Bord na Móna

# Bloomhill Bog

## Cutaway Bog Decommissioning and Rehabilitation Plan 2022

This document seeks to address the requirements of Condition 10.2 of IPC License Ref. P0502-01:

> "*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 Bloomhill Bog upon cessation of peat production and compliments the licence requirement to decommission the site.*

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

*Industrial peat production has now fully ceased at Bloomhill Bog.*

*In addition, to preparing this document to comply with Condition 10 of IPC Licence Ref. P0502-01, due regard was also given to the proposed Peatlands Climate Action Scheme (PCAS) announced by the Minster. This Scheme will see the Minister support, via the Climate Action Fund and Ireland's National Recovery and Resilience Plan, Bord na Móna in developing a package of measures, 'the Scheme', for enhanced decommissioning, rehabilitation and restoration of cutaway peatlands referred to as, the Peatlands Climate Action Scheme'. However, only the additional costs associated with the additional and enhanced rehabilitation, i.e, measures which go beyond the existing standard mandatory decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support. The additional costs of the Scheme will be supported by Government through the Climate Action Fund and Ireland's National Recovery and Resilience Plan, administered by the Department of Environment, Climate and Communications (DECC), while the National Parks and Wildlife Service (NPWS) will act as the Scheme regulator.*

*While this document outlines the enhanced rehabilitation measures planned for the Bloomhill Bog, activities which goes beyond that required by Condition 10 in the Licence, rehabilitation necessary to comply with the 'standard' requirement of Condition 10 (in the absence of the Scheme) is also included, to estimate costs. The inclusion of the 'standard' rehabilitation together with the enhanced rehabilitation in this document allows the Scheme Regulator to distinguish and objectively determine the specific activities (and their associated costs) eligible for support under the Scheme.*

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

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

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

**Table of Contents**

## NON-TECHNICAL SUMMARY

- Industrial peat harvesting is now finished at Bloomhill Bog, southwest of Ballynahown, in Co. Offaly.
- Bord na Móna is planning to rehabilitate Bloomhill Bog.
- This is happening as Bord na Móna are obliged to carry out peatland rehabilitation via an IPC License issued by the Environmental protection Agency. In addition, the Government has agreed to support peatland rehabilitation via the establishment of the Peatland Climate Action Scheme (PCAS). This is funded via the government and by Bord na Móna.
- The key objective of peatland rehabilitation is environmental stabilisation. This means the establishment habitats and vegetation back onto the bare peat, and minimising impacts to downstream waterbodies. The bog was drained in the past to allow peat production. Better results for water quality improvements, climate action, the reduction of carbon emissions and biodiversity are achieved when the remaining peat is re-wetted. This means drain-blocking and other measures to raise water levels to the surface of the bog and to encourage the natural colonisation of vegetation.
- In general soggy ground conditions are preferred. This means the remaining peat is wet and that plants that prefer wetter conditions, like Bog Cotton and Reeds will thrive.
- Many Bord na Móna bogs can not be restored to raised bog, as so much peat has been removed and the environmental conditions have been modified. However other natural habitats will develop like shallow wetlands with Reedbeds and Birch woodland, and in time a naturalised peatland can be restored.
- Re-wetting peat is also better for climate action. This reduces carbon emissions as re-wetting the remaining peat reduces carbon losses such as the production of Carbon Dioxide, the main Greenhouse Gas. The site is expected to still be a reduced carbon source for some time, but eventually the carbon sink function can re-establish as peat-forming conditions are restored. This will take some time.
- The development of a range of habitats in Bloomhill Bog will support biodiversity including plants, insects, birds and mammals. This includes some species that are rare and protected in the wider landscape. It will increase the national area of native woodland. Many wetland habitats in the wider landscape have been reclaimed for agriculture and other uses and peatland rehabilitation is an opportunity to create new wetland habitats.
- Bloomhill Bog was drained and developed for industrial peat production in the 1981. Peat production ceased in 2020. Therefore, much of the site currently comprises of bare peat. A small part of the site has already established pioneer peatland habitats.
- Measures proposed for Bloomhill Bog include internal drain blocking and other measures required to raise water levels to the surface of the peat (changing levels of pipes for example).
- Bord na Mona plan to carry out this work on part of the site in 2022-2024.
- These rehabilitation measures will be planned by a team consisting of ecologists, hydrologists and engineers. It is a principle of Bord na Móna rehabilitation planning that no actions will be taken that would negatively impact on adjacent land. No boundary drains will be blocked. Water will still leave the site via the existing outlets.
- It will take some time for vegetation and habitats to fully develop at Bloomhill, and a peatland ecosystem to be restored. However, it is expected that most of the site will be developing pioneer habitats after 5-10 years.
- This is a peatland rehabilitation plan. Bord na Móna continually reviews its land-bank to consider future commercial or industrial developments, such as renewable energy. Bord na Móna are reviewing the potential to develop a potential renewable energy project at Bloomhill Bog. It is expected that this review

will be completed in 1-2 years. In advance of this review of renewable energy potential, it is planned to rehabilitate **part** of Bloomhill Bog in 2022-2024 that is not constrained (see drawing number BNM-DR-23-15-05: Enhanced Rehab Measures and BNM-DR-23-15-20: Standard Rehab Measures). The remaining area will be rehabilitated after the renewable energy review is complete. Any other proposed development will planned in adherence to relevant planning guidelines and will consider the rehabilitation and the condition of the site.

- Peatland rehabilitation of the Bord na Móna bogs will bring a range of benefits to the local community via improvements to the local landscape and is also important for supporting national policies and strategies in relation to reduction of carbon emissions from these peatlands, supporting biodiversity and improvements to water quality.

## SUMMARY

**Name of bog:** Bloomhill **Area:** 889 ha

**Site description:**

- Bloomhill Bog is located in Co. Offaly, approximately 4km south-west of Ballynahown in County Offaly. It is part of the Blackwater Bog group.
- Bloomhill Bog has been in peat production since the early 1980's. The peat was primarily harvested for fuel peat to be used at Cloghan Power Station, West Offaly Power in Shannonbridge and Derrinlough Brickette Factory in Co. Offaly. Some horticultural peat was also harvested at Bloomhill Bog.
- The River Shannon flows within 0.5 km of the western edge of the site.
- There is minor overlap with a number of sites designated for conservation.
- The site is dominated by bare peat.
- Bloomhill Bog has a pumped drainage regime.
- Deep peat reserves remain on much of the former production area.
- Industrial peat production in the remaining active peat production areas of the site ceased in 2020.

**Rehabilitation goals and outcomes**

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

- Meeting conditions of the IPC licence;
- Stabilisation or improvement in water quality parameters (e.g. suspended solids);
- Environmental stabilisation.
- Optimising hydrological conditions in the former area recently in industrial peat production for the further development of wetland, Reed swamp, wet woodland and fen habitats on shallow cutaway peats, along with management of existing wetlands.
- The site has already developed a mosaic of pioneer cutaway habitats in places, notably wetland, Birch woodland and fen habitats. These areas will be assessed for potential for targeted actions to enhance existing wetland habitats and create small wetland features.
- Integrating rehabilitation measures with current infrastructure and land-uses.
- Optimising hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future.
- Supporting current land-use.
- Rehabilitation will support the National Policies on Climate Action and GHG mitigation by maintaining and enhancing the current residual peat storage capacity of the bog (locking the carbon into the ground). It is expected that the bog will have reduced emissions (reduced source) as it develops naturally functioning wetland and peatland habitats. It will also support Ireland's commitments towards Water Framework Directive and the National River Basin Management Plan 2018-2021.

**Scope of rehabilitation**

The principal scope of this rehabilitation plan is defined by:

- The area of Bloomhill Bog.
- EPA IPC Licence - Ref. P0502-01. 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.
- Bord na Móna are reviewing the potential to develop a potential renewable energy project at Bloomhill Bog. It is expected that this review will be completed in 1-2 years. In advance of this review of renewable

energy potential, it is planned to rehabilitate **part** of Bloomhill Bog in 2022-2024 that is not constrained (see drawing number BNM-DR-23-15-05: Enhanced Rehab Measures and BNM-DR-23-15-20: Standard Rehab Measures). The remaining area will be rehabilitated after the renewable energy review is complete. This peatland rehabilitation will either be in association with a potential renewable energy project, with peatland rehabilitation integrated into the proposed project, or will be completed in the absence of any proposed renewable energy project. Bord na Móna remain committed to rehabilitating all of Bloomhill Bog and meeting conditions of the IPC Lisence for this bog.

- **The Scheme (PCAS)** includes enhanced measures which are designed to exceed/meet the standard stabilisation requirements as defined by the IPC Licence and to enhance the ecosystem services of Bloomhill Bog optimising **climate action benefits**.
- The local environmental conditions of this bog. Bloomhill Bog has variable environmental characteristics with a range of residual peat depths, hydrology and topography. Some of the bog has been cutaway, while some other areas have began to re-colonise with pioneer cutover vegetation communities.
- The key goals and outcomes of rehabilitation at this bog outlined above.
- To minimise potential impacts on neighbouring land, some boundary drains around Bloomhill Bog will be left unblocked, as blocking boundary drains could affect adjacent land.
- Other constraints including archaeology and rights of way.

**Criteria for successful rehabilitation:**

The Criteria for successful rehabilitation to meet Condition 10 of the IPC Licence have been defined as:

- Rewetting of residual deep peat in the former area of industrial peat production to slow water movement across the site to retain silt, encouraging development of vegetation cover via natural colonisation, and reducing the area of bare exposed peat (IPC Licence validation). The target will be the delivery of measures and this will be measured by an aerial survey after rehabilitation is completed. (IPC Licence validation).
- Stabilising/improving key potential emissions to water (e.g. suspended solids). This will be measured via water quality monitoring (suspended solids and ammonia) for at least 2 years after the rehabilitation has been completed (IPC Licence validation).
- Reducing pressure from peat production on the local river catchment (IPC Licence validation). This will be measured by the EPA WFD monitoring programme.
- Optimising the extent of suitable hydrological conditions for climate action (Climate action verification). This will be measured by an aerial survey after rehabilitation has been completed.
- Reduction in carbon emissions (Climate action verification). Baseline monitoring will be carried after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.
- Setting the site on a trajectory towards establishment of a mosaic of compatible habitats including wetland, fen, Reed swamp, wet woodland, heath, embryonic *Sphagnum*-rich peat forming communities, scrub and Birch woodland communities, where conditions are suitable, and eventually towards a reduced Carbon source (Climate action verification). Some areas will naturally be dry and develop Birch woodland and other drier habitats. It will take some time for stable naturally functioning habitats to fully develop at Bloomhill Bog.
- Improvement in biodiversity and ecosystem services (Climate action verification).

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

**Summary of measures:**

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

- Planning actions, including developing a detailed site plan and carrying out a hydrology and drainage assessment.
- Carry out an ecological appraisal of the potential impacts of the planned rehabilitation.
- Carry out proposed measures, which will be a combination of drain blocking, peat field re-profiling, wetland creation, targeted drain-blocking within stabilised areas and fertiliser applications targeting bare peat on headlands, high fields and other areas.
- Phase 2 measures may include seeding of targeted vegetation and inoculation of *Sphagnum* in compatible areas.
- Silt ponds will continue to be maintained during the rehabilitation and decommissioning phase.
- Evaluate success of short-term rehabilitation measures outlined above and remediate, where necessary.
- Decommissioning of silt-ponds will be assessed and carried out, where required.

**Timeframe:**

- 2021: Short-term planning actions.
- 2022-2024: Short-term practical actions.
- 2023-2024: Any Long term practical actions; Evaluate success of short-term rehabilitation measures outlined above and remediate, where necessary.
- 2024: Decommission silt-ponds, if necessary.

**Budget and Costing**

- The rehabilitation plan outlined in this document is predicated on the understanding that it is the Minister's intention to support, via the Climate Action Fund and Ireland's National Recovery and Resilience Plan, Bord na Móna in developing a package of measures, 'the Scheme', for enhanced decommissioning, rehabilitation and restoration of cutaway peatlands referred to as, the Peatlands Climate Action Scheme'. *However, only the additional costs associated with the additional and enhanced rehabilitation, i.e, measures which go beyond the existing standard mandatory decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support.*
- In relation to the pre-existing Condition 10 IPC Licence requirement to carry out what can be termed the 'standard' decommissioning and rehabilitation, Bord na Móna maintains a Provision on its balance sheet to pay for these future costs when industrial peat extraction ceases. This is updated every year. For more information see the Bord na Móna Annual Report (Bord na Móna 2020). Bord na Móna is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

**Monitoring, after-care and maintenance**

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

- Quarterly monitoring assessments of the site to determine the general status of the site, assess the condition of the rehabilitation work, asses the progress of natural colonisation, monitoring of any potential impacts on neighbouring land and general land security. The number of site visits will reduce after 2 years to bi-annually. These site visits will assess the need to additional rehabilitation, if needed.
- **Water quality monitoring** will be established. Monitoring of key water quality parameters for 2 years after rehabilitation will include: Ammonia, Phosphorous, Suspended solids (silt), pH and conductivity.
- Where other uses are proposed for the site, these will be assessed by Bord na Móna in consultation with interested parties. Other after-uses can be proposed for licensed areas and must go through the appropriate assessment and planning procedures.

**Additional Monitoring:**

- The monitoring and validation of re-vegetation via natural colonisation and changes in bog condition will be carried out using an aerial 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 and Ireland's National Recovery and Resilience Plan or other external funding.

**Validation and IPC Licence surrender**

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

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

# 1. INTRODUCTION

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Blackwater bog group (Ref. P0502-01). As part of Condition 10.2 of this licence, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. Bloomhill bog is part of the Blackwater bog group (see Appendix II for details of the bog areas within the Blackwater Bog Group). Bloomhill Bog is located in Co. Offaly.

This document seeks to address the requirements of Condition 10.2 of IPC Licence Ref. P0502-01:

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

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

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

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

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

It is expected that the PCAS will have benefits accruing from biodiversity provision, water quality and storage attenuation as well as increased carbon storage, reduced carbon emissions and acceleration towards carbon sequestration. The Scheme will also facilitate monitoring of carbon fluxes (Greenhouse Gases and fluvial carbon)

in selected areas (in addition to other established Research programmes), to monitor changes in where the interventions will accelerate the trajectory towards a naturally functioning peatland ecosystem.

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

- more intensive management of water levels through outfall management, drain-blocking and management of water levels within the bog;
- re-profiling/re-wetting of extant deep peat that will deliver suitable conditions for development of wetlands, fens and bog habitats;
- targeted fertiliser applications,
- seeding of targeted vegetation; and
- proactive inoculation of suitable peatland areas with *Sphagnum.*

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

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

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

## 1.1 Constraints and Limitations

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

Bord na Móna are reviewing the potential to develop a potential renewable energy project at Bloomhill Bog. It is expected that this review will be completed in 1-2 years. In advance of this review of renewable energy potential, it is planned to rehabilitate **part** of Bloomhill Bog in 2022-2024 that is not constrained (see drawing number BNM-DR-23-15-05: Enhanced Rehab Measures and BNM-DR-23-15-20: Standard Rehab Measures). The remaining area will be rehabilitated after the renewable energy review is complete. The peatland rehabilitation will **either** be in association with a potential renewable energy project, with peatland rehabilitation integrated into the proposed project, **or** will be completed in the absence of any proposed renewable energy project. It is expected that Bord na Móna will revise and update the rehabilitation plan for Bloomhill when this renewable energy review is complete. Bord na Móna remain fully committed to rehabilitating the whole bog and meeting the conditions of the IPC Lisence. Any consideration of any other future after-uses for Bloomhill Bog, such as

renewable energy, 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.

Industrial peat extraction at Bloomhill Bog permanently ceased in 2020.

The area in recent peat production is bare peat. however substantive areas of Bloomhill are recolonising or have been for a number of years, with resultant pioneering vegetation now in situ.

It is anticipated that the combination of active enhanced rehabilitation measures and further natural colonisation will quickly support the further development of pioneer vegetation. Nevertheless, it will take some time (30-50 years) for naturally functioning peatland ecosystems to fully re-establish across the entirety of Bloomhill Bog.

Parts of Bloomhill Bog (outside the areas owned and under the control of Bord na Móna) are currently used by domestic turf cutters to harvest pea. These areas are ecologically and hydrologically linked to the area owned by Bord na Móna where rehabilitation is planned. Nevertheless, Bord na Móna are aware of such issues which may constrain the proposed rehabilitation actions, and this rehabilitation plan considered potential impacts of these on the delivery of the stated objectives.

Rehabilitation in other areas of the bog may also be constrained due to other property issues or issues such as rights of way. There are a small number of known archaeology records on Bloomhill Bog. All rehabilitation measures proposed at Bloomhill Bog will consider the sensitivity of these records.

# 2. METHODOLOGY

This rehabilitation plan was developed with a combination of desktop and field surveys, consultations with internal and external stakeholders and cognisance of the Scheme (PCAS). The development of this rehabilitation plan considered **recently published** guidance issued by the EPA in 2020 – **Guidance on the process of preparing and implementing a bog rehabilitation plan**.

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

- Experience of 40 years of research on the after-use development and rehabilitation of the Bord na Móna cutaway bogs (Clarke, 2010; Bord na Móna, 2016);
- Significant international engagement during this period with other counties in relation to best-practise regarding peatland rehabilitation and after-use through the International Peat Society and the Society for Ecological Restoration (Joosten & Clarke, 2002; Clarke & Rieley, 2010; Gann *et al*., 2019);
- Consultation and engagement with internal and external stakeholders;
- GIS Mapping;
- BNM drainage surveys;
- Bog topography and LIDAR data:
- Hydrological modelling; and
- The development of a **Methodology Paper (draft) outlining the Scheme (PCAS)**. This rehabilitation includes enhanced measures defined in the Methodology Paper which are designed to exceed the standard stabilisation requirements as defined by the IPC Licence and to enhance the ecosystem services of Bloomhill Bog, in particular, optimising **climate action benefits**.

## 2.1 Desk Study

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

- Anderson *et al*. (2017). An overview of the progress and challenges of peatland restoration in Western Europe.
- Bonn *et al*. (2017). Peatland restoration and ecosystem services- science, policy and practice.
- Carroll *et al*. (2009). *Sphagnum* in the Peak District. Current Status and Potential for Restoration. Moors for the Future Report No 16.
- Clark & Rieley (2010). Strategy for responsible peatland management.
- Eades *et al*. (2003). The Wetland Restoration Manual.
- Farrell & Doyle (2003). Rehabilitation of Industrial Cutaway Atlantic Blanket Bog, NW Mayo, Ireland.
- Gann *et al*. (2019). International Principles and Standards for the practice of Ecological Restoration.
- Hinde *et al*. (2010). *Sphagnum* re-introduction project: A report on research into the re-introduction of *Sphagnum* mosses to degraded moorland. Moors for the Future Research Report 18.
- Joosten & Clarke (2002). Wise Use of mires and peatlands – Background and Principles including a framework for Decision-making.

- Lindsay (2010). Peatbogs and Carbon: a Critical Synthesis to Inform Policy Development in Oceanic Peat Bog Conservation and Restoration in the Context of Climate Change.
- Mackin *et al*. (2017). Best practice in raised bog restoration in Ireland. Irish Wildlife Manuals, No. 99. National Parks and Wildlife Service,
- McBride *et al*. (2011). The Fen Management Handbook (2011), Scottish Natural Heritage.
- McDonagh (1996). Drain blocking by machines on Raised Bogs. Unpublished report for National Parks and Wildlife Service.
- NPWS (2017a). National Raised Bog Special Areas of Conservation management plan. Department of Arts, Heritage and the Gaeltacht.
- Pschenyckyj et al., 2021, Optimising Water Quality Returns from Peatland Management while Delivering Co-Benefits for Climate and Biodiversity, Report produced for An Fóram Uisce, Online, Available at: https://thewaterforum.ie/app/uploads/2021/04/Peatlands_Full_Report_Final_March2021b.pdf, Accessed 17.08.2021.
- Quinty & Rochefort (2003). Peatland Restoration Guide, second edition. Canadian *Sphagnum* Peat Moss Association and New Brunswick Department of Natural Resources and Energy.
- Regan*, et. al.* (2020). Ecohydrology, Greenhouse Gas Dynamics and Restoration Guidelines for Degraded Raised Bogs. EPA Research Report. Prepared for the Environmental Protection Agency by Trinity College Dublin.
- Renou-Wilson *et al*. (2011). BOGLAND - Sustainable Management of Peatlands in Ireland. STRIVE Report No 75 prepared for the Environmental Protection Agency.
- Schouten (2002). Conservation and Restoration of Raised Bogs: Geological, Hydrological and Ecological Studies. Dúchas - The Heritage Service of the Department of the Environment and Local Government, Ireland;
- Thom (2019). Conserving Bogs – Management Handbook.
- Wheeler & Shaw (1995). Restoration of Damaged Peatlands – with Particular Reference to Lowland Raised Bogs Affected by Peat Extraction.
- Wittram *et al*. (2015). A Practitioners Guide to Sphagnum Reintroduction. Moors for the Future Partnership.


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

- Blackwater Integrated Pollution Control Licence;
- Blackwater Annual Environmental Reports;
- Review of the National Biodiversity Data Centre (NBDC) webmapper;
- Inland Fisheries Ireland (IFI) Reports;
- Environmental Protection Agency database (www.epa.ie);
- EPA Guidance on Requests for Alterations to a Licensed Industrial or Waste Activity;
- BirdWatch Ireland online data (including I-WeBS and CBS datasets; www.birdwatchireland.ie);
- Geological Survey of Ireland - National Draft Bedrock Aquifer map;
- Geological Survey of Ireland - Groundwater Database (www.gsi.ie);
- Historic Environment Viewer at https://webgis.archaeology.ie/historicenvironment/
- National Parks & Wildlife Services Public Map Viewer (www.npws.ie);
- Water Framework Directive catchments.ie/maps/ Map Viewer (www.catchments.ie);
- OPW Indicative Flood Maps (www.floodmaps.ie);
- CFRAM Preliminary Flood Risk Assessment (PFRA) maps (www.cfram.ie);

- River Basin Management Plan for Ireland 2018 – 2021;
- Bord na Móna Annual Report 2020.
- Spatial data in respect of Article 17 reporting, available online at https://www.npws.ie/maps-and-data/habitat-and-species-data/article-17.

## 2.2 Consultation

Several stakeholders have been identified during the course of Bord na Móna's rehabilitation and Biodiversity Action Plan activities and will be contacted during the rehabilitation planning process for their views. See Section 4 of this document.

## 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, Bloomhill Bog was surveyed in 2012. Additional ecological monitoring and visits have taken place at Bloomhill Bog Bog between 2013-2021 to inform rehabilitation planning, where required.

A final site visit to inform the current Rehab Plan took place by BNM Ecologists in September of 2021 and habitat maps have been updated accordingly, where required.

This rehabilitation plan is informed by the original baseline survey as well as subsequent confirmatory site walk-over surveys and visits, and updates to baseline data.

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

A detailed ecological survey report for Bloomhill Bog is contained in Appendix III.

# 3. SITE DESCRIPTION

Bloomhill Bog is located approximately 4km south-west of Ballynahown in County Offaly. Bloomhill Bog surrounds a large mineral island also known as Bloomhill. The mineral island is made up primarily of agricultural lands and residential lands. A number of small roads run through the bog. An esker known as the Pilgrim's Road Esker is located immediately to the south west of the site while Mongan Bog SAC is also located to the south west of the site. Mongan Bog was originally partially ditched by Bord na Móna in the 1980's but has subsequently had restoration works carried out on it. A travel path that connects Bloomhill Bog with Blackwater Bog to the south, passes along the eastern boundary of Mongan Bog SAC.

The surrounding landscape is a mosaic primarily consist 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.

See Drawing number BNM-DR-23-15-01 titled **Bloomhill Bog: Bog Site Location**, included in the accompanying Mapbook[1] , which illustrates the location of Bloomhill Bog in context to the surrounding area.

## 3.1 Status and Situation

### *3.1.1 Site history*

Bloomhill Bog has been in peat production since the early 1980's. The peat was primarily harvested for fuel peat to be used in Cloghan Power Station, Derrinlough Brickette Factory and West Offaly Power in Shannonbridge, Offaly. The bog still retains deep peat reserves in some places.

### *3.1.2 Current land-use*

The site is dominated by bare peat former production bog land.

Several small areas of remnant raised bog remain along the margins of the site. These areas are small, fragmented and quite degraded. Further drying and degradation is likely to occur. There are also areas of scrub, immature woodland and mature birch dominated woodland in the site margins.

An active rail line is still operational between Bloomhill and other BnM bogs in the landscape surrounding the site. The rail line is used to transport peat from Bloomhill to Derrinlough and other customers and will continue to be used until Derrinlough Brickette factory ceases production. Decommissioning of this infrastructure is dependent on the general cessation of the supply of peat to Derrinlough Brickette Factory.

### *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

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

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. These job numbers have now declined with the cessation of peat extraction.

In respect of Bloomhill Bog, jobs included in the above study would have included those to facilitate extraction of peat at Bloomhill, and associated processing and transfer to the relevant power station, in addition to staff employment at workshops and the main Bord na Móna facility located at Leabeg.

As the primary employer in many Midland counties, Bord na Móna played a central role in building communities through a number of 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."

## 3.2 Geology and Peat Depths

### *3.2.1 Sub-soil geology*

GSI data indicates that the Ballysteen Formation and Navan Beds underlie the majority of Bloomhill, with a small area underlain by Old Red Sandstone. There are no mapped karst features in the immediate surroundings of the bog.

Most of the site is underlain by dark limestone, mudstone and sandstone. The formation is described as; the lower part of this informally named unit comprises rhythmic alternations of variably calcareous black to grey shale grading into variably argillaceous micrite with evaporites in places. The upper part is composed of relatively clean micrite. A small area in the north of the site is old red sandstone, described as red mudstones, siltstones and sandstones, and poorly sorted, polymict pebble conglomerates and breccias. The southern section of the bog is underlain by dark muddy limestone and shale. The bedrock in this section can be described as irregularly bedded and nodular bedded argillaceous bioclastic limestones (wackestones and packstones), interbedded with fossiliferous calcareous shales.

Subsoils underlying extant peat are significantly lacustrine calcareous marls with glacial sub-soil mounds and ridges (See Drawing number BNM-DR-23-15-04 titled **Bloomhill Bog: Peat-Depths**). Quaternary Sediment maps show Bloomhill underlain by peat, yet surrounded by inorganic deposits, including Alluvium to the west along the River Shannon, Gravel derived from Limestones to the south and an area of Till derived chiefly from Limestones on a ridge between the bogs and towards the north and east.

### *3.2.2 Peat type and depths*

Commercial peat extraction has been undertaken at Bloomhill Bog since 1981. Most the site retains relatively deep peat reserves with some smaller pockets of shallow residual peat depths where the peat has been cutaway (See Drawing number BNM-DR-23-15-04 titled **Bloomhill Bog: Peat-Depths**). Peat depths of 2-3 m occur across most of the former production area.

## 3.3 Key Biodiversity Features of Interest

Bloomhill bog can be sub-divided into four main sections for the purpose of reporting, east, north and two distinct sections to the south. One southern section is directly connected to the larger former production area. The second southern section (referred to hereafter as the Bloomhill extreme south) is situated further to the south and west of the main Bloomhill bog ring. It is connected to the main body of the site via machine pass and railway. It contains a large portion of remnant raised bog and a smaller former production area. There are some drainage ditches in the western portion of this bog but by in large it was never developed for peat harvesting. A small portion of the Bloomhill extreme south section in the east was developed and used for peat harvesting. This is now largely a bare peat former production area surrounded by a thin, degraded ring of bog remnant. A number of small water bodies pass through or in close proximity to the site. The Boor River passes along the northern boundary of the former production area. The Curraghboy River and a tributary of the same pass through the south of the site. The River Shannon passes within 0.5Km of the western boundary of the site.

The majority of the former production bog is currently featureless bare peat. Some pioneer vegetation communities are starting to develop in areas that have been out of production for some time.

The margins of the BnM property include some habitat areas including remnant raised bog (PB1), scrub (WS1) and Birch woodland (WN7).

Bloomhill Bog is situated within 5Km or overlaps a number of sites designated for conservation including; The Middle River Shannon Callows SPA, The River Shannon SAC, Mongan Bog SPA, Mongan Bog SAC and Fin Lough SAC (Further details in section 3.4 of the document).

### *3.3.1 Current habitats*

Bloomhill East

The eastern lobe of Bloomhill Bog is dominated by bare peat habitats. Some small waterbodies have developed in topographical depressions. Open pioneer cutaway vegetation communities are developing in wet areas and close to some drains. The margins of the eastern lobe of Bloomhill bog are dominated by scrub, immature woodland and some more mature woodland habitats. Silt ponds are present and riparian vegetation has developed around them. Some small, degraded bog remnants exist in parts of the margins of the eastern lobe of Bloomhill Bog.

*North*

The northern area of the bog is dominated by cutover bare peat. Some pioneer cutover vegetation communities are establishing in the west of this portion of the site. Two silt ponds and the associated riparian vegetation communities exist in the extreme north east and south west of this area of the bog. The silt ponds are fringed by riparian vegetation communities with scrub and woodland habitats occurring outside the zones frequently worked for silt pond maintenance.

*South*

The south west area of the bog is dominated by bare peat. In some areas close to drains and areas where surface water is present in topographical hollows, pioneering open habitat and fen vegetation communities are establishing. Small, degraded bog remnants exist along the margins of this section. To the north of the southern portion of the bog, well developed mosaics of wet woodland/scrubland can found. There are also silt ponds (no. -7) in this area surrounded by scrubby grassland habitats. Some patches of drier woodland/scrubland and acid grassland can be found in higher areas. A canalised stream flows through the central area of the southern portion of the bog. This is fringed by scrub, immature woodland and stands of dense bracken. In the western region of the southern section a mosaic of woodland, scrub and heavily degraded remnant bog exists. This area has been subject to private turf cutting in the past. The railway track running along the site boundary is dominated by calcareous grassland and scrub habitat.

See Drawing number BNM-DR-23-15-17 titled **Bloomhill Bog: Current Habitat Map**, included in the accompanying Mapbook, which illustrates the habitats at Bloomhill Bog.

*Sphagnum mounds present in remnant high bog in Bloomhill*

*View of typical silt ponds in Bloomhill*

*View of wetland at Bloomhill*

*Bare peat and wetland habitat at Bloomhill former production area*

*Bloomhill Bog drain in-filling with wetland vegetation*

*Black Bog Rush in wetlands in Bloomhill*

### *3.3.2 Species of conservation interest*

A number of species of conservation concern have been recorded at Bloomhill Bog. The following is a summary of the records of these species available within both BnM records and those of the National Biodiversity Centre.

Multiple mammal species have been recorded on or within 1Km of the bog; Irish Hare *Lepus timidus subsp. Hibernicus*, Red Fox *Vulpes Vulpes*, Fallow Deer *Dama dama*, Eurasian Badger *Meles meles*, European Otter *Lutra lutra*, and Pine Marten *Martes martes*. Badger, hare and deer species field signs were observed throughout the bog by BnM ecologists during a walkover survey in September 2021. No recordings for bat species on Bloomhill Bog could were found in the NDBC records.

Regarding lepidopteran species, records exist for Six Spot Burnet Moth *Zygaena filipendulae* on or within 1Km from the Bloomhill Bog site. Brimstone Butterfly *Gonepteryx rhamni,* Common Blue *Polyommatus icarus,* Speckled Wood *Pararge aegeria,* Peacock *Aglais io and* Green Veined White Butterfly *Pieris napi* were recorded using the habitats at Bloomhill Bog by a BnM ecologist during September 2021. BnM survey records also contain records for Latticed Heath *Chiasma clathrate* and Common heath *Ematurga atomaria.*

White tailed bumblebee *Bombus Lucorum agg*. and Garden Bumblebee *Bombus Hortorum* were also recorded on Bloomhill Bog by BnM ecologists.

Common Frog was recorded on Bloomhill Bog by BnM ecologists during walkover surveys in September 2021.

Numerous bird species are known to use the cutover bogs in Ireland's midlands as breeding grounds, Wintering grounds or both. Records for bird species of immediate conservation concern at Bloomhill Bog or within 1Km of the site include;

Breeding Season records - House Martin *Delichon urbicum*, Common Kestrel (*Falco tinnunculus*), Whinchat *Saxicola rubetra*, Snipe *Gallinago gallinago*, Starling *Sturnus vulgaris*, Little Grebe *Tachybaptus ruficollis*, Mallard *Anas platyrhynchos*, Mute Swan *Cygnus olor*, Lapwing *Vanellus vanellus*, Skylark *Alauda arvensis* and Peregrine *Falco peregrinus.*

Wintering bird records - include Teal *Anas crecca*, Wigeon *Anas penelope*, Tufted Duck *Aythya fuligula*, Whooper Swan *Cygnus cygnus*, Marsh Harrier *Circus aeruginosus* and Hen Harrier *Circus cyaneus*.

NDBC records show that Green Winged Orchid *Anacamptis morio* has been recorded on or within 1Km within of the Bloomhill Bog boundary. This is an esker species known from Clonmacnoise .

### *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.

The following invasive species have been recorded on or within 1Km of Bloomhill Bog; Fallow Deer *Dama dama, Rhododendron ponticum,* and Sycamore *Acer pseudoplatanus*. *Rhododendron ponticum* was recorded in the south west margins of the site during a BnM survey.

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

## 3.4 Statutory Nature Conservation Designations

There are a number of European Sites (SAC's or SPA's) in close proximity (i.e. within a 5km radius at minimum) to Bloomhill Bog. A number of NHA's (Natural Heritage Areas) and pNHA's (Proposed Natural Heritage Areas)

also occur within 5km of Bloomhill Bog (See Drawing number BNM-DR-23-15-23 titled **Bloomhill Bog: Proximity to Designated Sites**).

The Middle River Shannon Callows SPA (Site Code: 004096) and The River Shannon SAC (Site Code: 000216) overlap with parts of the western bog boundary. Qualifying interests for the The Middle River Shannon Callows SPA are; Whooper Swan, Wigeon, Corncrake, Golden Plover, Lapwing, Black-tailed Godwit, Black-headed Gull and Wetland/Waterbirds. The qualifying interests of the River Shannon SAC include; Molinia meadows on calcareous, peaty or clayey-silt-laden soils, Lowland hay meadows, Alkaline fens, Limestone pavements, Alluvial forests with Alnus glutinosa and Fraxinus excelsior and Otter.

Mongan Bog SPA (Site Code: 004017) and SAC (Site Code: 000580) is situated directly south west of the Bloomhill Bog boundary. The qualifying interests of the SAC include; Active raised bogs, Degraded raised bogs still capable of natural regeneration and Depressions on peat substrates of the Rhynchosporion. While the qualifying interests of Mongan Bog SPA include Greenland White-fronted Goose *Anser albifrons flavirostris.*

Fin Lough SAC (Site Code: 000576) is located approximately 2.5Km south west of Bloomhill Bog and qualifying interests of the SAC include; Alkaline fens and Geyer's Whorl Snail *Vertigo geyeri.*

The following NHA's and pNHA's are also situated within 5Km of Bloomhill Bog; Clonfinlough Esker (Site Code: 000892), Doon Esker Wood pNHA (Site Code: 001830), Clonlyon Glebe Gog pNHA (Site Code: 000893), Clonydonnin Bog NHA (Site Code: 000565), Carrickynagthan Bog NHA (Site Code: 001623), Pilgrim's Road Esker pNHA (Site Code: 001776) and Clornan Wood pNHA (Site Code: 000894).

### *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 66,994 ha. Mongan Bog Wetland (Ramsar Site No. 416) situated directly south west of the Bloomhill Bog boundary. It is an internationally important Wintering ground for Greenland white Fronted Geese. The closest Ramsar Sites after Mongan Bog to Bloomhill Bog are Clara Bog and Raheenmore Bog (Offaly).

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

## 3.5 Hydrology and Hydrogeology

Bloomhill forms part of the Upper Shannon Catchment (Catchment ID : 26G) as defined by the EPA under the Water Framework Directive (WFD) and is situated within the Shannon[Lower]_SC_010 Sub-Catchments. The bog is located along the floodplain of the River Shannon south of the town of Athlone. Bloomhill bog contains several drainage pathways which primarily drain in a westerly direction towards the River Shannon.

The river Boor (EPA Code: 26B07) flows along the northern boundary of the bog. The Ballynahown River (EPA Code: 26B17) flows north, passing the western boundary of the site (approximately 850m distance at closest point) before joining the Boor. An unnamed tributary of the Shannon (EPA Segment Code: 26_1915) flow through the central area of the southern lobe of the site.

Five outfall points and associated silt pond infrastructure exist on Bloomhill Bog former production area. Outfalls are situated in the north and the west of site. The outfalls in the west discharge water into the Shannon while the outfall in the north discharge into the Boor river.

Bloomhill Bog currently has a pumped drainage regime. Depression analysis (See Drawing number BNM-DR-23-15-09 titled **Bloomhill Bog: Depression Analysis**) indicates that parts of the bog are natural basin with significant potential for re-wetting, with the assumption that all drains would be blocked. It is likely that a

portion of the basins in the cutaway will re-wet with deeper water, creating a mosaic of wetland habitats, when drains are blocked.

Regional hydrological data suggest that Bloomhill receives average precipitation of 905mm/yr (1981-2010), with an estimated evapotranspiration rate of c. 500mm/yr, leaving an average effective precipitation of 405mm/yr. Assuming no recharge to groundwater and no groundwater contribution to discharge from the bog, the available precipitation that may become runoff (assuming no change in storage) is 405mm/yr, which equates to an annual runoff rate of c. 4,050m3/ha.

GSI data indicates that the Ballysteen Formation and Navan Beds underlie the majority of Bloomhill, with a small area underlain by Old Red Sandstone. All of these units are classified as Locally Important Aquifers (Bedrock which is Moderately Productive only in Local Zones). Several bedrock faults can be observed in the surrounding areas including several that cross through the bog. No data exists concerning depth to bedrock, and there are no mapped areas of exposed bedrock in the immediate vicinity of the bog. There are no mapped karst features in the immediate surroundings of the bog.

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

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

Quaternary Sediment maps show Bloomhill underlain by peat, yet surrounded by inorganic deposits, including Alluvium to the west along the River Shannon, Gravel derived from Limestones to the south and an area of Till derived chiefly from Limestones on a ridge between the bogs and towards the north and east. GSI Groundwater mapping indicates that the majority of the bog is of moderate vulnerability with a number of small pockets of extreme vulnerability. While Groundwater Vulnerability is typically used to indicate the susceptibility to groundwater pollution, it can provide a useful proxy indication of likely groundwater flow rates in the surrounding area.

Groundwater Vulnerability 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.

## 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 bog lands in a licensed area is discharged via an appropriately designed silt pond treatment arrangement as required in Condition 6.6. of the licence.

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

Bloomhill bog has 12 treated surface water outlets to the receiving waters. There is one to the IE_SH_26S021800 SHANNON (Upper)_120 (River Shannon), 3 treated outlets to the IE_SH_26B071200 BOOR_020 (Boor River) direct and the balance of 8 treated outlets to the IE_SH_26S021800 SHANNON (Upper)_120 (Curraghboy River).

Details of silt ponds, associated surface water emission points and those being monitored and sampled as part of the PCAS scheme are detailed on the accompanying structures map along with water quality map . See Drawing number BNM-DR-23-15-02 titled **Bloomhill Bog: Structures and Sampling**, along with Drawing number BNM-DR-26-15-WQ01 titled **Bloomhill Bog: Water Quality Map** included in the accompanying Mapbook, which illustrate the various drainage and water quality infrastructure present at Bloomhill.

There is a robust monitoring program to track and verify any changes in baseline water quality conditions pre and post decommissioning and rehabilitation so that the success or otherwise can be tracked and verified for the National Parks & Wildlife Service, Environmental Protection Agency and Local Authority Water Program, amongst a range of stakeholders.

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

Initial monthly results are included in appendix XIII. These results are for 14 months from November 2020 to Dec 2021, with some months where no sampling was possible. These indicate the baseline water quality from a minimum of 70% of the bog's catchment. Peat extraction ceased in 2020 and as expected some of the key water quality parameters, that can impact water quality from peat extraction activities, such as suspended solids, remained relatively static, with one exception at SW42 in December 2020. During this period, ammonia indicating a mixed trend across the seven locations, with some sections of the bog's catchment showing a level or downward trend and others an increasing trend. All other parameters fluctuated slightly, most likely influenced by normal weather patterns, especially rainfall.

Monthly ammonia concentrations from November 2020 to December 2021 had a range of 0.005 to 1.5 mg/l with an average of 0.463 mg/l.

Results for suspended solids for the same period indicate a range of 2 to 31mg/l with an average of 4.46 mg/l.

From an analysis of any monitoring over the previous 5 yrs., during such time where peat extraction was undertaken each Summer the IPC licence environmental monitoring of some of the discharges from this bog, indicate that results were under the ELV for SS and Ammonia and broadly under the trigger levels for COD (Table 3.1).

| Bog | SW | Monitoring | pH | SS mg/l | TS mg/l | Ammonia mg/l | TP mg/l | COD mg/l | Colour |
|---|---|---|---|---|---|---|---|---|---|
| Bloomhill | SW-45 | Q2 19 | 7.4 | <5 | 184 | 0.12 | <0.05 | 70 | 193 |
| Bloomhill | SW-46 | Q2 19 | 8.1 | <5 | 160 | 0.02 | <0.05 | 22 | 44 |
| Bloomhill | SW-45 | Q1 18 | 7.5 | 5 | 134 | 1.5 | 0.05 | 46 | 119 |
| Bloomhill | SW-46 | Q1 18 | 7.9 | 5 | 410 | 0.04 | 0.05 | 43 | 108 |
| Bloomhill | SW-29 | Q4 17 | 6.9 | 8 | 138 | 1.3 | 0.05 | 65 | 250 |
| Bloomhill | SW-30 | Q4 17 | 7.8 | 5 | 412 | 0.28 | 0.05 | 44 | 90 |
| Bloomhill | SW-32 | Q4 17 | 7.6 | 5 | 314 | 2.2 | 0.05 | 52 | 119 |
| Bloomhill | SW-33 | Q4 17 | 7.6 | 5 | 404 | 0.45 | 0.05 | 50 | 101 |
| Bloomhill | SW-34 | Q4 17 | 7.5 | 5 | 416 | 0.28 | 0.05 | 53 | 95 |
| Bloomhill | SW-35 | Q4 17 | 7.6 | 5 | 294 | 1.7 | 0.05 | 64 | 140 |
| Bloomhill | SW-36 | Q4 17 | 7 | 5 | 158 | 1.6 | 0.05 | 80 | 211 |
| Bloomhill | SW-37 | Q4 17 | 6.7 | 5 | 244 | 0.18 | 0.12 | 148 | 306 |
| Bloomhill | SW-38 | Q4 17 | 7.2 | 5 | 336 | 0.15 | 0.05 | 56 | 57 |
| Bloomhill | SW-39 | Q4 17 | 7.4 | 5 | 250 | 1.1 | 0.05 | 10 | 130 |
| Bloomhill | SW-40 | Q4 17 | 7.3 | 9 | 264 | 0.56 | 0.05 | 86 | 214 |
| Bloomhill | SW-41 | Q4 17 | 7 | 5 | 162 | 1.2 | 0.05 | 71 | 161 |
| Bloomhill | SW-42 | Q4 17 | 7.7 | 5 | 284 | 1.2 | 0.05 | 57 | 119 |
| Bloomhill | SW-43 | Q4 17 | 6.7 | 5 | 90 | 1.2 | 0.05 | 60 | 208 |

**Table 3.1. Decommissioning and Rehabilitation Programme Water Quality Monitoring.**

The licence obligation of quarterly sampling regime on a selected number of ponds to be sampled over a 3 year cycle will not be sufficient to be able to appropriately track the changing water chemistry that will occur as part of this enhanced rehabilitation programme, so this sampling regime will occur on a monthly basis.

In order to assist in monitoring surface water quality from this bog, it was agreed to increase the existing licence monitoring requirements of the IPC Licence, to sampling for the same parameters every month.

This new sampling programme commenced in November 2020 and is enabling a baseline to be established, with sampling to progress during the scheduled works, and for a period of up to 2 years post rehabilitation. Depending on the period required to confirm that the main two parameters, suspended solids and ammonia as remaining compliant with the licence emission and trigger limit values and there is an improving trajectory in these two parameters i.e. reduction in concentration, the monitoring programme and intensity will be periodically reviewed and amended.

In the preparation of this monitoring programme, Bord na Mona have been providing the Local Authority Water Programme (LAWPRO) with details of the surface water emissions points associated with this bog and will be amending some of the proposed monitoring locations on foot of this engagement. LAWPRO have in turn provided details of their 2021 monitoring programme and these are included in the Water Quality Map.

This is necessary to ensure that there is alignment with the WFD monitoring programme and that where possible, the monitoring programme will enable any improvements in water quality or establishing trends to be quantified against any available WFD monitoring data. It will also enable the periodic sharing of data which will inform the monitoring reports, success criteria and enable LAWPRO under the Water Framework Directive to track any changes in pressures and be aware of changes in water chemistry.

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

Monitoring results will be maintained, trended every six months and reported on each year and as required, as part of the requirement to report on Condition 10.1 of the IPC Licence on Bog Rehabilitation in the Annual Environmental Report, and will be provided to LAWPRO and the EPA as required to inform progress and national monitoring requirements under the WFD. These results will also be available in April each year as a requirement of the Annual Environmental Report at www.epa.ie.

The parameters to be included as per condition 6.2 of the IPC Licence include monthly monitoring for pH, Flow, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour & COD. In addition, DOC has been included as a parameter to try and identify any changes in carbon in the surface water, and where required by LAWPRO, to assist in investigating other changes in water chemistry, the series of parameters can be reviewed and amended.

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 peatlands normally improves because 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 programme is expected to have a positive impact on water quality and help the NWBMP deliver its objectives in relation to the WFD.

Water will still discharge from designated emission points when rehabilitation at Bloomhill Bog has been completed. This discharge will have improving water quality and there will be increased wetland attenuation, meaning slower release of water. his is expected to have a positive impact on status of downstream watercourses.

## 3.7 Fugitive Emissions to air

None.

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

## 3.8 Carbon emissions

The bog is likely to be a carbon source as it is has large sections of drained (degraded) peatland with currently active drainage, which facilitates the oxidation of peat, areas planted with conifer forestry, areas developing Birch woodland and scrub, and areas re-wetted but developing fen and wetland habitats. 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 carbon sink function. The EPA NEROS project carried out GHG flux research at Moyarwood Bog and found that Moyarwood Bog was overall a Carbon sink (sink for $CO_2$ and a source for Methane) 6 years after bog restoration was carried out (Renou-Wilson et al. 2018).

It is expected that Bloomhill Bog can become a reduced carbon source/part carbon sink following rehabilitation. The potential of any cutaway site to develop as a reduced carbon source/carbon sink in the longer-term depends on land-use, the success of the rehabilitation measures, the extent of optimal re-wetting and hydrological conditions, the extent of development of *Sphagnum*-rich or other peat-forming habitats, the balance of carbon fluxes from different cutaway habitats and future climatic conditions. Some of the cutaway is expected to develop Reed Swamp and fen habitats with alkaline emission factors. This site is expected to develop a mosaic of fen, Reed swamp, wet woodland and scrub. Birch woodland is expected to develop on the drier mounds and peripheral headlands.

## 3.9 Current ecological rating

The majority of Bloomhill bog is dominated by bare peat and so is considered to be of **local importance (lower value)**. The margins of the production bog contain some habitats of higher value including remnant raised bog, developing calcareous grassland on disused railway tracks and Birch woodland considered to be of **Local Importance (higher value)**. Smaller portions of the site where discrete sections of the BnM property overlap the SAC boundaries have been assigned a rating of **International Importance**, due to their European designation status.

# 4. CONSULTATION

## 4.1 Consultation to date

Consultation will seek to engage an audience of relevant stakeholders at both a national and local level. National stakeholders have been identified from varied bog restoration and rehabilitation efforts undertaken by Bord na Móna over the past 40 years, with particular emphasis on engagement with stakeholders during their Biodiversity Action Plan programme since 2010. National Stakeholders includes relevant government departments and agencies, relevant semi-state bodies, NGOs and other environmentally-focused groups with a national remit. This draft plan was made available to stakeholders on www.bnmpcas.ie when it was finalised internally by Bord na Móna, and stakeholders were invited to make submissions on the objectives and content of this plan in relation to Bloomhill Bog.

There has been ongoing consultation about rehabilitation and other general issues over the years about Bloomhill 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).
- Ongoing feasibility and development of greenways and cycle tracks (Offaly Leader, Offaly County Council and Failte Ireland);
- Consultation with Green Offaly regarding a proposed Peatland Biosphere Reserve in Offaly.
- Ongoing consultation and engagement with the National Park's and Wildlife Service regarding the conservation of Mongan Bog SAC.

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

## 4.2 Issues raised by Consultees

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

### *4.2.1 Assessments of rehabilitation*

To date a number of consultees including: the IFA, the IMSCA and Trinity College Dublin have raised concerns regarding the duration and scope of consultation period. Stakeholders suggested that the consultation period should be extended to allow all potential stakeholders to make submissions where required.

Queries on pre-rehabilitation assessments were raised by NPWS and the National Museum of Ireland relating to the finalisation of several bog rehab plans in 2021 in relation to Appropriate Assessment, Environmental Impact Assessment and Strategic Environmental Assessment.

### *4.2.2 Restoration scope*

Restoration/rehabilitation of marginal habitats was raised by IPCC and BCI relating to the finalisation of several bog rehab plans in 2021 as worthy of consideration within the rehabilitation measures to support carbon sequestration and biodiversity objectives.

### *4.2.3 Monitoring*

Further details on monitoring of ecological metrics, and how and where reporting on this monitoring would take place, was raised the IPCC, University College Dublin and Trinity College researchers in their respective submissions relating to the finalisation of several bog rehab plans in 2021. Irish Water reiterated the requirement of a strong monitoring program with respect to water quality during and post rehabilitation.

### *4.2.4 Flooding and drainage*

The IFA, Offaly County Council, The Department of Agriculture Food and the Marine, individual local residents and ICMSA queried likely impacts relating to the finalisation of several bog rehab plans in 2021 and 2022, and the finalisation for this Bloomhill Rehabilitation Plan arising from the proposed re-wetting associated with the rehabilitation in relation to flooding on adjoining lands and, specifically, with regards to the maintenance of drains. The IFA also raised the issue of Health and Safety in relation to raising water levels as well as possible impacts on land and property prices as a result of the scheme generally.

### *4.2.5 Future management*

The IFA expressed concerns regarding the future ownership of the BnM bogs subject to rehabilitation. They expressed a desire for contingency planning for potential future ownership of designated bogs so as to ensure no negative impacts arise on adjacent properties from any new ownership.

### *4.2.6 Mongan Bog SAC*

There has been ongoing consultation and engagement with NPWS regarding the conservation of Mongan Bog SAC. Issues include restoration works carried out during the Living Bog LIFE raised bog restoration project and the ongoing use of the travel path and industrial railway adjacent to the Mongan Bog SAC by Bord na Móna. More recently NPWS have queried whether some open drains along the travel path could be blocked as part of the rehabilitation plan.

### *4.2.7 Other issues*

Other issues (raised by IPCC) during the finalisation of several bog rehab plans in 2021 included after use of the bog and turf cutting on the margins of the bog (outside of the area owned by Bord na Móna).

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

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

## 4.3 Bord na Móna response to issues raised during consultation

*4.3.1. Consultation*

BnM are carrying out ongoing consultation has part of the process of developing the rehabilitation plan for Bloomhill Bog. This is ongoing with a dedicated Community Liaison Officer communicating to affected and interested parties. A website has been developed to make information available. This will be continually updated. It is expected that some PCAS Bogs will become demonstration sites so that interested stakeholders can come to visit and observe the measures on the ground.

*4.3.2 Assessments of rehabilitation*

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

An Archaeological Impact Assessment (AIA) has been undertaken on all the bogs in PCAS (Appendix XII). The aim for known archaeology on these bogs is to accomplish preservation in situ and we are taking steps to identify and avoid all known archaeology. It is anticipated that any archaeology will benefit from the ultimate remit of the rehabilitation, in that water tables will be raised thereby preserving in-situ. There is also an identified procedure for managing reports of stray finds that may arise during rehabilitation works.

*4.3.3 Restoration scope*

As part of the PCAS, all restoration/rehabilitation options have been developed to support climate action and biodiversity objectives. Other issues such as existing amenity, social impacts, industrial history, archaeology were not part of the direct scope of PCAS but were considered when developing the rehabilitation plan. After use of the bog is outside the scope of PCAS. Rehabilitation will lead to the development of a stable diverse re-wetted cutaway landscape that will have added benefits for amenity in the future.

*4.3.4 Monitoring*

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

*4.3.5 Flooding, drainage or other impacts on adjacent land.*

It is the intention of Bord na Móna that the re-wetting of the bogs will be carried out in such a manner that does not impact on third party lands. Where it is deemed that blocking of a shared drain would cause any

adjoining lands to be adversely affected, this will be avoided and alterations made to the rehabilitation plan. In general, drains around the margins of the bog will not be blocked.

External consultants have been appointed to carry a hydrological assessment to identify any potential impacts to neighbouring lands and to mitigate against any such impacts. No issues were identified. There is no potential for direct impacts on arterial drainage downstream.

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

#### *4.3.6 Amenity*

Creating amenity such as walking tracks or greenways is not part of the direct scope of PCAS. There is no current amenity planned for Bloomhill by BnM. Currently there are several feasibility studies considering potential greenway routes in Offaly and one such potential route would be along the BnM railway from Bunihinly, through Bloomhill and linking to Blackwater. PCAS will enable and support any future amenity development. There can be further opportunities to develop amenity at this site. Any future amenity can be positively aligned and integrated to any after-use plans following the completion of the proposed rehabilitation at Bloomhill Bog. Rehabilitation measures proposed for Bloomhill Bog do not need to be amended to integrate any future amenity projects positioned along the margin of the former production bog or along the former bog railways.

#### *4.3.7 Water quality*

It is the expectation of BnM that rehabilitation measures should positively impact the water quality in receiving water bodies through enhancing the water attenuation across rehabilitated sites. The robust water monitoring programme implemented as part of PCAS will be used to assess water quality leaving rehabilitated sites at designated points. Biological monitoring of associated water courses is outside the scope of the PCAS scheme.

#### *4.3.8 Future management*

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

Bord na Móna considers issues regarding estate security, fire risk, invasive species and water pollution of utmost importance. BnM intends to maintain security and manage fire risk over the entirety of the estate. In this regard, PCAS activities, should have no detrimental impact on these issues. Regarding water pollution, BnM is regulated by the EPA and as such adheres to the strict water pollution measures laid out by the same.

#### *4.3.9 Mongan Bog SAC*

Bord na Móna will continue to engage with NPWS regarding the conservation of Mongan Bog. The industrial railway is a critical piece of infrastructure for Bord na Móna and will be required until milled peat stock is removed from Bunihinly, Kilgarvan and Bloomhill Bogs. The travel path is required for continued maintenance

of the industrial railway. It is anticipated that the bog railway will be decommissioned when peat stocks are removed from the above bogs. This is likely to occur in 2024-2025.

Bord na Móna will consider the future use of this travel path when the bog railway has been decommissioned. Currently it would not be feasible to carry out blocking along the remaining drains along the travel path adjacent to Mongan Bog SAC as there is a risk that blocking the remaining drains would render the travel path impassable and impact on maintenance of the industrial railway.

#### *4.3.9 Other issues*

Other issues, including after-use and management issues outside the boundary of Bloomhill Bog, are acknowledged but are specifically outside the scope of this rehabilitation plan.

Security: It is the intention of Bord na Móna to keep secure the estate and ensure that any anti-social behaviour that occurs within the estate is reported and dealt with by the appropriate authorities.

#### *4.3.10 Concluding statement.*

- Much of Bloomhill bog has developed a mosaic of habitats already since the cessation of peat production. However, some parts of Bloomhill bog includes large areas of bare peat. This will not be radically changed.
- No specific issues were raised during consultation that required significant changes to the substance of the rehabilitation plan.
- Issues raised by several consultees in relation to potential impacts on adjacent land had already been accounted for during the hydrological analysis and assessment, and corresponding adaptations to incorporate Drainage Management Plan mitigation measures.
- Several marginal drains will not be blocked to avoid impacts on adjacent lands, rights of way or turf-banks. This does not change the overall rehabilitation goals and outcomes and can be integrated with the other rehabilitation measures to allow cutaway re-wetting.
- No changes were required to the rehabilitation plan to enable any future potential amenity.

# 5. REHABILITATION GOALS AND OUTCOMES

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

- Meeting conditions of IPC Licence.
- Stabilisation or reduction in water quality parameters of water discharging from the site (e.g. suspended solids).
- Reducing pressure on receiving water-bodies that have been classified as At Risk from peatlands and from peat extraction, via stabilization or improving water-quality from this bog, and therefore, reducing pressures.
- Optimising hydrological conditions for **climate action benefits as part of PCAS**.
- Carrying out an intensive rehabilitation measures in the area that is recently out of peat extraction (including hydrological management, drain-blocking, re-profiling, wetland creation, fertiliser application, seeding of vegetation &, inoculation of *Sphagnum,* where appropriate).
- Optimising hydrological conditions for the development of embryonic *Sphagnum*-rich vegetation communities on deep residual peat, where possible.
- Optimising or enhancing hydrological conditions for the development of Reed Swamp and fen on shallow more alkaline peat and other subsoils.
- Integrating rehabilitation measures with current land-use (e.g. turf-cutting).
- Optimising hydrological conditions for the protection of any exposed archaeological structures, their retention in situ and preservation into the future, where possible.
- Taking account of potential future land-uses.
- The main goal and outcome of this plan is the successful rehabilitation (environmental stabilisation) of peatlands used for industrial peat production at the bog in a manner that is acceptable to both external stakeholders and to Bord na Móna and which optimise climate action and other ecosystem service benefits.

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

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

- Rehabilitating former industrial peat production bog will also in the longer-term support other ecosystem services such as such the development of new habitat to support biodiversity and local attenuation of water flows from the bog.
- WFD status in receiving water bodies can be affected by peatlands and peat extraction, but is also affected by other sources such as agriculture. In addition, receiving water bodies that are assessed as At Risk from peatlands and from peat extraction are likely to have several contributary sources of impacts (private peat extraction and Bord na Mona).
- Re-wetting in general will benefit the future preservation of most known and unknown archaeological features.
- Bord na Móna are also planning rehabilitation measures in some adjacent bogs (e.g. Belmont, Bunahinly-Kilgarvan) in 2021/2022. There are expected to be cumulative water quality and other ecosystem service benefits to receiving water bodies such as the Shannon from rehabilitation to more than one bog in the same catchment.

# 6. SCOPE OF REHABILITATION

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

- The area of Bloomhill Bog (See Drawing number BNM-DR-23-15-01 titled **Bloomhill Bog: Bog Site Location**).
- EPA IPC Licence - Ref. P0502-01. 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. Bloomhill Bog is part of the Blackwater Bog Group.
- The Scheme is designed to exceed the stabilisation requirements as defined by the IPC Licence. This scheme is designed to enhance the ecosystem services of Bloomhill Bog, in particular, optimising **climate action benefits of the area recently out of industrial peat extraction**. The proposed interventions will mean that environmental stabilization is achieved (meaning IPC obligations are met) and, in addition, significant other ecosystem service benefits particularly for climate action will be accrued.
- The local environmental conditions of Bloomhill Bog identify wetland creation, dry cutaway measures and deep peat re-wetting as the most suitable rehabilitation approach for the area recently out of peat production at this site.
- The key objective of rehabilitation, as defined by this licence, is **environmental stabilisation** of the bog. Bord na Móna have defined the key goal and outcome of rehabilitation at Bloomhill Bog as **environmental stabilisation** of the site via **optimising climate action benefits, where possible, and integrating rehabilitation with the existing land-uses**. The re-wetting of residual peat in the area recently out of peat extraction will be optimised, **setting the site on a trajectory towards the development of peat-forming communities on residual deep peat, and the development of wetlands/Reed Swamp and fen on shallow more alkaline peat and other subsoils.**
- The BnM review of a potential renewable energy project at Bloomhill Bog is a temporal constraint on the scope of rehabilitation. It is expected that the decision to develop a renewable energy project at Bloomhill Bog will take place within 1-2 years.
- Enhanced Rehabilitation of Bloomhill 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.

## 6.1 Key constraints

- **Bog conditions.** Rehabilitation outcomes of sites are constrained by the environmental characteristics of these particular areas. For example, there is potential for raised bog restoration at some sites where there has not been significant industrial peat extraction and the peat body is largely intact (deep peat sites that are drained). At other sites, most of the peat mass has been removed, the environmental characteristics of these areas have therefore changed radically (peat depths, hydrology, water chemistry, substrate type, nutrient status, etc.) and there will therefore be different habitat outcomes (wetlands, fen, heathland, grassland and Birch woodland). At Bloomhill Bog, peat depths of above 1.1m occur over most of the site with large sections containing residual peats of >2.6m. Some pockets of shallower peat exist in the south west section of the site.
- Furthermore, there are local factors (such as topography and drainage) that will influence the future trajectory of this bog. At Bloomhill Bog, most of the former production area is bare peat. There are some area of pioneer cutaway vegetation communities developing near the field drains or in wet

topographical depressions. There are more developed scrub, immature woodland and woodland habitats as well as raised bog remnants in the marginal areas of the site. These need to be considered as part of the wider rehabilitation work.

- **Potential land-use.** Bord na Móna are reviewing the potential to develop a potential renewable energy project at Bloomhill Bog. It is expected that this review will be completed in 1-2 years. In advance of this review of renewable energy potential, it is planned to rehabilitate **part** of Bloomhill Bog in 2022-2024.
- Bord na Móna remain committed to rehabilitating **all** of Bloomhill Bog and to meeting IPC Licence conditions for this bog. The remaining area will be rehabilitated after the renewable energy review is complete. The peatland rehabilitation of the remaining area will **either** be in association with a potential renewable energy project, with peatland rehabilitation integrated into the proposed project, **or** will be completed in the future in the absence of any proposed renewable energy project. Phasing rehabilitation in way has the potential to support additional climate action measures (integrating renewable energy).
- See Bloomhill Bog: Mapbook, which outlines the proposed cutaway footprint to be rehabilitated with PCAS enhanced rehabilitation measures (drawing number BNM-DR-23-15-05: Enhanced Rehab Measures and BNM-DR-23-15-20: Standard Rehab Measures). A minor road divides the eastern side from the western side of the bog and forms a natural boundary between the area to be rehabilitated and the constraint area being considered for future land-use. At this stage, it is not anticipated that any future potential land-use in the east side of the site will impact on the proposed rehabilitation in the western side of the site, as there is a natural hydrological break (the minor road).
- **Surrounding landscape and neighbours.** Another key constraint is the interaction between the Bord na Móna sites and the surrounding landscape. Care has to be taken that no active rehabilitation management is carried out that could negatively and knowingly impact on surrounding land. This includes any hydrological management on neighbouring farmland, as well as potential changes to the hydrology of surrounding designated sites. It is anticipated that the work proposed here (blocking drains and re-wetting cutaway peatlands) will not have any flooding impacts on adjacent land.
- **Archaeology**. The discovery of monuments or archaeological objects during peatland rehabilitation may potentially constrain the rehabilitation measures proposed for a particular area. If this occurs, rehabilitation measures will be reviewed and adapted. An archaeological impact assessment of the proposed rehabilitation at Bloomhill Bog will be carried out (Appendix IX). Rehabilitation in areas of archaeological interest will be avoided or amended (e.g. buffers in line with Best Practice) to avoid or minimise impact to any archaeological features (Appendix IX).
- **Mongan Bog SAC**. Bord na Móna still operate a travel pass and bog railway along the east side of Mongan Bog SAC. This area will be rehabilitated when the bog railway is not required and decommissioned. No measures are proposed for the high bog area (not in the ownership of Bord na Móna).
- **Public Rights of Way**. Where a public right of way or similar burden exists on Bord na Móna property, consideration will be given to ensuring that this remain intact where possible. In some instances, depending upon previous land uses and management, alternative solutions may be required. These will be explored in consultation with local communities and statutory bodies during the consultation work associated with the decommissioning and rehabilitation work described here. No known rights of way exist at Bloomhill Bog.

## 6.2 Key Assumptions

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

## 6.3 Key Exclusions

The scope of this rehabilitation plan does not cover:

- The longer-term raised bog restoration trajectory of the site. The plan covers the short-term rehabilitation **actions** and **a monitoring and after-care programme** to monitor the rehabilitation during the Scheme and to respond to any needs. It is expected that this rehabilitation plan will set the site on an enhanced and accelerated trajectory towards stabilisation and deep peat re-wetting. The plan does not set any goals or outcomes, for example, the extent (specific area) of active raised bog habitat (ARB) that may develop at this site in the long-term. This is beyond the scope of this rehabilitation plan.
- This plan is not intended to be an after-use or future land-use plan for Bloomhill Bog.
- The high bog area of Mongan Bog SAC. While this area is still part of the IPC Lisence, its ownership has been transferred to An Taisce.
- The longer-term management of this site, potentially as a nature conservation site, or for amenity, or for other uses in the future.

# 7. CRITERIA FOR SUCCESSFUL REHABILITATION

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

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

Rehabilitation is generally defined by Bord na Móna as

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

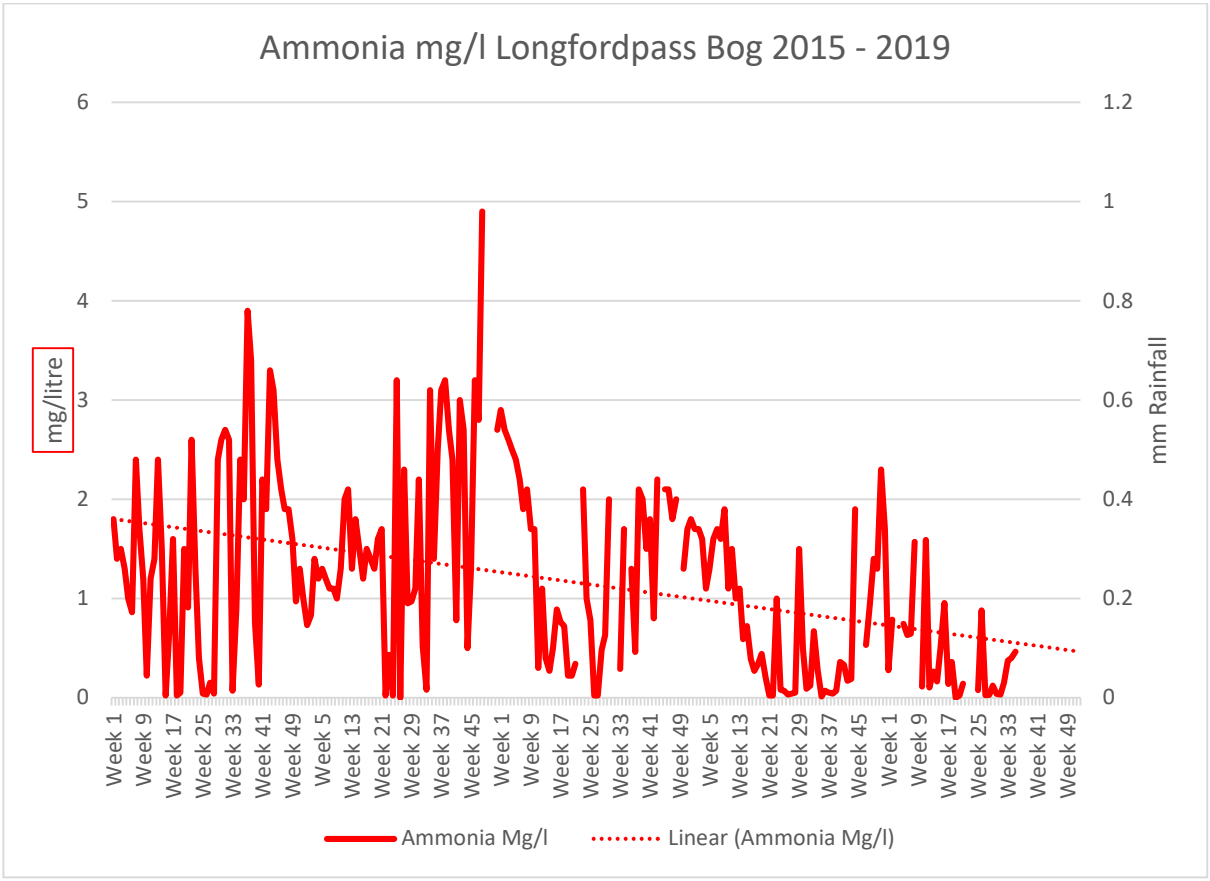
## 7.1. Criteria for successful rehabilitation to meet EPA IPC licence conditions:

- Rewetting of residual peat in the former area of industrial peat production to offset potential run off of suspended solids and to encourage/accelerate development of vegetation cover via natural colonisation, and reducing the area of bare exposed peat. See Table 7.1 for a summary of the criteria for successful rehabilitation and associated monitoring. The target will be the delivery of measures and this will be measured by an aerial survey after rehabilitation is completed.
- That there is a stabilizing/improving concentration of suspended solids and ammonia in discharges from Bord na Móna sites, associated with the measures undertaken to stabilize the peat surface by the blocking of the internal drainage system and the maximized rewetting of the peat surface.This will be demonstrated by developing a stable or downward trajectory of water quality indicators (suspended solids and ammonia) towards what would be typical of a re-wetted cutaway bog. This will be measured via water quality monitoring (suspended solids and ammonia) for at least 2 years after the rehabilitation has been completed.
- Receiving water bodies have been classified under the River Basin Management Plan and this classification includes waters that are At Risk from peatlands and peat extraction. The success criteria will be that the At Risk classification will see improvements in the associated pressures from this peatland or if remaining At Risk, that there is an improving trajectory in the pressure from this peatland.

With regard to predicting and estimating likely trends that might materialize or could be considered as a target, monitoring of surface water ammonia emissions from Longfordpass bog in Littleton over 3 yrs., post cessation of peat extraction with ongoing rehabilitation, were considered. These are indicating a downward trend in Ammonia concentrations (Figure 7.1).

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

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



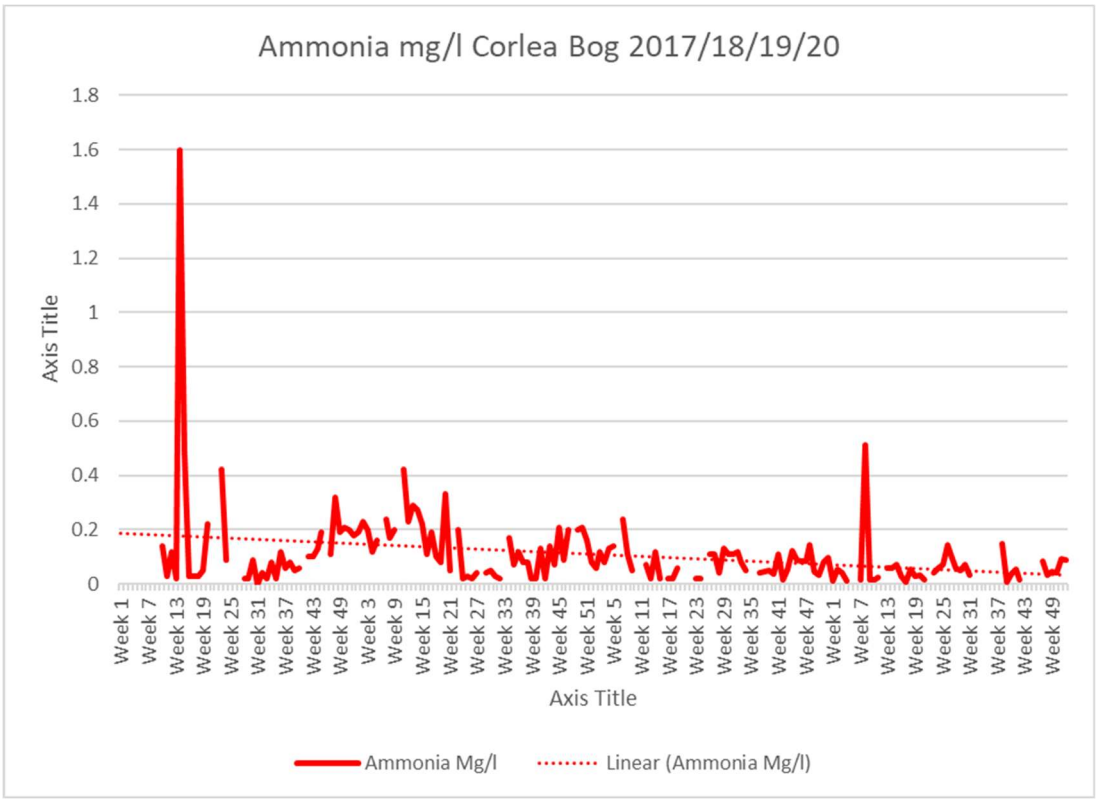




**Figure 7.1. Ammonia trends at Longfordpass and Corela 2015-2020.**

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

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

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

| Criteria type | Criteria | Target | Measured by | Expected Time-frame |
|---|---|---|---|---|
| IPC validation | Rewetting in the former area of industrial peat production | Delivery of rehabilitation measures<br>Reduction in bare peat. | Aerial photography after rehabilitation has been completed – to demonstrate measures (drain-blocking)<br>Establishment of a baseline for future monitoring of bare peat, | 2022-2025 |

| | | | | |
|---|---|---|---|---|
| | | | vegetation establishment and habitat condition. | |
| IPC validation | Key water quality parameters<br>Ammonia, Phosphorous, Suspended solids, pH and conductivity | Reduction or stabilisation of key water quality parameters | Water quality monitoring. Started in advance of the proposed rehabilitation. | 2021-2024 |
| IPC validation | Reducing pressure from peat production on the local water body catchment (WFD) | No decline in the WFD status of the local river catchment related to this bog | EPA WFD monitoring programme | WFD schedule |
| Climate action verification | Optimising the extent of suitable hydrological conditions to optimise climate action | Optimal extent of suitable hydrological conditions | Aerial photography and Habitat mapping to map extent of suitable hydrological conditions.<br>Baseline monitoring to be carried out during the scheme when rehabilitation is complete. Sites can be re-monitored in the future and compared against this baseline. | 2022-2025 |
| Climate action verification | Reduction in carbon emissions. | Reduction in carbon emissions | Carbon emissions – estimated using a high bog condition assessment and appropriate carbon emission factors. | 2022-2025 |
| 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<br>Baseline monitoring to be carried out during the scheme when rehabilitation is complete. Sites can be re-monitored in the future and compared against this baseline. | 2022-2025 |
| Climate action verification | Biodiversity and ecosystem services. | Improvement in biodiversity and ecosystem services. | Metrics that relate to selected biodiversity and ecosystem services (to be defined). | 2022-2025 |

| | | | | |
|---|---|---|---|---|
| | Habitat establishment<br>Presence of key species – Sphagnum<br>Breeding and wintering birds | | Presence of key species – Sphagnum – Walkover survey<br>Breeding birds – Breeding bird survey<br>Pollinators – Pollinator walk | |

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

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

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

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

- Rehabilitation measures have been designed to accelerate and work with natural colonisation and other natural processes. Bord na Móna experience of rehabilitation has shown that re-wetting improves conditions for natural colonisation and that natural colonisation is accelerated where the environmental conditions are most suitable. Rehabilitation measures have been designed to modify the conditions of areas within sites where conditions are less suitable for natural colonisation (modifying hydrology, topography, nutrient status or availability of potential seed sources).
- **Monitoring to be robust and effective.** Rehabilitation Monitoring will be established to validate the success of rehabilitation as required by Condition 10 of the IPC Licence and to verify the benefits of the proposed enhanced measures to optimise climate action. This will focus on a collecting a range of scientific data that can then quickly be adapted and into metrics that can be used to measure changes in various ecosystem services.

## 8. Rehabilitation Actions and Time Frame

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

A number of illustrative figures have been produced to inform Rehab Planning and Design, including Aerial Photography, Peat Depths, LiDar Surface Maps, and Depression Analysis modelling; these are included in the accompanying Mapbook as the drawings referenced below:

BNM-DR-23-15-22 titled **Bloomhill Bog: Aerial Imagery2020**

BNM-DR-23-15-04 titled **Bloomhill Bog: PeatDepths**

BNM-DR-23-15-03 titled **Bloomhill Bog: LiDAR Map**

BNM-DR-23-15-09 titled **Bloomhill Bog: Depression Analysis**

The rehabilitation actions themselves will be a combination of PCAS measures to re-wet peat. The distribution of these measures is provisionally outlined in drawing titled **BNM-DR-23-15-05 Bloomhill Bog: Rehabilitation Measures** in the accompanying Mapbook (Note that the actual distribution of these measures may be subject to change in response to stakeholder consultation and refinement of the enhanced rehabilitation measures.)

These enhanced measures for areas out of recent peat extraction at Bloomhill bog will include**:**

- Re-assessment of the pumping regime; removal of the pump on site is desired if this has no significant external impact. Initial hydrological modelling indicates that parts of the west of the site will develop a mosaic of open water and wetland habitats with permanent deeper water when pumping is reduced or stopped. Hydrological management will look to optimise summer water levels to maximise the development of wetland vegetation (by looking to set water depths at < 0.5 m, where possible). It is inevitable that some sections will naturally have deeper water due to the topography at this site. Water-levels will be adjusted at outfalls and by adjusting piped drainage. More sustainable permanent gravity drainage solutions will be examined. Some targeted bunding may be required. It is expected that a natural seasonal regime of water fluctuation will develop, with water-levels fluctuating in association with levels in the adjacent watercourses and associated groundwater conditions.
- It is proposed to eventually decommission two pumps along the west side of Bloomhill in the area to be rehabilitated.
- Intensive drain blocking to create wetlands, and the introduction of Reeds and other Rhizomes, where needed;
- Management of water levels with overflow pipes;
- Re-alignment of piped drainage;
- Re-wetting the deep peat and some shallow peat areas of the bog using berms and field re-profiling. This enhanced measure seeks to create large (c. 45m x 60m) flat areas or cells of shallow (< 10 cm) water conditions on bare peat, across multiple fields that are enclosed by shallow berms to retain shallow surface water;
- Re-wetting some deep peat areas of the bog through field drain blocking to create peat barriers (up to seven every 100 m along each field drain);

- Regular drain blocking (3/100) on dry cutaway adjacent to wetland mosaics, along with the blocking of outfalls and management of water levels;
- Field re-profiling on deep peat fields using a screw leveller, along with drain blocks, drain infilling and keyed berms across the fields, in conjunction with outfall management;
- Inoculation of *Sphagnum* on compatible residual deep peat areas;
- Targeted fertiliser applications on bare peat areas to accelerate vegetation establishment on headlands and high fields.

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

- Targeted drain blocking around existing wetlands or standing water to create/promote the spread of wetland habitats;
- Optimising water retention in wetland areas, including placement of berms where required;
- Regular drain blocking (3/100) in targeted dry cutaway adjacent to wetland mosaics, along with the blocking of outfalls and management of water levels;
- 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 water quality parameters meet targets the condition of the silt ponds will be reviewed. Silt ponds will either be de-watered (water levels lowered to a level where the silt pond will naturally develop as a small wetland feature), left in situ, or infilled (where discharges do not require silt control).

An indication of the areas for these various measures is shown in Table 8.1 and in **BNM-DR-23-15-05 Bloomhill Bog: Enhanced Rehabilitation Measures**.

*Table 8.1 Enhanced rehabilitation measures and target area at* Bloomhill *Bog. 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.*

| Type | Code | Description | Area (Ha) |
|---|---|---|---|
| Deep peat cutover bog | DPT1 | Regular drain blocking (3/100 m) + modifying outfalls and managing water levels with overflow pipes | 0 |
| | DPT2 | More intensive drain blocking (7/100 m) + modifying outfalls and managing overflows | 3.9 |
| | DPT3 | More intensive drain blocking (max 7/100 m), + field reprofiling with screw leveller +drain infilling +cross berms + modifying outfalls and managing overflows | 0 |
| | DPT4 | Berms and field re-profiling (45m x 60m cell) + modifying outfalls and managing overflows + drainage channels for excess water + *Sphagnum* inoculation | 217.4 |
| | DPT5 | Cut and Fill cell bunding (30m x 30m cell) + modifying outfalls and managing overflows + drainage channels for excess water + *Sphagnum* inoculation | 0 |
| Dry cutaway | DCT1 | Modifying outfalls and managing water levels with overflow pipes | 0 |
| | DCT2 | Regular drain blocking (3/100 m) + modifying outfalls and managing water levels with overflow pipes + targeted fertiliser treatment | 38.0 |
| | DCT3 | More intensive drain blocking (max 7/100 m) + modifying outfalls and managing overflows + targeted fertiliser treatment | 0 |
| Wetland cutaway | WLT1 | Turn off or reduce pumping to re-wet cutaway + modifying outfalls and managing water levels with overflow pipes | 0 |
| | WLT2 | Turn off or reduce pumping to re-wet cutaway + modifying outfalls and managing water levels with overflow pipes + Targeted blocking of outfalls within a site | 31.7 |
| | WLT3 | Turn off or reduce pumping to re-wet cutaway + modifying outfalls and managing water levels with overflow pipes + Targeted blocking of outfalls within a site + constructing larger berms to re-wet cutaway + transplanting Reeds and other rhizomes | 0 |
| | WLT4 | More intensive drain blocking (max 7/100 m), + modifying outfalls and managing overflows + transplanting Reeds and other rhizomes | 44.2 |
| | WLT5 | More intensive drain blocking (max 7/100 m), + field reprofiling + modifying outfalls and managing overflows + transplanting Reeds and other rhizomes | 0 |
| Marginal land | MLT1 | No work required | 69.6 |
| | MLT2 | More intensive drain blocking (max 7/100 m) | 3.6 |
| Additional Work | AWT2 | Targeted drain blocking | 12.7 |
| **Other** | | Largely rehabilitated. Assessment will consider additional enhancement measures that align with current land-use, amenity and constraints | 0 |
| **Other** | | Silt-ponds | 1.9 |
| **Other** | | Constrained Areas | 465.9 |
| **Other** | | Archaeology Constrained Areas | |
| **Total** | | | 889.0 |

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

- Seek formal approval of the enhanced plan, noting the alternative standard plan should funding from the Scheme not materialise, from the EPA;

- Agree an *ex ante* budget of eligible costs (based on the approved enhanced plan) with the Scheme regulator;
- Develop a detailed site plan with detailed site drawings outlining how the various rehabilitation methodologies (within the proposed PCAS) will be applied to Bloomhill Bog. This will take account of peat depths, topography, drainage and hydrological modelling. (See **BNM-DR-23-15-05 Bloomhill Bog: Enhanced Rehabilitation Measures** for an indicative view of the application of different rehabilitation methodologies);
- A review of remaining milled peat stocks will be carried out. Some peat stock remains on the site. All peat stocks will eventually be removed. It is expected that peat stocks will be removed from this site over several years.
- A drainage management assessment of the proposed enhanced rehabilitation measures has been carried out, any issues identified resolved and the rehabilitation plan adapted, where required.
- A review of known archaeology and an archaeological impact appraisal of the proposed rehabilitation has been carried out. The results of this assessment has been incorporated into the rehabilitation plan to minimise known archaeological disturbance, where possible.
- A review of issues that may constrain rehabilitation such as known rights of way, turbary and existing land agreements has been carried out. There is some known turbary on this bog.
- An ecological appraisal of the potential impacts of the planned rehabilitation on the presence of sensitive ground-nesting bird breeding species (e.g. breeding waders) will be carried out. The scheduling of rehabilitation operations will be adapted, where required.
- Ensure all activities comply with the environmental protection requirements of the IPC Licence.
- An Appropriate Assessment of the Rehabilitation Plan has been carried out. (Note that the rehabilitation plan for Bloomhill Bog went to Stage 2, NIS). See Bloomhill Decommissioning and Rehabilitation Plan – Addendum 1 for more details.
- Track implementation and enforcement of the relevant IPC Licence conditions, and other environmental control measures during the implantation of the rehabilitation plan.

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

- Carry out proposed measures as per the detailed site plan. This will include a combination of drain blocking, peat field re-profiling, cell-bunding and fertiliser applications targeting headlands, high fields and other areas. All rehabilitation will be carried out with regard to environmental control measures (Appendix IV);
- Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions;
- Carry out the proposed monitoring, as outlined.
- While natural colonisation is expected to commence almost immediately once peat production ceases, Phase 2 actions will be carried out in targeted areas to accelerate re-vegetation and colonisation of target species. Phase 2 actions may include seeding of targeted vegetation and inoculation of *Sphagnum*;
- Silt ponds will be monitored during this period and there will be continued maintenance and cleaning to prevent potential

- from the site during the rehabilitation phase; and
- Submit an *ex post* report to the Scheme regulator to verify the eligible measures to be carried out in year 1 of the Scheme, and an *ex ante* estimate for year 2 of the Scheme; and so on for each year of the Scheme

## 8.3 Long-term (>3 years)

- Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary;
- Delivery of a monitoring, aftercare and maintenance programme (See section 10.2 below);
- Decommissioning of silt-ponds will be assessed and carried out, where required; and
- Reporting to the EPA will continue until the IPC License is surrendered.

## 8.4 Timeframe

- **2021**: Short-term planning actions.
- **2022-2024**: Short-term practical actions.
- **2023-2024**: Long term practical actions. Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- **2024**: Long term practical actions. Decommission silt-ponds, if necessary

## 8.5 Budget and costing

Bord na Móna (BnM) understand that it is the Minister's intention to impose an obligation on Bord na Móna to develop a package of measures, 'the Scheme', for the enhanced decommissioning, rehabilitation and restoration of cutaway peatlands (PCAS). It is understood that additional costs of the Scheme will be supported by the Government through the Climate Action Fund and Ireland's National Recovery and Resilience Plan. However, only the additional costs associated with the additional and enhanced rehabilitation, i.e, measures which go beyond the existing decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support.

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

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

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

# 9. AFTERCARE AND MAINTENANCE

## 9.1 Programme for monitoring, aftercare and maintenance

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

- There will be **initial quarterly monitoring assessments** of the site to determine the general status of the site, the condition of the silt ponds, assess the condition of the rehabilitation work, monitoring of any potential impacts on neighbours land, general land security, boundary management, dumping and littering.
- The number of these site visits will reduce after 2 years to twice annually and then after 5 years to annual visits.
- These monitoring visits will also consider any requirements for further practical rehabilitation measures.
- The **baseline condition of the site will be established** post-rehabilitation implementation by using an aerial survey to take an up to date aerial photo, when rehabilitation is completed. This will be used to verify completion of rehabilitation measures. The extent of bare peat will be assessed using this baseline data, and habitat maps will be updated, if needed.
- **Water quality monitoring** at the bog will be established. The main objective of this water quality monitoring will be to establish a baseline and then monitor the impact of peatland rehabilitation on water quality from the bog.
- In order to assist in monitoring surface water quality from this bog, it is planned to increase the existing licence monitoring requirements to sampling for the same parameters to every month during the scheduled activities and for a period up to two years. post rehabilitation, depending on the period required to confirm that the main two parameters, suspended solids and ammonia are remaining compliant with the licence emission and trigger limit values and there is an improving trajectory in these two parameters i.e. reduction in concentration.
- This new sampling programme commenced in November 2020 and is enabling a baseline to be established, with sampling to progress during the scheduled works, and for a period of up to 2 years post rehabilitation. Depending on the period required to confirm that the main two parameters, suspended solids and ammonia as remaining compliant with the licence emission and trigger limit values and there is an improving trajectory in these two parameters i.e. reduction in concentration, the monitoring programme and intensity will be periodically reviewed and amended.
- In the preparation of this monitoring programme, Bord na Mona have been providing the Local Authority Water Programme (LAWPRO) with details of the surface water emissions points associated with this bog and will be amending some of the proposed monitoring locations on foot of this engagement. LAWPRO have in turn provided details of their 2021 monitoring programme and these are included in the Water Quality Map.
- This is necessary to ensure that there is alignment with the WFD monitoring programme and that where possible, the monitoring programme will enable any improvements in water quality or establishing trends to be quantified against any available WFD monitoring data. It will also enable the periodic sharing of data which will inform the monitoring reports, success criteria and enable LAWPRO under the Water Framework Directive to track any changes in pressures and be aware of changes in water chemistry.
- This enhanced monitoring programme will aim to include a minimum of 70% of a bog's drainage catchments, whatever number of surface water outlets these include.

- Monitoring results will be maintained, trended every six months and reported on each year and as required, as part of the requirement to report on Condition 10.1 of the IPC Licence on Bog Rehabilitation in the Annual Environmental Report, and will be provided to LAWPRO and the EPA as required to inform progress and national monitoring requirements under the WFD. These results will also be available in April each year as a requirement of the Annual Environmental Report at www.epa.ie.
- The parameters to be included as per condition 6.2 of the IPC Licence include monthly monitoring for pH, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour & COD. In addition, DOC has been included as a parameter to try and identify any changes in carbon in the surface water, and where required by LAWPRO, to assist in investigating other changes in water chemistry, the series of parameters can be reviewed and amended.
- This monthly sampling regime on a selected number of silt ponds will be carried out over a two-year cycle. The original (licence) requirement was for a quarterly sampling regime but this has been increased to a monthly regime to appropriately track the changing water chemistry that will occur as part of this enhanced rehabilitation. In addition, DOC will be included as a parameter to try and identify any changes in carbon in the surface water.
- If, after two years, key criteria for successful rehabilitation are being achieved and key targets are being met, then the water quality monitoring will be reviewed, with consideration of potential ongoing research on site. The water quality data, the aerial surveys and the habitat mapping will be collated and will be submitted to the EPA as part of the final validation report.
- If, after two years, key criteria for successful rehabilitation have **not** been achieved and key targets have **not** been met, then the rehabilitation measures and status of the site will be evaluated and enhanced, where required. This evaluation may indicate no requirement for additional enhancement of rehabilitation measures, but may demonstrate that more time is required before key criteria for rehabilitation has been achieved. Monitoring of water quality will then also continue for another period to be defined.
- Where other uses are proposed for the site that are compatible the provision of biodiversity and ecosystem services, these will be assessed by Bord na Móna in consultation with interested parties. Other after-uses can be proposed for licensed areas and must go through the appropriate assessment process and planning procedures.

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

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

- It is proposed to monitor the improvement of some biodiversity ecosystem services. To be defined in relation to monitoring of the overall Scheme and after consultation with stakeholders.

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

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

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

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

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## BLOOMHILL DECOMMISSIONING AND REHABILITATION PLAN - ADDENDUM 1

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Blackwater bog group (Ref. P0502-01). 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. Bloomhill bog is part of the Blackwater bog group. Bloomhill Bog is located in Co. Offaly.

This addendum outlines the findings of the Appropriate Assessment reporting carried out in respect of proposed PCAS activities at Bloomhill Bog.

## APPROPRIATE ASSESSMENT REPORTING FINDINGS

An Appropriate Assessment Stage 1 Screening Report[2] was commissioned by Bord na Móna to inform whether the proposed PCAS activities at Bloomhill Bog had the potential to result in Likely Significant Effects on European Sites.

Following screening, an Appropriate Assessment was deemed to be required:

*'Following screening it can reasonably be concluded that there is no likelihood of significant effects to nine of the above European Sites because of the proposed project, either alone or in-combination with other plans or projects. Therefore, the potential for significant effects on nine European Sites has been excluded, the Project has been 'Screened Out' from the Appropriate Assessment process, no Appropriate Assessment is required.*

*Following screening it can reasonably be concluded that there is likelihood of significant effects to seven of the above European Sites as a result of the proposed project, either alone or in-combination with other plans or projects. Therefore, the potential for significant effects on any European Sites has not been excluded, and Appropriate Assessment is required in respect of the following European Sites:*

*River Shannon Callows SAC (Site Code: 000216);*

*Middle Shannon Callows SPA (Site Code: 004096);*

*Mongan Bog SAC (Site Code: 000580);*

*Fin Lough SAC (000576);*

*Pilgrim's Road Esker SAC (001776);*

*Mongan Bog SPA (Site Code: 004017); and*

*River Suck Callows SPA (Site Code: 004097).'*

The above European Sites were subject to a Stage 2 Evaluation which concluded as follows:

*'This Natura Impact Statement has been prepared to provide sufficient objective scientific information in support of the proposed development, in order to allow an Appropriate Assessment determination in the context of Article 6(3) of the Habitats Directive. The report has been prepared in order to evaluate the significance of potential effects on European sites from the proposed decommissioning and rehabilitation of Bloomhill Bog, as described in Appendix B, alone and in-combination with other developments.*

[2] Delichon Ecology (2022), Cutaway Bog Decommissioning and Rehabilitation Plan, Screening for Appropriate Assessment & Natura Impact Statement. Bloomhill Bog, Co. Offaly.

*Appropriate Assessment Stage One Screening of all European sites identified within a 15km radius of the proposed development evaluated that the potential for significant effects on the Special Conservation Interests or Qualifying Interests of three no. European Sites could not be excluded. In particular, the potential for indirect effects via a deterioration in water quality, and from disturbance to /displacement to fauna.*

*Thus, the respective elements were brought forward for further critical examination in the Natura Impact Statement Report to inform the Appropriate Assessment process.*

*Following examination and analysis, and taking account of the protective measures proposed, the potential for*

- *Disturbance and displacement of SCI waterbird species occurring within the Middle Shannon Callows SPA, River Suck Callows SPA and Mongan Bog SPA were found not to result in adverse effects due to the protective measures around timing and scheduling of works, such as the implementation of an exclusion zone during the period when SCI's may present (Section 3.4.1.12). This exclusion zone (150m) is selected based on the largest Minimum Approach Distance or MAD for the SCI species under consideration and constitutes Best Available Scientific knowledge.*

- *Impacts to water dependent and nutrient sensitive Annex I habitats and species of River Shannon Callows SAC, Pilgrim's Road Esker SAC, Mongan Bog SAC and Fin Lough as a result of deterioration in water quality. These habitats and species are as follows: Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) (6410), Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis) (6510), Alkaline fens (7230), Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)* (91E0), Otter (Lutra lutra) (1355), Active raised bogs (7110), Degraded raised bogs still capable of natural regeneration (7120), Depressions on peat substrates of the Rhynchosporion (7150) and Geyer's Whorl Snail (Vertigo geyeri) (1013).*

- *Disturbance and / or displacement of the otter population associated with the River Shannon Callows SAC.*

*The key protective measure being retention of silt laden water and potentially deleterious materials associated with the decommissioning and rehabilitation works to the project footprint. The attenuation of silt and particulate matter generated as a result of the proposed works is a key mitigation measure for the proposed rehabilitation and decommissioning works. The main source of potential impact to influence significant adverse effects to the downstream areas of the Middle Shannon Callows SPA, River Suck Callows SPA and River Shannon Callows SAC relate to particulate matter run-off from the site, during the rehabilitation works. A key consideration in this regard will be drain blocking as described in Section 3.4.1.5. This methodology relies on the placement of terminal dams at the extremity of the drain; i.e. that closest to watercourse within the receiving environment. The securing of strategic peat dams will allow the hydraulic separation between the proposed rehabilitation works and the receiving and downstream aquatic environment, and in so doing isolating these works from sensitive ecological and environmental receptors within the project zone of influence and in the case of Bloomhill Bog the Middle Shannon Callows SPA, River Suck Callows SPA and River Shannon Callows SAC. Other key mitigation measures include the standard best practice environmental control measures, measures to avoid berm failure, the utilisation of existing surface water management infrastructure and the provision of further bespoke surface water management and mitigation measures. Once operational, the rehabilitated bog will provide further attenuation contributing to positive quality trends to the receiving environment, including the downstream areas of the Middle Shannon Callows SPA and River Shannon Callows SAC.*

*There are no significant effects identified which would adversely affect the Special Conservation Interests or conservation objectives of the various SPA's under consideration with regard to the densities, range or conservation status of the waterbird species and their supporting wetland habitats.*

*There are no significant effects identified which would adversely affect the Qualifying Interests or conservation objectives of the various SAC's under consideration with regard to the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected.*

*The provisions of Article 6 of the 'Habitats' Directive 92/43/EC (2000) defines integrity as the 'coherence of the sites ecological structure and function, across its whole area, or the habitats, complex of habitats and/or population of species for which the site is classified'. It is clear that, given the application of prescribed protective measures for the avoidance of impacts and the implementation of the required mitigation measures, the proposed development will not give rise to adverse effects on the integrity of any of the identified European sites evaluated herein.'*

## APPROPRIATE ASSESSMENT REPORTING RECOMMENDED MITIGATION

### Mitigation Measures

### Description of the measure

The below best practice and bespoke mitigation measures have been designed and are prescribed in cognisance of those water dependent and nutrient sensitive features of Qualifying Interest for which European Sites within the project Zone of Influence have been designated. These measures have been designed and have been prescribed to ensure that all targets and attributes set out for these features of qualifying interest are not compromised or effected by the proposed rehabilitation works at Bloomhill Bog.

Note: References to Figures and/or Tables appear as presented in the NIS prepared to inform Appropriate Assessment.

**Best Practice Environmental Control Measures to be applied to Decommissioning and Rehabilitation Works**

The following Best Practice Environmental Control measures are to be applied as standard to ensure compliance with IPC license Conditions:

- Bog restoration/rehabilitation works will be restricted to within the footprint of the proposed rehabilitation works area.
- The proposed rehabilitation works 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.
- A standard operating procedure overseen by the Project Ecologist will be in place for all PCAS activities to avoid any significant effects on breeding birds. This will include ground nesting birds and will apply to silt pond cleaning, and cutaway activities. Restriction zones will be in place to avoid effects on any identified ground nesting birds/waterfowl as appropriate.
- All plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations (SI 359/1996).
- The proposed works 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, works will be halted.
- Works 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.
- All waste will be sorted by the works crews, managed within the site in designated waste disposal facilities, and removed to a licenced waste facility, in line with BnM Standard operating practice.
- 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.
- All fuels required for machinery and equipment will be stored in a designated location, away from main traffic activity, at the nearest BnM Compound. All fuel will be stored in bunded, locked storage containers. Diesel or petrol fuel and mechanical oils will also be used by site vehicles.
- 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 works will be reduced by keeping spill kits and other appropriate equipment on-site.
- Site works will be carried out in accordance with 'best practice'. In order to ensure compliance and implementation of 'best practice', these measures will be communicated to relevant Bord na Móna staff and updated as required.
- All waste water will be removed by a licenced waste contractor to a licenced waste water treatment facility.
- Any fertiliser used will be Rock Phosphate and will not be applied in the following conditions:
    1. The land is waterlogged;
    2. The land is flooded, or it is likely to flood;
    3. The land is frozen, or covered with snow;
    4. Heavy rain is forecast within 48 hours (forecasts will be checked from Met Éireann).
    5. The ground slopes steeply and there is a risk of water pollution, when factors such as surface run-off pathways, the presence of land drains, the absence of hedgerows to mitigate surface flow, soil condition and ground cover are taken into account.

- Fertiliser will not be spread within 25m of a hydraulic break (where slope indicates runoff potential); 25m of an area subject to annual winter inundation, 25m of a natural watercourse, or 25m of any drains where conveyance is to be retained through the proposed rehabilitation extent.
- Fertiliser will be applied to headlands and bare fields where the surface slope indicates runoff is directed away from the above areas, and to within 2m of internal drainage channels within the cutover high field areas. These drainage channels will be blocked in advance of fertiliser application, restricting potential run-off to downstream drainage channels
- Buffer zones in respect of waterbodies, as specified on https://gis.epa.ie/EPAMaps/, will be adhered with at all times with regard to fertiliser application.

The below image / flow chart (**Figure 15**) provides Bord na Móna's proposed clean up procedures for fuel/oil and peat.

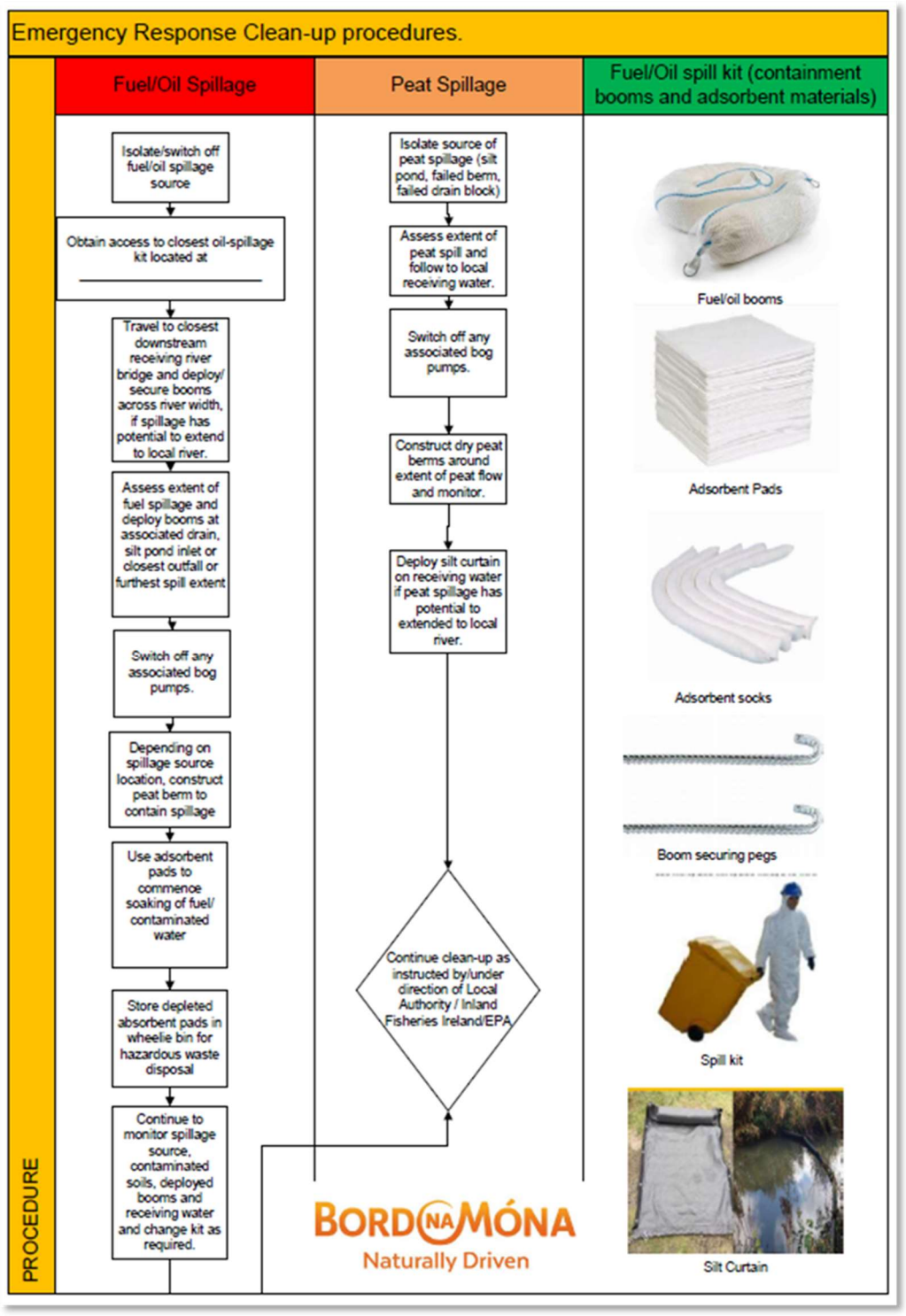
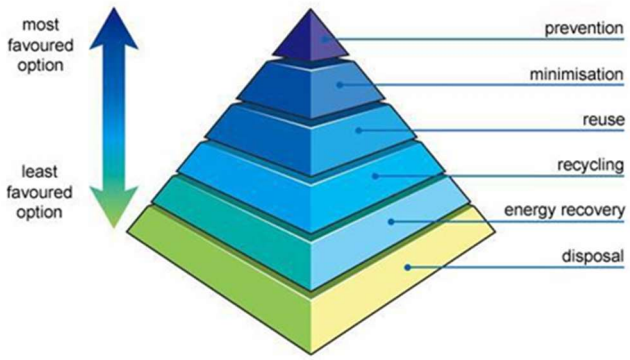



**Figure 15: BnM Emergency Response Clean Up Procedures**

**Best Practice Measures around the treatment of Waste**

Condition 7 of the IPC licence for Peat Extraction at Bloomhill Bog requires waste items to be disposed of or recovered as follows:

- 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.
- 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.
- 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:
    - The names of the agent and transporter of the waste.
    - The name of the persons responsible for the ultimate disposal/recovery of the
    - waste.
    - The ultimate destination of the waste.
    - Written confirmation of the acceptance and disposal/recovery of any hazardous waste consignments sent off-site.
    - 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.
    - 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, as agreed by the EPA, with waste records maintained as required for inspection by authorized persons of the EPA at all times.
- 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.

These best practice measures have been included for the protection of watercourses in the receiving environment, downstream connected European Sites (River Shannon Callows SAC / Middle Shannon Callows SPA) and their nutrient sensitive and water dependent habitats and species of Qualifying Interest.

**Best Practice & Biosecurity**

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.
- For any material entering the site, the supplier must provide an assurance that it is free of invasive species.
- All plant and equipment employed on the proposed works (e.g. diggers, tracked machines, footwear etc.) must be thoroughly cleaned down using a power washer unit, and washed into a dedicated and contained area prior to arrival on site and on leaving site to prevent the spread of invasive aquatic / riparian species such as (but not limited to) Japanese knotweed (Fallopia japonica) and Himalayan Balsam (Impatiens glandulifera). A sign off sheet must be maintained by the contractor to confirm cleaning;
- 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 the works area.

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

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

- All water quality monitoring equipment which has been used in water will be treated with a disinfectant or a strong saline solution and then thoroughly dried (ideally over 24 hours) BEFORE being used in water again.
- Check, Clean, Dry protocol will be adhered with before and after visiting a river or lake for monitoring, in line with Best Practice[3] or for activities such as *Sphagnum* inoculation.
- Virkon Aquatic will be available as required.

These best practice measures have been included for the protection of watercourses in the receiving environment, downstream connected European Sites (River Shannon Callows SAC / Middle Shannon Callows SPA and River Suck Callows SPA) and their nutrient sensitive and water dependent habitats and species of Qualifying Interest.

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

**Silt Ponds**

Silt Ponds – 22 no. Silt ponds with a total volume of 30329.04m$^3$ and area of 2.02ha are in place at Bloomhill Bog and connected to the existing drainage network. These silt ponds, already stipulated and in use as mitigation measures in respect of Peat Extraction under IPC license, will continue to function as the primary intervention in terms of sediment release to receiving waterbodies. It should be noted, that the silt pond network at Bloomhill Bog site will not be the sole mitigation measure to attenuate silt laden waters emanating from the site during the project construction and operational phases. The design of the PCAS scheme requires the creation of internal drain blocking measures (including terminal dams), which will in itself reduce the possibility of surface run-off to the receiving environment during the rehabilitation works. Once rehabilitation works are completed and the bog has been rehabilitated, the bog will act as a natural repository for surface water, regulating and slowing the movement of surface water from Bloomhill Bog to the receiving environment. It is considered that the silt pond network will provide further attenuation and regulation to those measures associated with the PCAS measures during the project construction phase and the rewetted peatland habitat during the project's operational phase.

The water quality emission limit values (under condition 6.2 of the Integrated Pollution Control (IPC) licence issued for Bloomhill Bog) are unique to the water quality impacts from peat extraction, and as requested by the EPA. These values are not appropriate to use as a measures of success with regard to the expected water quality improvements that will arise from ceasing the annual peat extraction activity, removal of all stock and the associated rehabilitation of this bog. Existing water quality results from Bloomhill Bog indicate that suspended solids are well under the ELV that are applied during peat extraction, with ammonia also well under the associate trigger level. Silt ponds are an IPC Licence requirement to manage expected suspended solids that can arise from peat extraction and are not solely relied upon to mitigate impacts from rehabilitation of the peatlands. The silt pond locations are highlighted on (**Figure 16**), and all silt ponds are sized as required under condition 6.10 of the associated IPC Licence with regard to expected impact from the activity of milling peat and associated production processes, and maintained as required under condition 6.7 and 6.8. To that end, it is considered that silt ponds within Bloomhill Bog are sufficiently sized to attenuate any silt or particulate matter

Regular cleaning and reporting on same already forms part of annual (AER) reporting submitted to EPA. All Silt Ponds at Bloomhill Bog site are currently compliant with EPA requirements. **Table 27** below, and **Figure 16** overleaf summarise and illustrate the onsite Silt Pond locations, the figures also illustrates the current flow regime within the main drainage network (into which any other drains also feed). Continued maintenance and reporting on same will be reported on annually until IPC license Surrender.

**Table 27: Silt Ponds in use at Bloomhill Bog site**

| Bog Name | IPC License Reference | Pond No. | Area (m$^2$) | Volume (m$^3$) |
|---|---|---|---|---|
| Bloomhill | 502_01 | BD84 | 497.70212240800 | 746.55318361200 |
| Bloomhill | 502_01 | BH100 | 1588.28598455000 | 2382.42897683000 |
| Bloomhill | 502_01 | BH105 | 695.69264801500 | 1043.53897202000 |
| Bloomhill | 502_01 | BH85 | 525.52840217100 | 788.29260325700 |
| Bloomhill | 502_01 | BH85A | 460.28231866000 | 690.42347799000 |
| Bloomhill | 502_01 | BH86 | 355.38238279600 | 533.07357419400 |
| Bloomhill | 502_01 | BH89_93 | 1523.11080434000 | 2284.66620652000 |
| Bloomhill | 502_01 | BH94_96 | 1318.21958201000 | 1977.32937302000 |
| Bloomhill | 502_01 | BH97 | 398.29159478400 | 597.43739217600 |
| Bloomhill | 502_01 | BH99 | 1920.02989547000 | 2880.04484321000 |
| Bloomhill | 502_01 | BN74 | 647.86693752300 | 971.80040628400 |
| Bloomhill | 502_01 | CB80 | 321.77715054300 | 482.66572581500 |

| Bog Name | IPC License Reference | Pond No. | Area ($m^2$) | Volume ($m^3$) |
|---|---|---|---|---|
| Bloomhill | 502_01 | CB81 | 158.41756619400 | 237.62634929100 |
| Bloomhill | 502_01 | CB82 | 307.14368575300 | 460.71552863000 |
| Bloomhill | 502_01 | CB83 | 1291.06255576000 | 1936.59383363000 |
| Bloomhill | 502_01 | CB83A | 1915.82432704000 | 2873.73649056000 |
| Bloomhill | 502_01 | CC101 | 2644.73071156000 | 3967.09606733000 |
| Bloomhill | 502_01 | CC102 | 1747.80434506000 | 2621.70651759000 |
| Bloomhill | 502_01 | CN75 | 294.86006718900 | 442.29010078300 |
| Bloomhill | 502_01 | CN76 | 459.75836428700 | 689.63754643000 |
| Bloomhill | 502_01 | CN77 | 666.13384325000 | 999.20076487500 |
| Bloomhill | 502_01 | CN79 | 481.45477124500 | 722.18215686700 |
| | | **Total** | **20219.36** | **30329.04** |

The above capacity is considered sufficient for the purposes of decommissioning and rehabilitation.

The attenuation of silt and particulate matter generated as a result of the proposed works is a key mitigation measure for the proposed rehabilitation and decommissioning works. The main source of potential impact to influence significant adverse effects to the downstream areas of the River Shannon Callows SAC relate to particulate matter run-off from the site, during the rehabilitation works. A key consideration in this regard will be drain blocking as described below. This methodology relies on the placement of terminal dams at the extremity of the drain; i.e. that closest to watercourse within the receiving environment. The securing of strategic peat dams will allow the hydraulic separation between the proposed rehabilitation works and the receiving and downstream aquatic environment, and in so doing isolating these works from sensitive ecological and environmental receptors within the project zone of influence and in the case of Bloomhill Bog site and European Sites within the project Zone of Influence.

These mitigation measure has been included for the protection of watercourses in the receiving environment, downstream connected European Sites (River Shannon Callows SAC / Middle Shannon Callows SPA and River Suck Callows SPA) and their nutrient sensitive and water dependent habitats and species of Qualifying Interest.

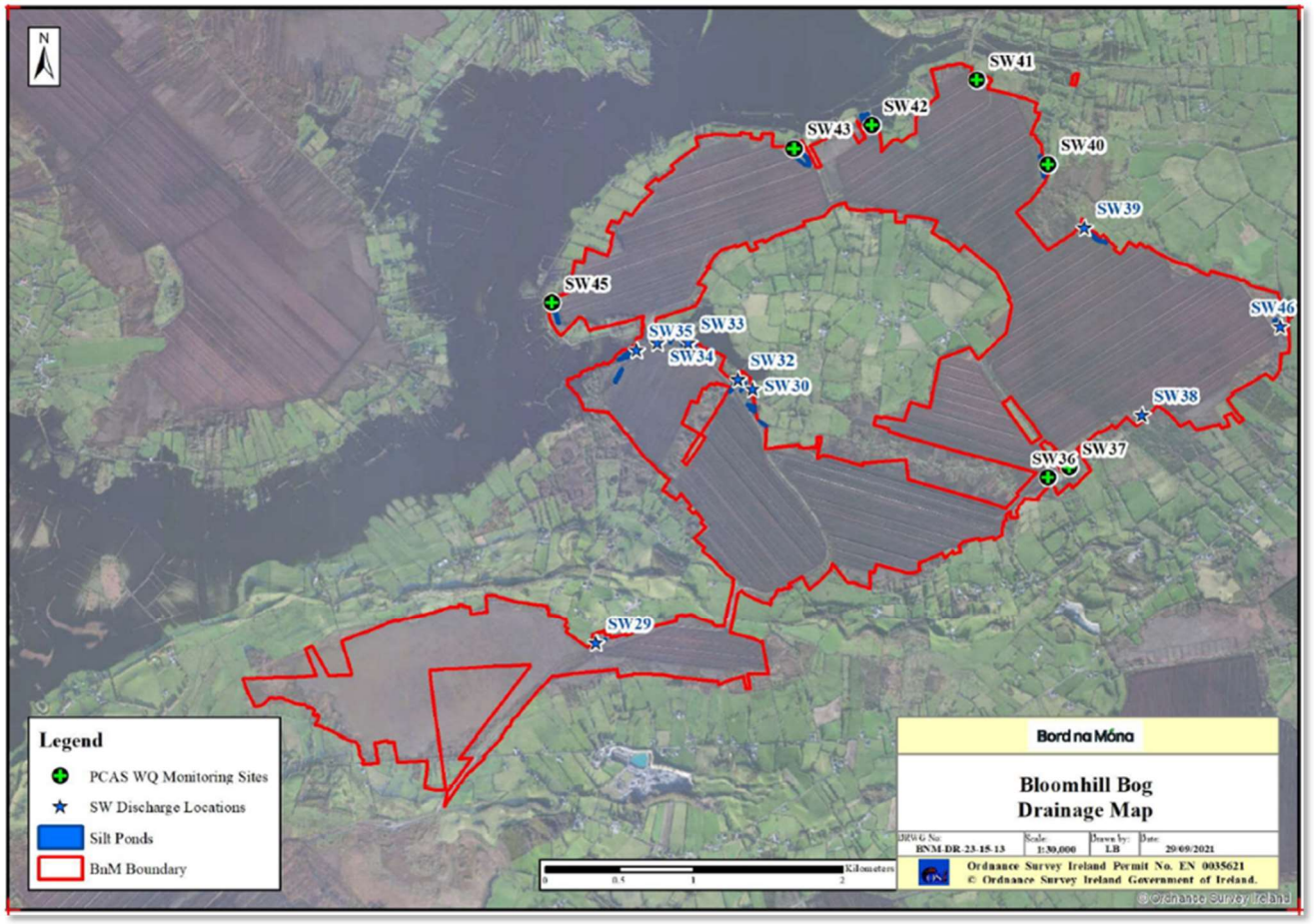



**Figure 16: Bloomhill Bog Site Drainage and Silt Ponds**

**Measures to avoid runoff when carrying out drain blocking**

The principal mitigation for proposed rehabilitation works at Bloomhill Bog site will involve securing the works area from the receiving environment when rehabilitation works are ongoing. This will include the creation of terminal dams at the margins of the rehabilitation works. These dams will secure the works area from the receiving environment, in particular downstream watercourses and waterbodies. These terminal dams are an integral part of the rehabilitation design works and comprise mitigation by design.

- All Silt ponds will be cleaned prior to the commencement of upstream drain blocking.
- When blocking drains, terminal dams i.e. the dams at the extremity of the drain and closest to any hydrologically connected watercourses, will be blocked first with AT MINIMUM 2 IN SERIES STANDARD DAMS, to prevent sediment release from subsequent dam insertion. This will form a hydraulic barrier between subsequent drain works and other rehabilitation works at the bog and the receiving and surrounding environment.
- The functionality and efficacy of these terminal dams will be monitored by the Project Ecologist/Environmental Supervisor and audited by the project engineering team. If the structural competency of the terminal dams become compromised, additional mitigation will be secured on site, such as silt fencing or additional check dams.
- Dams will be inspected during periods of dry weather to ensure no 'cracking' of peat has occurred which might allow for discharge.
- Discharge from all rehabilitated areas will be directed into silt ponds.
- Outfalls and overflow pipes from e.g. bunded cells will be directed into silt ponds.
- An Emergency Response Plan will be available in the event of any inadvertent release of a large volume of sediment.
- The above will be overseen by a suitably qualified Environmental Supervisor with support from members of the BnM Ecology Team.

This mitigation measure has been included for the protection of watercourses in the receiving environment, downstream connected European Sites (River Shannon Callows SAC / Middle Shannon Callows SPA / River Suck Callows SPA) and their nutrient sensitive and water dependent habitats and species of Qualifying Interest.

**Measures for cleaning Silt Ponds within EPA Blue line features**

Cleaning of silt ponds integrated adjoining or upstream EPA Blue line features, such as the Shannon Upper_120 watercourse, will follow the below best practice measures.

- Consideration of seasonal restrictions for instream works (works to commence between April / May – October inclusive) and requirement to liaise / notify Inland Fisheries Ireland (IFI) in advance of cleaning works commencing.
- Cleaning works to align with best practice measures, including BnM Standard Operating Procedures (SOPs) for works within and near watercourses, works with hydrocarbons, biosecurity measures when working at and different watercourses and waterbodies.
- Cognisance of capture of non-target aquatic species (Crayfish, lamprey, small fish etc.) within the dredged material and the secure rescue and translocation of these species downstream of the pond cleaning works. Cleaning of silt ponds will be completed under licence (where required) and in accordance with strict biosecurity measures. Silt ponds will be cleaned from the inlet point to the outlet point allowing fish and aquatic life to migrate downstream as the works progress. The silt pond cleaning works and

species translocation efforts will be overseen by a suitably qualified Project Ecologist or Environmental Supervisor and ongoing monitoring undertaken by the project ecologist.

- Excavated silt material will be placed at least 20m away from the blue line feature and will be deposited into corralled berms and thereafter secured into the nearby ground with the back of the machine excavator bucket, to ensure particulate matter is not mobilised during or following rainfall events.

It should be noted, that the silt pond network at Bloomhill Bog will not be the sole mitigation measure to attenuate silt laden waters emanating from the site during the project construction and operational phases. The design of the PCAS scheme requires the creation of internal drain blocking measures, which will in itself reduce the possibility of surface run-off to the receiving environment during the rehabilitation works. However, the functionality of a silt pond feature is based on its capacity to assimilate and attenuate ongoing surface water flows. Silt ponds need to be cleaned and emptied regularly to ensure they have sufficient capacity to operate efficiently.

Once rehabilitation works are completed and the bog has been rehabilitated, the bog will act as a natural repository for surface water, regulating and slowing the movement of surface water from Bloomhill Bog to the receiving environment. It is considered that the silt pond network will provide further attenuation and regulation to those measures associated with the PCAS measures during the project construction phase and the rewetted peatland habitat during the project's operational phase.

This mitigation measure has been included for the protection of watercourses in the receiving environment, downstream connected European Sites (River Shannon Callows SAC / Middle Shannon Callows SPA and River Suck Callows SPA) and their nutrient sensitive and water dependent habitats and species of Qualifying Interest.

**Mortality or disturbance to Otter**

- Confirmatory surveys for active Otter holts and breeding activity will be carried out 150m upstream and downstream of suitable habitat prior to the commencement of works in close proximity.
- Should it be confirmed all works within 150m of an active otter holt, will be carried out during daylight hours and outside of 2 hours after sunrise or before sunset during summer and outside of 1 hours after sunrise or before sunset during winter.
- No wheeled or tracked vehicles (of any kind) will be used within 20m of active, but non-breeding otter Holts, and light work will not take place within 15m of such holts, except under license.
- The prohibited area associated with otter holts, should they be located in confirmatory surveys, will, where appropriate, be protected from any inadvertent disturbance from any works or personnel occurring nearby such as at a silt pond and declared as 'Ecology Restriction Zone' with no mention of otters to any onsite staff.
- Appropriate awareness of the purpose of the excluded area will be conveyed through toolbox talks with site staff and sufficient signage will be placed on each possible access point. All contractors or operators on site will be made fully aware of the procedures pertaining to Ecology Restriction Zones and subject to audits and non-conformance records in the event of non-compliance, to be included in reports submitted to Local Authorities and relevant Statutory Consultees.
- All PCAS activities will be carried out during daylight hours.
- All works will be carried out and completed in compliance with Bord na Mona's Standard Operating Procedure for otter.

This mitigation measure has been included for the avoidance of ex-situ effects to otter, a feature of Qualifying Interest for the River Shannon Callows SAC.

**Mitigation when undertaking flood avoidance measures and retention of hydraulic barriers**

The following mitigation and best practice measures will be undertaken at the Bloomhill Bog site. Although drain blocking and consequent and hydrological rewetting of the Bloomhill Bog site will occur, it is not intended to rewet or hydrologically alter adjoining lands or those areas surrounding the Bloomhill Bog site. To this end, the following mitigation measures will be implemented:

- Maintenance of peripheral drains and where required, to create hydraulic barriers between the site and the receiving environment. This will mean that lands and local drainage patterns associated with the margins of the BnM site will be maintained;
- Maintenance of specified internal drains to avoid flooding where required to maintain existing drainage of adjacent lands. In some instances this may include re-grading or widening of specific existing drains which currently act as preferential flow paths through the bog.
- Monitoring of adjacent lands will also be specified.

This mitigation measure has been included for the protection of watercourses in the receiving environment, downstream connected European Sites (Middle Shannon Callows SPA / River Shannon Callows SAC / River Suck Callows SPA) and their nutrient sensitive and water dependent habitats and species of Qualifying Interest. In addition, this mitigation seeks to maintain the hydrological conditions of the site and by extension the adjacent and nearby SPA and SAC sites that support groundwater dependent habitats and there reliant species of Qualifying Interest; i.e. Mongan Bog SAC, Mongan Bog SPA, Fin Lough SAC and Pilgrim's Road Esker SAC. However, BnM will no longer deepen existing internal drains to support peat extraction activities. The proposed blocking of the internal drainage system and the enhanced rehabilitation measures designed to rewet large areas of cutover peat within bog sites such as Bloomhill Bog, could be assumed to sustain or secure the hydrological and hydrogeological conditions with the rehabilitation site, with the potential for knock on positive effects to nearby or interconnected groundwater dependent habitats and their associated species.

**Mitigation during upgrade of boundary or peripheral drains outside of the proposed rehabilitation footprint**

Boundary drains may require maintenance to retain their functionality as hydraulic breaks between the site and adjoining lands. Ground verification surveys were completed by a Chartered Engineer from the Bord na Mona engineering team in September 2021, in advance of developing the Engineering drawings for Bloomhill Bog, to establish the baseline condition for all boundary drains in proximity to Natura 2000 sites and third party lands and whether maintenance or upgrading was required to achieve the outcomes presented in the Drainage Management Plan for the bog. The retention of the boundary drains (peripheral drains) presented on Drawing BNM-DR-23-05-BL-0212 will not require further intervention or excavation. The capacity and condition of these drains has been assessed through a desk top study in addition to the ground verification exercise which has verified that the drains required to be retained are suitable to act as a hydraulic break to adjoining lands. This hydraulic break essentially cuts the hydraulic gradient from the bog to the adjoining lands limiting the rise in ground water. The boundary drains will have a minor impact in terms of drying out peat along the edges of the bog, however it is observed from experience, the zone of influence of the drain is limited with positive impacts occurring in very close proximity to the drains. To modify these boundary drains would create the potential for unacceptable negative impact to adjoining lands.

Maintenance of boundary drains will be completed during periods of low flow and will follow the below sequencing:

- Prior to commencement of channel works, at least 2 no. check dams will be placed at the downstream end of the drainage channel to control the flow of suspended sediment downstream to receiving watercourses.
- The most downstream check dam will comprise locally sourced turves and double bagged sand bags to initially secure and check downstream flow within the channel. At least 10m upstream of this check dam, a peat dams will be created and keyed into the adjoining drainage channel banks.
- The build-up of silt material upstream of the constructed check dams will be monitored during upgrade works and the silt material will be removed from the drainage channel during works as it builds up. The material will be removed from the channel, spread and levelled into the adjacent field, a minimum of 10m from the nearest drain.
- The constructed check dams will be inspected during periods of dry weather to ensure no 'cracking' of peat has occurred which might allow for discharge.
- Upon completion of the upgrade works, all silt will be removed from the drainage channel immediately upstream of the 2 standard drain blocks prior their removal. The 2 standard drain blocks will only be removed once all upgrade works are completed and once all water within the channel is suitably settled with no evidence of suspended solids within the water column.
- Where a new drain is required, it will be formed and established prior to connecting the drainage channel to wider drainage network. Only once it has formed and become established, with the bed and banks stabilised will it be connected to the wider drainage network. This approach will minimise to a negligible level the potential for suspend solids to be generated in waters within the new drainage channel and conveyed downstream to receiving watercourses and European Sites.
- An Emergency Response Plan will be available in the event of any inadvertent release of a large volume of sediment.

The set up of these features will be overseen by a suitably qualified Ecologist/Ecological Clerk of Works and ongoing monitoring undertaken by the project ecologist.

This mitigation measure has been included for the protection of watercourses in the receiving environment, downstream connected European Sites (Middle Shannon Callows SPA / River Shannon Callows SAC and River Suck Callows SPA) and their nutrient sensitive and water dependent habitats and species of Qualifying Interest.

**Mitigation through Design - Emergency Response Plan for Berm Failure**

The below mitigation measures will be put in place when constructing and working with berm features as part of the bog rewetting and rehabilitation process. The berm design adopts an empirical design approach. It is proposed to apply proven sizes, proportions, materials, and assemblies from existing successful rehabilitation measures and flood defense berm features carried out in the past by Bord na Mona. This represents mitigation for the proposed rehabilitation works through design; i.e. integrating key design principles into the rehabilitation efforts to restrict potential berm failure and consequent run-off to the receiving environment. Further to the above, **Figure 15** above presents an Emergency Response procedure to address peat spillage in the unlikely event of berm failure.

The selection of an appropriate drain block spacing.

- Drain blocks are formed at a minimum of 300mm higher than the adjacent ground level and are relatively wide to create a relatively strong structure out of peat that will mitigate water flow eroding the drain block construction.
- The provision of a key in the drain ensures a tight seal is maintained and a strong structure is developed to mitigate the formation of preferential flow paths around the edges of the drain block.
- Operators assigned to this work element are familiar with the technique and process and provide effective robust drain blocks. The operators are experienced and capable of adapting to the particular conditions encountered within the bog.
- Qualified, experienced Engineers overseeing the works during the installation phase ensure that quality procedures of the various elements are implemented and effectively meet the standards for quality service and performance.

This mitigation measure has been included for the protection of watercourses in the receiving environment, downstream connected European Sites (Middle Shannon Callows SPA / River Shannon Callows SAC and River Suck Callows SPA) and their nutrient sensitive and water dependent habitats and species of Qualifying Interest.

**Mitigation through maintenance and avoidance:**

- Ongoing monitoring of completed peat drain blocks in the weeks after formation will ensure they have consolidated.
- The risk associated with peat drain block failure from an environmental and rehabilitation measures impact is generally categorised as low as a peat drain block failure will result in an impact that is localised and silt control measures are provided upstream of all discharge points. There is an allowance for a reactive approach to remediation measures where required.
- A post rehabilitation Lidar and imagery survey will take place which will capture any areas where failures occurred resulting in remediation measures in a particular area if required. The Lidar survey will be implemented when the rehabilitation measures have been in place for a reasonable period of time allowing areas of weakness or potential concern to become apparent.
- In the event of a peat drain block failure, the adjacent peat drain blocks will generally have sufficient capacity to accommodate any additional hydrostatic pressures generated ensuring the negative impact is localised.
- If, after heavy rainfall, significant water flows in the drains cause localised drain block failure, the regular and frequent placing of drain blocks along the drain further downstream will mitigate the impact to the immediate area.
- As peat drain blocks are designed to retain water on the cutover resulting in a reduction in discharge into the boundary drains, preventing any negative impacts on adjacent agricultural land.

Further to the above, **Figure 15** above presents an Emergency Response procedures to address peat spillage in the unlikely event of berm failure.

This mitigation measure has been included for the protection of watercourses in the receiving environment, downstream connected European Sites (Middle Shannon Callows SPA / River Shannon Callows SAC and River Suck Callows SPA) and their nutrient sensitive and water dependent habitats and species of Qualifying Interest.

**Measures to avoid disturbance or displacement to SCI bird species**

Birds

- An Ecological Restriction Zone will be adopted as part of the proposed rehabilitation works. This will include a buffered area ca. 150m from silt ponds that supported (or has the capacity to support) feeding over-wintering avifauna within Bloomhill Bog – see **Figure 17** overleaf. Any potential disturbance to SCI birds outside of these Ecological Restriction Zones within Bloomhill Bog are considered to be reversible and not significant. The proposed Ecological Restriction Zone comprises a 150m buffer offsetting a seasonal wetland area near the bog's western boundary (shown in yellow), in addition to the silt pond areas on site (shown in red). Both of these areas are considered to provide suitable foraging or roosting habitat for some SCI species of the Middle Shannon Callows and River Suck Callows SPA; i.e. Whooper Swan, Wigeon and Black-headed Gull. PCAS activities will be restricted within these areas for the non-breeding period associated with the SCI species for which potentially adverse effect pathways exist.
- Works restrictions may be required between the months of October to March inclusive. The timing and duration of the restrictions and works practices during this period will be considered through ongoing liaison between the Project Ecologist and the project team.
- Once an Ecological Restriction Zone is operational, no PCAS scheme activities will take place within the prescribed zone. Travel and access within these sections of the site to undertake cleaning or maintenance activities may be permitted as they are likely to be intermittent, short term and of low intensity and duration. Given the hydrological sensitivities of Mongan Bog, the travel pass will not be used for PCAS operations. To that end, machinery will be taken by road to Bloomhill. The railway adjacent to Mongan Bog will eventually be decommissioned as part of PCAS. Scheduling is dependant on peat removal. Decommissioning will not have any negative impacts to drainage on Mongan Bog as it will not require any additional drainage. Bord na Móna will consider the need for this access/travel path when peat operations are finally ceased, the railway is decommissioned and will consider options to close this travel path, in addition to exploring further options to adopt additional drain blocking adjacent to this travel path.
- The timing restrictions associated with the Ecological Restriction Zone will be communicated to staff through toolbox talks, and visual markers will be placed on the peat extraction area to delineate the avoidance zone.
- Locations of these restriction zones will also be presented to the machine drivers via the built-in GPS tablet and ESRI application and the machine drivers will use this technology to avoid entering any restricted areas.
- Conformance will be audited through compliance checks by the Project Ecologist (with 'stop-works' authority).
- A standard operating procedure overseen by the Project Ecologist will be in place for all PCAS activities to avoid any significant effects on breeding birds. This will include ground nesting birds and will apply to silt pond cleaning, and cutaway activities. Restriction zones will be in place to avoid effects on any identified ground nesting birds/waterfowl as appropriate.

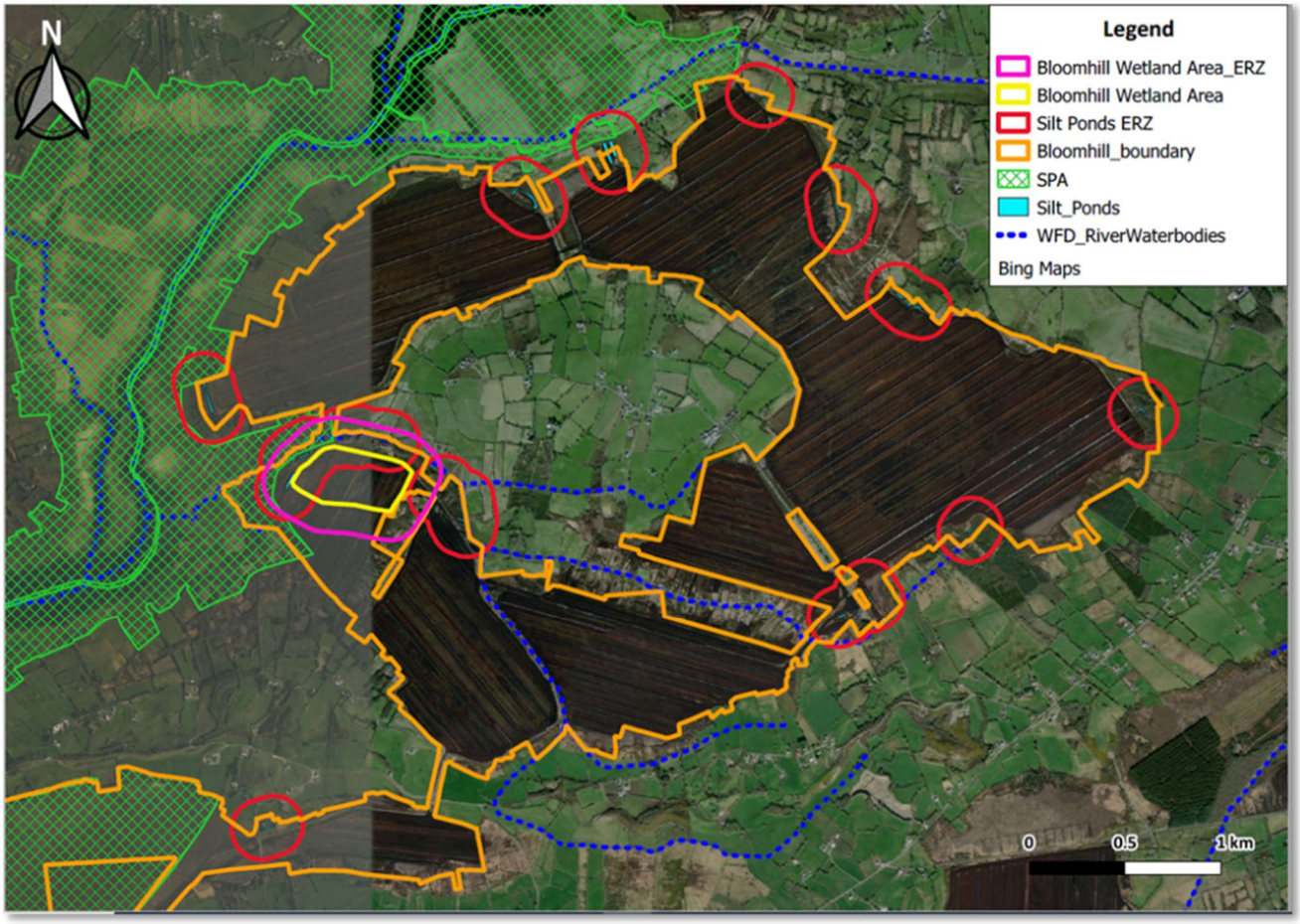



**Figure 17: Ecological Restriction Zones for Bloomhill Bog**

This mitigation measure has been included for the protection (and the avoidance of disturbance and displacement) of SCI species for adjacent and nearby SPA sites (Middle Shannon Callows SPA / Suck River Callows SPA and Mongan Bog SPA).

**Standard Operating Procedures for Loading of remaining Peat Stockpiles within Bloomhill Bog**

The loading and removal of any remaining milled peat stockpiles at Bloomhill Bog will follow the below Standard Operating Procedures (SOPs) (See **Figure 18**). The below schematic / flow diagram displays how peat loading and removal will be completed at the Bloomhill Bog site. This will ensure that loading and removal of remaining peat stockpiles will be controlled, will follow an agreed protocol and will not result in the release or spread or milled peat to the receiving or surrounding environment and by extension European Sites within the project Zone of Influence.

This mitigation measure has been included for the protection of watercourses in the receiving environment, downstream connected European Sites (River Shannon Callows SAC / Middle Shannon Callows SPA and River Suck Callows SPA) and their nutrient sensitive and water dependent habitats and species of Qualifying Interest.

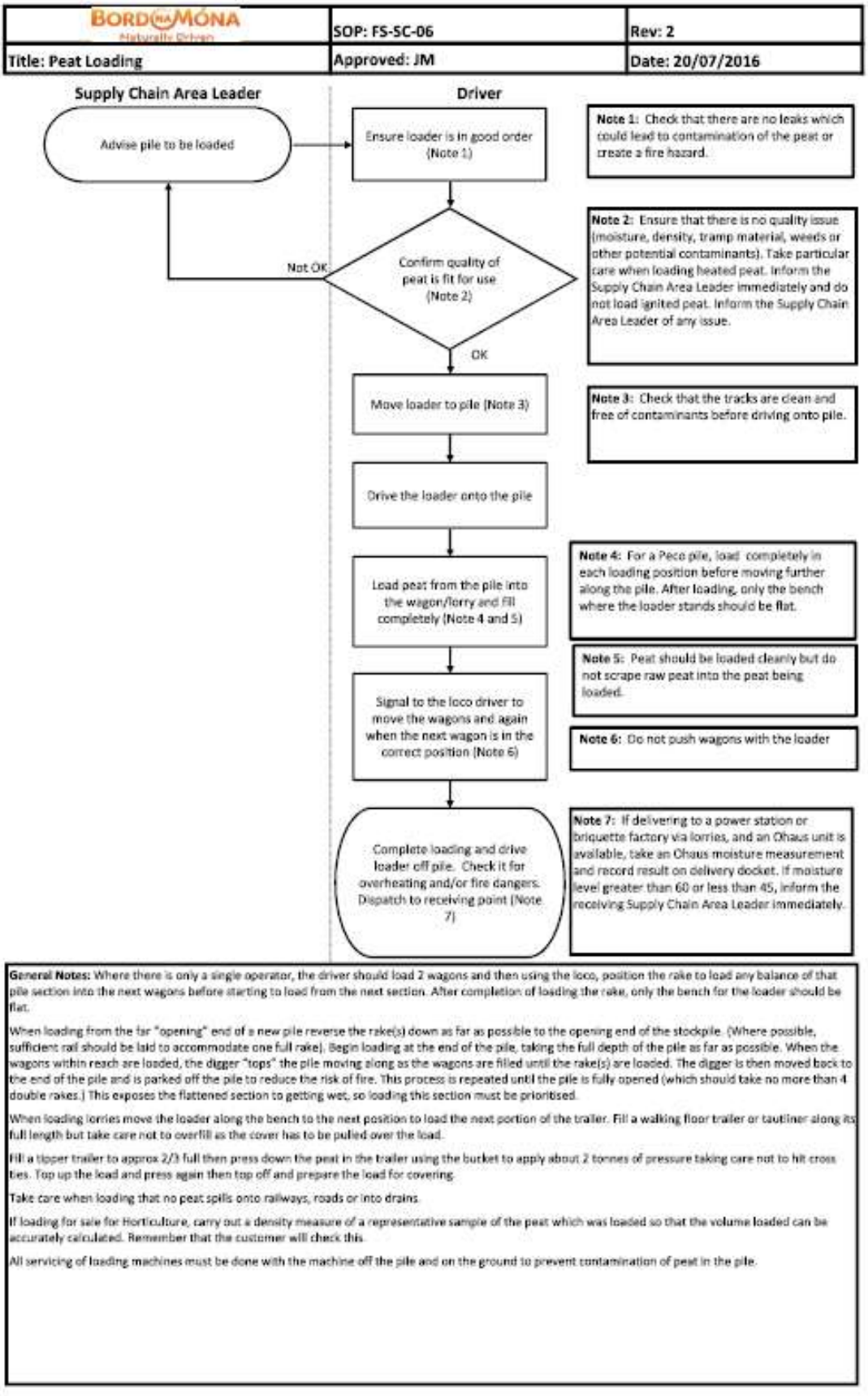



**Figure 18: BnM Peat Loading SOPs**

***General Dust Control Steps:***

**The following measures will be put in place when loading and removing remaining peat stockpiles from Derrycolumb Bog.**

- Wind Socks will be installed at all Bog Areas that have on-going complaints or are classed as Dust
- Sensitive, so that wind speed and direction can be assessed. BNM Item Number (412958).
- Any dust mitigation measures will be recorded and referenced on the daily return sheet.
- Headland peat collection will be recorded on PQMS form 023.
- Idle travel will be avoided as much as practically possible.
- Use grass paths and far headlands where possible when travelling in dust sensitive areas.
- Avoid travelling near main highways, dwellings and areas deemed as problematic regarding dust impact.
- Keep the headlands continuously ridged.
- Shelter Belts and Wind Breaks are used where feasible.
- Stockpiles are covered as per the Area Polycovering Plan.
- Machinery maintains slow speeds when travelling along headlands.
- All Continuous Improvement initiatives regarding Dust Mitigation will be fully investigated and supported by bog areas.

**Headland Harvesting**

- Keep the headland continuously ridged.
- Harvest headland peat every third crop, as per FS-PR-13 standard.
  · By Haku trailer where possible or,
  · Harvest to fields, disengage crossing drains and outfalls.
  · By utilising headland harvesters.
- Hydraulic Harrows where available, spoons will be lifted when travelling on a headland.
- Headland peat collection will be fully documented and recorded on PQMS form 023.
- Miller drums will be disengaged and lifted when approaching or travelling on a headland.
- Slow speeds should be maintained on a headland.
- Optimise routes to avoid dust sensitive areas.

## Effectiveness of these measures

The Mitigation Measures (Project Design Measures, Management Plans, Environmental Emergency Response Measures and Best Practice Measures), listed above, have been developed by the hydrological/drainage and ecological expert members of the Decommissioning and Rehabilitation project team in Bord na Móna and use best practice water quality protection techniques which are tried and tested regularly across the country. Furthermore, a suitably qualified Environmental Supervisor will be employed during the construction stage to monitor the effectiveness of these measures on a daily basis. The Environmental Supervisor will be supported and assisted by members of the BnM Ecology Team as required.

The watercourse crossing, drainage and water quality measures have been developed using relevant legislation, guidance and literature including:

**Watercourse crossing works and aquatic habitat protection guidance**

- Inland Fisheries Ireland (2016) Guidelines on Protection of Fisheries during construction works in and Adjacent to Waters;
- NRA (2008) Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes; and,
- OPW (2013) Construction, Replacement or Alteration of Bridges and Culverts.
- EPA Ireland; Managing the Impact of Fine Sediment on River Ecosystems

**Pollution Prevention Guidance Notes (PPGs) & Guidance for Pollution Prevention (GPP)**[4]

- PPG 1: Understanding your environmental responsibilities - good environmental practices
- GPP 2: Above ground oil storage tanks
- PPG 3: Use and design of oil separators in surface water drainage systems
- GPP 4: Treatment and disposal of wastewater where there is no connection to the public foul sewer
- GPP 5: Works and maintenance in or near water
- PPG 6: Working at construction and demolition sites
- PPG 7: Safe storage - The safe operation of refuelling facilities
- GPP 8: Safe storage and disposal of used oils
- GPP 8: Safe storage and disposal of used oils
- GPP 8: Safe storage and disposal of used oils
- GPP 19: Vehicles: Service and Repair
- GPP 21: Pollution incident response planning
- GPP 22: Dealing with spills
- GPP 26 Safe storage - drums and intermediate bulk containers
- PPG 27: Installation, decommissioning and removal of underground storage tanks

**Construction Industry Research and Information Association (CIRIA)**[5]

- CIRIA Report C502 Environmental Good Practice on Site;
- CIRIA Report C532 Control of Water Pollution from Construction Sites: Guidance for consultants and contractors;
- CIRIA Report C648 Control of Pollution from Linear Construction Project; Technical Guidance;
- CIRIA Handbook C650 Environmental good practice on site;
- CIRIA Handbook C651 Environmental good practice on site checklist;
- CIRIA Report C609 - SuDS – hydraulic, structural & water quality advice; and,
- CIRIA Report C697 – The SuDS Manual.

[4]https://www.netregs.org.uk/environmental-topics/pollution-prevention-guidelines-ppgs-and-replacement-series/guidance-for-pollution-prevention-gpps-full-list/

[5] Available from https://www.ciria.org/

**Invasive Species Guidance**

- Managing Japanese knotweed on development sites - The Knotweed Code of Practice produced by the Environmental Agency (2013)[6];
- NRA Guidelines on The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads (2010)[7];
- Managing Invasive Non-native Plants in or near Freshwater, Environment Agency (2010)[8];
- Best Practice Management Guidelines Japanese knotweed *Fallopia japonica*, Invasive Species Ireland (2015);
- IFI Biosecurity Protocol for Field Survey Work, Inland Fisheries Ireland (2010[9]).

**Guidance relating to Bird Disturbance**

- Livesey et al., (2016) Database of bird flight initiation distances to assist in estimating effects from human disturbance and delineating buffer areas. Journal of Fish and Wildlife Management 7: 181–191.
- Scottish National Heritage (2009) Monitoring the impact of onshore wind farms on birds - January 2009. Guidance Note.
- Scottish National Heritage (2016) Dealing with Construction and birds. Guidance Version 3.
- Scottish National Heritage (2017) Survey Methods for Use in Assessing the Impacts of Onshore Windfarms on Bird Communities. Version 2. https://www.nature.scot/recommended-bird-survey-methods-inform-impact-assessment-onshore-windfarms
- Fox, T. & Stroud, D.A. (2002). The Greenland White-fronted Goose *Anser albifrons flavoristis.* BWP Update 4:65-88.
- Hayhow, D.B. *Consequences of winter habitat use in a migratory shorebird.* Thesis submitted for the degree of Doctor of Philosophy at the University of East Anglia, Norwich, 2009

**Guidance relating to Mammal Disturbance**

- OPW (2013) Construction, Replacement or Alteration of Bridges and Culverts[10].
- National Roads Authority. Guidelines for the treatment of Otters prior to the construction of National Road Schemes. https://www.tii.ie/tii-library/environment/construction-guidelines/Guidelines-for-the-Treatment-of-Otters-prior-to-the-Construction-of-National-Road-Schemes.pdf

### Implementation of Mitigation Measures

The Mitigation Measures (Project Design measures, Management Plans, Environmental Emergency Procedures and Best Practice Measures) will be implemented by the Project Manager/PSCS and BnM Project Staff during the Decommissioning and Rehabilitation stage. Implementation of the Mitigation Measures, will be implemented under an Environmental Management Plan for Bloomhill Bog Decommissioning and Rehabilitation.

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[6] http://cfinns.scrt.co.uk/wp-content/uploads/2014/06/2013-code-of-practice.pdf

[7] https://www.tii.ie/technical-services/environment/construction/Management-of-Noxious-Weeds-and-Non-Native-Invasive-Plant-Species-on-National-Road-Schemes.pdf

[8] https://www.midsussex.gov.uk/media/1725/managing-invasive-non-native-plants.pdf

[9] https://www.fisheriesireland.ie/Biosecurity/biosecurity-protocol-for-field-survey-work.html

[10] https://www.gov.ie/en/publication/957aa7-consent-requirements-constructionalteration-of-watercourse-infrastru/

All protection measures have been designed in line with Best Practice and constitute the Best Available techniques following scientific literature and field baseline verification. As such there is a very high degree of confidence in their likely success.

Implementation of the mitigation measures for the Decommissioning and Rehabilitation activities will be the responsibility of Bord na Móna Operations and supervision of the works will be carried out by this Bord na Móna Department incorporating Area leaders, Operations Managers and Project Supervisor Construction Stage (PSCS).

In addition, implementation of the mitigation measures will be monitored and inspected by Bord na Móna Environmental, Ecology and Engineering Departments, who are independent of Bord na Móna Operations. Project Ecologists, Engineers and Environmental Compliance Officers will be appointed for each bog and they will ensure that measures are carried out in accordance with an Site-Specific Environmental Management Plan which sets out the required mitigation measures for each bog and defines the pertinent individual roles. The Ecologist, Environmental Compliance Officer, Engineer, H & S Manager, Site Supervisor and PSCS will have a 'stop works' authority.

### Degree of confidence in the likely success of the mitigation measure

All protection measures have been designed in line with Best Practice and constitute the Best Available techniques following scientific literature and field baseline verification. As such there is a very high degree of confidence in their likely success.

### Monitoring of the Implementation and Effectiveness of the Mitigation Measures

A degree of Monitoring is required under Condition 10.1 of the IPC license under which Peat Extraction and now Decommissioning and Rehabilitation is to take place. This environmental monitoring carried out during the aftercare and maintenance period of Decommissioning and Rehabilitation, has to ensure no Environmental Pollution has been caused, and is subject to an Independent Closure Audit (ICA) followed by an EPA Exit Audit (EA) in order to facilitate IPC License surrender.

This programme for monitoring, aftercare and maintenance has been designed to meet the Conditions of the IPC Licence and 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 neighbour's land, general land security, boundary management, dumping and littering.
- The number of these site visits will reduce after 2 years to bi-annually and then after 5 years to annual visits.
- These monitoring visits will also consider any requirements, if required, for further practical rehabilitation measures.
- The **baseline condition of the site will be established** post-rehabilitation implementation by using an aerial drone 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, if required.
- A **water quality monitoring programme** at the bog will be established. The main objective of this water quality monitoring programme will be to establish a baseline and then monitor the impact of peatland rehabilitation on water quality from the bog. Monitoring of key environmental variables will include: Ammonia, Phosphorous, Suspended solids (silt), pH and conductivity. Water quality samples will be

collected from the main drainage system from the bog at a designated point, before water leaves the site. Water quality samples will be collected at monthly intervals.

- If, after three years, key criteria for successful rehabilitation are being achieved and critical success factors are being met, then the water quality monitoring programme will be reviewed, with consideration of potential ongoing research on site. The water quality data, the drone surveys and the habitat mapping will be collated and will be submitted to the EPA as part of the final validation report.
- If, after three years, key criteria for successful rehabilitation have **not** been achieved and critical success factors have **not** been met, then the rehabilitation measures and status of the site will be evaluated and enhanced, where required. This evaluation may indicate no requirement for additional enhancement of rehabilitation measures but may demonstrate that more time is required before key criteria for rehabilitation has been achieved. Monitoring of water quality will then also continue for another period to be defined.
- Where other uses are proposed for the site, 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.

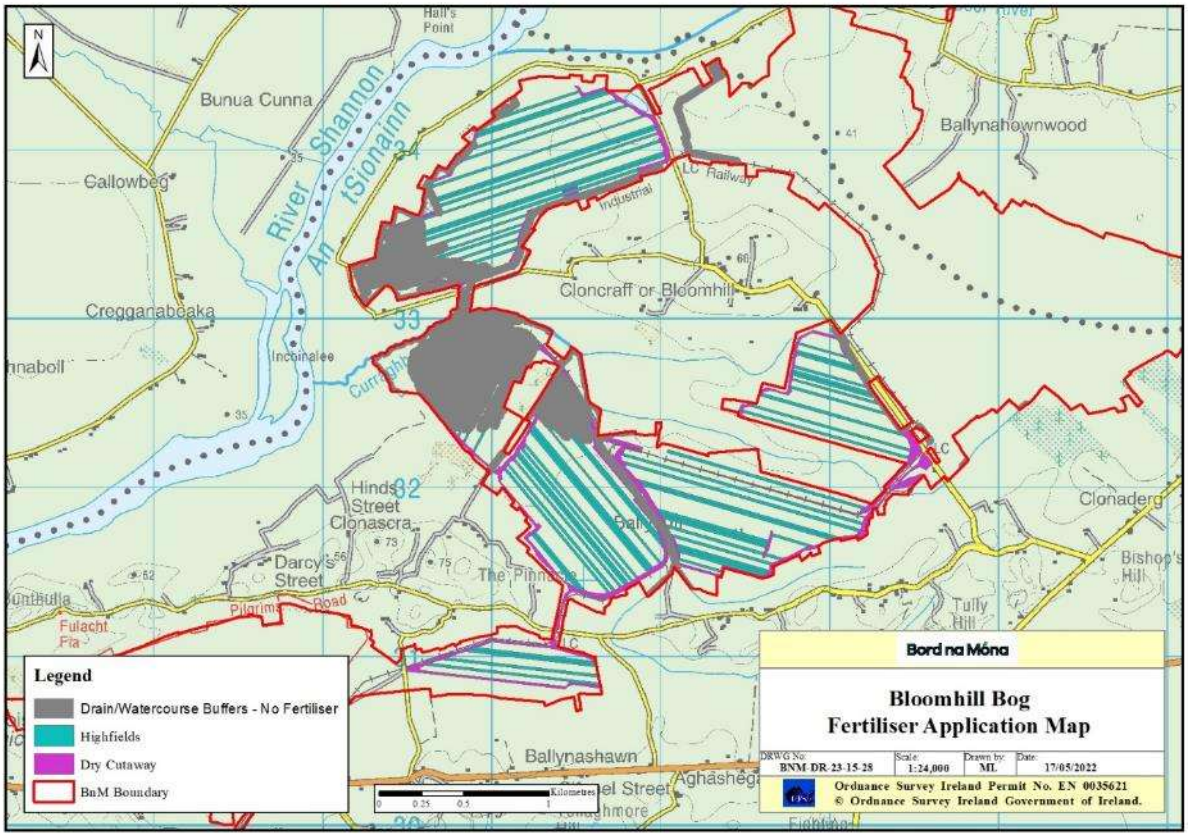
### How any mitigation failure will be addressed

The Mitigation measures prepared specifically for this project have been designed in line with Best Practice and constitute the Best Available techniques following scientific literature and Best Practice. The Mitigation Measures are considered to be robust and proven measures which will avoid adverse effects to European Sites.

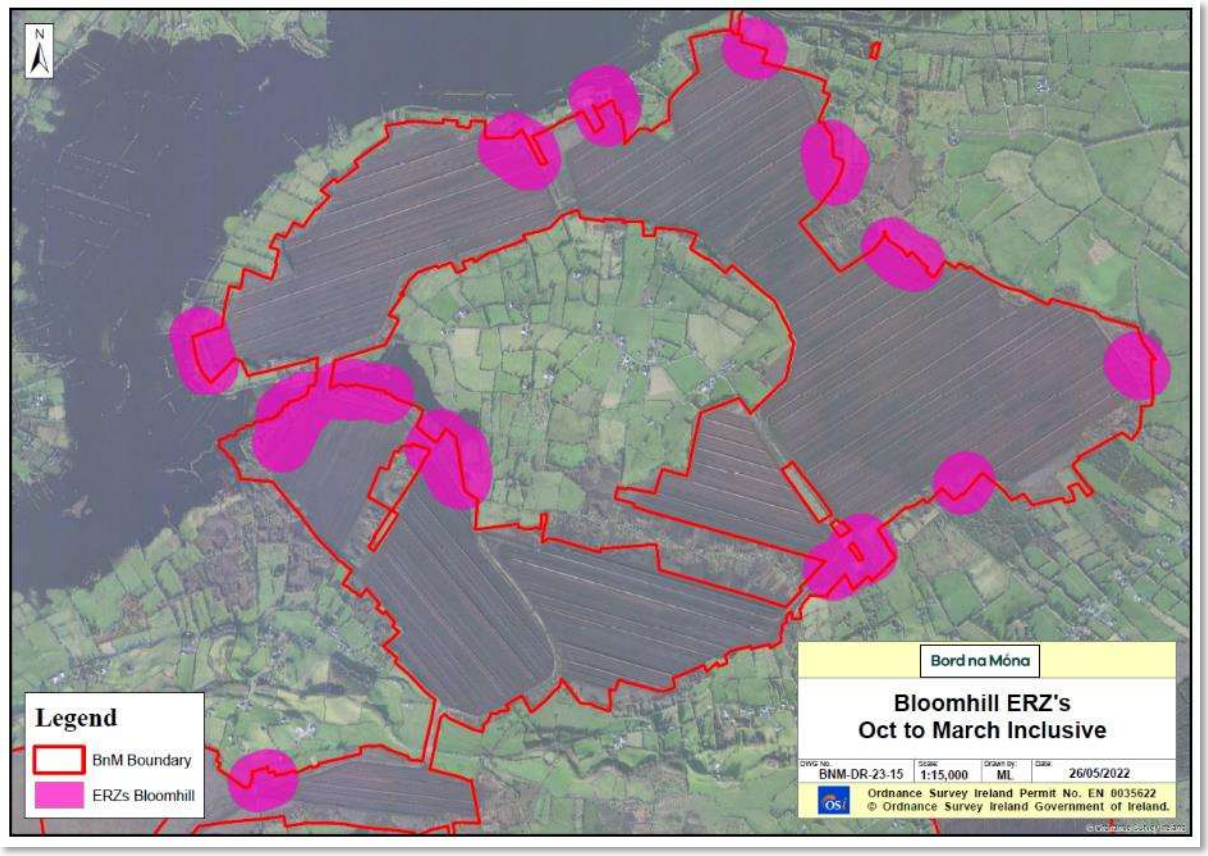
On this basis, it can be confidently concluded that failures in the mitigation measures and their prescribed outcomes will be avoided.

Nonetheless contingency measures will be in place for unforeseen events such as oil/fuel spillages, water pollution or any inadvertent release of sediment. This will ensure any unforeseen potentially adverse effects are identified in a timely manner and appropriate remedial action taken immediately. The Ecologist, Environmental Compliance Officer, Engineer, H & S Manager, Site Supervisor and PSCS will have a ‘stop-works’ authority to temporarily stop works over part of the site to avoid an infringement of the Environmental Commitments or an unforeseen environmental event. Works will not be allowed to re-commence until the issue is resolved.

## Fertiliser Application Map




## Wintering Birds Environmental Restriction Zones



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

In the event that the Scheme (PCAS) is not supported by additional funding, Bord na Móna is still obligated to carry out peatland rehabilitation to meet the conditions of the IPC Licence. Under its EPA licences and following cessation of peat extraction, BnM is mandated to 'decommission' its operations by removing materials 'that may result in environmental pollution' and establish that 'rehabilitation' measures have environmentally stabilised peat production areas.

This proposed standard peatland rehabilitation plan is outlined here to **estimate potential costs**. Bord na Móna will still be expected to cover the costs that would have accrued from standard decommissioning and rehabilitation activities, as part of its original obligations. The existing costs associated with both the removal of potentially polluting materials and the environmental stabilisation of the peatlands resides with Bord na Móna. However, the expenditure necessary to deliver the additional and enhanced decommissioning, rehabilitation and restoration and the benefits that flow from these measures and interventions/improvements will be eligible for funding by government through the Climate Action Fund and Ireland's National Recovery and Resilience Plan.

The same process as outlined in Section 2 will be followed.

### Scope of rehabilitation

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

- The area of Bloomhill Bog.
- EPA IPC Licence - Ref. P0502-01. 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. Bloomhill Bog is part of the Blackwater Bog group.
- The current condition of Bloomhill Bog. Pioneer cutaway vegetation is developing across parts of the site, whilst some parts have already been stabilised/rehabilitated whilst other remain unvegetated .
- The key objective of rehabilitation, as defined by this licence, is **environmental stabilisation** of the bog.
- To minimise potential impacts on neighbouring land. Some boundary drains around Bloomhill Bog will be left unblocked as blocking boundary drains could affect adjacent land.
- Future land-use: Bord na Móna are reviewing the potential to develop a potential renewable energy project at Bloomhill Bog. It is expected that this review will be completed in 1-2 years. In advance of this review of renewable energy potential, it is planned to rehabilitate part of Bloomhill Bog in 2022-2024 that is not constrained. The remaining area will be rehabilitated after the renewable energy review is complete. The peatland rehabilitation will **either** be in association with a potential renewable energy project, with peatland rehabilitation integrated into the proposed project, **or** will be completed in the absence of any proposed renewable energy project.

### Rehabilitation goals and outcomes

The key rehabilitation goal and outcome for Bloomhill Bog is environmental stabilisation of the site via wetland creation and deep peat 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 habitats.

**Criteria for successful rehabilitation:**

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

**Rehabilitation indicators**

- Demonstrating the delivery of the rehabilitation through site visits and through updated aerial photography (indicating presence of peat blockages and re-wetting). This will be demonstrated by a post rehab survey.
- Stabilising potential emissions from the site (e.g. suspended solids). The key target will be developing a stable or downward trajectory of water quality indicators (suspended solids and ammonia). This will be demonstrated by water quality monitoring results.

**Rehabilitation measures: (BNM-DR-23-06_05 Bloomhill Bog: Standard Rehabilitation Measures)**

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

**Timeframe:**

- 2022-2024. 1st phase of rehabilitation. Field drain blocking and water-level management.
- 2024. 2nd phase. Further realignment of piped drainage and other re-wetting measures dependent on success of 1st phase re-wetting, as determined by pump management, ongoing monitoring of water levels and re-vegetation.

- Other enhancement measures such as fertiliser treatment will be carried out, if needed. These will be determined by ongoing monitoring.
- 2023-2024. Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- 2023-2024. Decommission silt-ponds, if necessary.

**Table AP-1. Rehabilitation measures and target area.**

| Type | Code | Description | Area (Ha) |
|---|---|---|---|
| Deep peat | DPT1 | Regular drain blocking (3/100 m) + modifying outfalls and managing water levels with overflow pipes | 221.3 |
| Dry cutaway | DCT1 | Modifying outfalls and managing water levels with overflow pipes | 38.0 |
| Wetland | WLT1 | Turn off or reduce pumping to re-wet cutaway + modifying outfalls and managing water levels with overflow pipes | 76.0 |
| **Marginal Land** | MLT1 | No work required | 85.9 |
| Other | Silt Pond | Silt ponds | 1.9 |
| Other | Completed | Rehabilitation Complete | 0 |
| Other | Constraint | Rights of Ways and constrained areas/buffers/Archaeology | 465.9 |
| **Total** | | | **889.0** |

See Drawing number BNM-DR-23-15-20 titled **Bloomhill Bog: Standard Rehab Measures** included in the accompanying Mapbook which illustrates the standard rehab measures to be applied.

**Monitoring, after-care and maintenance**

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

**Validation and IPC Licence surrender**

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

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

## APPENDIX II: BOG GROUP CONTEXT

The Blackwater Bog Group IPC Licensed area is made up of three sub-groups (Attymon, Blackwater and Derryfadda) and have been in industrial peat production for several decades. The majority of sites are situated alongside the Shannon and Suck Rivers within counties Roscommon, Galway, Westmeath and Offaly and cover an overall area of 15,515 ha. Each bog area further comprises a range of habitats from bare milled peat production areas to re-colonising cutaway to workshops areas and transport infrastructure. Industrial peat extraction from these sites mainly supplied ESB power stations at Shannonbridge (WOP) and Lanesborough (LRP).

Industrial peat extraction in the Blackwater Bog Group has permanently ceased on the majority of sites. It is planned to supply remaining milled peat stocks to Shannonbridge (WOP) and Lanesborough (LRP) during 2020. Both power stations will cease using peat by the end of 2020. Decommissioning and rehabilitation for the Blackwater Bog Group as part of the PCAS project started in 2021.

A number (6) of bogs were initially drained but have never been used for industrial peat production (three former development bogs (Kellysgrove, Tirrur-Derrymore and Newtown-Loughgore), Clonboley, Killeglan and Derrydoo-Woodlough). The latter three bogs are classed as restored raised bogs, still contain active bog habitat (that qualifies as the Annex I EU Habitats Directive habitat) and now form the core of the Bord na Móna Raised Bog Restoration Project due to their high biodiversity value and bog restoration potential. NPWS have identified the Clonboley bog cluster as having high ecological value within the recent assessment of raised bog SACs, NHAs and non-designated sites (NPWS 2014[11]). Several of these sites have been restored during the period 2011-2020.

Several sections of Tirrir-Derrymore bog have been leased to NPWS for domestic turf cutting as part of the SAC turf-cutting compensation scheme. Turf-cutters from neighbouring SACs have been relocated to this site by NPWS. Several other bogs are being assessed for similar use.

The depth of remnant peat within Blackwater bog units will have a very significant impact on the development of these sites, with deeper peat (Derryfadda milled peat production bogs) having potential for the establishment of embryonic peat-forming (*Sphagnum*-rich) vegetation communities. Milled peat cutaway (such as at Blackwater) develops in a somewhat different way as in places the underlying gravel is exposed, there is significant alkaline influence on the water chemistry and in many of these cutaway bogs will develop fen and wetlands due to the local topography, hydrology and water chemistry.

[11] http://www.npws.ie/peatlandsturf-cutting/nationalraisedbogsacmanagementplan/

A breakdown of the component bog areas for the Blackwater Bog Group IPC License Ref. PO502-01 is outlined in Table Ap-2.

*Table Ap-2a: Blackwater Bog Group names, area and indicative status (Attymon sub-group)*

| Bog Name | Area (ha) | Stage of development | Land-Use and History | Peat Production Cessation | Rehab Plan Status |
|---|---|---|---|---|---|
| Attymon | 336 | Cutover Bog<br>Industrial peat production commenced at Attymon Bog in 1941 and ceased in 2019. Attymon is a deep peat cutover bog. | Attymon Bog formerly supplied fuel sod peat.<br>Coillte have developed a portion of the former production area for conifer forestry.<br>Some rehabilitation was carried out in 2019/2020. | 2109 | Finalised 2018 |
| Cloonkeen | 252 | Cutover Bog<br>Industrial peat production commenced at Cloonkeen Bog in 1953 and ceased in 2019. Cloonkeen Bog is a deep peat cutover bog. | Cloonkeen Bog formerly supplied fuel sod peat.<br>Coillte have developed a portion of the former production area for conifer forestry.<br>Some rehabilitation was carried out in 2019/2020. | 2019 | Finalised 2018 |
| Derrydoo-Woodlough | 452 | Development Bog<br>Derrydoo-Woodlough Bog was drained in the 1980s in anticipation of industrial peat production. No industrial peat harvesting ever took place. | Bog restoration was carried out in 2013-2014<br>Rehabilitation (bog restoration) now complete. | N/A | Finalised 2012 |
| Tirrur-Derrymore | 422 | Development Bog<br>This bog was drained in the 1980s in anticipation of industrial peat production. No industrial peat harvesting ever took place. | This bog has significant raised bog restoration potential.<br>Section leased to NPWS as a SAC turf-cutting relocation site. | N/A | Updated 2020 |
| Newtown-Loughgore | 448 | Development Bog<br>This bog was drained in the 1980s in anticipation of industrial peat production. No industrial peat harvesting ever took place. | Some sod turf production<br>Bog restoration was carried out in 2019-2020<br>Rehabilitation (bog restoration) nearly complete. | 2020 | Finalised 2012 |
| Killeglan | 581 | Development Bog<br>This bog was drained in the 1980s in anticipation of industrial peat production. No industrial peat harvesting ever took place. | Bog restoration was carried out in 2013-2014<br>Rehabilitation (raised bog restoration) complete | N/A | Finalised 2016 |
| Cloonboley 1 | 675 | Development Bog<br>This bog was drained in the 1980s in anticipation of industrial peat production. No industrial peat harvesting ever took place on the main section. | A small sub-section has been used for sod turf production.<br>Bog restoration was carried out in 2013-2014<br>Rehabilitation (raised bog restoration) complete | 2020 | Finalised 2014 |
| Cloonboley2 | 203 | Development Bog<br>This bog was drained in the 1980s in anticipation of industrial peat | Bog restoration was carried out in 2013-2014<br>Rehabilitation (raised bog restoration) complete | N/A | Finalised 2016 |

| | | | | | |
|---|---|---|---|---|---|
| | | production. No industrial peat harvesting ever took place. | | | |

*Table Ap-2b: Blackwater Bog Group names, area and indicative status (Blackwater sub-group)*

| Bog Name | Area (ha) | Stage of development | Land-Use and History | Peat Production Cessation | Rehab Plan Status |
|---|---|---|---|---|---|
| Ballaghhurt | 597 | Cutaway Bog<br>Industrial peat production commenced at Ballaghhurt Bog in 1981. The majority of the site is cutaway with some residual deeper peat | Ballaghhurt Bog formerly supplied a range of commercial functions including horticultural peat and fuel peat.<br>Pioneer cutaway vegetation communities are naturally developing on some cutaway areas. | 2020 | Draft 2017 |
| Belmont | 316 | Cutaway Bog<br>Industrial peat production commenced at Belmont Bog during the 1950's. The majority of the site is cutaway. | There are some areas of pioneer cutaway vegetation communities naturally colonising cutaway sections.<br>Coilte have developed a portion of the bog for forestry. | 2020 | Finalised 2021 |
| Blackwater | 2,303 | Cutaway Bog<br>Industrial peat production commenced at Blackwater Bog during the 1950's. The majority of the site is cutaway. | Bloomhill Bog formerly supplied milled horticultural peat and fuel peat.<br>There is extensive development of emergent cutaway vegetation communities across the former production area.<br>The site has been used for experimental forestry (BOGFOR) and other conifer plantations.<br>Part of the site was rehabilitated with lake and wetland creation.<br>An ash facility took ash from Shannonbridge Power station | 2020 | Draft 2017 |
| Bloomhill | 883 | Cutover Bog<br>Industrial peat production commenced at Bloomhill Bog during 1981. The majority of the site still has relatively deep residual peat. | Bloomhill Bog formerly supplied milled horticultural peat and fuel peat.<br>Much of the former peat production area is bare peat. | 2020 | Finalised |
| Bunahinly-Kilgarvan | 389 | Cutover Bog<br>Industrial peat production commenced at Bunahinly-Kilgarvan Bog during the 1990's. Residual Deep peat remains on these bogs. | Bunahinly-Kilgarvan formerly supplied milled horticultural peat and fuel peat.<br>Much of the former production area is bare peat.<br>Part of Bunihinly has been re-wetted. | 2020 | Draft 2017 |
| Glebe | 132 | Cutover Bog<br>Industrial peat production commenced at Glebe Bog during the 1990's. Residual deep peat remains on these bogs. | Glebe Bog formerly supplied milled; horticultural peat and fuel peat.<br>Glebe bog is still listed as a pNHA.<br>Much of the former production area is bare peat. | 2020 | Draft 2017 |
| Clooniff | 523 | Cutover & cutaway Bog<br>Industrial peat production commenced at Clooniff Bog during | Clooniff Bog formerly milled fuel peat. | 2020 | Finalised 2021 |

| | | | | | |
|---|---|---|---|---|---|
| | | the 1970's. A mosaic of variable peat depths remains on this bog. | Much of the former production area is bare peat or wetland.<br>Some emergent vegetation communities are naturally colonising cutaway areas. Reduced pumping has created a large wetland in one area. | | |
| Cornafulla | 460 | Cutover Bog<br>Industrial peat production commenced at Cornafulla Bog in 1987. This bog still retains relatively deep residual peat. | Cornafulla Bog formerly supplied milled horticultural peat and fuel peat.<br>Much of the former production area or cutaway is bare peat. | 2020 | Draft<br>2017 |
| Cornaveagh | 492 | Cutover Bog<br>Industrial peat production commenced at Cornaveagh Bog in 1970's and ceased in 2020. This bog still retains relatively deep residual peat. | Cornaveagh Bog formerly supplied milled horticultural peat and fuel peat.<br>Much of the former production area footprint or cutaway is bare peat. | 2020 | Draft<br>2017 |
| Culliaghmore | 442 | Cutover Bog<br>Industrial peat production commenced at Culliaghmore Bog in 1960's and ceased in 2020. Much of this bog is cutaway, with some pockets of deeper residual peat. | Culliaghmore Bog formerly supplied milled horticultural peat and fuel peat.<br>Much of the former production area footprint or cutaway is bare peat.<br>Some pioneer cutaway vegetation communities are naturally colonising cutaway areas. | 2020 | Draft<br>2017 |
| Garryduff | 970 | Cutaway Bog<br>Industrial peat production commenced at Garryduff Bog in 1960's. The majority of this bog is cutaway. | Much of the former production area footprint or cutaway is bare peat.<br>Extensive natural development of pioneer cutaway vegetation communities is present on cutaway areas. | 2020 | Finalised<br>2021 |
| Kellysgrove | 201 | Development Bog<br>Kellysgrove Bog was drained in the 1980s in anticipation of industrial peat production. No peat harvesting ever took place. | The site retains degraded raised bog vegetation.<br>Kellysgrove Bog retains significant raised bog restoration potential.<br>A way-marked walking trail is positioned along the old Ballinasloe Canal. | 2020 | Finalised<br>2021 |
| Kilmacshane | 1,294 | Cutaway Bog<br>Industrial peat production commenced at Kilmacshane Bog in 1960's. The majority of this bog is cutaway with some pockets of deeper peat remaining. | Kilmacshane Bog formerly supplied milled horticultural peat and fuel peat.<br>Some pioneer cutaway vegetation communities are naturally colonising cutaway areas and water levels have risen as pumping reduced, creating wetlands. | 2014 | Finalised<br>2021 |
| Lismanny | 449 | Cutaway Bog<br>Industrial peat production commenced at Lismanny Bog in 1960's. The majority of this bog is cutaway with some pockets of deeper peat remaining. | Lismanny Bog formerly supplied milled horticultural peat and fuel peat.<br>Much of the former production area footprint is bare peat.<br>Some pioneer cutaway vegetation communities are naturally colonising cutaway areas. | 2020 | Draft<br>2021 |

*Table Ap-2c: Blackwater Bog Group names, area and indicative status (Derryfadda sub-group)*

| Bog Name | Area (ha) | Stage of development | Land-Use and History | Peat Production Cessation | Rehab Plan Status |
|---|---|---|---|---|---|
| Derryfadda | 610 | Cutover bog<br>Industrial peat production commenced at Derryfadda Bog in 1980's. This bog still retains residual deep peat. | Derryfadda Bog formerly supplied milled horticultural peat and fuel peat.<br>Much of the former production area is bare peat.<br>Some pioneer cutaway vegetation communities are naturally colonising cutaway areas. | 2020 | Draft 2017 |
| Boughill | 415 | Cutover bog<br>Industrial peat production commenced at Boughill Bog in 2008. This bog still retains residual deep peat. | Boughill Bog formerly supplied milled horticultural peat and fuel peat.<br>Much of the former production area footprint or cutaway is bare peat. | 2020 | Draft 2017 |
| Castlegar | 517 | Cutover bog<br>Industrial peat production commenced at Castlegar Bog in 2001. This bog still retains residual deep peat. | Castlegar Bog formerly supplied milled horticultural peat and fuel peat.<br>Much of the former production area is bare peat.<br>The adjacent Annaghbeg Bog NHA is an intact undrained raised bog | 2019 | Finalised 2021 |
| Gowla | 650 | Cutover bog<br>Industrial peat production by BnM commenced at Gowla Bog in 1970's. Development for sugar production was in place at Gowla since the 1950's. This bog still retains residual deep peat. | Gowla Bog formerly supplied milled horticultural peat and fuel peat.<br>Much of the former production area footprint is bare peat. | 2020 | Draft 2017 |

See Drawing number BNM-DR-23-15-24 titled **Blackwater Bog Group**, included in the accompanying Mapbook which illustrates the location of Bloomhill Bog and the Blackwater Bog Group in context to the surrounding area.

## APPENDIX III: ECOLOGICAL SURVEY REPORT

**Ecological Survey Report**

*Note: This report outlines an ecological survey of the bog. This report should not be taken as a management plan for the site as other land-uses may still be considered. Information within this report may inform the development of other land-uses and identify areas with particular biodiversity value.*

| | | | |
|---|---|---|---|
| **Bog Name:** | **Bloomhill** | **Area (ha):** | 891ha |
| **Works Name:** | Blackwater | **County:** | Offaly |
| **Recorder(s):** | DF | **Survey Date(s):** | 23rd & 26th March 2012 |

**Habitats present (in order of dominance)**

The most common habitats present at this site include:

- Bare peat (BP) (Codes refer BnM classification of pioneer habitats of production bog. See Appendix II).
- Riparian zones (RIP)
- Pioneer Purple Moorgrass-dominated grassland (gMol) with Gorse-dominated scrub (eGor)
- Pioneer Soft Rush-dominated poor fen (pJeff)
- Pioneer Reedbed (pPhrag) (in marginal small drainage ditch)
- Pioneer dry heath (dHeath) with open Birch-dominated scrub (oBir) or Purple Moorgrass-dominated grassland (gMol) (generally in old cutover or marginal bog areas).
- Riparian areas (RIP)
- Silt ponds (Silt) with associated habitats

The most common habitats found around the margins of the site include:

- Marginal raised bog (PB1) (Codes refer to Heritage Council habitat classification, Fossitt 2000), See Appendix II.)
- Cutover bog (PB4)
- Raised bog (PB1)
- Scrub (WS1)
- Birch woodland (WN7)
- Wet grassland (GS4) (privately managed farmland)

**Description of site**

Bloomhill is located approximately 4km south west of Ballynahown in County Offaly (a small portion of the site is located within Co Westmeath). Bloomhill is part of the Blackwater group of bogs and is connected to Blackwater main bog to the south via a rail line. Bloomhill is also connected to Bunahinley/Kilgarvan bog to the north via a rail link. The River Shannon flows within 0.5 km of the western edge of the site. Bloomhill Bog can be divided into five main sections of bog that are all in full peat production. Industrial peat production began in Bloomhill in 1981.

Bloomhill Bog completely surrounds a large mineral island known as Bloomhill. The mineral island is made up primarily of agricultural lands with houses and a school. A number of small roads go through the bog in various places. An esker known as the Pilgrim's Road is located immediately to the south west of the site while Mongan Bog SAC is also located to the south west of the site. Mongan Bog was originally ditched by Bord na Móna in the 1980's but has subsequently had restoration works carried out on it. A travel path that connects Bloomhill Bog with

Blackwater Bog passes along the edge of Mongan Bog. Mongan Bog is presently owned by An Taisce even though it is shown as being part of the BnM property on the habitat map.

The majority of Bloomhill has been mapped as bare peat with little vegetation in the production areas.

Several areas of remnant raised bog remain along the edges of the site. These areas are small, with the largest example of this habitat along the northern boundary. The largest section was dominated by Heather but also contained Bog Aspodenal, Bog Myrtle and Cladonia along with *Sphagnum cuspidatum*, *S. capillifolium* and *S. magellanicum*. A significant section of this area had been ditched and was quite dry with no quaking feel to it. Curlew were present in this area at the time of the ecological survey and were heard calling. The remaining, smaller, sections of raised bog around the margins of the site were very dry and were becoming colonised with Gorse, Pine and Birch.

A section of the site, along the western boundary, consists of an area of wet grassland, wet willow woodland and cutaway bog. The wet grassland is located between the Curraghboy River and the wet willow woodland. This area is actively grazed by horses and cattle and was never managed for peat production. A band of wet willow woodland is also located alongside the wet grassland. The woodland consisted of Willow, Birch, Alder, Bog Myrtle, Common Reed, Meadow Sweet, Mint, Purple Moor Grass and Greater Tussock Sedge. At least some of the woodland was located on very old cutover bog.

A section of former production bog was beginning to become re-vegetated with a mix of Soft Rush and Heather. This area appeared to contain deep peat but was subject to periodic inundation. A flood defence berm and pump were being installed in this area at the time of the ecological survey.

Other, fringe habitats were comprised of wet grassland that was grazed, Birch woodland, dominated by Birch and scrub that consisted of Gorse and Birch. A section of Birch woodland to the west of the site had recently been felled, presumably for firewood. This area is within the BnM boundary.

Overall the majority of Bloomhill is in active peat production and it is envisioned that it will remain in production until 2030. The majority of the site has been mapped as bare peat.

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

- Designated sites that partially overlap with the site includethe River Shannon Callows SAC (site code 000216) and the Pilgrim's Road Esker SAC (site code 001776).
- Mongan Bog SAC (site code 000580) is located adjacent to the site and is owned by An Taisce. This SAC overlaps with the travel path that connects Bloomhill to Blackwater Bog to the south.

**Adjacent habitats and land-use**

Cutover bog (PB4), Birch woodland (WN7), scrub (WS1), raised bog (PB1), improved agricultural grassland (GA1) and wet grassland (GS4) all border the site. There is a significant amount of callows type wet grassland to the west of the site adjacent to the River Shannon. The bog encircles a raised area that is primarily used as agricultural grassland. An Esker (Pilgrim's Way SAC) is located to the south west of the site and is comprised of agricultural grassland (GA1) and scrub (WS1).

**Watercourses (major water features on/off site)**

- The Boor River passes along the northern boundary of the site.
- The Curraghboy River passes through a section of the site.
- A tributary of the Curraghboy River passes through a section of the site, towards the south. This stream was canalised and did not contain any aquatic or riparian vegetation.
- The River Shannon passes within 0.5 km from the western boundary of the site.
- All water courses on the site are part of the Shannon River Basin District.

**Peat type and sub-soils**

A mixture of fen peat and “red” or “Sphagnum” peat exists on the site, with the majority of the latter. Remaining peat depths show that a large proportion of the site contains in excess of 2.6m of peat remaining. No gravel or marl are exposed around the site. The hill (Bloomhill) that is surrounded by the bog is underlain with sandstone.

**Fauna biodiversity**

**Birds**

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

- Kestral (a pair)
- Mallard (20+)
- Teal (6)
- Curlew (calling in the north of the site).
- Other more common species include Heron, Starling, Robin, Long Tailed Tit, Grey Crow, Magpie and Blackbird.

**Mammals**

Signs of several mammal species were noted on the site during the survey.

- Deer (most likely Fallow)
- Otter
- Pine Marten
- Hare
- Fox

**Other species**

Frog

**References**

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

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

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

# APPENDIX V. BIOSECURITY

Invasive flora species have been recorded in the vicinity of Bloomhill Bog, including *Rhododendron ponticum*. All measures taken to ensure the prevention of spread on invasive species will follow Best Practice.

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

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

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

The biosecurity measures outlined above are in line with best practice guidelines issued by the National Roads Authority (NRA, 2010) – The Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads and broadly based on the Environment Agency's (2013) – The Knotweed Code of Practice: Managing Japanese Knotweed on Development Sites (Version 3, amended in 2013, 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[12] /other aquatic invasive species such as Parrots Feather will be adhered with throughout all rehabilitation measures and activities.

[12] 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 Blackwater bog group (Ref. PO-502-01). As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. The bog is part of the Blackwater group. This regulatory requirement is the main driver of the development of this rehabilitation plan.

## 2 The Peatlands Climate Action Scheme (PCAS)

Bord na Móna (BnM) understand that it is the Minister's (DECC) intention to impose an obligation on Bord na Móna to develop a programme of measures, 'the Scheme', for the enhanced decommissioning, rehabilitation and restoration of boglands previously used to supply peat for electricity generation within the State. The enhanced decommissioning, rehabilitation and restoration of the peatlands funded by the Scheme (PCAS) will deliver benefits across climate action (GHG mitigation through reduced carbon emissions and acceleration towards carbon sequestration), enrich the State's natural capital, increase eco-system services, strengthen biodiversity, improve water quality and storage attenuation as well as developing the amenity potential of the peatlands.

It is envisaged that Bord na Móna carry out an enhanced decommissioning, rehabilitation and restoration, under the Scheme (PCAS), and supported by the Climate Action Fund and Ireland's National Recovery and Resilience Plan and Ireland's National Recovery and Resilience Plan across a footprint of 33,000 ha (a subset of the BnM estate that has been used for energy production). This Scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations under existing EPA IPC licence conditions. Interventions and measures supported by the Scheme will ensure that environmental stabilisation is achieved (meaning IPC obligations are met), and importantly, significant additional benefits, particularly relating to climate action and

other ecosystem services, will also be delivered. However, only the additional costs associated with the additional and enhanced rehabilitation, i.e., those activities which go beyond the existing decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support under the Scheme.

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

For the avoidance of doubt, should the Scheme and the associated statutory obligation on Bord na Móna not materialise, Bord na Móna will not carry out the enhanced decommissioning, rehabilitation and restoration measures described in this plan. Bord na Móna will instead plan to complete an adapted standard decommissioning and rehabilitation measures required under Condition 10 and outlined in Appendix I.

## 3 National Climate Policy

The National Policy Position establishes the fundamental national objective of achieving a transition to a competitive, low carbon, climate-resilient and environmentally sustainable economy by 2050. It sets out:

- the context for the objective;
- clarifies the level of GHG mitigation ambition envisaged; and
- establishes the process to pursue and achieve the overall objective.

The evolution of climate policy in Ireland will be an iterative process based on the adoption by government of a series of national plans over the period to 2050. GHG mitigation and adaptation to the impacts of climate change are to be addressed in parallel national plans – respectively through the National Climate Action Plan. The plans will be continually updated, as well as being reviewed on a structured basis at appropriate intervals and, at a minimum, every five years. This will include early identification and ongoing updating of possible transition pathways to 2050 to inform sectoral strategic choices.

Bord na Móna is following a decarbonisation programme aimed at reducing the carbon emissions from its activities. Industrial peat production has now ceased and several other decarbonisation measures are being implemented. The company aims to further develop renewable energy and resource recovery markets with a key objective of reducing the carbon intensity of all products. In addition, the carbon emission mitigation benefits associated with the post-peat extraction rehabilitated peatland following re-wetting, revegetation and colonisation of significant areas with native woodland will make a significant contribution to achieving the State's carbon emission reduction targets.

## 4 National Peatlands Strategy

The National Peatlands Strategy (2015) contains a comprehensive list of actions, necessary to ensure that Ireland's peatlands are preserved, nurtured and become living assets within the communities that live beside them. It sets out a cross-governmental approach to managing issues that relate to peatlands, including compliance with EU environmental law, climate change, forestry, flood control, energy, nature conservation, planning, and agriculture. The Strategy has been developed in partnership between relevant Government Departments/State bodies and key stakeholders through the Peatlands Council.

The strategy recognises that Ireland's peatlands will continue to contribute to a wide variety of human needs and to be put to many uses. It aims to ensure that Ireland's peatlands are sustainably managed so that their benefits can be enjoyed responsibly. It aims to inform appropriate regulatory systems to facilitate good decision making in support of responsible use. It also aims to inform the provision of appropriate incentives, financial supports and disincentives where required. The strategy attempts to strike an appropriate balance between different needs, including local stakeholders like turf-cutters and semi-state bodies such as Bord na Móna.

In line with a National Peatlands Strategy recommendation, a Peatlands Strategy Implementation Group (PSIG), was established, assisted in the finalisation of the Strategy, is overseeing subsequent implementation and will report to Government on an annual basis on the implementation of the actions and principles contained within the Strategy.

Bord na Móna is a key stakeholder in the National Peatlands Strategy and the Peatlands Strategy Implementation Group. The strategy recognises the potential for some Bord na Móna sites to be restored and to contribute to the national SAC and NHA network of protected raised bog sites. The strategy (agreed in 2015) also recognises the various different values of cutaway bog and developed six key principles (with Bord na Móna) for the after-use of cutaway bog.

- Bord na Móna will continue to assess and evaluate the potential of the company's land bank, using a land use review system. The assessment will help prepare a set of evidence-based management plans for the various areas of peatland. These plans will also inform its cutaway bog rehabilitation.
- The policy of Bord na Móna is not to open up any undrained new bogs for peat production.
- Lands identified by Bord na Móna as having high biodiversity value and/or priority habitats will be reserved for these purposes as the principal future land use.
- Generally, Bord na Móna cutaway bogs that flood naturally will be permitted to flood unless there is a clear environmental and/or economic case to maintain pumped drainage.
- In deciding on the most appropriate afteruse of cutaway peatlands, consideration shall be given to encouraging, where possible, the return to a natural functioning peatland ecosystem.
- This will require re-wetting of the cutaway peatlands which may lead in time to the restoration of the peatland ecosystem.
- Environmentally, socially and economically viable options should be analysed to plan the future use of industrial cutaway peatlands, in conjunction with limiting factors as outlined in Bord na Móna's Strategic Framework for the Future Use of Peatlands.

The National Peatlands Strategy highlights the importance and value of developing peatland rehabilitation plans for Bord na Móna cutaway sites and implementing this peatland rehabilitation. Some of these principles have now been superseded by the company's decision to cease industrial peat extraction. The National Peatlands Strategy is currently being reviewed by Government.

## 5 Draft National River Basin Management Plan 2022-2027 (Water Framework Directive)

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

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

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

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

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

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

## 6 National Biodiversity Action Plan 2016-2021

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

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

## 7 National conservation designations

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

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

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

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

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

## 9 All-Ireland Pollinator Plan 2021-2025

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

## 10 Land-use planning policies

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

## 11 National Archaeology Code of Practise

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

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

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

## 12 Bord na Móna Biodiversity Action Plan 2016-2021

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

One example of a key CBD target is:

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

The EUs headline target for progress by 2020 is to:

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

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

## 13 Bord na Móna commitments

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

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

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

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

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

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

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

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

# APPENDIX VII. DECOMMISSIONING

## 1. Condition 10 Decommissioning

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

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

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

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

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

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

| Item | Description | Bloomhill Bog Decommissioning Plan |
|---|---|---|
| 1 | Clean-up of remaining or unconsolidated waste or materials located in Bogs, Yards, Buildings and Offices | Clean-up of Bog |
| 2 | Cleaning Silt Ponds | Cleaning Silt Ponds |
| 3 | Decommissioning Peat Stockpiles | Peat Stockpile Management via Levelling |
| 4 | Decommissioning or Removal of Buildings and Compounds | Not relevant |
| 5 | Decommissioning Fuel Tanks and associated facilities | Decommissioning and De-Gassing Mobile Fuel Tanks |
| 6 | Decommissioning and Removal of Bog Pump Sites | Where 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.

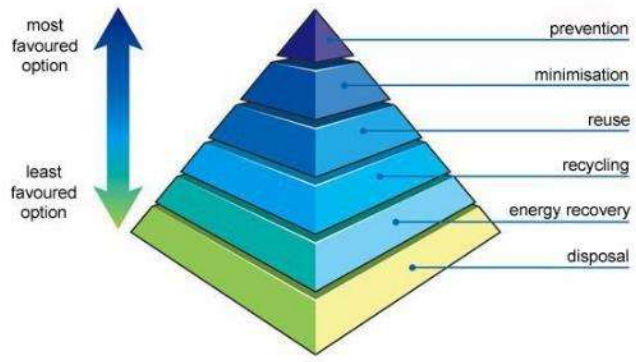
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

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 Annual Environmental Report (AER) for the site.

As required by the licence, these waste items will be removed for recycling or disposal, using external contractors with the required waste collection permits, approved under 7.2, with waste records maintained as required under 7.3.

Where possible, Bord na Móna will utilize the appropriate waste hierarchy to identify waste that can reused or recycled ahead of disposal.



The validation of the success of condition 10.1 is carried out through an Independent Closure Audit (ICA), followed by and EPA Exit Audit (EA) and the eventual partial or full surrender of the licence.

**2. Enhanced Decommissioning.**

The remaining infrastructure does not constitute a risk to the environment and would not be a requirement of condition 10 of the licence. The removal of these are deemed as enhanced measures. These may enhance the future afteruse of the bog for amenity value, security against access for illegal and unsocial activities and general State and community benefit. In relation to this bog, this would include the infrastructure defined below:

| Item | Enhanced Decommissioning Type | Bloomhill Bog Decommissioning Plan |
|---|---|---|
| 1 | Removal of Railway Lines | Removal of Railway Lines |
| 2 | Decommissioning Bridges and Underpasses | Where 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 | Where Applicable |

## APPENDIX VIII. GLOSSARY

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

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

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

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

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

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

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

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

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

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

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

# APPENDIX IX. EXTRACTIVE WASTE MANAGEMENT PLAN

## (Minimisation, treatment, recovery and disposal)

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

**Scope:**
This plan covers IPPC Licence's P0502-01, Blackwater Group of Bogs in Counties Roscommon, Galway, Westmeath and Offaly.

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

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

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

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

**2.0 P0502-01IPPC Licence Extractive Waste Conditions**

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

**7.0 Extractive Waste Management Plan**

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

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

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

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

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

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

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

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

**Classification in accordance Annex II.**

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

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

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

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

10.2 Cutaway Bog Rehabilitation Plan:

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

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

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

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

**Review.**
This plan will be reviewed every five years, the first review to take place in September 2017. This review will entail an inspection of these waste facilities to ensure their placing, management, maintenance and stability comply with the requirements of the Extractive Waste Management requirements and condition 7.5, 7.6 and 7.7 of the Bloomhill Bog Licence P0502-01.
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## APPENDIX X. MITIGATION MEASURES FOR THE APPLICATION OF FERTILISER

*The following measures will apply unless superseded by stipulations in Appropriate Assessment reporting. See Addendum I in this regard.*

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

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

# APPENDIX XI. CONSULTATION SUMMARIES

**Table APXI -1 Consultees contacted**

| Bog Name | Contact Organisation | Contact Name | Date of Issue | Format | Date Response Received | Response Format |
|---|---|---|---|---|---|---|
| Bloomhill | Department of Housing, Local Government and Heritage NPWS | Multiple Staff Members | 19.11.2021 | Email | | |
| Bloomhill | National Museum of Ireland | Multiple Staff Members | 19.11.2021 | Email | 24.11.2021 | Email |
| Bloomhill | Department of Housing, Local Government and Heritage | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | Dept of Agriculture Food & the Marine | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | Department of Environment, Climate and Communications | Multiple Staff Members | 19.11.2021 | Email | | |
| Bloomhill | Dept of Rural and Community Development | General Email Contact | 19.11.2021 | Email | 21.11.2021 | Email |
| Bloomhill | Department of the Housing Local Government and Heritage | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | Minister for Environment, Climate and Communications | Minister - Eamon Ryan | 19.11.2021 | Email | | |
| Bloomhill | Minister of state for Agriculture with responsibility for Land use and Biodiversity | Pippa Hackett Minister of State for Land Use and Biodiversity) | 19.11.2021 | Email | | |
| Bloomhill | Oireachtas | Danielle McDonnell (Minister Malcolm Noonan Secretary) | 19.11.2021 | Email | 19.11.2021 | Email |
| Bloomhill | An Taisce | General Email Contact | 19.11.2021 | Email | | |

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|---|---|---|---|---|---|---|
| Bloomhill | Environmental Protection Agency | Multiple Staff Members | 19.11.2021 | Email | | |
| Bloomhill | Inland Fisheries Ireland | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | Local Authority Waters Programme | Multiple Staff Members | 19.11.2021 | Email | | |
| Bloomhill | NWRA | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | Teagasc | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | The Heritage Council | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | Waterways Ireland | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | An Forum Uisce (The Water Forum) | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | Coillte | Multiple Staff Members | 19.11.2021 | Email | | |
| Bloomhill | Irish Water | General Email Contact | 19.11.2021 | Email | 21.12.2021 | Email |
| Bloomhill | Irish Water- Water Supply Project Eastern and Midlands Region | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | Office of Public Works (OPW) | Multiple Staff Members | 19.11.2021 | Email | 24.11.2021 | Email |
| Bloomhill | CARO (Climate Action Regional Office) Eastern and Midlands | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | Bat Conservation Ireland | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | Birdwatch Ireland | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | Butterfly Conservation Ireland | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | Eastern and Midland Regional Assembly | General Email Contact | 19.11.2021 | Email | | |

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|---|---|---|---|---|---|---|
| Bloomhill | Fisheries Ireland | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | Friends of the Earth | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | Friends of the Irish Environment | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | ICMSA (Irish Creamery Milk Suppliers Association) | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | ICSA (Irish Cattle and Sheep Farmers Association | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | Irish Farmers Association | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | Irish Peatlands Conservation Council | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | Irish Raptor Study Group | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | Irish Rural Link (Community Wetlands Forum) | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | Irish Rural Link | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | Irish Wildlife Trust | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | Inland Waterways Association of Ireland (IWAI) | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | National Association of Regional Game Councils | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | NPWS Rangers North Midlands | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | NUIG Galway | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | PPN Westmeath Public Participation Network | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | Ranger Association Committee | General Email Contact | 19.11.2021 | Email | | |

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|---|---|---|---|---|---|---|
| Bloomhill | Shannon Flood Risk State Agency Co-ordination Working Group | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | Sustainable Water Action Network (SWAN) | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | Trinity College Dublin | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | Turf Cutters and Contractors Association | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | UCD / Irish Rural Link | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | University College Dublin | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | Waterways Ireland | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | Woodlands of Ireland | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | Offaly County Council - Director of Services | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | Offaly County Council - Chief Executive | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | Offaly County Council - Senior Planner | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | Offaly County Council - Local Enterprise Office | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | Offaly County Council - Heritage Officer | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | Offaly County Council | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | Offaly County Council | | 19.11.2021 | Email | 28.01.2022 | Email |
| Bloomhill | *Offaly County Councillors - Birr District* | Cllr. John Carroll | 19.11.2021 | Email | | |
| Bloomhill | *Offaly County Councillors - Birr District* | *Cllr. John Clendennon* | 19.11.2021 | Email | | |
| Bloomhill | *Offaly County Councillors - Birr District* | *Cllr. Eamonn Dooley* | 19.11.2021 | Email | | |

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|---|---|---|---|---|---|---|
| Bloomhill | *Offaly County Councillors - Birr District* | *Cllr. John Leahy* | 19.11.2021 | Email | | |
| Bloomhill | *Offaly County Councillors - Birr District* | *Cllr. Clare Claffey* | 19.11.2021 | Email | | |
| Bloomhill | *Offaly County Councillors - Birr District* | *Cllr. Peter Ormond* | 19.11.2021 | Email | | |
| Bloomhill | *Offaly County Councillors - Edenderry District* | Mark Hackett | 19.11.2021 | Email | | |
| Bloomhill | *Offaly County Councillors - Edenderry District* | Noel Cribbin | 19.11.2021 | Email | | |
| Bloomhill | *Offaly County Councillors - Edenderry District* | Eddie Fitzpatrick | 19.11.2021 | Email | | |
| Bloomhill | *Offaly County Councillors - Edenderry District* | Liam Quinn | 19.11.2021 | Email | | |
| Bloomhill | *Offaly County Councillors - Edenderry District* | John Foley | 19.11.2021 | Email | | |
| Bloomhill | *Offaly County Councillors - Edenderry District* | Robert McDermott | 19.11.2021 | Email | | |
| Bloomhill | *Offaly County Councillors - Tullamore District* | Neil Feighery | 19.11.2021 | Email | | |
| Bloomhill | *Offaly County Councillors - Tullamore District* | Tony McCormack | 19.11.2021 | Email | | |
| Bloomhill | *Offaly County Councillors - Tullamore District* | Declan Harvey | 19.11.2021 | Email | | |
| Bloomhill | *Offaly County Councillors - Tullamore District* | Sean O'Brien | 19.11.2021 | Email | | |
| Bloomhill | *Offaly County Councillors - Tullamore District* | Ken Smollen | 19.11.2021 | Email | | |
| Bloomhill | *Offaly County Councillors - Tullamore District* | Frank Moran | 19.11.2021 | Email | | |
| Bloomhill | *Offaly County Councillors - Tullamore District* | Danny Owens | 19.11.2021 | Email | | |
| Bloomhill | TD Laois/Offaly | *Barry Cowen* | 19.11.2021 | Email | | |
| Bloomhill | TD Laois/Offaly | *Charlie Flanagan* | 19.11.2021 | Email | | |
| Bloomhill | TD Laois/Offaly | *Sean Fleming* | 19.11.2021 | Email | | |

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|---|---|---|---|---|---|---|
| Bloomhill | TD Laois/Offaly | *Carol Nolan* | 19.11.2021 | Email | | |
| Bloomhill | TD Laois/Offaly | *Brian Stanley* | 19.11.2021 | Email | | |
| Bloomhill | Westmeath County Councillors - Chief Exec | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | Westmeath County Councillors - Director of Service | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | Westmeath County Councillors - Director of Service | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | Westmeath County Councillors - | Deirdre Reilly | 19.11.2021 | Email | | |
| Bloomhill | Director of Services Planning, Economic and Tourism Development, Trim MD. Meath | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | Westmeath County Councillors - Mullingar-Kinnegad | John Shaw | 19.11.2021 | Email | | |
| Bloomhill | Westmeath County Councillors - Mullingar-Kinnegad | Emily Wallace | 19.11.2021 | Email | | |
| Bloomhill | Westmeath County Councillors - Mullingar-Kinnegad | Andrew Duncan | 19.11.2021 | Email | | |
| Bloomhill | Westmeath County Councillors - Mullingar-Kinnegad | Michael Dollard | 19.11.2021 | Email | | |
| Bloomhill | Westmeath County Councillors - Mullingar-Kinnegad | Aoife Davitt | 19.11.2021 | Email | | |
| Bloomhill | Westmeath County Councillors - Mullingar-Kinnegad | Denis Leonard | 19.11.2021 | Email | | |
| Bloomhill | Westmeath County Councillors - Mullingar-Kinnegad | Ken Glynn | 19.11.2021 | Email | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Bloomhill | Westmeath County Councillors - Mullingar-Kinnegad | Hazel Smyth | 19.11.2021 | Email | | |
| Bloomhill | Westmeath County Councillors - Mullingar-Kinnegad | Billy Collentine | 19.11.2021 | Email | | |
| Bloomhill | Westmeath County Councillors - Mullingar-Kinnegad | Frank McDermott | 19.11.2021 | Email | | |
| Bloomhill | Westmeath County Councillors - Mullingar-Kinnegad | Paddy Hill | 19.11.2021 | Email | | |
| Bloomhill | Westmeath County Councillors - Athlone - Moate | John Dolan | 19.11.2021 | Email | | |
| Bloomhill | Westmeath County Councillors - Athlone - Moate | Tom Farrell | 19.11.2021 | Email | | |
| Bloomhill | Westmeath County Councillors - Athlone - Moate | Frankie Keena | 19.11.2021 | Email | | |
| Bloomhill | Westmeath County Councillors - Athlone - Moate | Johnny Penrose | 19.11.2021 | Email | | |
| Bloomhill | Westmeath County Councillors - Athlone - Moate | Vinny McCormack | 19.11.2021 | Email | | |
| Bloomhill | Westmeath County Councillors - Athlone - Moate | Aengus O'Rourke | 19.11.2021 | Email | | |
| Bloomhill | Westmeath County Councillors - Athlone - Moate | Liam McDaniel | 19.11.2021 | Email | | |
| Bloomhill | Westmeath County Councillors - Athlone - Moate | Jamie Moran | 19.11.2021 | Email | | |
| Bloomhill | Westmeath County Councillors - Athlone - Moate | Louise Heavin | 19.11.2021 | Email | | |

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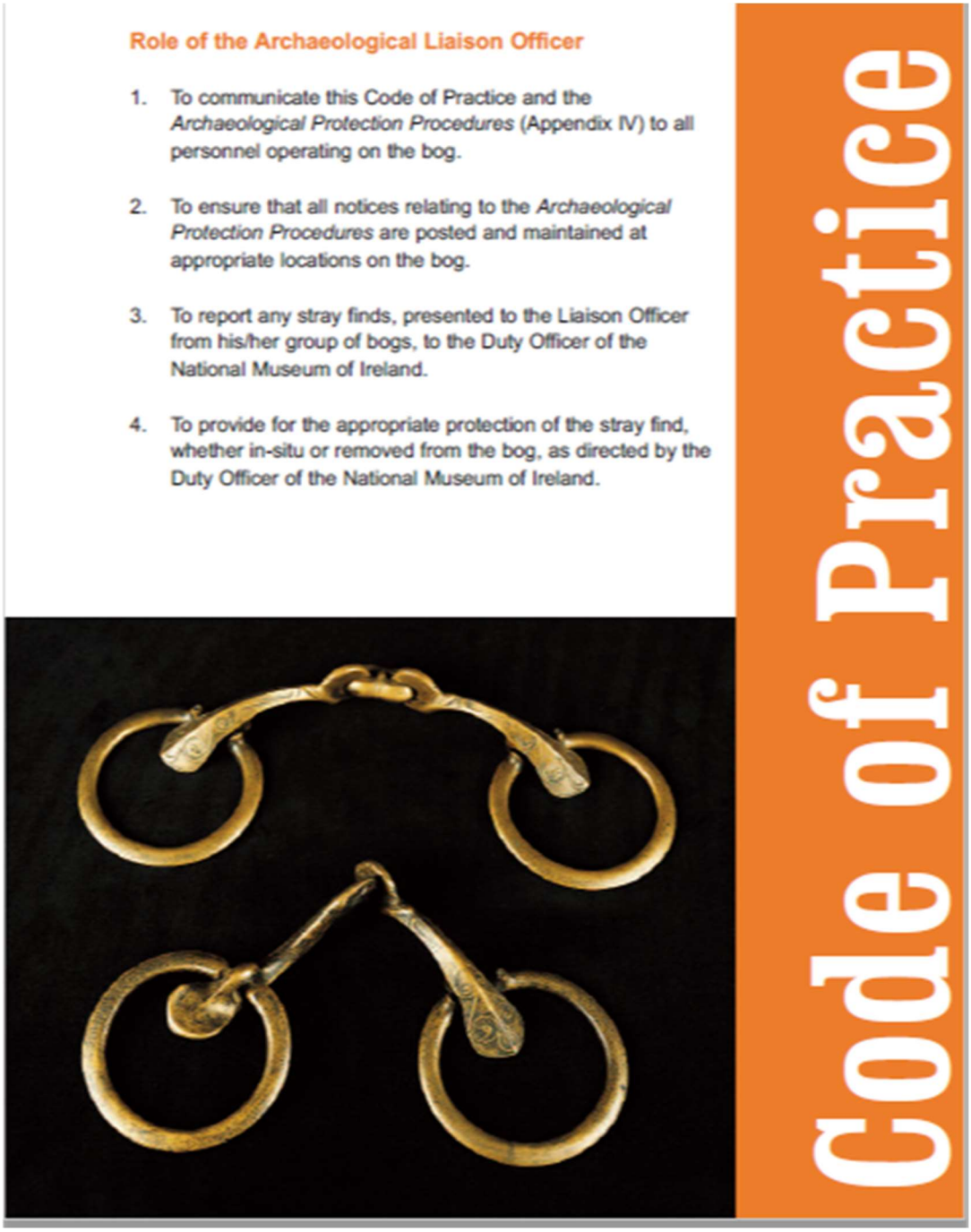
|---|---|---|---|---|---|---|
| Bloomhill | Minister of State at the Department of Housing, Local Government and Heritage | Peter Burke (Longford-Westmeath) | 19.11.2021 | Email | | |
| Bloomhill | Longford-Westmeath | General Email Contact | 19.11.2021 | Email | | |
| Bloomhill | Minister of State at the Department of Enterprise, Trade and Employment | Robert Troy (Longford-Westmeath) | 19.11.2021 | Email | | |
| Bloomhill | All Land- owners in vicinity of bog | | 19.11.2021 | Letter drop | | |
| Bloomhill | All those with turbary rights | | 19.11.2021 | Letter drop | | |
| Bloomhill | Ferbane Tidy Towns | | 19.11.2021 | Email | | |
| Bloomhill | Tullamore Tidy towns | | 19.11.2021 | Email | | |
| Bloomhill | Westmeath Tidy Towns | | 19.11.2021 | Email | | |
| Bloomhill | Coirtrade | General Email Contact | 19.11.2021 | Email | | |

**Table APXI -2 Response summary from Consultees contacted**

| Organisation | Summary of Response by Stakeholder | BnM Response |
|---|---|---|
| Irish Water | Irish Water made submissions on multiple PCAS bogs including Bloomhill Bog, raising the following points:<br>1) IW wished to express support for PCAS<br>2) IW recognised the potential for beneficial impacts of bog rehabilitation on drinking water supplies<br>3) IW expressed the need to list the potential benefits of PCAS to regional drinking water supplies within the rehabilitation<br>plans<br>4) IW expressed need for strong monitoring protocols initially and post restoration<br>5) IW advised protection of drinking water sources be afforded special consideration, welcomed the planned maintenance of silt-ponds and requested they be consulted if decommissioning of silt-ponds proves necessary | Dialogue is ongoing. |

| | | |
|---|---|---|
| Offaly County Council | This are is **under active consideration as a key link in the *Midland Cycling Destination –Offaly*** proposed network at the moment. A **Feasibility Study for the Shannon Monastic Greenway** is underway and key route options under the Options Report pass through or along the edges of the bog. Bord na Mona are on the Steering Group and have the draft options report. | BnM responded to address the concerns of raised by the Offaly County Council.<br>Dialogue is ongoing between BnM and the Offaly County Council. |

## APPENDIX XII. ARCHAEOLOGY



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 | **Procedure: ENV017** | **Rev: 1** |
|---|---|---|
| **Title: Archaeological Findings** | **Approved: EM** | **Date: 13/10/2020** |

**1) Purpose**

The purpose of this procedure is to describe the arrangements in Bord na Móna for findings of Archaeological material (Stray Finds).

**All objects, sites or monuments, no matter how fragmentary, are important elements of our heritage.**

**2) Procedure**

1. Check whether there are any known archaeological monuments in your area.
2. Be vigilant at all times - objects or traces of structures can be found on the field surfaces, in the drain faces, on the bog margins or caught within the mechanics of machinery.
3. If an object is found leave it in place, if it is safe to do so, note its position and immediately contact your Archaeological Liaison Officer who will assess the situation and contact the Duty Officer of the National Museum of Ireland.
4. Resist the temptation to investigate the find spot as this may disturb fragile archaeological deposits.
5. If the object is already dislodged or is in imminent danger, remove it carefully, mark its find spot and report it immediately to your Archaeological Liaison Officer.
6. Objects made of wood, leather or textile, which are removed from peat should be kept in conditions similar to those in which they are found. This can be done by packing them in peat or, if waterlogged, placing them in a clean basin of water and sealing the container. Resist the temptation to clean or remove peat from the object.
7. If timbers or other materials, such as gravel or stones, which could be part of a man-made structure are noted on the bog, mark the location and report it immediately to your Archaeological Liaison Officer. If you suspect the find is of archaeological importance, resist the temptation to expose it any further as this could result in damage to the structure.
8. Report anything that looks unnatural in the bog – your Archaeological Liaison Officer will decide whether it should be referred to the appropriate authorities.

**NOTE:** Our archaeological heritage is a finite, non-renewable resource. Once a site is destroyed its information is lost forever and we have lost the chance to understand a little more about our past, where we have come from and perhaps the opportunity to learn for the future.

Your Archaeological Liaison Officer is ……

**3) Records**

| Revision Index | | | |
|---|---|---|---|
| Revision | Date | Description of change | Approved |
| 1 | 13/19/2020 | First release | EMcD |
| 2 | | | |

**Archaeological Impact Assessment of Proposed Bog Rehabilitation at Bloomhill Bog, Co. Offaly. Dr. Charles Mount.**

# Archaeological Impact Assessment of Proposed Bog Decommissioning and Rehabilitation at Bloomhill Bog, Cos. Offaly and Westmeath

**Draft**

**Report For**

**Bord Na Móna Energy Ltd.**

**Author**

**Dr. Charles Mount**

**Bord Na Móna Project Archaeologist**

## Introduction

The EPA (2020) *Guidance on the process of preparing and implementing a bog rehabilitation plan* notes that the licensee should characterise the bog prior to embarking on detailed planning and implementation. This characterisation should detail how the land is classified in terms of statutory protections, e.g. as European sites, world heritage sites, RAMSAR sites, National Heritage Areas, national monuments, archaeological heritage, etc. This archaeological impact assessment report was prepared by Dr. Charles Mount for Bord na Móna Energy Ltd to fulfil this characterisation in relation to archaeological heritage. It represents the results of a desk-based assessment of the impact of proposed bog rehabilitation of c.765 hectares at Bloomhill Bog, Cos. Offaly and Westmeath on the known archaeological heritage of the bog. The proposed rehabilitation actions will be a combination of measures to create wetlands and re-wet deep peat as outlined in the draft Methodology Paper for the proposed Bord na Móna Decommissioning, Rehabilitation and Restoration Scheme. These enhanced measures for Bloomhill Bog will include:

- Re-assessment of the pumping regime; removal of the pump on site is desired if this has no significant external impact. Initial hydrological modelling indicates that parts of the west of the site will develop a mosaic of open water and wetland habitats with permanent deeper water when pumping is reduced or stopped. Hydrological management will look to optimise summer water levels to maximise the development of wetland vegetation (by looking to set water depths at < 0.5 m, where possible). It is inevitable that some sections will naturally have deeper water due to the topography at this site. Water-levels will be adjusted at outfalls and by adjusting piped drainage. More sustainable permanent gravity drainage solutions will be examined. Some targeted bunding may be required. It is expected that a natural seasonal regime of water fluctuation will develop, with water-levels fluctuating in association with levels in the adjacent watercourses and associated groundwater conditions.
- Intensive drain blocking to create wetlands, and the introduction of Reeds and other Rhizomes, where needed;
- Management of water levels with overflow pipes;
- Re-alignment of piped drainage;
- Re-wetting the deep peat and some shallow peat areas of the bog using berms and field re-profiling. This enhanced measure seeks to create large (c. 45m x 60m) flat areas or cells of shallow (< 10 cm) water conditions on bare peat, across multiple fields that are enclosed by shallow berms to retain shallow surface water;
- Re-wetting some deep peat areas of the bog through field drain blocking using a dozer to create peat barriers (up to seven every 100 m along each field drain);
- Regular drain blocking (3/100) on dry cutaway adjacent to wetland mosaics, along with the blocking of outfalls and management of water levels;
- Field re-profiling on deep peat fields using a screw leveller, along with drain blocks, drain infilling and keyed berms across the fields, in conjunction with outfall management;
- Inoculation of Sphagnum on compatible residual deep peat areas;
- Targeted fertiliser applications on bare peat areas to accelerate vegetation establishment on headlands and high fields.

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

- Targeted drain blocking around existing wetlands or standing water to create/promote the spread of wetland habitats;
- Optimising water retention in wetland areas, including placement of berms where required;

- Regular drain blocking (3/100) in targeted dry cutaway adjacent to wetland mosaics, along with the blocking of outfalls and management of water levels;
- 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 water quality parameters meet targets 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).

Bloomhill Bog is located c.1km west of Ballinahown, Co. Westmeath, and north of the R444 road. The bog surrounds the dryland is island of Bloomhill and the Offaly/Westmeath county boundary runs through the north-eastern part of the bog. The overall rehabilitation area occupies the townlands of Ballyduff, Ballynahownwood, Clonaderg, Clonascra, Clonfinlough, Clonmacnoise and Cloncraff and Bloomhill, on OS 6 inch sheets Offaly Nos. 5, 6 and 6a and Westmeath No. 35.

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

- The IAWU Peatland Survey
- Bord na Móna Re-assessment survey 2009
- The Sites and Monuments Record that is maintained by the Dept of Housing, Local Government and Heritage
- The topographical files of the National Museum of Ireland.
- The Excavations database
- Previous assessments

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

## Desktop assessment

**1980s Excavations**

After the report of the discovery of a Road - gravel/stone trackway running for 0.95km across Bloomhill Bog (RMP WM-035-017/OF006-001001) from Bloomhill to Ballynahownwood townlands to the National Museum of Ireland the monument was excavated on behalf of the Bord na Móna and the office of Public Works by Thaddeus Breen in 1983 and 1986 (E395, Breen *et al.* 1988). Two cuttings were excavated each at the Offaly and Westmeath ends of the trackway. The trackway was found to be a multi-period construction dating from the 6$^{th}$ to thirteenth centuries AD.

**Peatland survey**

Bloomhill Bog was surveyed by the Irish Archaeological Wetland Unit (IAWU) in 1992 as part of the Archaeological Survey of Ireland Peatland Survey (Unlicensed). Fifty-three sightings of archaeological material were made (see Table 1). There are records of the depth below the contemporary bog surface of the sightings. Thirty-seven of the sightings were identified on the of surface and the remaining 15 ranged from 0.08-0.91m below the surface. These archaeological sightings were notified to the Archaeological

Survey of Ireland. The medieval Road-Gravel/Stone trackway (WM-035-017/OF006-001001) (excavated in 1983 and 1986 by Breen, E395) was also excavated by the Aonghus Moloney and Conor McDermott of the IAWU in 1992 (92E0176) with a cutting at the Westmeath Ballynahownwood townland end.

| SMR_NO | SMR Class | IAWU Cat._No. | IAWU Class | Townland | ITM E | ITM N | Depth BS m |
|---|---|---|---|---|---|---|---|
| OF006-001001- | Redundant record | OF-CBL 0021 | WOWO | Cloncraff or Bloomhill | 604803 | 732802 | 0.25 |
| OF006-001002- | Road - class 3 togher | OF-CBL 0014 | TOGH | Cloncraff or Bloomhill | 606891 | 733839 | 0.00 |
| OF006-001003- | Road - class 3 togher | OF-CBL 0012 | TOGH | Cloncraff or Bloomhill | 606866 | 733804 | 0.00 |
| OF006-001004- | Road - class 2 togher | OF-CBL 0004 | TOGH | Cloncraff or Bloomhill | 606974 | 733798 | 0.00 |
| OF006-076---- | Road - class 3 togher | OF-BDF 0001 | TOGH | Ballyduff | 606892 | 731930 | 0.33 |
| OF006-077---- | Road - class 2 togher | OF-CBL 0008 | TOGH | Cloncraff or Bloomhill | 607082 | 733642 | 0.00 |
| OF006-080---- | Road - class 3 togher | OF-CBL 0022 | TOGH | Cloncraff or Bloomhill | 604666 | 732864 | 0.91 |
| OF006-084---- WM035-017---- | Road - gravel/stone trackway - peatland | OF-CBL 0001 | GRRD | Cloncraff or Bloomhill | 606868 | 734033 | 0.00 |
| OF006-085---- | Redundant record | OF-CBL 0002 | WOWO | Cloncraff or Bloomhill | 606878 | 733812 | 0.08 |
| OF006-086---- | Redundant record | OF-CBL 0003 | WOWO | Cloncraff or Bloomhill | 607184 | 733438 | 0.00 |
| OF006-087---- | Road - class 3 togher | ? | - | Cloncraff or Bloomhill | 607017 | 733757 | - |
| OF006-088---- | Redundant record | OF-CBL 0005 | TOGH | Cloncraff or Bloomhill | 607017 | 733756 | 0.00 |
| - | - | OF-CBL 0006 | WOWO | Cloncraff or Bloomhill | 607048 | 733772 | 0.00 |
| OF006-089---- | Redundant record | OF-CBL 0007 | WOWO | Cloncraff or Bloomhill | 606999 | 733837 | 0.00 |
| OF006-090---- | Redundant record | I OF-CBL 0009 | WOWO | Cloncraff or Bloomhill | 606911 | 733802 | 0.10 |
| OF006-091---- | Road - class 3 togher | OF-CBL 0010 | TOGH | Cloncraff or Bloomhill | 606927 | 733807 | 0.00 |
| - | - | OF-CBL 0011 | FIND | Cloncraff or Bloomhill | 606649 | 733932 | 0.00 |
| OF006-092---- | Redundant record | OF-CBL 0013 | WOWO | Cloncraff or Bloomhill | 606898 | 733829 | 0.00 |
| OF006-093---- | Redundant record | OF-CBL 0015 | WOWO | Cloncraff or Bloomhill | 607042 | 733734 | 0.00 |
| - | - | OF-CBL 0016 | WOWO | Cloncraff or Bloomhill | 606951 | 733632 | 0.00 |
| OF006-095---- | Redundant record | OF-CBL 0017 | WOWO | Cloncraff or Bloomhill | 604516 | 732819 | 0.08 |
| OF006-096---- | Redundant record | OF-CBL 0018 | WOWO | Cloncraff or Bloomhill | 604561 | 732868 | 0.00 |
| OF006-097---- | Redundant record | OF-CBL 0019 | WOWO | Cloncraff or Bloomhill | 604566 | 732880 | 0.56 |
| OF006-098---- | Redundant record | OF-CBL 0020 | WOWO | Cloncraff or Bloomhill | 604804 | 732955 | 0.56 |
| OF006-099---- | Redundant record | OF-CBL 0023 | WOWO | Cloncraff or Bloomhill | 604950 | 732865 | 0.16 |
| OF006-100---- | Redundant record | OF-CBL 0024 | PORO | Cloncraff or Bloomhill | 607074 | 733698 | 0 |
| OF006-101---- | Redundant record | OF-CDG 0001 | WOWO | Clonaderg | 608168 | 732753 | 0.00 |
| OF006-102---- | Redundant record | OF-CDG 0002 | WOWO | Clonaderg | 608089 | 732734 | 0.10 |
| OF006-103---- | Redundant record | OF-CDG 0003 | WOWO | Clonaderg | 608148 | 732774 | 0.00 |
| OF006-104---- | Redundant record | OF-CDG 0004 | WOWO | Clonaderg | 608084 | 732773 | 0.20 |
| OF006-105---- | Redundant record | OF-CDG 0005 | WOWO | Clonaderg | 607068 | 732519 | 0.00 |
| - | - | OF-CDG 0006 | WOWO | Clonaderg | - | - | 0.00 |
| WM035-016---- | Road - class 3 togher | WM-BHD 0020 | TOGH | Ballynahownwood | 607197 | 733739 | 0.17 |
| OF006-084---- WM035-017---- | Road - gravel/stone trackway – peatland | WM-BHD 0021 | GRRD | Cloncraff or Bloomhill | 607099 | 734048 | 0.00 |
| WM035-018---- | Road - class 2 togher | WM-BHD 0001 | TOGH | Ballynahownwood | 607162 | 733493 | 0.00 |
| WM035-019---- | Road - class 3 togher | WM-BHD 0002 | TOGH | Ballynahownwood | 607198 | 734208 | 0.00 |
| WM035-020---- | Redundant record | WM-BHD 0003 | WOWO | Ballynahownwood | 607030 | 733993 | 0.00 |
| WM035-021---- | Structure - peatland | WM-BHD 0004 | WOWO | Ballynahownwood | 607013 | 733982 | 0.00 |
| WM035-022---- | Road - class 3 togher | WM-BHD 0005 | WOWO | Ballynahownwood | 607021 | 733908 | 0.00 |
| WM035-023---- | Redundant record | WM-BHD 0006 | WOWO | Ballynahownwood | 607137 | 733992 | 0.00 |
| WM035-024---- | Structure - peatland | WM-BHD 0007 | WOWO | Ballynahownwood | 607144 | 733988 | 0.10 |
| WM035-025---- | Road - class 3 togher | WM-BHD 0008 | TOGH | Ballynahownwood | 607158 | 733987 | 0.00 |
| WM035-026---- | Road - class 3 togher | WM-BHD 0009 | WOWO | Ballynahownwood | 607181 | 733913 | 0.00 |
| WM035-027---- | Road - class 3 togher | WM-BHD 0010 | TOGH | Ballynahownwood | 607077 | 733818 | 0.00 |
| WM035-028---- | Road - class 3 togher | WM-BHD 0011 | TOGH | Ballynahownwood | 607154 | 733802 | 0.13 |
| WM035-029---- | Road - class 3 togher | WM-BHD 0012 | WOWO | Ballynahownwood | 607086 | 733828 | 0.00 |
| WM035-030---- | Road - class 3 togher | WM-BHD 0013 | TOGH | Ballynahownwood | 607071 | 733845 | 0.00 |
| WM035-031---- | Structure - peatland | WM-BHD 0014 | WOWO | Ballynahownwood | 607064 | 733846 | 0.00 |
| WM035-032---- | Redundant record | WM-BHD 0015 | WOWO | Ballynahownwood | 607050 | 733791 | 0.00 |
| WM035-033---- | Road - class 3 togher | WM-BHD 0016 | WOWO | Ballynahownwood | 607207 | 734200 | 0.10 |
| WM035-034---- | Road - class 3 togher | WM-BHD 0017 | TOGH | Ballynahownwood | 607230 | 733736 | 0.00 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| WM035-035---- | Road - class 3 togher | WM-BHD 0018 | WOWO | Ballynahownwood | 607064 | 733822 | 0.00 |
| WM035-036---- | Road - class 3 togher | WM-BHD 0019 | TOGH | Ballynahownwood | 607209 | 733760 | 0.00 |

Table 1. List of sightings in Bloomhill Bog made by the IAWU with SMR concordance.

**Recorded Monuments**

The Record of Monuments and Places (RMP) for Cos. Offaly and Westmeath which was established under Section 12 of the National Monuments (Amendment) Act, 1994 was examined as part of the assessment (DAHGI 1995 and 1997). These records were published by the Minister in 1995 and 1997 and include sites and monuments that were known in Bloomhill Bog before that date. This review established that there are several RMPs located in the proposed rehabilitation area (see Table 2 and Fig. 1).

| SMR_NO | RMP Class | SMR Class | Townland | ITM E | ITM N |
|---|---|---|---|---|---|
| OF006-001--- | **Togher Complex** | Redundant record<br>Road - class 3 togher<br>Road - class 3 togher<br>Road - class 2 togher | Cloncraff or Bloomhill | 604803 | 732802 |
| OF006-076---- | **Togher** | Road - class 3 togher | Ballyduff | 606892 | 731930 |
| OF006-077---- | **Togher** | Road - class 3 togher | Cloncraff or Bloomhill | 607082 | 733642 |
| OF006-080---- | Togher | Road - class 2 togher | Cloncraff or Bloomhill | 604666 | 732864 |

Table 2. Sites in Bloomhill Bog entered in the RMP.

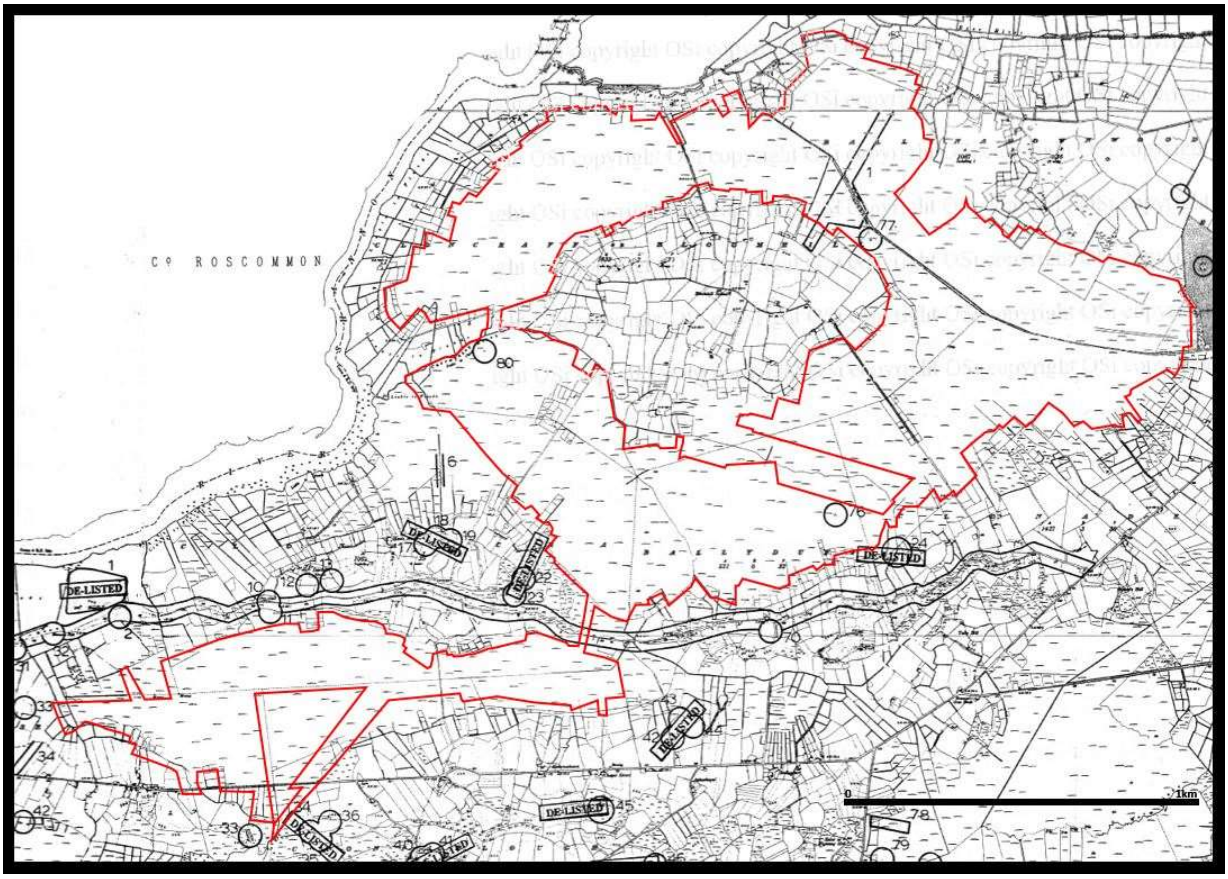



Fig. 1. Bloomhill Bog, Cos. Offaly and Westmeath, detail of the Record of Monuments and Places map sheets Offaly Nos. 5, 6 and 6a and Westmeath No. 35. The proposed rehabilitation area is outlined with the red line. There are Recorded Monuments in the rehabilitation area.

**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 15th of November 2021. The SMR consists of records included in the RMP and sites and monuments notified to the Dept. since the publication of the RMP. This review established that there are 51 entries in the SMR in the proposed rehabilitation area (see Table 1 and Fig. 2). Twenty-two of these entries are classified as Redundant record, 19 as Road - class 3 togher, 3 as Road - class 2 togher, 3 as Structure-peatland, and 2 as Road - gravel/stone trackway - peatland .

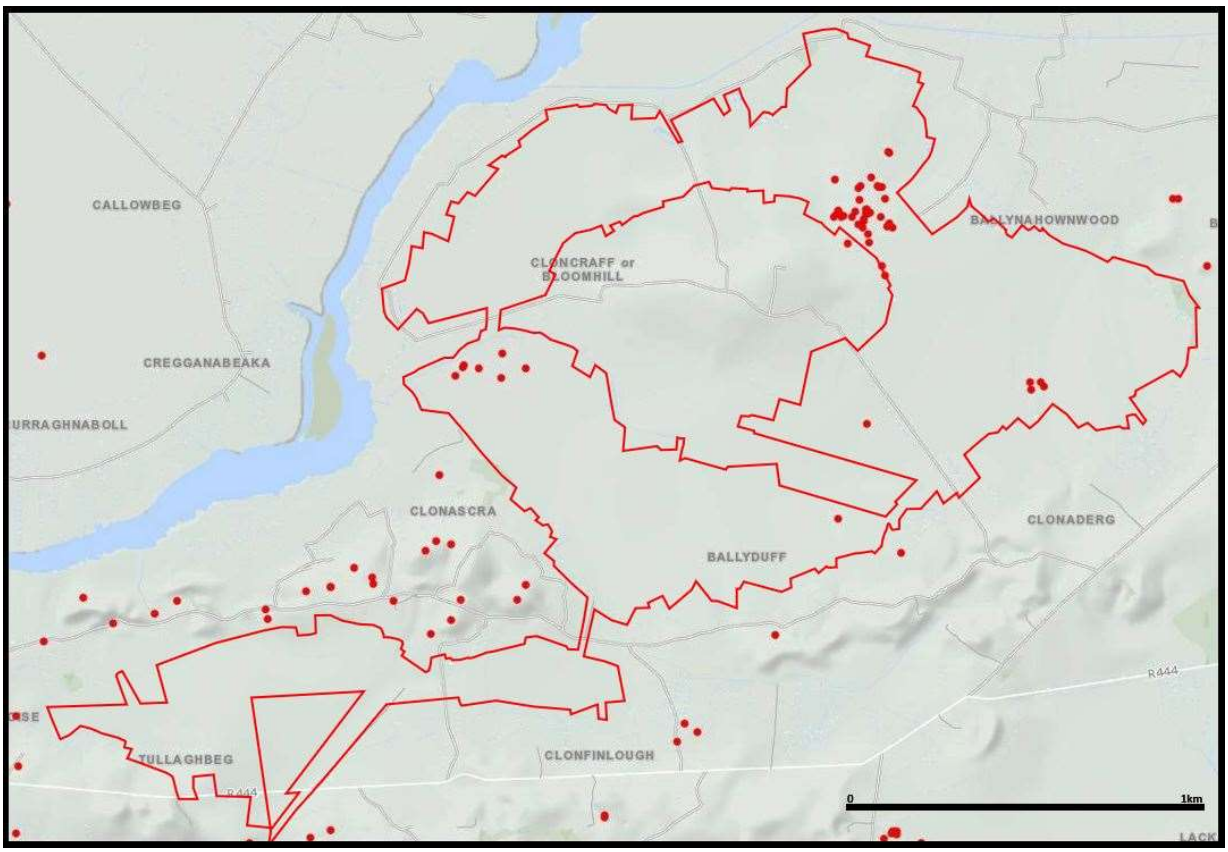



Fig. 2. Bloomhill Bog, Co. Offaly, detail of the Sites and Monuments Record. The proposed rehabilitation area is outlined with the red line.

**Bord na Móna Re-assessment survey 2009**

Bloomhill Bog was re-surveyed by the Bord na Móna Re-assessment survey 2009 (Rohan 2009, License No. 09E0404). At the time of the survey the bog was in production. A handheld GPS was used to find the location of the previously identified sites but, with the exception of the Road - gravel/stone trackway – peatland (RMP OF006-084----/WM035-017----) they were no longer extant. Fifteen sightings the Road - gravel/stone trackway – peatland (OF-BML001a-0) RMP OF006-084----/WM035-017---- were recorded mostly on the field surface with one in the drain face along with an additional five sightings of new material (see Table 3).

| SMR_NO | SMR Class | IAWU Cat._No. | Re-assessment Survey Cat._No. | Townland | ITM E | ITM N | Depth BSm |
|---|---|---|---|---|---|---|---|
| OF006-084----WM035-017---- | Road - gravel/stone trackway - peatland | OF-CBL 0001 WM-BHD 0021 | OF-BML001a | Cloncraff or Bloomhill | 606896.2 | 733792.9 | - |
| OF006-084----WM035-017---- | Road - gravel/stone trackway - peatland | OF-CBL 0001 WM-BHD 0021 | OF-BML001b | Cloncraff or Bloomhill | 606929.2 | 733847.9 | - |
| OF006-084----WM035-017---- | Road - gravel/stone trackway - peatland | OF-CBL 0001 WM-BHD 0021 | OF-BML001b | Cloncraff or Bloomhill | 606963.2 | 733884.9 | - |
| OF006-084----WM035-017---- | Road - gravel/stone trackway - peatland | OF-CBL 0001 WM-BHD 0021 | OF-BML001d | Cloncraff or Bloomhill | 607004.2 | 733930.9 | - |
| OF006-084----WM035-017---- | Road - gravel/stone trackway - peatland | OF-CBL 0001 WM-BHD 0021 | OF-BML001e | Cloncraff or Bloomhill | 606963.2 | 733884.9 | - |
| OF006-084----WM035-017---- | Road - gravel/stone trackway - peatland | OF-CBL 0001 WM-BHD 0021 | OF-BML001f | Cloncraff or Bloomhill | 607072.2 | 734003.9 | - |
| OF006-084----WM035-017---- | Road - gravel/stone trackway - peatland | OF-CBL 0001 WM-BHD 0021 | OF-BML001g | Cloncraff or Bloomhill | 607108.1 | 734047.8792 | - |
| OF006-084----WM035-017---- | Road - gravel/stone trackway - peatland | OF-CBL 0001 WM-BHD 0021 | OF-BML001h | Cloncraff or Bloomhill | 607108.2 | 734079.9 | - |
| OF006-084----WM035-017---- | Road - gravel/stone trackway - peatland | OF-CBL 0001 WM-BHD 0021 | OF-BML001i | Cloncraff or Bloomhill | 607182.2 | 734121.9 | - |
| OF006-084----WM035-017---- | Road - gravel/stone trackway - peatland | OF-CBL 0001 WM-BHD 0021 | OF-BML001j | Cloncraff or Bloomhill | 607108.2 | 734079.9 | - |
| OF006-084----WM035-017---- | Road - gravel/stone trackway - peatland | OF-CBL 0001 WM-BHD 0021 | OF-BML001k | Cloncraff or Bloomhill | 607258.1 | 734218.8 | - |
| OF006-084----WM035-017---- | Road - gravel/stone trackway - peatland | OF-CBL 0001 WM-BHD 0021 | OF-BML001l | Cloncraff or Bloomhill | 607285.1 | 734246.8 | - |
| OF006-084----WM035-017---- | Road - gravel/stone trackway - peatland | OF-CBL 0001 WM-BHD 0021 | OF-BML001m | Cloncraff or Bloomhill | 607343.1 | 734310.8 | - |
| OF006-084----WM035-017---- | Road - gravel/stone trackway - peatland | OF-CBL 0001 WM-BHD 0021 | OF-BML001n | Cloncraff or Bloomhill | 607364.1 | 734349.8 | - |
| OF006-084----WM035-017---- | Road - gravel/stone trackway - peatland | OF-CBL 0001 WM-BHD 0021 | OF-BML001o | Cloncraff or Bloomhill | 607386.1 | 734368.8 | - |
| - | Archaeological wood | - | OF-BML002 | Ballynahownwood | 607370.1 | 733707 | 0.05 |
| - | Archaeological wood | - | OF-BML003 | Ballynahownwood | 607297.1 | 733620 | - |
| - | Hurdle panel | - | OF-BML004 | Ballynahownwood | 607492.1 | 733653 | 0.22 |
| - | Archaeological wood | - | OF-BML005 | Ballynahownwood | 607492.1 | 733653 | 0.20 |
| - | Archaeological wood | - | OF-BML006 | Ballynahownwood | 607761 | 733733.9 | 0.31 |

Table 3. Sightings of archaeological material in Bloomhill Bog made during the 2009 Re-assessment survey.

**Reported finds**

The topographical files of the National Museum of Ireland were searched for records of finds from the bog in x 2021 and the finds are included below in Table 4.

| Townland | Museum No. | Description |
|---|---|---|
| Clonascra | 1965:46 | Pot quern stone |
| Clonascra | 1977:2188.1-4 | 4 wooden pegs |

Table 4. List of archaeological finds from Bloomhill Bog reported to the National Museum of Ireland.

**Archaeological investigations**

Reports of additional 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 additional reports of archaeological investigation carried out in the rehabilitation area.

**Previous assessments**

Bloomhill Bog has been the subject of an Environmental Impact Assessment Report caried out by Irish Archaeological Consultancy LTD in 2018 for Bord na Móna Energy Limited in relation to IPC Licence P0500-01. The assessment noted the sightings made in the IAWU survey in 1992 and the 2009 Re-assessment Survey and noted that there was a moderate to high potential for archaeological features to be uncovered during the course of any future development works in Bloomhill Bog.

## Impact assessment

A total of 71 sightings of archaeological material were identified and recorded in Bloomhill Bog by the IAWU in 1992 and the Re-assessment Survey in 2009 and 49 of these were entered into the Sites and Monuments Record. The Re-assessment Survey 2009 found that none of the sightings made by the IAWU in 1992 survived except for the Road - gravel/stone trackway (RMP WM-035-017/OF006-001001) that extends across Bloomhill and Ballynahownwood townlands. This was identified in fifteen sightings (OF-BML001a-o). Five sightings of additional archaeological material were made in 2009 (see Table 5). Examination of LIDAR depth data at the locations of the 2009 sightings indicates that the line of the Road - gravel/stone trackway RMP WM-035-017/OF006-001001 survives. This monument is also visible in aerial photography and LIDAR imagery (see Fig. 3). The other sightings numbered OF-BML002-6 do not survive.

| SMR_NO | SMR Class | IAWU Cat._No. | Re-assessment Survey Cat._No. | Townland | ITM E | ITM N | Depth BSm | 2020 depth | 2008 depth | Status |
|---|---|---|---|---|---|---|---|---|---|---|
| OF006-084---- WM035-017---- | Road - gravel/stone trackway | OF-CBL 0001 WM-BHD 0021 | OF-BML001a | Cloncraff or Bloomhill | 606896.2 | 733792.9 | - | 3.59 | 4.10 | Extant |
| OF006-084---- WM035-017---- | Road - gravel/stone trackway | OF-CBL 0001 WM-BHD 0021 | OF-BML001b | Cloncraff or Bloomhill | 606929.2 | 733847.9 | - | 4.08 | 4.63 | Extant |
| OF006-084---- WM035-017---- | Road - gravel/stone trackway | OF-CBL 0001 WM-BHD 0021 | OF-BML001b | Cloncraff or Bloomhill | 606963.2 | 733884.9 | - | 4.49 | 4.63 | Extant |
| OF006-084---- WM035-017---- | Road - gravel/stone trackway | OF-CBL 0001 WM-BHD 0021 | OF-BML001d | Cloncraff or Bloomhill | 607004.2 | 733930.9 | - | 4.03 | 4.41 | Extant |
| OF006-084---- WM035-017---- | Road - gravel/stone trackway | OF-CBL 0001 WM-BHD 0021 | OF-BML001e | Cloncraff or Bloomhill | 606963.2 | 733884.9 | - | 4.49 | 4.63 | Extant |
| OF006-084---- WM035-017---- | Road - gravel/stone trackway | OF-CBL 0001 WM-BHD 0021 | OF-BML001f | Cloncraff or Bloomhill | 607072.2 | 734003.9 | - | 4.03 | 4.19 | Extant |
| OF006-084---- WM035-017---- | Road - gravel/stone trackway | OF-CBL 0001 WM-BHD 0021 | OF-BML001g | Cloncraff or Bloomhill | 607108.1 | 734047.8792 | - | 3.63 | 4.08 | Extant |
| OF006-084---- WM035-017---- | Road - gravel/stone trackway | OF-CBL 0001 WM-BHD 0021 | OF-BML001h | Cloncraff or Bloomhill | 607108.2 | 734079.9 | - | 3.68 | 3.49 | Extant |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| OF006-084----<br>WM035-017---- | Road - gravel/stone trackway | OF-CBL 0001<br>WM-BHD 0021 | OF-BML001i | Cloncraff or Bloomhill | 607182.2 | 734121.9 | - | 3.75 | 2.86 | Extant |
| OF006-084----<br>WM035-017---- | Road - gravel/stone trackway | OF-CBL 0001<br>WM-BHD 0021 | OF-BML001j | Cloncraff or Bloomhill | 607108.2 | 734079.9 | - | 3.68 | 3.49 | Extant |
| OF006-084----<br>WM035-017---- | Road - gravel/stone trackway | OF-CBL 0001<br>WM-BHD 0021 | OF-BML001k | Cloncraff or Bloomhill | 607258.1 | 734218.8 | - | 3.16 | 3.60 | Extant |
| OF006-084----<br>WM035-017---- | Road - gravel/stone trackway | OF-CBL 0001<br>WM-BHD 0021 | OF-BML001l | Cloncraff or Bloomhill | 607285.1 | 734246.8 | - | 3.65 | 3.62 | Extant |
| OF006-084----<br>WM035-017---- | Road - gravel/stone trackway | OF-CBL 0001<br>WM-BHD 0021 | OF-BML001m | Cloncraff or Bloomhill | 607343.1 | 734310.8 | - | 3.33 | 3.93 | Extant |
| OF006-084----<br>WM035-017---- | Road - gravel/stone trackway | OF-CBL 0001<br>WM-BHD 0021 | OF-BML001n | Cloncraff or Bloomhill | 607364.1 | 734349.8 | - | 3.89 | 4.30 | Extant |
| OF006-084----<br>WM035-017---- | Road - gravel/stone trackway | OF-CBL 0001<br>WM-BHD 0021 | OF-BML001o | Cloncraff or Bloomhill | 607386.1 | 734368.8 | - | 3.87 | 4.24 | Extant |
| - | Archaeological wood | - | OF-BML002 | Ballynahown wood | 607370.1 | 733707 | 0.05 | 3.57 | 4.68 | Gone |
| - | Archaeological wood | - | OF-BML003 | Ballynahown wood | 607297.1 | 733620 | - | 2.54 | 3.94 | Gone |
| - | Hurdle panel | - | OF-BML004 | Ballynahown wood | 607492.1 | 733653 | 0.22 | 3.57 | 4.71 | Gone |
| - | Archaeological wood | - | OF-BML005 | Ballynahown wood | 607492.1 | 733653 | 0.20 | 3.57 | 4.71 | Gone |
| - | Archaeological wood | - | OF-BML006 | Ballynahown wood | 607761 | 733733.9 | 0.31 | 2.62 | 3.51 | Gone |

Table 5. Sightings of archaeological material in Bloomhill Bog made during the 2009 Re-assessment survey with the depth of peat removed since 2008.


Fig. 3. Bloomhill Bog, Co. Offaly. Google earth aerial image taken May 2021 indicating the extent of the Road - gravel/stone trackway RMP WM-035-017/OF006-001001 crossing the bog.

## Recommendations

The line of the Road - gravel/stone trackway RMP WM-035-017/OF006-001001 which extends extends across Bloomhill and Ballynahownwood townlands should be preserved *in situ* with a 20m buffer zone (see Table 6). 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.

| SMR_NO | SMR Class | IAWU Cat._No. | Re-assessment Survey Cat._No. | Townland | ITM E | ITM N | Status | Recommendation |
|---|---|---|---|---|---|---|---|---|
| OF006-084----<br>WM035-017---- | Road - gravel/stone trackway | OF-CBL 0001<br>WM-BHD 0021 | OF-BML001a | Cloncraff or Bloomhill | 606896.2 | 733792.9 | Extant | 20m Buffer zone |
| OF006-084----<br>WM035-017---- | Road - gravel/stone trackway | OF-CBL 0001<br>WM-BHD 0021 | OF-BML001b | Cloncraff or Bloomhill | 606929.2 | 733847.9 | Extant | 20m Buffer zone |
| OF006-084----<br>WM035-017---- | Road - gravel/stone trackway | OF-CBL 0001<br>WM-BHD 0021 | OF-BML001b | Cloncraff or Bloomhill | 606963.2 | 733884.9 | Extant | 20m Buffer zone |
| OF006-084----<br>WM035-017---- | Road - gravel/stone trackway | OF-CBL 0001<br>WM-BHD 0021 | OF-BML001d | Cloncraff or Bloomhill | 607004.2 | 733930.9 | Extant | 20m Buffer zone |
| OF006-084----<br>WM035-017---- | Road - gravel/stone trackway | OF-CBL 0001<br>WM-BHD 0021 | OF-BML001e | Cloncraff or Bloomhill | 606963.2 | 733884.9 | Extant | 20m Buffer zone |
| OF006-084----<br>WM035-017---- | Road - gravel/stone trackway | OF-CBL 0001<br>WM-BHD 0021 | OF-BML001f | Cloncraff or Bloomhill | 607072.2 | 734003.9 | Extant | 20m Buffer zone |
| OF006-084----<br>WM035-017---- | Road - gravel/stone trackway | OF-CBL 0001<br>WM-BHD 0021 | OF-BML001g | Cloncraff or Bloomhill | 607108.1 | 734047.8792 | Extant | 20m Buffer zone |
| OF006-084----<br>WM035-017---- | Road - gravel/stone trackway | OF-CBL 0001<br>WM-BHD 0021 | OF-BML001h | Cloncraff or Bloomhill | 607108.2 | 734079.9 | Extant | 20m Buffer zone |
| OF006-084----<br>WM035-017---- | Road - gravel/stone trackway | OF-CBL 0001<br>WM-BHD 0021 | OF-BML001i | Cloncraff or Bloomhill | 607182.2 | 734121.9 | Extant | 20m Buffer zone |
| OF006-084----<br>WM035-017---- | Road - gravel/stone trackway | OF-CBL 0001<br>WM-BHD 0021 | OF-BML001j | Cloncraff or Bloomhill | 607108.2 | 734079.9 | Extant | 20m Buffer zone |
| OF006-084----<br>WM035-017---- | Road - gravel/stone trackway | OF-CBL 0001<br>WM-BHD 0021 | OF-BML001k | Cloncraff or Bloomhill | 607258.1 | 734218.8 | Extant | 20m Buffer zone |
| OF006-084----<br>WM035-017---- | Road - gravel/stone trackway | OF-CBL 0001<br>WM-BHD 0021 | OF-BML001l | Cloncraff or Bloomhill | 607285.1 | 734246.8 | Extant | 20m Buffer zone |
| OF006-084----<br>WM035-017---- | Road - gravel/stone trackway | OF-CBL 0001<br>WM-BHD 0021 | OF-BML001m | Cloncraff or Bloomhill | 607343.1 | 734310.8 | Extant | 20m Buffer zone |
| OF006-084----<br>WM035-017---- | Road - gravel/stone trackway | OF-CBL 0001<br>WM-BHD 0021 | OF-BML001n | Cloncraff or Bloomhill | 607364.1 | 734349.8 | Extant | 20m Buffer zone |
| OF006-084----<br>WM035-017---- | Road - gravel/stone trackway | OF-CBL 0001<br>WM-BHD 0021 | OF-BML001o | Cloncraff or Bloomhill | 607386.1 | 734368.8 | Extant | 20m Buffer zone |

Table 6. Sightings of the Road - gravel/stone trackway RMP WM-035-017/OF006-001001 that survive in Bloomhill bog with ITM coordinates.

## 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. The line of

the Road - gravel/stone trackway RMP WM-035-017/OF006-001001 which extends extends across Bloomhill and Ballynahownwood townlands should be preserved *in situ* with a 20m buffer zone. 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

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Dr. Charles Mount
18 November 2021

# APPENDIX XIII. WATER QUALITY MONITORING RESULTS FOR BLOOMHILL BOG

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

| PCAS SW Sampling Scheme | | | | Suspended Solids | Suspended Solids | Suspended Solids | Suspended Solids | Suspended Solids | Suspended Solids | Suspended Solids | Suspended Solids | Suspended Solids | Suspended Solids | Suspended Solids |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bog Group | Licence No | Bog Name | SW Code - GIS | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l |
| | | | | 1/11/20 | 1/12/20 | 1/2/21 | 1/5/21 | 1/6/21 | 1/7/21 | 1/8/21 | 1/9/21 | 1/10/21 | 1/11/21 | 1/12/21 |
| Blackwater | P0502-01 | Bloomhill | SW36 | N/S | 8 | 2 | 5 | 2 | 11 | 7 | 3 | 2 | 3 | 2 |
| Blackwater | P0502-01 | Bloomhill | SW37 | N/S | 10 | 2 | 2 | 2 | 7 | 3 | 8 | 2 | 4 | 2 |
| Blackwater | P0502-01 | Bloomhill | SW40 | 3 | 8 | 3 | 2 | 20 | 8 | 5 | 2 | 2 | 2 | 2 |
| Blackwater | P0502-01 | Bloomhill | SW41 | 2 | 13 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Blackwater | P0502-01 | Bloomhill | SW42 | 2 | 31 | 2 | 2 | 2 | 6 | 2 | 6 | 2 | 2 | 2 |
| Blackwater | P0502-01 | Bloomhill | SW43 | 13 | 3 | 2 | 2 | 15 | 12 | 4 | 12 | 2 | 3 | 2 |
| Blackwater | P0502-01 | Bloomhill | SW45 | N/S | 4 | N/S | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| | | | ELV | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 |
| | | | | | | | | | | | | | | |
| PCAS SW Sampling Scheme | | | | Colour | Colour | Colour | Colour | Colour | Colour | Colour | Colour | Colour | Colour | Colour |
| Bog Group | Licence No | Bog Name | SW Code - GIS | mg/l Pt Co | mg/l Pt Co | mg/l Pt Co | mg/l Pt Co | mg/l Pt Co | mg/l Pt Co | mg/l Pt Co | mg/l Pt Co | mg/l Pt Co | mg/l Pt Co | mg/l Pt Co |
| | | | | 1/11/20 | 1/12/20 | 1/2/21 | 1/5/21 | 1/6/21 | 1/7/21 | 1/8/21 | 1/9/21 | 1/10/21 | 1/11/21 | 1/12/21 |
| Blackwater | P0502-01 | Bloomhill | SW36 | N/S | 241 | 218 | 243 | 206 | 201 | 192 | 150 | 159 | 191 | 216 |
| Blackwater | P0502-01 | Bloomhill | SW37 | N/S | 404 | 348 | 376 | 312 | 308 | 346 | 282 | 399 | 396 | 377 |
| Blackwater | P0502-01 | Bloomhill | SW40 | 522 | 486 | 486 | 558 | 434 | 328 | 572 | 289 | 427 | 411 | 494 |
| Blackwater | P0502-01 | Bloomhill | SW41 | 224 | 211 | 219 | 272 | 214 | 185 | 260 | 170 | 186 | 166 | 166 |
| Blackwater | P0502-01 | Bloomhill | SW42 | 223 | 224 | 229 | 275 | 114 | 182 | 256 | 131 | 162 | 135 | 146 |
| Blackwater | P0502-01 | Bloomhill | SW43 | 270 | 161 | 141 | 200 | 335 | 330 | 296 | 279 | 232 | 199 | 141 |
| Blackwater | P0502-01 | Bloomhill | SW45 | N/S | 198 | N/S | 228 | 239 | 181 | 268 | 200 | 194 | 136 | 158 |
| | | | | | | | | | | | | | | |
| PCAS SW Sampling Scheme | | | | COD | COD | COD | COD | COD | COD | COD | COD | COD | COD | COD |
| Bog Group | Licence No | Bog Name | SW Code - GIS | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l |
| | | | | 1/11/20 | 1/12/20 | 1/2/21 | 1/5/21 | 1/6/21 | 1/7/21 | 1/8/21 | 1/9/21 | 1/10/21 | 1/11/21 | 1/12/21 |
| Blackwater | P0502-01 | Bloomhill | SW36 | N/S | 54 | 51 | 72 | 78 | 80 | 78 | 34 | 57 | 66 | 74 |
| Blackwater | P0502-01 | Bloomhill | SW37 | N/S | 80 | 69 | 83 | 87 | 82 | 89 | 48 | 100 | 105 | 97 |
| Blackwater | P0502-01 | Bloomhill | SW40 | 121 | 109 | 110 | 109 | 107 | 95 | 120 | 49 | 96 | 106 | 119 |
| Blackwater | P0502-01 | Bloomhill | SW41 | 57 | 54 | 57 | 66 | 75 | 75 | 82 | 20 | 64 | 55 | 50 |
| Blackwater | P0502-01 | Bloomhill | SW42 | 48 | 49 | 23 | 60 | 43 | 64 | 66 | 61 | 55 | 37 | 45 |
| Blackwater | P0502-01 | Bloomhill | SW43 | 63 | 50 | <10 | 54 | 64 | 121 | 95 | 77 | 66 | 60 | 47 |
| Blackwater | P0502-01 | Bloomhill | SW45 | N/S | 49 | N/S | 60 | 71 | 75 | 86 | 16 | 64 | 63 | 52 |
| | | | | | | | | | | | | | | |
| PCAS SW Sampling Scheme | | | | pH | pH | pH | pH | pH | pH | pH | pH | pH | pH | pH |
| Bog Group | Licence No | Bog Name | SW Code - GIS | pH Units | pH Units | pH Units | pH Units | pH Units | pH Units | pH Units | pH Units | pH Units | pH Units | pH Units |
| | | | | 1/11/20 | 1/12/20 | 1/2/21 | 1/5/21 | 1/6/21 | 1/7/21 | 1/8/21 | 1/9/21 | 1/10/21 | 1/11/21 | 1/12/21 |
| Blackwater | P0502-01 | Bloomhill | SW36 | N/S | 7.1 | 6.5 | 7.4 | 7.7 | 7.6 | 7.7 | 7.8 | 7.7 | 7.6 | 7.5 |
| Blackwater | P0502-01 | Bloomhill | SW37 | N/S | 7.2 | 6.9 | 7.2 | 7.5 | 7.4 | 7.3 | 7.8 | 7.4 | 7.3 | 7.2 |
| Blackwater | P0502-01 | Bloomhill | SW40 | 7.2 | 7.1 | 6.8 | 6.9 | 7.3 | 7.3 | 7 | 7.4 | 7.2 | 7.2 | 6.8 |
| Blackwater | P0502-01 | Bloomhill | SW41 | 7.1 | 7 | 6.9 | 6.9 | 7.6 | 7.5 | 7.3 | 7.5 | 7.3 | 7.2 | 7.2 |
| Blackwater | P0502-01 | Bloomhill | SW42 | 7.6 | 7.6 | 7.4 | 7.3 | 8.1 | 7.7 | 7.7 | 7.7 | 7.8 | 7.7 | 7.7 |
| Blackwater | P0502-01 | Bloomhill | SW43 | 6.4 | 6.3 | 6.2 | 6.5 | 6.9 | 6.9 | 7 | 7.2 | 6.9 | 6.8 | 6.7 |
| Blackwater | P0502-01 | Bloomhill | SW45 | N/S | 6.5 | N/S | 6.8 | 7.4 | 7.8 | 7.3 | 7.4 | 7.3 | 7.1 | 6.8 |
| | | | | | | | | | | | | | | |
| PCAS SW Sampling Scheme | | | | TP as P | TP as P | TP as P | TP as P | TP as P | TP as P | TP as P | TP as P | TP as P | TP as P | TP as P |
| Bog Group | Licence No | Bog Name | SW Code - GIS | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l |
| | | | | 1/11/20 | 1/12/20 | 1/2/21 | 1/5/21 | 1/6/21 | 1/7/21 | 1/8/21 | 1/9/21 | 1/10/21 | 1/11/21 | 1/12/21 |
| Blackwater | P0502-01 | Bloomhill | SW36 | N/S | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Blackwater | P0502-01 | Bloomhill | SW37 | N/S | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 0.05 | <0.05 | <0.05 | <0.05 |
| Blackwater | P0502-01 | Bloomhill | SW40 | 0.24 | 0.18 | 0.2 | 0.19 | 0.42 | 0.35 | 0.26 | 0.33 | 0.23 | 0.2 | 0.18 |
| Blackwater | P0502-01 | Bloomhill | SW41 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Blackwater | P0502-01 | Bloomhill | SW42 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Blackwater | P0502-01 | Bloomhill | SW43 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Blackwater | P0502-01 | Bloomhill | SW45 | N/S | <0.05 | N/S | <0.05 | <0.05 | <0.05 | <0.05 | 0.05 | <0.05 | <0.05 | <0.05 |
| | | | | | | | | | | | | | | |
| PCAS SW Sampling Scheme | | | | TS | TS | TS | TS | TS | TS | TS | TS | TS | TS | TS |
| Bog Group | Licence No | Bog Name | SW Code - GIS | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l |
| | | | | 1/11/20 | 1/12/20 | 1/2/21 | 1/5/21 | 1/6/21 | 1/7/21 | 1/8/21 | 1/9/21 | 1/10/21 | 1/11/21 | 1/12/21 |
| Blackwater | P0502-01 | Bloomhill | SW36 | N/S | 123 | 69 | 211 | 293 | 315 | 311 | 386 | 364 | 307 | 256 |
| Blackwater | P0502-01 | Bloomhill | SW37 | N/S | 151 | 110 | 143 | 164 | 183 | 206 | 211 | 154 | 215 | 173 |
| Blackwater | P0502-01 | Bloomhill | SW40 | 302 | 246 | 243 | 232 | 357 | 314 | 247 | 390 | 274 | 292 | 257 |
| Blackwater | P0502-01 | Bloomhill | SW41 | 136 | 168 | 124 | 112 | 235 | 243 | 202 | 226 | 181 | 211 | 124 |
| Blackwater | P0502-01 | Bloomhill | SW42 | 222 | 214 | 158 | 153 | 400 | 262 | 243 | 353 | 316 | 261 | 238 |
| Blackwater | P0502-01 | Bloomhill | SW43 | 84 | 67 | 40 | 65 | 138 | 175 | 171 | 166 | 107 | 132 | 79 |
| Blackwater | P0502-01 | Bloomhill | SW45 | N/S | 26 | N/S | 118 | 197 | 237 | 151 | 266 | 214 | 173 | 108 |
| | | | | | | | | | | | | | | |
| PCAS SW Sampling Scheme | | | | Ammonia as N | Ammonia as N | Ammonia as N | Ammonia as N | Ammonia as N | Ammonia as N | Ammonia as N | Ammonia as N | Ammonia as N | Ammonia as N | Ammonia as N |
| Bog Group | Licence No | Bog Name | SW Code - GIS | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l |
| | | | | 1/11/20 | 1/12/20 | 1/2/21 | 1/5/21 | 1/6/21 | 1/7/21 | 1/8/21 | 1/9/21 | 1/10/21 | 1/11/21 | 1/12/21 |
| Blackwater | P0502-01 | Bloomhill | SW36 | N/S | 0.674 | 0.607 | 0.687 | 0.596 | 0.312 | 0.542 | 0.399 | 0.896 | 1.500 | 1.160 |
| Blackwater | P0502-01 | Bloomhill | SW37 | N/S | 0.390 | 0.265 | 0.252 | 1.320 | 0.530 | 0.303 | 0.091 | 0.354 | 0.542 | 0.337 |
| Blackwater | P0502-01 | Bloomhill | SW40 | 0.170 | 0.196 | 0.209 | 0.138 | 0.037 | 0.927 | 0.322 | 0.358 | 0.327 | 0.703 | 0.455 |
| Blackwater | P0502-01 | Bloomhill | SW41 | 0.584 | 0.701 | 0.545 | 0.531 | 0.172 | 0.198 | 0.473 | 0.152 | 0.347 | 0.459 | 0.613 |
| Blackwater | P0502-01 | Bloomhill | SW42 | 0.866 | 1.060 | 0.652 | 0.732 | <0.005 | 0.601 | 0.420 | 0.179 | 0.453 | 0.630 | 0.966 |
| Blackwater | P0502-01 | Bloomhill | SW43 | 0.497 | 0.536 | 0.427 | 0.393 | 0.076 | 0.038 | 0.884 | 0.325 | 0.469 | 0.683 | 0.583 |
| Blackwater | P0502-01 | Bloomhill | SW45 | N/S | 0.394 | N/S | 0.343 | 0.102 | 0.063 | 0.144 | 0.063 | 0.050 | 0.093 | 0.243 |
| | | | | | | | | | | | | | | |
| PCAS SW Sampling Scheme | | | | DOC | DOC | DOC | DOC | DOC | DOC | DOC | DOC | DOC | DOC | DOC |
| Bog Group | Licence No | Bog Name | SW Code - GIS | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l | mg/l |
| | | | | 1/11/20 | 1/12/20 | 1/2/21 | 1/5/21 | 1/6/21 | 1/7/21 | 1/8/21 | 1/9/21 | 1/10/21 | 1/11/21 | 1/12/21 |
| Blackwater | P0502-01 | Bloomhill | SW36 | N/S | 17.2 | 13.5 | 27.4 | 27.5 | 24.2 | 61.1 | 24.2 | 23.3 | 25.9 | 35.1 |
| Blackwater | P0502-01 | Bloomhill | SW37 | N/S | 33.3 | 24.9 | 31.2 | 28.3 | 28 | 41.3 | 26.5 | 35.8 | 38 | 34.7 |
| Blackwater | P0502-01 | Bloomhill | SW40 | 48.9 | 42.7 | 40 | 43.2 | 36.6 | 34.1 | 59.1 | 33 | 34.7 | 39.3 | 15.3 |
| Blackwater | P0502-01 | Bloomhill | SW41 | 23.4 | 20.2 | 20 | 25.5 | 27.2 | 26.5 | 39.2 | 26.2 | 22.6 | 22.9 | 22.2 |
| Blackwater | P0502-01 | Bloomhill | SW42 | 20 | 17.3 | 16.3 | 23.1 | 13.1 | 22.3 | 46.8 | 18.6 | 18.5 | 16.9 | 18.7 |
| Blackwater | P0502-01 | Bloomhill | SW43 | 14.3 | 14.8 | 9.59 | 17.8 | 27.2 | 38.8 | 35.8 | 33.7 | 25.3 | 22.7 | 13.3 |
| Blackwater | P0502-01 | Bloomhill | SW45 | N/S | 19.2 | N/S | 22.8 | 26.7 | 27.8 | 38.3 | 29.4 | 25.2 | 23.3 | 20.7 |

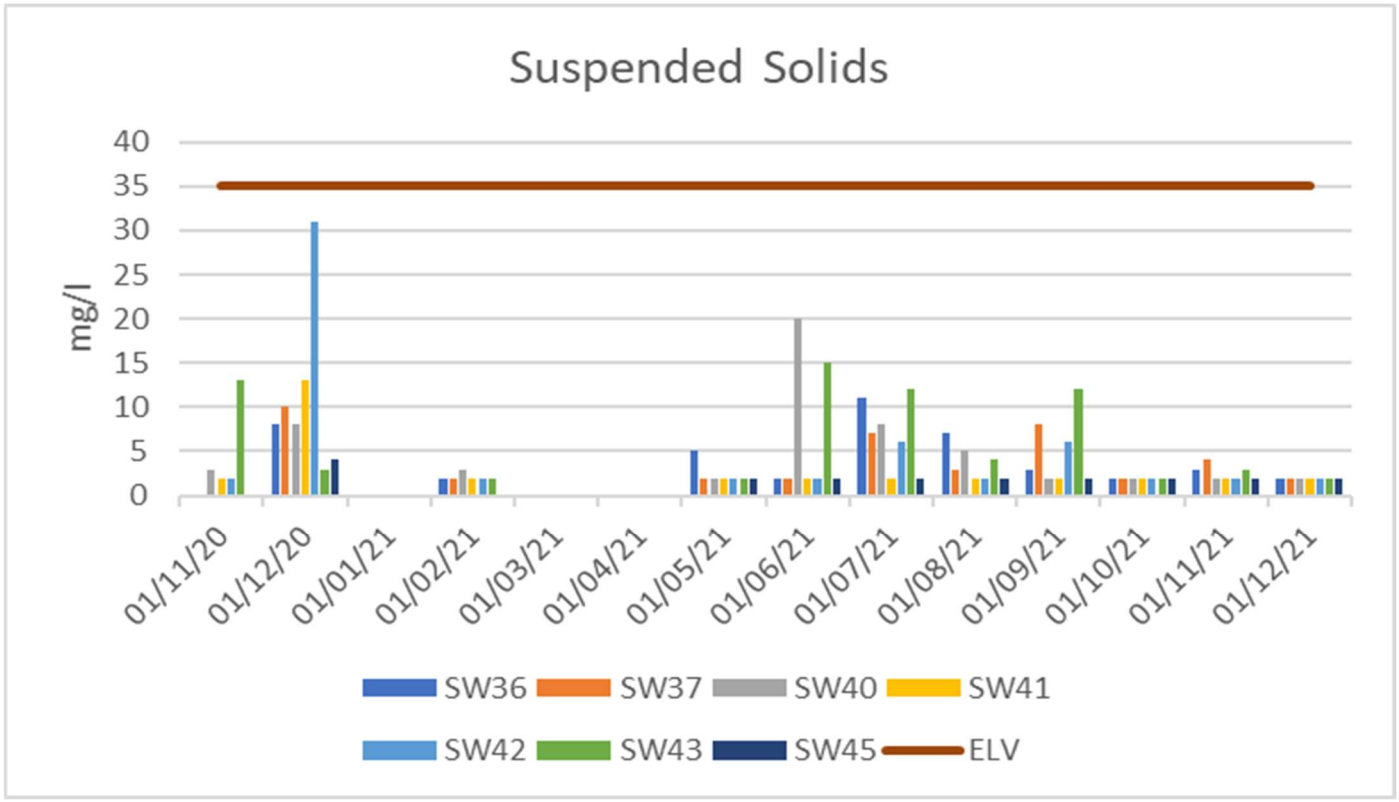


Figure AP13.1. Suspended solids in water sampling at Bloomhill from different discharge points.35 mg/l is the emission limit value.

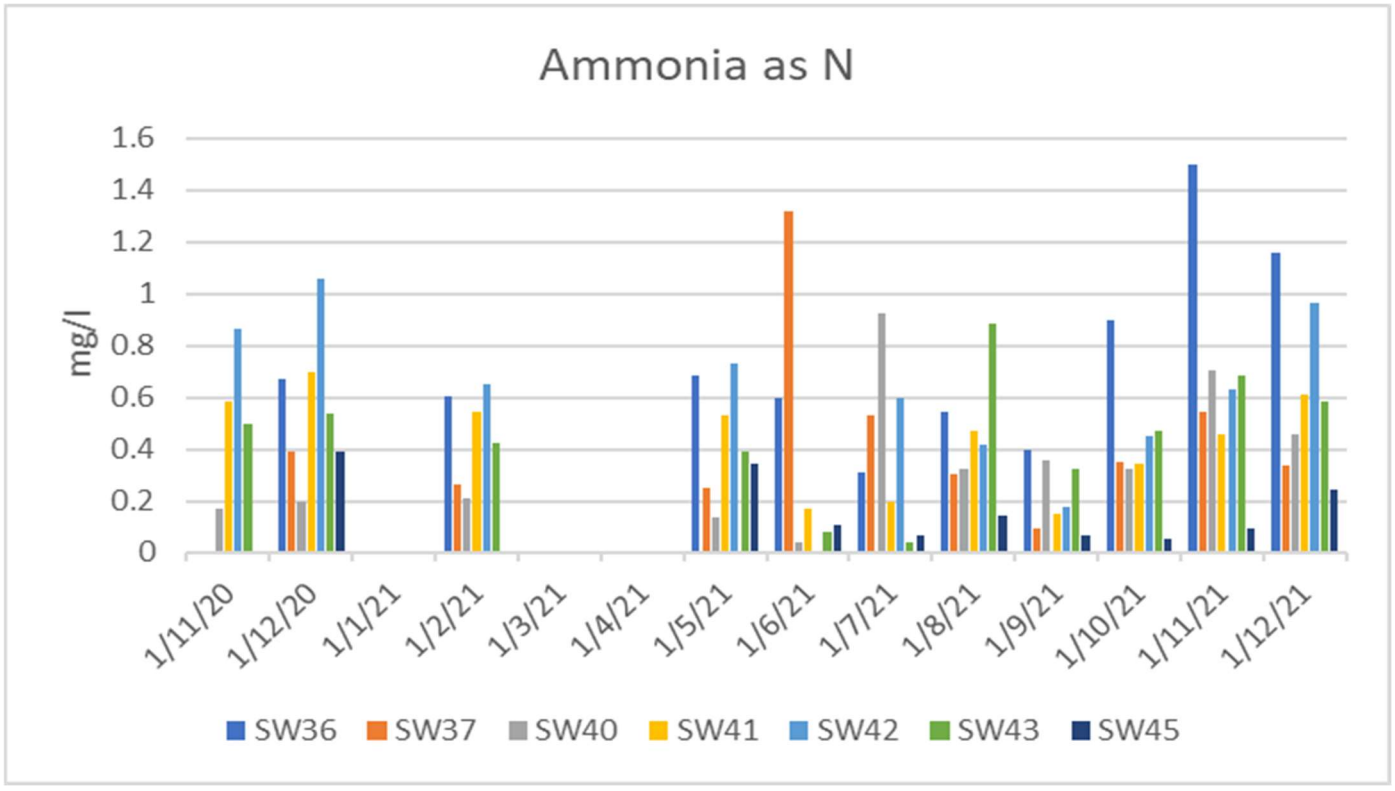


Figure AP13.2. Ammonia concentrations in water sampling from Bloomhill from different discharge points. The main trigger level for ammonia is 4.53mg/l for reporting to EPA.