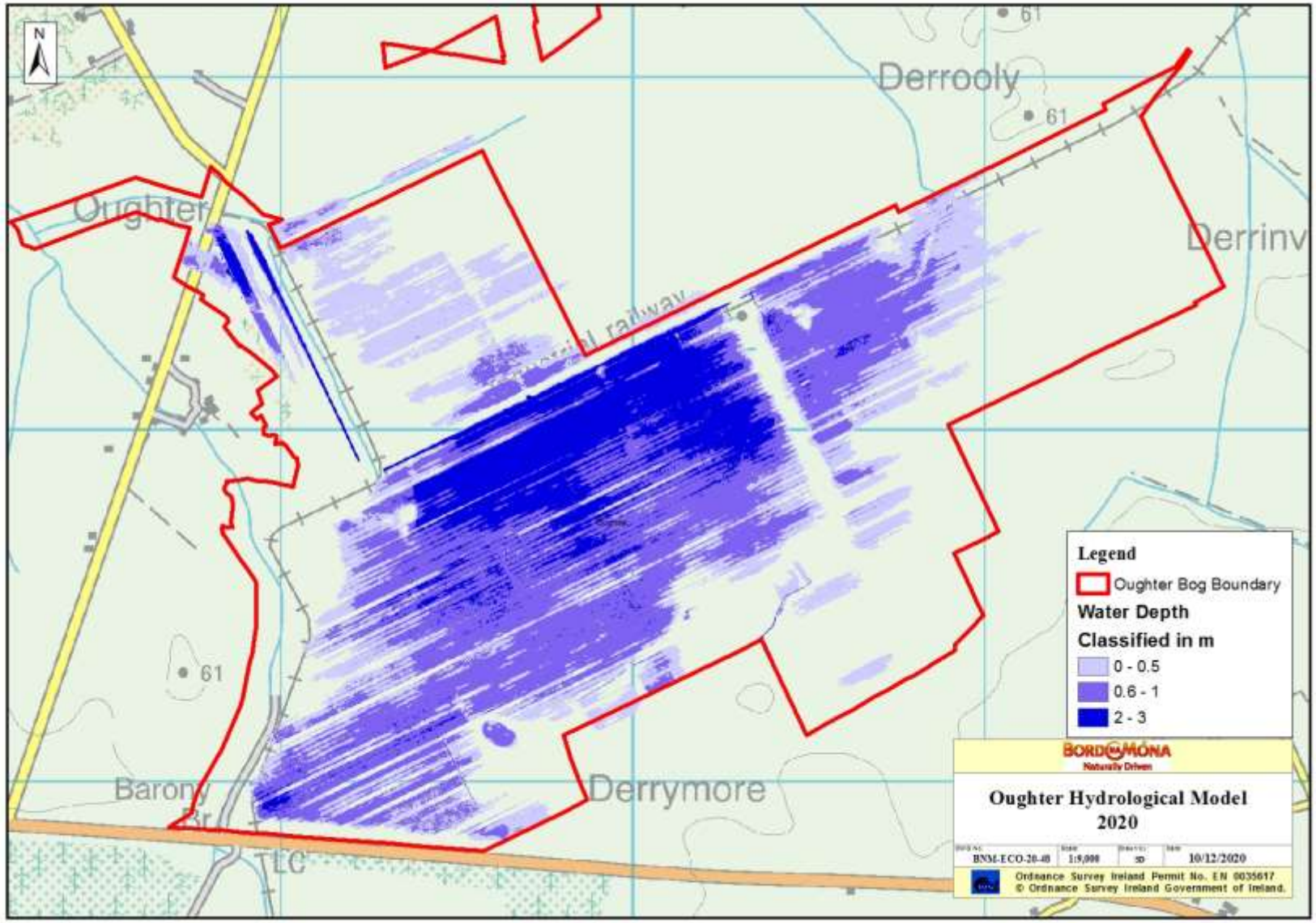

Figure 8.4. Hydrological modelling for Oughter Bog showing range of expected water depths based on current topography and key flow-paths. The model shows that the main area south of the railway has significant potential for re-wetting. Water levels can be managed by outfall pipes at appropriate levels.

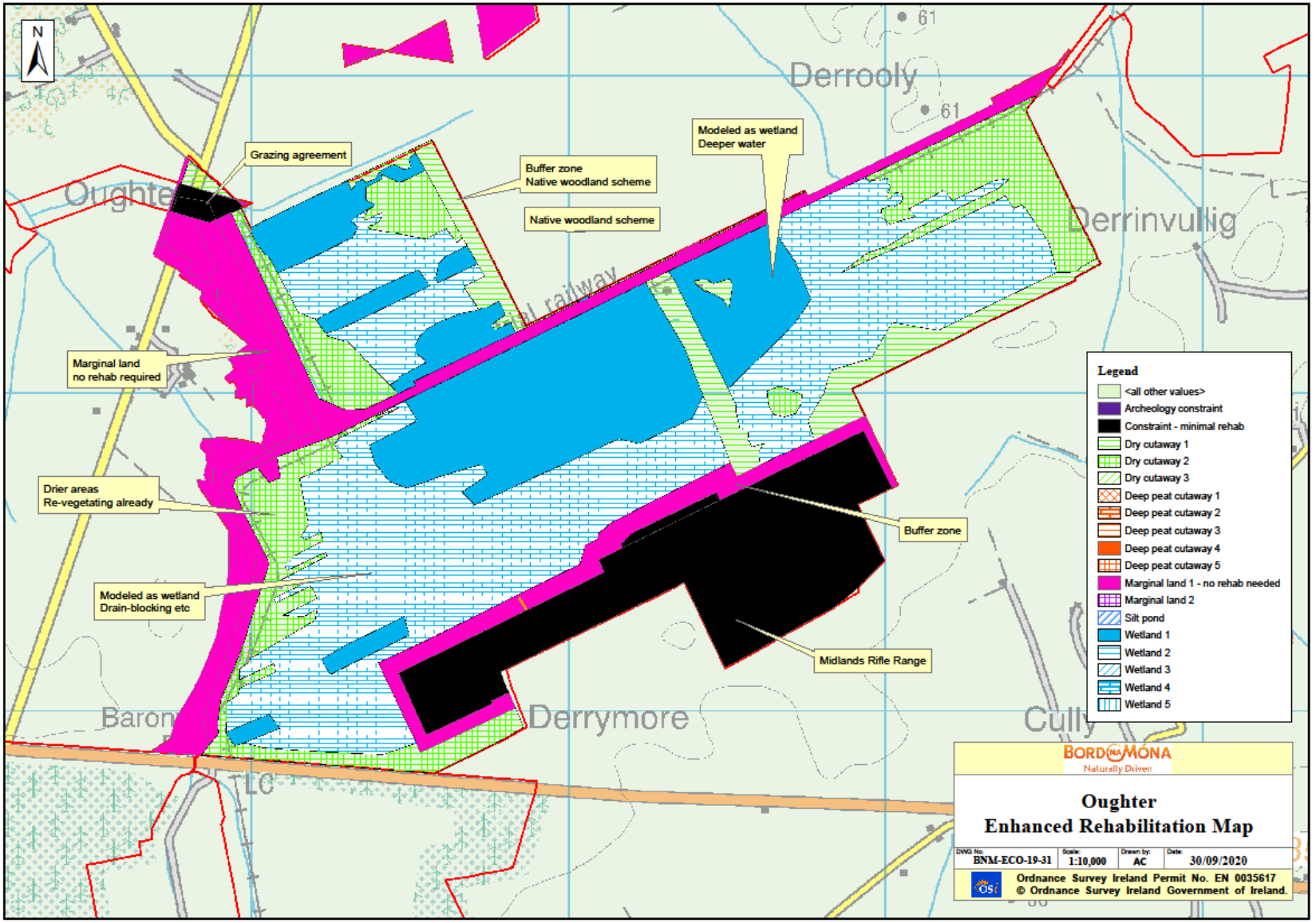

Figure 8.5. Enhanced Rehabilitation Plan *Note that the types of rehab and areas of rehab may change in response to stakeholder consultation and* refinement of the enhanced rehabilitation measures.

8.5 Budget and costing

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

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

Bord na Móna maintains a provision on its balance sheet to pay for the future costs of **standard** rehabilitation and decommissioning when industrial peat extraction ceases. This is updated every year - for more information see the Bord na Móna Annual Report (Bord na Móna 2020). Bord na Móna is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

At this time, a 'standard' rehabilitation provision (sufficient to discharge the requirement of Condition 10 in the licence) has been be allocated to the site based on the area of deep peat habitats, wetland habitats, shallow cutaway areas, drier areas, and regenerating bog communities across high bog (See Appendix I).

9. AFTERCARE AND MAINTENANCE

9.1 Programme for monitoring, aftercare and maintenance

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

- There will be **initial quarterly monitoring assessments** of the site to determine the general status of the site, the condition of the silt-ponds, assess the condition of the rehabilitation work, monitoring of any potential impacts on neighbours land, general land security, boundary management, dumping and littering.
- The number of these site visits will reduce after 2 years to bi-annually and then after 5 years to annual visits.
- These monitoring visits will also consider any further requirements for practical rehabilitation measures.
- The **baseline condition of the site will be established** post-rehabilitation implementation by using an aerial survey to take an up to date aerial photo, when rehabilitation is completed. The extent of bare peat will be assessed using this baseline data, and habitat maps will be updated.
- **Water quality monitoring** at the bog will be established. This will start in advance of the proposed rehabilitation. The main objective of this water quality monitoring will be to establish a baseline and then monitor the impact of peatland rehabilitation on water quality from the bog.
- In order to assist in monitoring surface water quality from this bog, it is planned to increase the existing licence monitoring requirements to sampling for the same parameters to every month during the scheduled activities and for a period up to 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.
- Water quality monitoring will aim to include up to 70% of a bogs drainage catchments. With regard to this bog.
- 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 three-year cycle. The original (licence) requirement was for a quarterly sampling regime but this has been increased to a monthly regime to appropriately track the changing water chemistry that will occur as part of this rehabilitation. In addition, DOC will be included as a parameter to try and identify any changes in carbon in the surface water.
- If, after two years, key targets for successful rehabilitation are being achieved, then the water quality monitoring programme will be reviewed, with consideration of potential ongoing scientific research on site. The water quality data, the aerial surveys and the habitat mapping will be collated and will be submitted to the EPA as part of the final validation report.
- If, after two years, key targets for successful rehabilitation have **not** been achieved, then the rehabilitation measures and status of the site will be evaluated and enhanced, where needed. This evaluation may indicate no requirement for additional enhancement of rehabilitation measures, but may

demonstrate that more time is required before key targets for successful rehabilitation has been achieved. Monitoring of water quality will then also continue for another period to be defined.

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

Additional monitoring measures are also proposed to monitor ecosystem service benefits that have been derived by rehabilitation. These proposed monitoring measures will be funded by the 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 potential GHG emissions can be estimated from the site, as the site continues along its trajectory towards a naturally functioning peatland ecosystem.
- It is proposed to monitor the improvement of some biodiversity ecosystem services. To be defined in relation to monitoring of the overall Scheme.

9.2 Rehabilitation plan validation and licence surrender – report as required under condition 10/4

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

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

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

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

In the event that the 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 interventions/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:

- EPA IPC Licence - Ref. P0500-01. As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. Oughter bog is part of the Boora Bog group.
- A key objective of rehabilitation, as defined by this licence, is **environmental stabilisation** of the bog.
- The area of former industrial peat production at Oughter Bog as defined by Figure 3.1. Industrial peat production has now permanently ceased at Oughter Bog.
- Minimising potential impacts on neighbouring land. Some boundary drains around Oughter Bog will be left unblocked as blocking boundary drains could affect adjacent land.
- Land-use. Biodiversity and ecosystem services have been identified as the primary land-use by Bord na Móna.

Rehabilitation goals and outcomes

The key rehabilitation goal and outcome for Oughter Bog is environmental stabilisation of the site via re-wetting. This is defined as:

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

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

Criteria for successful rehabilitation:

- Rewetting of residual peat in the former area of industrial peat production to offset potential silt run off and to encourage development of vegetation cover via natural colonisation, and reducing the area of bare exposed peat.

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

Rehabilitation indicators

- Demonstrating the delivery of the rehabilitation through site visits and through updated aerial photography (indicating presence of peat barriers, elevated water levels and re-wetting).
- Stabilising potential emissions from the site (silt run-off). The target will be developing a stable or downward trajectory of water quality indicators (suspended solids and ammonia).

Rehabilitation measures: (see Figure Ap-1)

- Blocking field drains in the former industrial production area using a dozer to create regular peat barriers (three barriers per 100 m) along each field drain.
- Re-alignment of piped drainage.
- Realignment of gravity outfalls (where needed).
- Fertiliser treatment of high fields and headlands (typically slow to naturally re-colonise) to encourage natural colonisation, if needed. (It is noted that the application of fertiliser may need additional assessment and approval as per the IPC Licence).
- No measures are planned for the surrounding marginal peatland habitats.
- Silt ponds will continue to be maintained during the rehabilitation and decommissioning.
- Evaluate success of short-term rehabilitation measures and enhance where necessary.
- Decommissioning of silt-ponds will be assessed and carried out, where required.

Timeframe:

- 2021. 1st phase of rehabilitation. Field drain blocking with dozer/excavator.
- 2021. 2nd phase. Further realignment of piped drainage and other re-wetting measures dependent on success of 1st phase re-wetting, as determined by ongoing monitoring of water levels and re-vegetation.
- Other enhancement measures such as fertiliser treatment will be carried out, if needed. These will be determined by ongoing monitoring.
- 2023-2024. Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- 2023-2024. Decommission silt-ponds, if necessary.

Budget and Costing

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

Table AP-1. Rehabilitation measures and target area.

Type	Code	Description	Area (Ha)
Dry Cutaway	DCT1	Limited drain blocking, Blocking outfalls and managing water levels with overflow pipes	63.7
Wetland	WLT1	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes	186.0
Marginal land	MLT1	No work required	59.7
Silt ponds		Silt-ponds	
Total			**357.9**

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 any additional rehabilitation.
- Water quality monitoring will be established.
- Monitoring results will be maintained, trended and reported on each year as part of the requirement to report on Condition 10.1 of the IPC Licence on Bog Rehabilitation in the Annual Environmental Report, which will be available in April each year at www.epa.ie.
- The parameters to be included (as per condition 6.2 of the IPC Licence) include monthly monitoring for pH, Flow, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD.
- This sampling regime on a selected number of silt ponds will be carried out over a two-year cycle. The original (licence) requirement was for a quarterly sampling regime.
- Where other uses are proposed for the site, these will be assessed by Bord na Móna in consultation with interested parties. Other after-uses can be proposed for licensed areas and must go through the 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.
- The water quality monitoring demonstrates that water quality of discharge is stabilising or improving.
- The site has been environmentally stabilised.

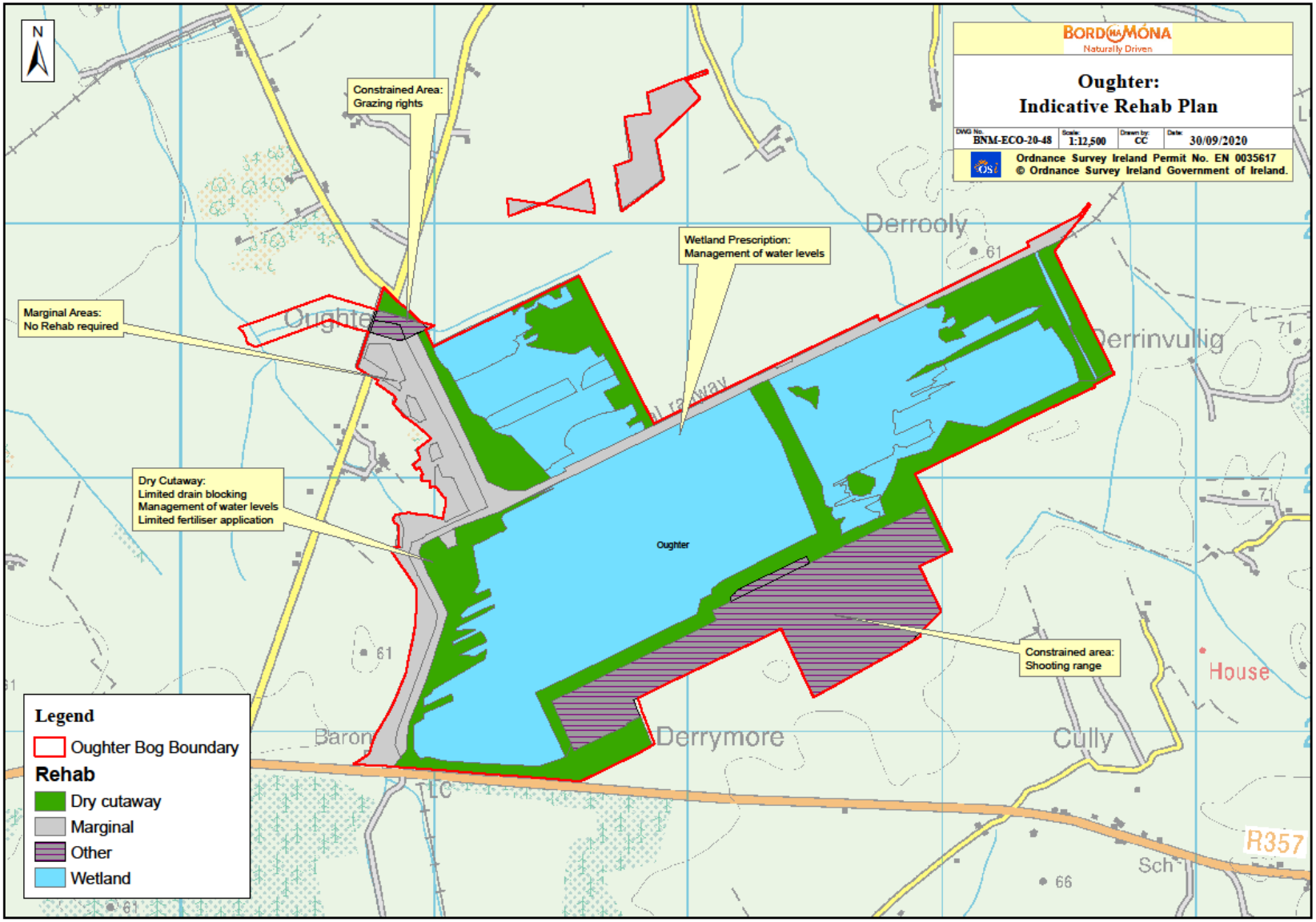


Figure Ap-1. Indicative standard rehabilitation plan for Oughter Bog.

APPENDIX II: BOG GROUP CONTEXT

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

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

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

The bogs in The Boora Bog Group have been used in the past to supply milled peat for the horticultural market, local power stations (Ferbane, Shannonbridge and West Offaly Power) and Derrinlough Briquette factory.

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

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

Bog Name	Area (ha)	Indicative Peat Production Status and land-use
Killaun	534	Killaun is currently a horticultural peat bog and industrial peat production is expected to continue in the future, depending on future milled peat resource requirements (subject to current substitute consent applications and future planning applications for industrial peat production).
Boora	2465	Milled peat production has ceased in Boora East. Milled peat production is anticipated to continue in part of Boora West for the foreseeable future, depending on future milled peat resource requirements (subject to current substitute consent applications and future planning applications for industrial peat production). The majority of Boora bog has already been rehabilitated. A significant area of cutaway bog has been re-wetted, developed as conifer forestry (Coillte) and developed as farmland (1980s). This site now forms the core of Lough Boora Discovery Park.
Pollagh/Cornalaur	281	Industrial peat production ceased at Pollagh Bog in 2019. There is some Emerging naturally colonising cutaway. Cornalaur was never developed or in peat extraction.
Noggusboy	982	Industrial peat production ceased at Noggusboy Bog West in 2019. Part of the site was developed for conifer forestry by Coillte. Part of the site was developed as Cloghan Lake, as part of Lough Boora Discovery Park, in 1999. Industrial peat production is expected to continue at Noggusboy East in the future, depending on future milled peat resource requirements (subject to

		current substitute consent applications and future planning applications for industrial peat production). There is some emerging naturally colonising cutaway.
Drinagh	1355	Industrial peat production ceased at Drinagh Bog in 2019. Drinagh East is cutaway and has been extensively rehabilitated as wetland. This part of the site has extensive development of naturally functioning peatland habitats. Some Coillte conifer forestry is also present. There is some emerging naturally colonising cutaway in Drinagh West.
Killaranny	273	Milled peat production is anticipated to continue at Kilaranny into the future, depending on future peat resource requirements, (subject to current substitute consent applications and future planning applications for industrial peat production). A portion of the site is leased by NPWS since 2011 as a re-location area for turf cutters from nearby Clara Bog SAC.
Oughter	484	Oughter Bog has not been in peat production since 2012. Industrial peat extraction has now ceased at Oughter Bog. The site has naturally been re-wetting and there is already significant natural colonisation.
Galros	194	Milled peat production is anticipated to continue at Galros Bog for the foreseeable future, depending on future milled peat resource requirements, (subject to current substitute consent applications and future planning applications for industrial peat production). Some naturally emerging cutaway habitats are developing in part of the site.
Clongawny More	1002	Industrial peat production ceased at Clongawny More Bog in 2019. Part of the site rehabilitated, as part of Lough Boora Discovery Park, in 1999. Some Coillte conifer forestry is also present. The site has naturally been re-wetting and there is already significant natural colonisation. Bord na Móna currently have submitted an application for renewable energy development on this bog.
Derrinboy	308	Milled peat production is anticipated to continue at Derrinboy Bog for the foreseeable future, depending on future milled peat resource requirements (subject to current substitute consent applications and future planning applications for industrial peat production). Derrinboy Bog supplies horticultural peat.
Moneitta	709	Milled peat production is anticipated to continue at Moneitta Bog for the foreseeable future, depending on future milled peat resource requirements (subject to current substitute consent applications and future planning applications for industrial peat production).
Boora_Lemanaghan_Rail_Link	8	Not applicable
Derries	371	Milled peat production has now ceased at the Derries Bog and the bog is considered cutaway. Wetland rehabilitation carried out over part of site in 1999. Amenity trackway development in 2015. Part of the Lough Boora Discovery Park. The site has now been extensively naturally colonised and is a mosaic of wetland and Birch woodland habitats.
Turraun	644	Milled peat production has now ceased at Turraun Bog and the bog is considered cutaway. Wetland rehabilitation carried out over part of area in 1999 as part of the Lough Boora Discovery Park. This section of the site has now been extensively naturally colonised and is a mosaic of wetland and Birch woodland habitats.
Derryclure	330	Milled peat production is anticipated to continue at Derryclure Bog for the foreseeable future, depending on future milled peat resource requirements (subject to current substitute consent applications and future planning

		applications for industrial peat production. Derryclure Bog supplies horticultural peat.
Lemanaghan	1300	Milled peat production is anticipated to continue at Lemanaghan for the foreseeable future, depending on future milled peat resource requirements. (subject to current substitute consent applications and future planning applications for industrial peat production There is some naturally emerging cutaway habitats.
Belair North	567	Milled peat production is anticipated to continue at Bellair North for the foreseeable future, depending on future peat resource requirements (subject to current substitute consent applications and future planning applications for industrial peat production. There are relatively deep peat resources still present in Bellair North.
Derrybrat	177	Milled peat production has now ceased at Derrybrat and the bog is considered cutaway. The site has been partially rehabilitated and there is already significant natural colonisation. Some Coillte conifer forestry has been developed on the site.
Belair South	229	Milled peat production has now ceased at Bellair South Bog and the bog is considered cutaway.
Total	**12,213**	

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:	**Oughter**	**Area (ha):**	357ha
Works Name:	Boora	**County:**	Offaly
Recorder(s):	MMC & DF	**Survey Date(s):**	16-17/09/2009/ 16/09/2020

Habitats present (in order of dominance)

Habitats present on the industrial cutaway include:

- Bare peat (BP), pioneer Poor Fen communities (pJeff, pEang, pTrig, pJbulb) and *Betula pubescens*-dominated scrub (eBir, cBir). There are fragmented and minor patches of Open water (OW), Reedbeds (pTyp, pPhrag), Dry Heath (dHeath), dry grassland (gCal,) & dry disturbed/pioneer communities (DisCF, DisWill) around the site. A small section adjacent to the shooting range has developed some Rich fen indicators (pCladium).
- There is some built land (BL3) with paths accessing works areas and a mobile phone mast along the eastern side. Rail-lines crossing the site can also be classified as BL3. A large drain (FW4) and associated riparian zone in a deep trench follows the railway and flows north. Spoil dug from this drain forms two ridges on either side of the trench and has not revegetated yet (ED3). This spoil is a mixture of glacial material, limestone and marl.
- Other fringe habitats around the margins of the bog include Scrub (*Betula pubescens* dominated and *Ulex europaeus* dominated), Birch woodland (WN7) and Cutover Bog (active and abandoned). There are also several drainage ditches around the margins of the site (FW4).

Description of site

Oughter Bog is located adjacent to the Blueball-Cloghan Road and the majority of the bog is still in active production. The bog is primarily divided into two main sections by a rail-line orientated NE-SW. Part of the bog formerly owned by BnM has been developed into a shooting range.

Southern section

The majority of the area south of the railway is in active production or is classified as production-related cutaway. A large part of this area, particularly the active fields, is bare peat. This area also contains some young pioneer Poor Fen vegetation (mainly pEang and pJeff) spreading from the drains. Large sections are re-vegetating rather quickly and there are also some patches of Birch-dominated scrub (eBir). There was some open water present but it was minor in extent and some of this habitat may be transient. Some small mounds and ridges contain dry grassland and disturbed vegetation communities (gCal & disCF). (Codes refer to BnM classification of pioneer vegetation of industrial cutaway areas).

The western boundary of the bog is marked by a small stream. This western margin contains a mosaic of habitats and is used for access and as a Works area. It is relatively quite disturbed and contains a range of habitats including Birch scrub (eBir) and Bramble developed on old spoil heaps, some patches of Bracken (dPter), some diverse wet grassland (pMol) and some dry grassland (gCal).

The south-east section contains a small area of cutover bog (PB4) and improved grassland (GA1) adjacent to the BnM boundary. This area is fenced off and managed as private land.

The oldest area out of production (classified as production-related on the land use map) is located adjacent to the east side of the shooting range. This area has almost completely re-vegetated and contains a diverse mosaic of vegetation communities including some indicators of Rich Fen (PF1). The main habitats are Birch scrub (eBir), pioneer Bottle Sedge -dominated vegetation (pRos), pioneer Bog Cotton-dominated vegetation (pEang), some

Soft Rush-dominated vegetation (pJeff) some Ling heather –dominated vegetation (dHeath) and a minor amount of open water (OW) associated with small pools that that developed along the drains in this section.

Northern Section

The majority of the area north of the rail-line has been classified as cutaway and a large part of it has been taken over by a private Native Woodland Scheme. The majority of the area within the Native Woodland Scheme contains pioneer Soft Rush-dominated vegetation, emergent Birch scrub and some closed Birch scrub. Some drier sections still contain Bare Peat, pioneer dry grassland communities or disturbed vegetation communities. A range of tree species were planted in 2008 including Scot's Pine, Birch and Alder. Some sections contain young trees that are now overwhelmed by Soft Rush. There is also some naturally regenerated emergent and closed Birch scrub developing in this area.

The area outside the Native Woodland Scheme contains similar habitats. Of note is a relatively large pool of open water that has developed adjacent to the railway and contains a small patch of Common Reed. Overall Common Reed was rare on this site.

A railway also branches off the main line and accesses the north-east corner of the site (N-S orientation). Fields on both sides are still in production and a large drain in a deep trench is also located adjacent to the railway.

Some Birch woodland (WN7) and Birch scrub (WS1) have developed along the western margin of this section and there is a small area of intact Raised bog (PB1) being encroached upon by these habitats.

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

None

Adjacent habitats and land-Use

Habitats and land-use around the site include cutover bog with active peat-cutting (PB4), the use of improved grassland (GA1) for grazing livestock and growing fodder, a rifle range on a section of built land and former production bog containing scrub and other habitats and some minor semi-natural habitats such as scrub and remnant patches of raised bog (PB1) and old cutover bog around the margins of the site that have developed a range of habitats including scrub (WS1) and some Birch woodland (WN7).

Watercourses (major water features on/off site)

A small stream is located along the west boundary of the site. This drains north and is part of the River Brosna catchment. A large drain flows though the northern half of the site through a deep trench and runs adjacent to the rail-line. This drain may have been a natural drainage features that was channelised and deepened during the development of the bog. This drain also connects to the stream flowing north. There is also a second drain flowing along part of the eastern boundary that connects to a second stream flowing north.

Fauna biodiversity

- Several birds were noted around the site. Wren (2) in scrub around site, Robin (4) in scrub, Meadow Pipit (5-10) using a variety of habitats on site, Mallard (2) in the deep drain, Snipe (4) in some of the wetter pioneer grassland, Hooded Crows (5-10) flying over site and roosting.
- Signs of Rabbits are widespread and common around the site.
- Signs of Hares also noted.
- Some signs of Deer activity (tracks) but not recent and relatively few.
- Pine Marten droppings noted in north-west section and tracks noted in south-east section.
- Signs of Badger activity in the Birch woodland along the north-western boundary.
- Fox droppings recorded at several locations.
- Frogs recorded at several locations on the site.
- One Painted Lady noted, associated with some of the dry grassland and scrub. One Speckled Wood noted in the Birch woodland along the western margin of the site.

Fungal biodiversity

Fungal species noted on the site included *Lactarius uvidus*, *Lycoperdon perlatum* and *Leccinum scabrum*.

HABITAT DESCRIPTIONS

(See Habitat Descriptions Document for detailed description of each vegetation community not described in this section.)

Habitats developed on industrial cutaway

Pioneer Poor Fen communities (pJeff)

This vegetation community is quite widespread around the site and appears in various stages of development.

This habitat is one of the most common vegetation types to initially colonise the bare peat fields. The initial community is quite open and may contain a significant portion of bare peat. Species present at the ends of fields are also typical of disturbed vegetation and include *Juncus effusus*, *Epilobium* spp., *Chamaerion angustifolium*, *Anthoxanthum odoratum*, *Leontodon* sp*., Cirsium vulgare, Cerastium fontanum, Polytrichum* sp., *Rubus fruticosus*, *Cirsium arvense*, *Pteridium aquilinum*, *Molinia caerulea*, *Tussilago farfara*, *Centaurea nigra* and *Dryopteris dilatata*. Some *Betula pubescens* and *Salix aurita* is found along the drains. The species composition varies with the underlying environmental conditions and species more typical of wetter conditions are found in other sections.

This vegetation type is more established in the production related area adjacent to the shooting range. The vegetation cover is higher and the species composition is similar to that recorded above, although there is a greater amount of young scrub species. Other species present in this area include *Triglochin palustris*, *Hypnum* sp., *Mentha aquatica*, *Lythrum salicaria, Eriophorum angustifolium*, *Achillea millefolium*, *Sonchus oleraceus*, *Juncus articulatus, Dactylis glomerata*, *Galium palustre*, *Holcus lanatus, Lotus corniculatis* and *Salix aurita*. Occasional *Pinus contorta* and *Picea sitchensis* seedlings and young saplings are present. There is also a greater amount of standing water in the drains and the extent of *Typha latifolia* is also greater in these drains. *Schoenoplectus lacustris* is also present in some of the drains but is minor in extent.

This habitat is more established in the Native Woodland Area and forms a mosaic with the eBir and pEang in this area. The pJeff is dominated by dense *Juncus effusus*. Other species present includes *Triglochin palustris, Dactylis glomerata, Juncus bulbosus, Rumex acetosa, Cirsium vulgare, Taraxacum sp., Phalaris arundinacea and Holcus lanatus.* The rushes are spread up and around the young *Pinus sylvestris*, *Betula pubescens* and *Alnus glutinosa* trees planted in this area and the trees do not seem to be healthy. There are some sections where dense thickets of *Rubus fruticosus* and *Chamaerion angustifolium* are developing. Some sections are still quite open with bare peat and the young saplings have not been overwhelmed by the vegetation. Overall it is relatively dry and there are no indicators of wetland complexes present such as *Phragmites australis* and *Typha latifolia*, although the latter species is present (but not common) in some of the drains. The drains mainly contain pJeff type vegetation.

Pioneer Poor Fen communities (pEang)

This community appears in mosaic with the pJeff in places and is quite extensive, dominating some large areas of inactive production fields. The vegetation is dominated by Eriophorum angustifolium and this species may form a mono-dominant sward in places. Other species present include *Triglochin palustris*, *Juncus articulatus*, *Hydrocotyle vulgaris*, *Mentha aquatica*, *Betula pubescens, Carex rostrata*, *Epilobium palustre*, and *Juncus bulbosus*.

This habitat is also associated with some standing water in some lower fields along the south-west boundary. It is forming a mosaic with pJeff and eBir in this area. These areas also contain *Utricularia* sp.

Pioneer Poor Fen communities (pRos)

This habitat is found in a production-related area north-east of the shooting range and in mosaic with pJeff, pEang, EBir, DHeath and some patches of Rich Fen. This area is quite diverse and the vegetation is well-established.

The pRos is typically dominated by *Carex rostrata* and also contains *C echinata, C. demissa*, *C. panicea, Eriophorum angustifolium*, *Mentha aquatica*, *Hydrocotyle vulgaris*, *Juncus articulatus, Anagallis tenella, Epilobium brunnescens* and *Filipendula ulmaria.* There may be some standing water within this vegetation type and small pools have also formed along the drains that are in the process of infilling. *Utricularia* sp. and *Chara* sp. were both found in some of

the shallow standing water in association with this vegetation type. Mosses associated with this vegetation type include *Calliergonella cuspidata*, *Fissidens adianthoides*, *Campylium stellatum* and *Drepanocladus* spp.

Pioneer Poor Fen communities (pPhrag, pTyph)

These habitats are not extensive on the site. Dense stands of *Phragmites australis* are quite rare with the only extensive area found north of the railway associated with the large open pool. This species is also spreading on the south side of the railway adjacent to this area. *Typha latifolia* is rarely extensive but it is much more widely distributed around the site.

There are also several small stands of *Schoenoplectus lacustris* in the Rich fen mosaic area.

Rich Fen mosaic area

This area is found in a production-related area north-east of the shooting range and is a mosaic of several habitats including pRos, pEang, pJeff, eBir and dHeath. This area is quite diverse and the vegetation is well-established in the wetter sections, although the drier fields may still have some sections dominated by bare peat. Some *Typha latifolia* is found in the drains and there is also some *Phragmites australis*, but its extent is very minor.

This area is of particular note due to the presence of several Rich Fen indicators in the area. These include small clumps of *Cladium mariscus* scattered through the area . Some the shallow open water frequently has dense *Chara* sp. and there are also signs of tufa precipitating out of the water in places. This area is likely to be fed by a series of springs. There are also indications of springs in the area such as iron flushes in some of the bare peat. *Sphagnum* sp. was recorded in this area in a vegetating zone along the edge of a drain . A small patch with *Schoenus nigricans* was also found close to the outer boundary of this area. This species was only found in one location in this area. Mosses associated with this vegetation type include *Calliergonella cuspidata*, *Fissidens adianthoides*, *Campylium stellatum* and *Drepanocladus* spp.

Open Water complexes (OW, pTyp, pPhrag)

Overall the amount of open water on this site is quite low. There are several small shallow pools north of the railway in the Native Woodland Scheme that are likely to be temporary, as there is no typical wetland vegetation associated with them. There are several other small pools in the production area south of the railway. Some of these may be temporary as there is no extensive wetland vegetation, although this may also be due to the limited amount of time since the fields were inactive. These pools are associated with pEang and pJeff vegetation.

The largest pool is found north of the railway. This large pool ahs some fringing Reedbeds with patches of *Typha latifolia* but the most common emergent habitat is pJeff. There is a large stand of *Phragmites australis* at the western end of this pool and this is the largest stand of this species on the site.

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

Small patches of emergent scrub dominated by *Salix cinerea* appear on some of the small mineral mounds within the production area. This scrub is quite open and also includes some *Betula pubescens*, *Rubus fruticosus* and *Calluna vulgaris.* The ground vegetation of these areas is typical of disturbed areas and this scrub is emerging from vegetation dominated by *Tussilago farfara* or *Campylopus introflexus* (DisCF).

Emergent scrub dominated by *Betula pubescens* and *Salix aurita* is a common part of most areas with established vegetation. This scrub has generally developed from pJeff or pEang vegetation and contains many of the ground cover species associated with these habitats.

The open scrub (oBir) is denser and dominated by *Betula pubescens*. Other species present include *Salix* sp. The ground cover contains many of the species associated with pEang and pJeff. This habitat is found adjacent to the shooting range and is found in mosaic with eBir and pJeff. The max height of this scrub is 8 m.

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

This habitat is present on the site but is only found in very small portions along the boundaries and on drier, more elevated areas. It was noted around the margin of the shooting range. *Calluna vulgaris* is the main colonising species, although it may be quite sparse in places. Other species present include *Campylopus introflexus*, *Rubus fruticosus* and *Chamaerion angustifolium*.

The dHeath within the Rich fen mosaic area is relatively sparse and dominated by colonising *Calluna vulgaris* along a ridge with a N-S orientation. Other species present include young *Pinus* spp. trees and saplings, *Salix aurita*, *Betula pubescens, Potentilla erecta, Deschampsia flexuosa, Carex panicea, Carex demissa, Erica tetralix, Succisa pratensis, Salix repens, Molinia caerulea, Campylopus introflexus*, Dryopteris dilatata, *Anthoxanthum odoratum*,

Hypericum sp., *Mentha aquatica* and *Epilobium sp.* Small patches of this habitat extend along some of the drier fields. Mosses associated with this area include *Hylocomium splendens*, *Polytrichum* sp. and *Hypnum* sp.

This community is also found associated with the cutover area along the south-east boundary of the site. Other species found in this area include *Euphrasia officinalis* agg., *Rumex acetosa*, *Carex demissa* and *Rosa canina*.

Dry grassland communities (gCal)

There are small patches of this vegetation community found around the margins of the site on drier ground that has been left undisturbed. Some of this grassland has developed along the bank of the railway and is quite species-rich. Parts are dominated by *Centaurea nigra* and *Filipendula ulmaria*. Other species present include *Lotus corniculatis*, *Hypericum pulchrum*, *Molinia caerulea*, *Holcus lanatus*, *Plantago lanceolata*, *Festuca rubra*, *Carex flacca*, *Achillea millefolium*, *Anthoxanthum odoratum*, *Rubus fruticosus*, *Leucanthemum vulgare*, *Mentha aquatica*, *Daucus carota*, *Sonchus oleraceus*, *Agrostis* sp., *Fragaria vesca*, *Dactylis glomerata*, *Hypericum tetrapterum*, *Potentilla erecta*, *Potentilla anserina*, *Pteridium aquilinum* and *Succisa pratensis*.

Some of this grassland is quite minor in extent and only covers a band about 10 m wide. Some *Ulex europaeus* bushes are spreading into the grassland.

Some patches of gCall on mounds close to the shooting range also contain Carlina acaulis, Senecio jacobaea, *Betula pubescens*, *Epilobium* sp., *Polygala serpyllifolia*, *Cirsium arvense*, *C. vulgare*, *Equisetum* sp. and *Calluna vulgaris.* This habitat forms a mosaic with DisCF and pCamp in this area.

Dry Disturbed/Pioneer communities (DisCF, DisWill)

Dry disturbed vegetation (DisCF) is found frequently on the small mineral mounds of sub-soil made up of glacial deposits that are found around the production area. It is frequently associated with emergent scrub (eBir) and dry grassland (gCal), which also are found on these mounds. This vegetation is dominated by *Tussilago farfara* and also contains *Rubus fruticosus*, *Molinia caerulea*, *Potentilla anserina*, *Daucus carota*, *Taraxacum* sp., *Agrostis* sp., *Carex flacca*, *Bellis perennis*, *Briza media*, *Equisetum* sp., *Dactylorhiza* sp., *Cirsium arvense*, *Cirsium palustre*, *Salix aurita*, *Leucanthemum vulgare*, *Hypochoeris radicata* and *Centaurium erythraea.*

Wet grassland communities (gMol)

Some species-rich grassland dominated by *Molinia caerulea* is found around the fringes of the production area, on drier sections and at the south-west corner. This grassland contains several other species including *Achillea millefolium*, *Triglochin maritimum*, *Centaurea nigra*, *Briza media*, *Rumex crispus*, *Vicia cracca*, *Leucanthemum vulgare*, *Cirsium palustre*, *Daucus carota*, *Plantago lanceolata*, *Filipendula ulmaria*, *Medicago lupulina*, *Hieracium pilosella*, *Carex panicea*, *Lotus corniculatis*, *Agrostis* sp., *Lythrum salicaria*, *Dactylorhiza* sp., *Carex demissa*, *Succisa pratensis*, *Tussilago farfara* and *Ulex europaeus*.

Some of this grassland is disturbed by production activity. Some of the grassland is transitional to disturbed vegetation (DisCF) in places where there has been some recent disturbance and vegetation re-colonisation.

Production areas (BP)

The majority of this bog is in active production. There are extensive fields of bare peat around the site that have been recently milled and are divided by drains devoid of vegetation.

Some vegetation is spreading into other fields where there has been less recent activity although vegetation re-colonisation is at various stages. The vegetation is most typically pJeff and it is spreading from the drains into the fields. The drains in these sections are generally completely vegetated and also contain some emergent *Betula pubescens*-dominated scrub (eBir).

There is some encroachment of vegetation from the sides of the drains including pJeff pEang, pTrig, and eBir.

Drain (FW4) + riparian zone

A large drain is found in a deep trench in the northern part of the site. This trench runs along-side the railway. The drain links to the small stream flowing north along the edge of the bog. This drain may have been a natural drainage feature that was channelized during the development of the bog, although there is no drainage feature mapped on the old OSI 6 inch map along this route. Parts of the drain take on the appearance of a stream and the channel bed is colonised by species such as *Agrostis stolonifera*, *Apium nodiflorum* and other unidentified aquatic species. The banks of the trench are quite steep and are re-vegetating, and a significant portion is still exposed sub-soil, with the most common plant community being DisCF. Some *Betula pubescens*, *Ulex europaeus* and *Salix aurita* scrub is

appearing along these banks, as are patches of *Pteridium aquilinum*. There is a line of spoil dug from the trench on both sides of the trench that is also revegetating.

Other Habitats (around the fringe of the bog)

Birch woodland (WN7)

This habitat is found on some intact high bog along the western boundary. The woodland is dominated by a *Betula pubescens* canopy, which varies in height and development according to age. The woodland transitions to dense scrub dominated by young trees in places and is spreading into raised bog and cutover bog (PB4) dominated by *Calluna vulgaris*. *Sorbus aucuparia* is also present. The shrub layer is poorly developed with some patches of *Rubus fruticosus* present. The ground cover is dominated by *Molinia caerulea* and leaf litter. Other species present in the ground cover include *Calluna vulgaris*, *Phragmites australis*, *Narthecium ossifragum*, *Empetrum nigrum*, *Hypericum tetrapterum*, Eriophorum vaginatum, *Polytrichum commune*, *Hylocomium splendens, Holcus lanatus*, *Pteridium aquilinum* and *Hedera helix.* Cattle are grazing this wood.

Raised Bog (PB1)

A very small patch of this habitat is found associated with the bog woodland along the western boundary of the site. This area is intact and has not been cut for peat. It is surrounded by Birch woodland and *Betula pubescens* scrub. The vegetation is typical of sub-marginal raised bog and species present include *Calluna vulgaris*, *Erica tetralix*, *Eriophorum vaginatum*, *E. angustifolium*, *Trichophorum cespitosum*, *Cladonia portentosa*, *Carex panicea* and *Rhynchospora alba*. There are some dried pools present and some hummocks of *Sphagnum capillifolium* and *S. papillosum*. Other moss species present included *Hypnum* sp., and *Polytrichum* sp.

Cutover Bog (PB4)

This habitat is found in a number of locations around the site. Some of it (land within the BnM boundary is fenced off and is managed as private land).

A small pocket is located along the western boundary (north of the railway). This area has been cut privately by sausage machines in the past and is now re-vegetating. The bog is dominated by *Calluna vulgaris* with extensive *Campylopus introflexus* and bare peat cover. Other species present include *Molinia caerulea*, *Eriophorum angustifolium*, *E. vaginatum*, *Betula pubescens* and *Erica tetralix*. This section of bog is quite species poor and dried out. There are also signs of cattle grazing in this area.

Cutover bog found adjacent to the shooting range is somewhat different in species composition and also contains *Succisa pratensis*, *Rubus fruticosus*, *Chamaerion angustifolium*, *Anthoxanthum odoratum*, *Hypericum pulchrum*, *Lotus corniculatis*, *Pedicularis sylvatica*, *Filipendula ulmaria*, *Salix aurita*, *Galium saxatile*, *Viola* sp., *Agrostis* sp., *Tussilago farfara*, *Holcus lanatus, Plantago lanceolata*, *Hypochoeris radicata* and *Centaurea nigra*. There are some thickets of *Rubus fruticosus* and *Betula pubescens* developing in this area. This area is a hotspot for *Succisa pratensis*.

This habitat is also found along the south-east boundary of the site. There are a range of vegetation types in this area on the cutover, ranging from active peat-cutting on the surface, active face-back cutting with associated standing water in drains, abandoned cut sections now re-vegetating, some gMol type grassland, some dHeath dominated by *Calluna vulgaris*, and some typical emergent scrub with *Chamaerion angustifolium*, *Pteridium aquilinum*, *Rubus fruticosus*, *Ulex europaeus* and *Betula pubescens.* There is some dumping in this area.

Improved grassland (GA1)

This habitat is found within the BnM boundary along the south-east boundary of the site. It is managed as private land and adjacent fields (outside the boundary) have also been reclaimed. These fields were used for grazing cattle and producing fodder (hay).

Scrub (WS1)

This habitat appears along the fringes of the production area, mainly along the boundaries. Several different communities are present.

Part of the western boundary is marked by a band of dense *Ulex europaeus*. This *Ulex* dominated scrub has developed on some un-disturbed high bog that was left uncut and also on some ridges of spoil that were piled up in the past. Other species present include *Salix cinerea*, *Salix aurita*, *Alnus glutinosa*, *Rubus fruticosus*, *Pteridium aquilinum*, *Crataegus monogyna* and *Betula pubescens*. This habitat forms a mosaic with Dense Bracken (HD1) along parts of the western boundary.

Stream (FW2)

A stream marks part of the western boundary of the site. This stream is part of the River Brosna catchment and flows north. It is found in a deep trench adjacent to the track to the mobile phone mast and the banks and riparian zone are somewhat disturbed from the recent development of this track. . Semi-aquatic species found along the stream channel include *Typha latifolia*, *Cirsium palustre*, *Mentha aquatica*, *Agrostis stolonifera*, *Nasturtium officinale, Apium nodiflorum, Epilobium hirsutum*, Lolium perenne and *Filipendula ulmaria.* The eastern bank is quite disturbed and is revegetating, while the western bank is vegetated with *Ulex*-dominated scrub.

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 measures 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, work will be halted.
- Rehabilitation 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.
- Rehabilitation and decommissioning will be carried out in accordance with 'best practice' (Currently being updated). In order to ensure compliance and implementation of 'best practice', these measures will be communicated to relevant Bord na Móna staff and updated as required.

APPENDIX V: BIOSECURITY

No invasive species have been recorded at Oughter Bog.

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

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

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

The biosecurity measures outlined above are in line with best practice guidelines issued by the National Roads Authority (NRA, 2010) – The Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads and broadly based on the Environment Agency's (2013) – The Knotweed Code of Practice: Managing Japanese Knotweed on Development Sites (Version 3, amended in 2013, accessed on the Environment Agency's website on the 11th of July 2016).

In addition to the above, Best Practise measures around the prevention and spread of Crayfish plague[4] and Zebra Mussel will be adhered with throughout all rehabilitation measures and activities.

[4] https://www.biodiversityireland.ie/projects/invasive-species/crayfish-plague/

APPENDIX VI: POLICY AND REGULATORY FRAMEWORK

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

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

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

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

1 EPA IPC Licence

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Boora bog group (Ref. PO-500 SB). As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. The bog is part of the Boora 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, under the proposed Scheme, and supported by the Climate Action Fund 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 additional costs associated with the additional and enhanced rehabilitation, i.e., those activities which go beyond the existing decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support under the proposed Scheme.

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

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**.

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.

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.

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

11 National Archaeology Code of Practise

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

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

- BNM must ensure that any monuments or archaeological objects discovered during peat extraction are protected in an appropriate manner by following the Archaeological Protection Procedures.
- BNM must ensure that any newly discovered monuments on Bord na Móna lands are reported in a timely manner to the National Monuments Service of the Department of Arts, Heritage and the Gaeltacht.
- BNM must ensure that any archaeological objects discovered on Bord na Móna lands are reported immediately to the Duty Officer of the National Museum of Ireland.

Bord na Móna will 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 has been carried out for the proposed rehabilitation at this site (Appendix X). The recommendations of this assessment have been 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 Móna s responses can be found in the Bord na Móna Biodiversity Action Plan (Bord na Móna 2016). Both policy documents highlight targets such as reducing pressure on biodiversity, promoting sustainability, habitat restoration and benefits of ecosystem services.

One example of a key CBD target is:

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

The EUs headline target for progress by 2020 is to:

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

The Pollagh 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	Oughter 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	Decommission and Removal of Porto-cabin tea centre and materials store
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.

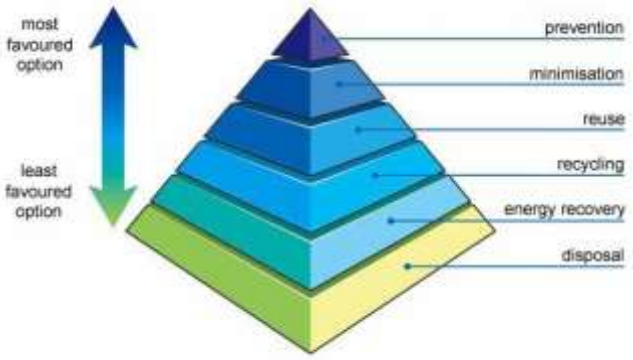
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

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

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

APPENDIX VIII. ENHANCED REHABILITATION MEASURES AND TARGET AREA.

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

Type	Code	Description	Area (Ha)
Deep peat cutover bog	DPT1	Regular drain blocking (3/100 m) + blocking outfalls and managing water levels with overflow pipes	
	DPT2	More intensive drain blocking (max 7/100 m) + blocking outfalls and managing overflows	
	DPT3	More intensive drain blocking (max 7/100 m), + field reprofiling + blocking outfalls and managing overflows	
	DPT4	Berms and field re-profiling (45m x 60m cell) + blocking outfalls and managing overflows + drainage channels for excess water + *Sphagnum* inoculation	
	DPT5	Cut and Fill cell bunding (30m x 30m cell) + blocking outfalls and managing overflows + drainage channels for excess water + *Sphagnum* inoculation	
Dry cutaway	DCT1	Blocking outfalls and managing water levels with overflow pipes	18.8
	DCT2	Regular drain blocking (3/100 m) + blocking outfalls and managing water levels with overflow pipes + targeted fertiliser treatment	44.9
	DCT3	More intensive drain blocking (7/100 m) + blocking outfalls and managing overflows + targeted fertiliser treatment	
Wetland cutaway	WLT1	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes	65.5
	WLT2	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes + Targeted blocking of outfalls within a site	
	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	
	WLT4	More intensive drain blocking (7/100 m), + blocking outfalls and managing overflows + transplanting Reeds and other rhizomes	120.5
	WLT5	More intensive drain blocking (7/100 m), + field reprofiling + blocking outfalls and managing overflows + transplanting Reeds and other rhizomes	
Marginal land	MLT1	No work required	59.7
	MLT2	More intensive drain blocking (7/100 m)	
	MLT3	More intensive drain blocking (7/100 m) + blocking outfalls and managing overflows with a controlled weir outfall + boundary berm	
Other		Silt-ponds	
			48.5
Total			357.9

APPENDIX IX. GLOSSARY

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

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

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

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

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

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

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

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

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

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

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

APPENDIX X. ARCHAEOLOGY

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

Role of the Archaeological Liaison Officer

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

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

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

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

Code of Practice

22

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 Decommissioning and Rehabilitation at Oughter Bog, Co. Offaly

Report For

Bord Na Móna Energy Ltd.

Author

Dr. Charles Mount

Bord Na Móna Project Archaeologist

Introduction

This archaeological impact assessment report was prepared by Dr. Charles Mount for Bord na Móna Energy Ltd. It represents the results of a desk-based assessment of the impact of proposed bog rehabilitation on c.358 hectares at Oughter Bog, Co. Offaly on the known archaeological heritage of the bog. The proposed rehabilitation actions will be a combination of measures to re-wet peat as outlined in the draft Methodology Paper (EDRRS). These enhanced measures for Oughter Bog will include:

- Re-wetting residual peat areas on the bog using berms and field re-profiling. This 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.
- In some areas, a cut-and-fill cell bunding technique is proposed. The cut and fill cell bunding approach aims to create 'saucers' or flat bunded areas (cells) on peat with berms to hold shallow water at appropriate levels.
- Re-wetting some areas of the bog through regular field drain blocking using a dozer/excavator to create three peat barriers every 100 m along each field drain.
- Re-alignment of piped drainage.
- Blocking drains in targeted existing pioneering vegetation mosaics, to accelerate re-wetting, and/or manage water levels to the correct height to accelerate the current trajectory towards Reed swamp and fen, using a dozer/excavator.
- Targeted fertiliser applications to accelerate vegetation establishment on headlands and high fields. (It is noted that the application of fertiliser may need additional assessment and approval as per the IPC Licence).
- 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 Oughter 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).
- Seedling of vegetation is not required at this site as natural colonisation and the development of pioneer habitats is already significantly progressed.

Oughter Bog is located c. 4km northwest of Blueball, Co. Offaly. The R357 road runs along the southern extent of the bog. The bog occupies the townlands of Derrycooly, Derryooly, Derrinvullig, Oughter, Derrymore and Cully on OS 6 inch sheets Offaly 15, 16, 23 and 24.

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 Oughter Bog. The extent of the rehabilitation is indicated in Fig. 1. This area was examined using information from the:

- The Bord na Móna 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 Oughter Bog before that date. This review established that there are no RMPs situated in the proposed rehabilitation area or vicinity (see Fig. 1). The closest RMP to the rehabilitation area OF024-002---- the present location of an Inscribed stone in Derrymore townland, is located more than c.0.9km south of the rehabilitation area.

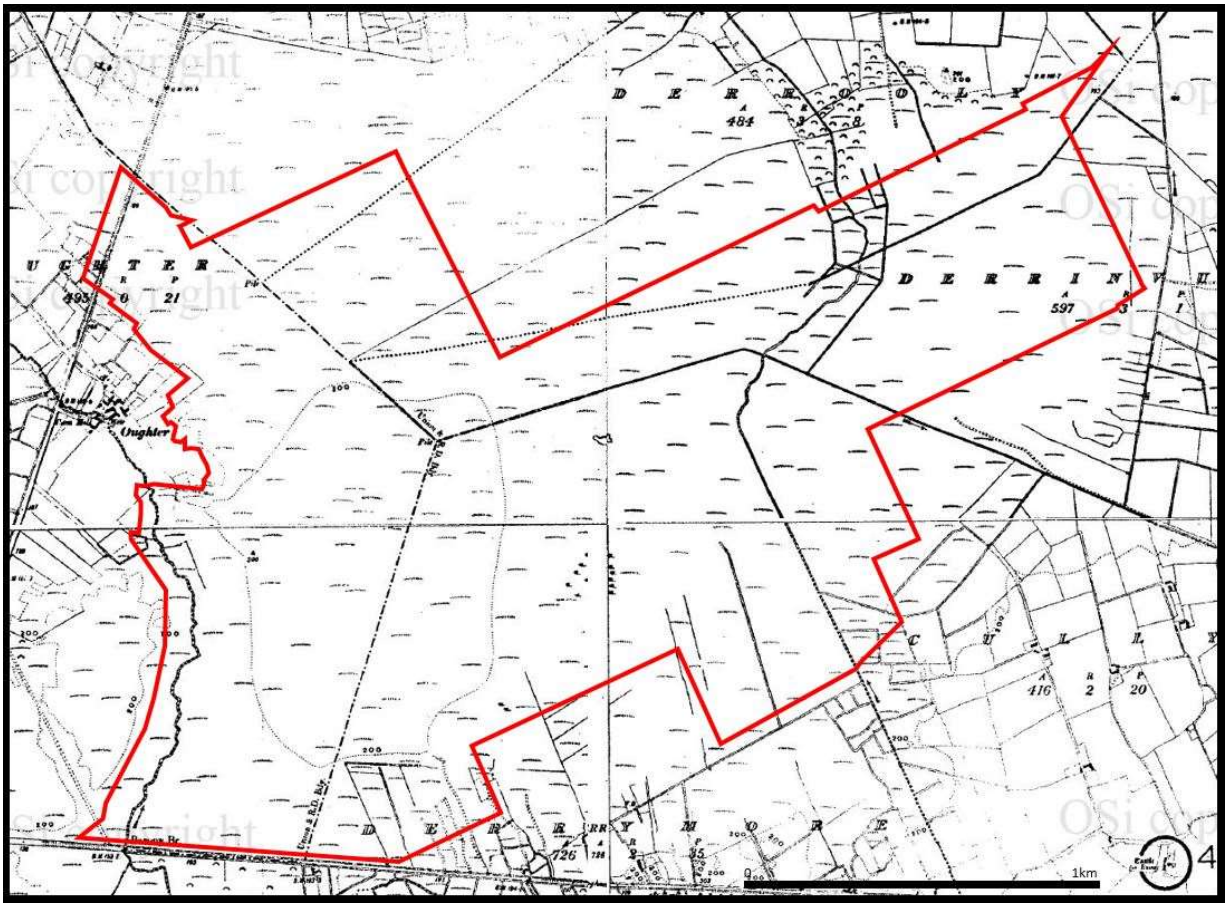


Fig. 1. Oughter Bog, Co. Offaly, detail of the Record of Monuments and Places map sheets No. 15, 16, 23 and 24. The proposed rehabilitation area is outlined with the red line. There are no Recorded Monuments in the area.

Peatland survey

Oughter Bog was surveyed by the Irish Archaeological Wetland Unit in 1993 as part of the Archaeological Survey of Ireland Peatland Survey. There were no archaeological sites recorded during the survey. No further archaeological work has taken place in the bog since 1993.

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 3rd of November 2020. 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 no monuments entered in the SMR in the proposed rehabilitation area (See Fig. 2).

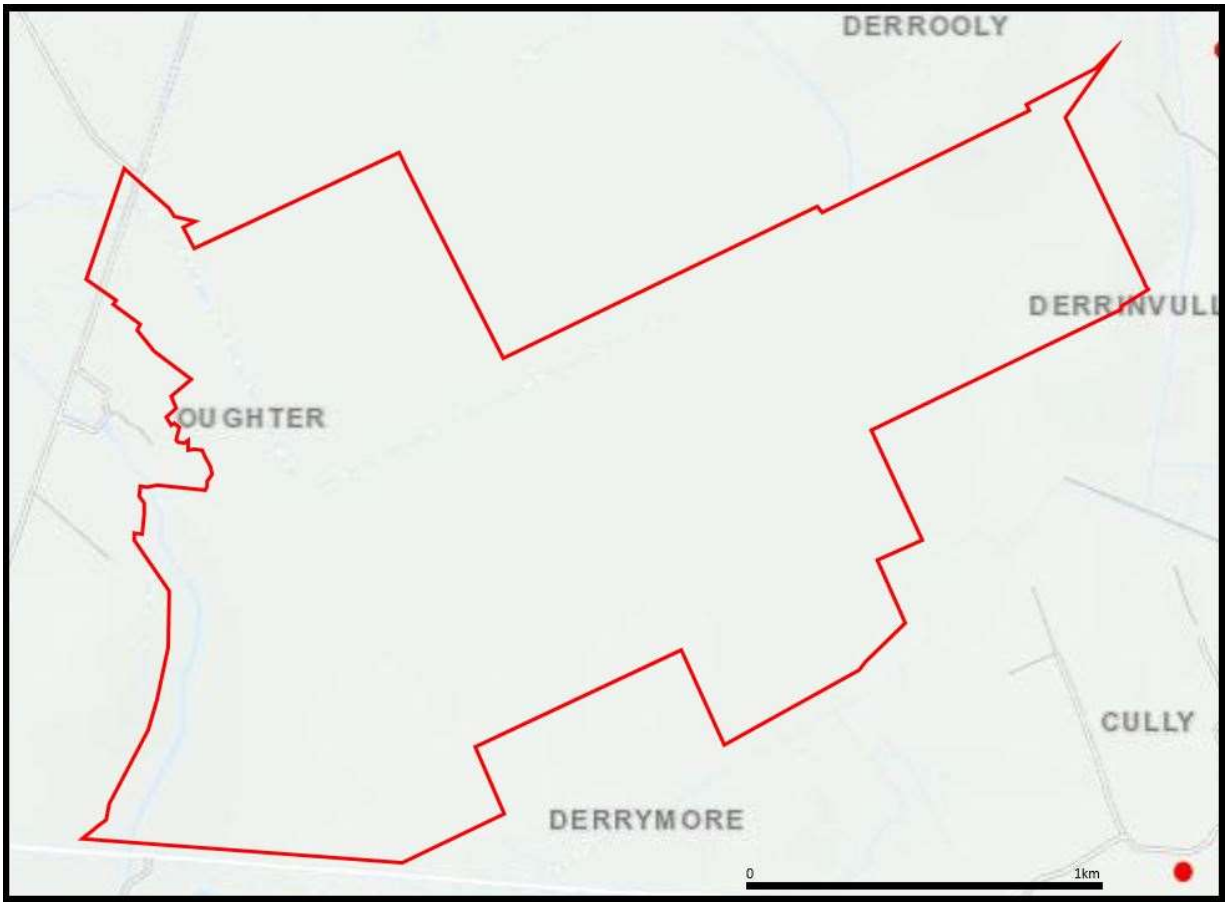


Fig. 2. Oughter Bog, Co. Offaly, detail of the Sites and Monuments Record. The proposed rehabilitation area is outlined with the redline. There are no SMRs in the area.

Archaeological investigations

Reports of archaeological excavations and licensed monitoring in the study area listed in the excavations database at excvations.ie were examined as part of the assessment. There are no reports of archaeological investigations carried out in the rehabilitation area.

Reported finds

No reports of archaeological finds from Oughter Bog are recorded in the topographical files of the National Museum of Ireland.

Previous assessments

Oughter bog has been the subject of an Environmental Impact Assessment Report caried out by Irish Archaeological Consultancy Limited in 2018 for Bord na Móna Energy Limited in relation to IPC Licence P0500-01. The assessment identified no extant archaeological material in the rehabilitation area but concluded that:

Wetlands and Peatlands are considered as Areas of Archaeological Potential for their potential to contain archaeological organic preserved remains. Wetlands also provide a significant resource for environmental analysis. It must be considered therefore that there remains a moderate potential for additional buried features to be uncovered during the course of any future development works in Oughter Bog.

Impact assessment

There are no known items of archaeological heritage in the rehabilitation area. The proposed rehabilitation will have no impact on any known archaeological material in the application area or the vicinity. In the worst-case scenario works affecting the surface and sub-surface of the bog might disturb previously unknown archaeological deposits or artefacts without preservation by record taking place.

Recommendations

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

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 no known items of archaeological heritage in the rehabilitation area. The proposed rehabilitation will have no impact on any known archaeological material in the application area or the vicinity. 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.

References

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

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

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