Bawnmore Bog

Cutaway Bog Decommissioning and Rehabilitation Plan

2025

This document seeks to address the requirements of Condition 10.2 of IPC Licence Ref. P0-409-01:

> "*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 BnM (formerly Bord na Móna) agree with the EPA the measures that will provide for rehabilitation, i.e., stabilisation of Bawnmore 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 Bawnmore Bog.

In addition, to preparing this document to comply with Condition 10 of IPC Licence Ref. P0-409-01, due regard was also given to the 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*, BnM in developing a package of measures, 'the Scheme', for enhanced decommissioning, rehabilitation and restoration of cutaway peatlands referred to as, the Peatlands Climate Action Scheme'. However, only the additional costs associated with the additional and enhanced rehabilitation, i.e., measures which go beyond the existing standard mandatory decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support. The additional costs of the Scheme will be supported by Government, administered by the Department of Environment, Climate and Communications (DECC), while the National Parks and Wildlife Service (NPWS) will act as the Scheme regulator.*

While this document outlines the enhanced rehabilitation measures planned for Bawnmore 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.

BnM have defined the key rehabilitation outcome at Bawnmore 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 Bawnmore 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.

Document Control Sheet	
Document Name:	Bawnmore Bog Cutaway Bog Decommissioning and Rehabilitation Plan 2026
Document File Path:	Rehab and Decomm Docs/06D Rehab Plans FY26/Bawnmore
Document Status:	Draft

This document comprises:	DCS	TOC	Text (Body)	References	Maps	No. of Appendices
	1	2	43	4	0	14

Rev. 0.1	Author(s):	Checked By:	Approved By:
Name(s):	RL	JOS	
Date:	06/12/2024	01/07/2025	

Rev. 1	Author(s):	Checked By:	Approved By:
Name(s):			
Date:			
Rev. 1.1	**Author(s):**	**Checked By:**	**Approved By:**
Name(s):			
Date:			

Table of Contents

NON-TECHNICAL SUMMARY

- BnM (formerly Bord na Móna) is updating its rehabilitation plan for Bawnmore Bog, located approximately three kilometres to the east of Urlingford on the Co. Tipperary/Kilkenny border.
- Bawnmore Bog was in industrial peat production from 1970 until 2017.
- In 2017, BnM announced the closure of the Littleton Briquette factory and the cessation of industrial peat production in a number of cutaway bogs within the Littleton Bog Group.
- BnM are obliged to carry out peatland rehabilitation via an IPC Licence 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 BnM.
- Peatland rehabilitation was carried out at the bog in 2018-2021 with an extensive drain-blocking programme (Phase 1 rehabilitation).
- BnM are proposing to carry out additional rehabilitation in 2025 (Phase 2).
- The key objective of peatland rehabilitation is environmental stabilisation. This means developing habitats and vegetation back onto the bare peat (putting a "skin" back onto the peat), and minimising effects to downstream waterbodies. Bawnmore 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 some instances, where depressions retain deeper water, further optimisation of water levels to further facilitate revegetation may also be achievable.
- In general, soggy ground conditions are preferred. This means the remaining peat is wet and that plants that prefer wetter conditions, like Bog Cotton will thrive.
- Some small sections with deeper residual peat have the capacity to regrow *Sphagnum* moss again, where there are suitable hydrological conditions. *Sphagnum* is a key species for restoring naturally functioning raised bog conditions.
- Many BnM bogs cannot be restored back to raised bog in the short-term, as so much peat has been removed, and the environmental conditions have been modified. However other peatland habitats with Heather, Bog Cotton, Rushes, Purple Moor-grass, Bog-mosses and scattered trees will develop, and in time a naturalised peatland can be restored.
- The development of a range of habitats in Bawnmore Bog will support biodiversity including plants, insects, birds and mammals. This includes some species that are rare and protected in the wider landscape. It will increase the national area of native woodland. Many wetland habitats in the wider landscape have been reclaimed for agriculture and other uses, and peatland rehabilitation is an opportunity to create new peatland and wetland habitats.
- Measures proposed for Bawnmore Bog include optimisation of water levels within existing waterbodies and drain blocking. Some fertiliser will be spread on headlands and other areas (a small part of the overall area) to encourage vegetation growth.
- BnM plan to carry out this work in 2025.
- These rehabilitation measures will be planned by a team consisting of expert ecologists, hydrologists and engineers. It is a guiding principle of BnM rehabilitation planning that no actions or activities will be undertaken that would negatively impact on adjacent land. No boundary drains will be blocked. Water will still leave the bog via the existing outlets.

- It will take some time for vegetation and habitats to fully develop at the more recently peat harvested areas of Bawnmore Bog, and for a wetland/peatland ecosystem to be restored. However, it is expected that most of these areas will be developing pioneer habitats after 5-10 years.
- This is a peatland rehabilitation plan. This plan does not consider future after-use or development. BnM continually reviews its land-bank to consider future commercial or industrial developments. Any other proposed development will be planned in adherence to relevant planning guidelines and will consider the rehabilitation and the condition of the bog.
- Peatland rehabilitation of this bog will bring a range of benefits to the local community via improvements to the local landscape and is also important for supporting national policies and strategies in relation to reduction of carbon emissions from these peatlands, supporting biodiversity and improvements to water quality.

1. INTRODUCTION

BNM (formerly Bord na Móna) operates under IPC Licence issued and administered by the EPA to extract peat within the Littleton Bog Group (Ref. P0-409-01) (see Appendix II for details of the bog areas within this Group). 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. Bawnmore Bog is located along the county Tipperary/Kilkenny border, approximately three kilometres to the east of Urlingford.

This document seeks to address the requirements of Condition 10.2 of IPC Licence Ref. P0-409-01:

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

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

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

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

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

Bawnmore Bog is part of the Littleton Bog Group and supplied the Littleton Brickette Factory. BnM made the decision to close this brickette factory in 2017 and to rehabilitate the Littleton Bog group. Bawnmore Bog was rehabilitated by BnM during 2018-2022 (Phase 1 rehabilitation). This updated rehabilitation plan supersedes the previous rehabilitation plan prepared in 2018.

It is proposed by Government that BnM 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. BnM have previously identified a footprint of 33,000 ha as peatlands suitable for this scheme. This Scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations (Appendix VII & IX) under existing EPA IPC licence conditions. Improvements supported by the Scheme will ensure that environmental stabilisation is achieved (meaning IPC obligations are met), and importantly, significant additional benefits, particularly relating to climate action and other ecosystem services, will also be delivered. The Scheme commenced in 2021.

Bawnmore Bog is proposed to be part of this Scheme (PCAS), and this updated rehabilitation plan outlines the approach to be taken. Additional peatland rehabilitation (Phase 2 Rehabilitation) has been proposed for Bawnmore Bog with the objective of improving hydrological conditions across this site and targeting bare peat areas to speed up the trajectory of natural vegetation colonisation. Measures will include:

- more intensive management of water levels through modifying outfalls, drain-blocking and bunding,
- optimising hydrological conditions for development of wetlands, fens and bog habitats, and
- targeted fertiliser applications.

These measures 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.

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. BnM announced the complete cessation of industrial peat production across its estate in January 2021.

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

1.1 Constraints and Limitations

This document covers the area of **Bawnmore Bog** shown in drawing number *BNM-DR-26-08-RP-01: Site Location*.

There are areas of active turf cutting (turbary) on the western margins of the bog which have been mapped as a constraint. The parts of Bawnmore Bog (within the areas owned by BnM) that are currently used by domestic turf cutters to harvest peat are ecologically and hydrologically linked to the area owned by BnM where rehabilitation is planned. BnM are aware of such issues which may constrain the proposed rehabilitation actions, and this rehabilitation plan considered potential impacts of turf cutting on the delivery of the stated objectives.

Part of the marginal areas around the bog were developed for conifer forestry in the 1990s by Coillte. Areas where Coillte forestry overlaps the bog boundary have been identified as constrained land on the rehabilitation plan.

Bawnmore Bog is proposed for inclusion in the Coillte/BnM Midlands Native Woodland Project, with 39 ha proposed for planting at Bawnmore. This proposed project is currently being considered for consent by the Forest Service. Areas proposed to be included in Native Woodland Project have also been mapped as constrained land in the rehabilitation plan.

Part of the access route at Bawnmore is used for log biomass storage (for Edenderry Power).

There are known rights of way around the margins of Bawnmore Bog. Where a public right of way or similar burden exists on BnM property, consideration will be given to ensuring that this remains 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.

Rehabilitation in other areas of the bog may also be constrained due to other property issues or archaeological features.

There are some areas of agricultural grassland along the margins of Bawnmore Bog. These areas will not be subject to rehabilitation and have been identified as constrained land.

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, '*Guidance on the Process of Preparing and Implementing a Bog Rehabilitation Plan' (EPA, 2020)*.

The ecological information and site information collected during the BnM ecological baseline survey, additional confirmatory site visits (covering the period 2011 to 2024 inclusive) and monitoring and desktop analysis forms the basis for the development of the rehabilitation plan for the bog, along with:

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

2.1 Desk Study

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

- Anderson *et al*. (2017). An overview of the progress and challenges of peatland restoration in Western Europe.
- Barry, T.A. *et al*. (1973). A survey of cutover peats and underlying mineral soils. Soil Survey Bulletin No. 30. Dublin, Bord na Móna and An Foras Taluntais.
- Bonn *et al*. (2017). Peatland restoration and ecosystem services- science, policy and practice.
- Carroll *et al*. (2009). *Sphagnum* in the Peak District. Current Status and Potential for Restoration. Moors for the Future Report No 16.
- Clark & Rieley (2010). Strategy for responsible peatland management.
- Eades *et al*. (2003). The Wetland Restoration Manual.
- Farrell & Doyle (2003). Rehabilitation of Industrial Cutaway Atlantic Blanket Bog, NW Mayo, Ireland.
- Gann *et al*. (2019). International Principles and Standards for the practice of Ecological Restoration.
- Hinde *et al*. (2010). *Sphagnum* re-introduction project: A report on research into the re-introduction of *Sphagnum* mosses to degraded moorland. Moors for the Future Research Report 18.
- Joosten & Clarke (2002). Wise Use of mires and peatlands – Background and Principles including a framework for Decision-making.
- Lindsay (2010). Peatbogs and Carbon: a Critical Synthesis to Inform Policy Development in Oceanic Peat Bog Conservation and Restoration in the Context of Climate Change.
- Mackin *et al*. (2017). Best practice in raised bog restoration in Ireland. Irish Wildlife Manuals, No. 99. National Parks and Wildlife Service,
- McBride *et al*. (2011). The Fen Management Handbook (2011), Scottish Natural Heritage.
- McDonagh (1996). Drain blocking by machines on Raised Bogs. Unpublished report for National Parks and Wildlife Service.
- NPWS (2017a). National Raised Bog Special Areas of Conservation management plan. Department of Arts, Heritage and the Gaeltacht.
- Pschenyckyj et al., (2021), Optimising Water Quality Returns from Peatland Management while Delivering Co-Benefits for Climate and Biodiversity. An Fóram Uisce.
- Quinty & Rochefort (2003). Peatland Restoration Guide, second edition. Canadian *Sphagnum* Peat Moss Association and New Brunswick Department of Natural Resources and Energy.
- Regan*, et. al.* (2020). Ecohydrology, Greenhouse Gas Dynamics and Restoration Guidelines for Degraded Raised Bogs. EPA Research Report. Prepared for the Environmental Protection Agency by Trinity College Dublin.
- Renou-Wilson *et al*. (2011). BOGLAND - Sustainable Management of Peatlands in Ireland. STRIVE Report No 75 prepared for the Environmental Protection Agency.
- Schouten (2002). Conservation and Restoration of Raised Bogs: Geological, Hydrological and Ecological Studies. Dúchas - The Heritage Service of the Department of the Environment and Local Government, Ireland;
- Thom (2019). Conserving Bogs – Management Handbook.
- Wheeler & Shaw (1995). Restoration of Damaged Peatlands – with Particular Reference to Lowland Raised Bogs Affected by Peat Extraction.
- Wittram *et al*. (2015). A Practitioners Guide to Sphagnum Reintroduction. Moors for the Future Partnership.

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

- Littleton Integrated Pollution Control Licence;

- Littleton 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 2022-2027
- Bord na Móna Annual Report 2024.
- Spatial data in respect of Article 17 reporting, available online at https://www.npws.ie/maps-and-data/habitat-and-species-data/article-17.

2.2 Consultation

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

2.3 Field Surveys

BnM carried out a baseline ecological survey of all of its properties in 2012-2018 and developed habitat maps. As part of this exercise, Bawnmore Bog was surveyed in 2012. Habitat maps were updated in 2017. Surveys also took place between October 2024 and February 2025, in advance of the preparation of this rehabilitation plan. Habitat maps have been updated, where required. This rehabilitation plan is informed by the original baseline survey as well as subsequent confirmatory site walk-over surveys and visits, and updates to baseline data.

Habitat mapping followed best practice guidance from Smith *et al.* (2011). Map outputs including all habitat maps and target notes were produced using GIS software application packages (ArcGIS). General marginal habitats and other habitats that had not been modified significantly by industrial peat extraction were classified using Fossitt *et al*. (2000). Plant nomenclature for vascular plants follows Stace (2019), while moss and liverwort nomenclature follow identification keys published by the British Bryological Society (2010). A more detailed BnM classification system was previously developed for classifying pioneer cutaway habitats as Fossitt categories were deemed not to be detailed enough for cutaway bog (much of cutaway bog could be classified as Cutover Bog - PB4). Much of the pioneer cutaway vegetation is still at an early stage of its development and cannot be assigned to Fossitt Level 3 categories yet.

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

3. SITE DESCRIPTION

Bawnmore Bog is located approximately three kilometres to the east of Urlingford on the Tipperary/Kilkenny border. It is part of the Littleton group of bogs with Inch bog to the south and Derryville bog to the north.

The county boundary divides the bog into roughly equal sections. Bawnmore has an irregular shape with one main central lobe, sub divided by the old railway network route and a small lobe to the north-east. The total combined area of the rehabilitation footprint of the bog is 530.8 ha.

Bawnmore was in industrial peat production from the 1970s. Peat extraction ceased on a phased basis finally ending in 2017. A significant part of the bog has developed typical cutaway habitats. Bawnmore also contains a relatively large area of marginal high bog in the northeastern lobe that has been drained yet had no peat removed.

Bawnmore Bog was rehabilitated by BnM during 2018-2022 (Phase 1 rehabilitation). The bog formerly had a pumped drainage regime; however, pumping ceased at Bawnmore in 2018. The bog now has a gravity drainage regime.

The surrounding landscape is dominated by a mosaic of farmland, largely consisting of improved grassland along with several areas of coniferous forestry, and other raised bogs, including Templetouhy, Carrickhill and Derryville to the north and Longfordpass to the south, all of which are owned and managed by BnM.

BnM propose to rehabilitate Bawnmore Bog in 2025. See Figure *BNM-DR-26-08-RP-01: Bog Site Location*, included in the accompanying Mapbook[1] , which illustrates the location of Bawnmore Bog in context to the surrounding area.

3.1 Status and Situation

3.1.1 Site history

Bawnmore Bog was used to supply fuel peat in Lough Ree Power in Littleton Briquette Factory. Bawnmore Bog was in industrial peat production from the 1970's. In 2017, BnM announced the closure of the Littleton Briquette factory and the cessation of industrial peat production in a number of cutaway bogs within the Littleton Bog Group, including Bawnmore.

Rehabilitation commenced at Bawnmore Bog in 2018, with a program of intensive drain blocking. A large part of the site has been re-wetted. Some large areas of bare peat still remain, as the vegetation has been slower to colonise due to underlying environmental factors (deeper residual peat). The pump was decommissioned in 2018.

3.1.2 Current land-use

Industrial peat extraction has now completely ceased.

Part of the marginal areas around the bog were developed for conifer forestry in the 1990s by Coillte. Areas where Coillte forestry overlaps the bog boundary have been identified as constrained land on the rehabilitation plan.

Bawnmore Bog is proposed for inclusion in the Coillte/BnM Midlands Native Woodland Project, with 39 ha proposed for planting at Bawnmore. This proposed project is currently being considered for consent by the Forest

[1] Cutaway Bog Decommissioning and Rehabilitation Plan – Bawnmore Bog Map Book

Service. Areas proposed to be included in Native Woodland Project have also been mapped as constrained land in the rehabilitation plan.

Part of the access route at Bawnmore is used for log biomass storage (for Edenderry Power).

There are known rights of way around the margins of Bawnmore Bog.

There are some areas of agricultural grassland along the margins of Bawnmore Bog. Cutover bog and remnants of intact raised bog are present along the western margins of the bog and are subject to domestic turf cutting. These areas will not be subject to rehabilitation and have been identified as constrained land.

3.1.3 Socio-Economic conditions

Bord na Móna has historically been a vital employer for the rural communities in the Irish Midlands. Bord na Móna compiled a report on the role of peat extraction in the midlands historically in which they report that in 1986, by the end of Bord na Móna's Third Development Programme, a total of twenty-three work locations had been established around the country. The company had an average employment of approximately 4,688 in the mid 1980's, with a peak employment of 6,100 during the production season, which placed it among the country's largest commercial employers. The importance of such levels of employment were largely due to its regional concentration in the Midlands and the lack of alternative employment opportunities in these areas 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.

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

In 2017, Bord na Móna announced the closure of the Littleton Briquette factory and the cessation of industrial peat production in a number of cutaway bogs within the Littleton Bog Group, including Bawnmore. Employment numbers have now declined following the cessation of peat extraction at this bog. It is anticipated that the scheme (PCAS) will provide some employment for a team of workers at this site for a period of time (> 1 year).

There are approximately 1400 people working in BnM at present, with approximately 135 roles directly involved in PCAS.

3.2 Geology and Peat Depths

3.2.1 Sub-soil geology

The underlying geology[2] at Bawnmore Bog is predominantly underlain by the Crosspatrick formation of pale-grey cherty crinoidal limestone. Marginal areas in the northwestern and southeastern are underlain by Waulsortian Limestones (dolomitised massive fine-grained limestone).

Quaternary sediment maps map Bawnmore Bog as cut over raised peat, yet surrounded by inorganic deposits, which are predominantly till derived from limestone along with some localised pockets of gravels from limestones and small pockets of lacustrine sediments in the wider surroundings.

3.2.2 *Peat type and depths*

Peat depths have been mapped across the bog using GPR and are provided in figure *BNM-DR-26-08-RP-04: Peat depths*. Across Bawnmore peat depths are more variable with peat generally being shallow in the northwest and west of the bog (<1.5m) with deeper deposits to the northeast and southeast of the site.

3.3 Key Biodiversity Features of Interest

The majority of Bawnmore Bog comprises a mosaic of bare peat, pioneer open habitats, wetland and Birch scrub and woodland.

3.3.1 Current habitats

The most common vegetation communities/habitats[3] present in the former production areas at Bawnmore include (Codes refer BnM classification of pioneer habitats of production bog. See Appendix III):

- Bare peat (0-50% cover) (BP) (Plate 3-5)
- Pioneer *Eriophorum angustifolium*-dominated community (Bog Cotton) (pEang) and pioneer *Juncus effusus*-dominated community (Soft Rush) (Plate 3-1, Plate 3-2, Plate 3-4, Plate 3-5, Plate 3-6)
- Willow-dominated scrub (eWill) (in mosaic with pJeff) (in those areas that are flooded regularly) Plate 3-2
- Open water (OW) (permanent) and Temporary open water (TOW) (Plate 3-3, Plate 3-2, Plate 3-4)
- Wetlands with pioneering *Tyhpa latifolia* (pTyp), *Phragmites australis* (pPhrag), Pioneer *Carex rostrata*-dominated community (Bottle Sedge) (pRos) (Plate 3-4, Plate 3-2, Plate 3-4)
- Birch-dominated woodland and scrub (BirWD, eBir, oBir) (on drier higher ground that is not flooded)
- Heather dominated vegetation/Pioneer dry heath (dHeath) (mainly in mosaic with Birch scrub and along the raised bog remnant along the powerline route)
- *Molinia caerulea*-dominated community (dry) (Purple Moorgrass) (gMol)
- Access routes (Acc)

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

[3] Codes refer BnM classification of pioneer habitats of production bog

- Riparian zones (Rip) (with drains and associated habitats such as scrub and Birch woodland)
- Silt ponds (Silt) with Gorse/Birch scrub and *Molinia caerulea*-dominated community (dry) (Purple Moorgrass) (gMol)

The most common habitats[4] found around the margins include:

- Raised bog (PB1) (plate 3-3)
- Cutover Bog (PB4)
- Scrub (WS1)
- Wet grassland (GS4)
- Birch woodland (WN7)
- Dense Bracken (HD1)
- Improved grassland (GA1) around the boundary extending into adjacent fields

See Drawing number *BNM-DR-26-08-RP-17: Current Habitat Map*, included in the accompanying Mapbook, which illustrates the habitats at Bawnmore Bog. See also Table 3-1 for photographic plates of habitats (taken in 2024).

[4] Codes refer to Heritage Council habitat classification (Fossitt 2000)

Photos of Habitats at Bawnmore Bog (2024)

Plate 3-5 Western section of Bawnmore (view looking north), dominated by pioneer vegetation, developing scrub and open water/wetland.

Plate 3-6 Central section of Bawnmore (view looking north), dominated by pioneer vegetation, developing scrub and open water/wetland.

Photos of Habitats at Bawnmore Bog (2024)	
	
Plate 3-7 Large area of raised bog in the northeastern lobe of Bawnmore that has been drained yet had no peat removed.	*Plate 3-8 Open water (OW) in Bawnmore Bog with developing wetlands and fen including Phragmites-dominated community (Reedbed) (pPhrag), pioneer Bog Cotton-dominated poor fen (pEang) and Bottle Sedge-dominated poor fen (pEang/pRos) (in wetland).*
	
Plate 3-9 High field dominated by bare peat and pioneer Eriophorum angustifolium (pEang), surrounded by fen habitat in the north section of the Bawnmore.	*Plate 3-10 Wetland area dominated by pioneer Eriophorum angustifolium (pEang), and Molinia caerulea. View looking south-east from the old railway.*

Table 3-1: Photos of Habitats at Bawnmore Bog (October 2024).

3.3.2 Species of conservation interest

A number of species of conservation concern utilize the habitats available at Bawnmore Bog. The following is a summary of the records of these species available within both BnM and NBDC records.

- Multiple mammal species have been recorded as part of BnM surveys on or in close proximity to the bog including Badger (*Meles meles*), Hare (*Lepus timidus hibernicus*) and Fox (*Vulpes vulpes*).
- Bird species of conservation interest recorded from the bog include the BOCCI[5] red listed species Snipe (*Gallinago gallinago*), Kestrel (*Falco tinnunculus*), Meadow Pipit (*Anthus pratensis*), Yellowhammer (*Emberiza citrinella*), Northern Lapwing (*Vanellus vanellus*) and the amber listed species Whooper Swan (*Cygnus cygnus*), Sky Lark (*Alauda arvensis*), Ringed Plover (*Charadrius hiaticula*), Mute Swan (*Cygnus olor*) and Mallard (*Anas platyrhynchos*).
- Yellowhammer, Common Sandpiper (*Actitus hypoleucos*), Little Egret (*egrette garzette*) and the first record of Great White Egret (*Ardea alba*) were all recorded in 2023/2024.
- Several butterflies have been recorded on Bawnmore Bog including Meadow Brown (*Maniola jurtina*), Ringlet (*Aphantopus hyperantus*), Common Blue (*Polyommatus icarus*), Small Tortoiseshell (*Aglais urticae*), Green-veined White (*Pieris napi*), Small White (*Pieris rapae*), Small Copper (*Lycaena phlaeas*), Peacock (*Inachis io*), Large White (*Pieris brassicae*) and Marsh Fritillary (*Euphydryas aurinia*), a rare species which is listed on Annex II of the European Union Habitats and Species Directive.

Peatland rehabilitation may result in positive quality effects on the relative abundance or proportion of species of conservation concern utilising bogs post rehabilitation. This may include Red or Amber listed species of breeding waders along with wintering species including Swans and other wildfowl.[6]

3.3.3 Invasive species

There are no BNM records for high impact invasive species recorded from the bog.

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

3.4 Statutory Nature Conservation Designations

There are no European Sites in close proximity (i.e. within a 5km radius at minimum) to Bawnmore Bog.

The closest EU designated sites are as follows:

- The Loughans SAC - Site code: 000407 - Distance: 5.2 km
- Spahill and Clomantagh Hill SAC - Site code: 00849 - Distance: 7.1 km
- Cullahill Mountain SAC - Site code: 00831 - Distance: 10 km
- River Barrow and River Nore SAC - Site code: 002162 - Distance: 12 km
- Lower River Suir SAC - Site code: 002137 - Distance: 13 km

[5] https://birdwatchireland.ie/app/uploads/2021/04/BOCCI4-leaflet-2-1.pdf

[6] https://www.bnmpcas.ie/wp-content/uploads/sites/18/2023/08/Annual-Monitoring-Report_Final-Rev-A_Redacted.pdf

A number of NHA's (Natural Heritage Areas) and pNHA's (Proposed Natural Heritage Areas) also occur within the wider area of Bawnmore Bog including:

- The Loughans pNHA - Distance: 5.2 km
- Spahill and Clomantagh Hill NHA - Distance: 7.1 km
- Cullahill Mountain NHA - Distance: 10 km
- Kilcooly Abbey Lake

See Figure *BNM-DR-26-08-RP-23: Proximity to Designated Sites* in the accompanying mapbook.

3.4.1 Other Nature Conservation Designations

The Ramsar Convention entered into force in Ireland on 15th March 1985. Ireland currently has 45 sites/wetlands designated as Wetlands of International Importance (Ramsar Sites). These cover a surface area of 66,994ha.

There are no Ramsar sites in close proximity to Bawnmore Bog.

3.5 Hydrology and Hydrogeology

Bawnmore Bog lies in the Suir Catchment (Catchment ID: 16) and the Nore Catchment (Catchment ID: 15) as defined by the EPA under the Water Framework Directive (WFD). The eastern section of the bog is situated within the Goul_SC_010 sub catchment and the western section is in the Suir_SC_040 sub catchment.

Bawnmore has a gravity-based drainage system, since the cessation of pumping in 2018.

Hydrological modelling (*BNM-DR-26-08-RP-09: Depression analysis*) indicates that parts of the bog are in natural basins. These areas which have undergone phase 1 rehabilitation have re-wetted following drain blocking, forming a mosaic of wetland habitats. Phase 2 rehabilitation will aim to optimise water levels in these areas.

GSI bedrock geology data indicates that Bawnmore is underlain two main bedrock units. Bawnmore primarily underlain by the Crosspatrick Formation, which consists of pale-grey cherty crinoidal limestone. Marginal sections to the north and south of Bawnmore are underlain by a Waulsortian Limestone unit which is characterised by dolomitised massive fine-grained limestone. Bedrock outcrops are recorded in the immediate vicinity of the Bawnmore Bog boundary.

There is a structural fault that extends southeast-northwest through the central area of Bawnmore, intersecting the Waulsortian limestone unit and Crosspatrick Formation. The strike and dip of the bedding within the Crosspatrick formation south of Bawnmore is 30 degrees west. The Crosspatrick Formation is classified as a locally important aquifer (Lm) as the bedrock units are generally moderately productive. In contrast, the Waulsortian Limestone unit is described as a regionally important aquifer (Rk) as it is karstified (diffuse).

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.

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

3.6 Emissions to surface-water and watercourses

Bawnmore Bog has 4 treated surface water outlets (SW20, SW21, SW22 and SW23) from previously active peat extraction catchments, which discharge to the Drish Rivers; (IE_SE_16D020068 DRISH_020), (IE_SE_16D020070 DRISH_030) and (IE_SE_16D020100 DRISH_040). The Drish River is classed as Poor water quality status (Ecological Status or Potential SW 2016-2021) – Water Framework Directive.

The locations of silt ponds, associated surface water emission points and those being monitored and sampled as part of the PCAS scheme are detailed on the attached water quality map (BNM-DR-25-06-13: General Drainage Map).

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.

Peat extraction is identified as a pressure in the third cycle of the river basin management plan (Water Action Plan for Ireland).

The main emission limit value (ELV) associated with these bogs is 35mg/l suspended solids, with trigger levels for ammonia of 3.6 mg/l and COD 100mg/l.

An analysis of the results over a number of years of the IPC licence environmental monitoring of some of the discharges from these bogs indicates that results were under the Emission Limit Value for Suspended Solids 99% of this period, with a similar level of compliance for COD and under the trigger level for Ammonia.

Ammonia averaged 0.5606mg/l and ranged from 0.01 to 3.6mg/l with Suspended Solids ranging from <2 to 12 mg/l and averaging 5.19mg/l.

Table 3.1 Decommissioning and Rehabilitation Programme Water Quality Monitoring.

Bog	SW	Monitoring	SS	Colour	COD	pH	TS	TP	Ammonia
Bawnmore	SW20	Q4 16	<5	106	36	7.7	402	<0.05	0.18

Bog	SW	Monitoring	SS	Colour	COD	pH	TS	TP	Ammonia
Bawnmore	SW21	Q4 16	12	88	39	8.1	338	<0.05	0.32
Bawnmore	SW22	Q4 16	<5	67	23	7.8	400	<0.05	0.10
Bawnmore	SW23	Q4 16	<5	64	37	8.0	356	<0.05	1.4
Bawnmore	SW20	Q3 17	5	128	59	8	320	0.05	0.12
Bawnmore	SW21	Q3 17	7	159	65	8.2	334	0.05	3.6
Bawnmore	SW22	Q3 17	5	155	62	7.7	396	0.05	0.09
Bawnmore	SW23	Q3 17	5	137	58	7.9	298	0.05	1
Bawnmore	SW20	Q1 18	<5	177	53	7.6	328	0.06	0.05
Bawnmore	SW21	Q1 18	<5	219	59	7.6	148	<0.05	1.6
Bawnmore	SW22	Q1 18	<5	163	59	7.7	354	<0.05	0.48
Bawnmore	SW23	Q1 18	<5	177	55	7.7	332	<0.05	0.06
Bawnmore	SW20	Q3 19	5	177	53	7.6	328	0.06	0.05
Bawnmore	SW21	Q3 19	5	219	59	7.6	148	0.05	1.6
Bawnmore	SW22	Q3 19	5	163	59	7.7	354	0.05	0.48
Bawnmore	SW23	Q3 19	5	177	56	7.7	332	0.05	0.06
Bawnmore	SW22	Q3 20	5	148	47	8.1	336	<0.01	0.01
Bawnmore	SW23	Q3 20	<2	120	55	7.7	342	<0.01	0.079
Bawnmore	SW22	Q4 20	<2	196	54	7.8	176	<0.01	0.378
Bawnmore	SW23	Q4 20	<2	197	54	7.8	171	<0.01	0.345
Bawnmore	SW22	Q1 21	<2	186	<10	7.7	396	<0.01	0.226
Bawnmore	SW23	Q1 21	<2	190	20	7.6	429	0.01	0.225
Bawnmore	SW22	Q2 21	<2	93.3	42	8.2	354	<0.05	0.009
Bawnmore	SW23	Q2 21	<2	95.1	39	8.2	347	<0.05	0.009
Bawnmore	SW22	Q3 21	<2	100	46	8	291	<0.05	0
Bawnmore	SW23	Q3 21	<2	100	37	8	296	<0.05	0
Bawnmore	SW22	Q1 22	<2	214	55	7.5	104	<0.05	0.478
Bawnmore	SW23	Q1 22	6	211	46	7.5	175	<0.05	0.129
Bawnmore	SW22	Q3 23	<2	212	54	7.7	246	<0.05	0.136
Bawnmore	SW23	Q3 23	<2	186	59	7.5	323	<0.05	0.031
Bawnmore	SW22	Q4 23	<2	167	50	7.5	434	<0.05	0.048
Bawnmore	SW23	Q4 23	<2	154	53	7.4	452	<0.05	0.132
Bawnmore	SW22	Q1 24	3	192	47	7.7	387	0.05	0.153
Bawnmore	SW23	Q1 24	3	279	64	7.1	223	<0.05	0.803
Bawnmore	SW22	Q2 24	2	290	59	7.7	374	0.07	0.074
Bawnmore	SW23	Q2 24	<2	335	47	5.6	137	<0.05	0.595
Bawnmore	SW22	Q3 24	<2	218	84	7.3	429	0.05	0.091
Bawnmore	SW23	Q3 24	6	218	84	7.3	429	0.05	2.74
Bawnmore	SW22	Q4 24	3	158	59	7.9		<0.05	0.034
Bawnmore	SW23	Q4 24	7	173	43	7.5	345	0.05	2.82

Rehabilitation of cutaway peatland is closely linked with control of emissions. One of the criteria for successful rehabilitation is stabilisation through re-vegetation, which will stabilise all substrates and in turn remove the need for further silt control measures. This site is already vegetated in some areas. Re-wetted peat also aids the primary objective of stabilizing peat, as when peat is re-wetted it is not vulnerable to wind erosion. Re-wetted peat and

the development of wet peatland habitats can also act as sinks for silt and mobile peat, and increases additional retention time for solids, and the peatland vegetation can quickly stabilise this material within blocked drains on site (by acting like constructed wetlands).

Water quality of water discharges from restored peatlands normally improves as a result of bog restoration measures and the restoration of natural peatland processes (Bonn *et al*., 20017). Bog restoration is also expected to improve water attenuation of the site as the drains are blocked, slowing water movement and water release from the site. Restored peatlands help slow the release of water and aid the natural regulation of floods downstream (Minayeva *et al*., 2017). The draft National River Basin Management Plan (NRBMP) 2022-2027 (DHPCLG, 2022) 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 BnM peatland rehabilitation is expected to have a positive impact on water quality and help the NRBMP deliver its objectives in relation to the WFD.

Water will still discharge from designated emission points when rehabilitation at Bawnmore Bog has been completed. This discharge will have improving water quality and there will be increased wetland attenuation, meaning slower release of water. This is expected to have a positive impact on status of downstream water bodies. While water quality improvements assist in meeting water frameworks directive ambitions and targets, they can also improve drinking water sources in applicable catchments with drained peatlands and the potential for associated reduction in treatment requirements at drinking water treatment facilities.

Decommissioning and Rehabilitation Programme Water Quality Monitoring.

The licence obligation of a quarterly sampling regime on a selected number of ponds to be sampled over a 3-year cycle would 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 monthly.

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 July 2023 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.

Initial quarterly results are included in appendix XIII, for Bawnmore. These results cover the period from July 2023 to December 2024 and are from some of the surface water outlets from the sections of bog to be rehabilitated in 2025. Peat extraction ceased in these bogs in 2017 and as expected some of the key water quality parameters that can impact water quality from peat extraction activities, remain on a relatively static trajectory, with suspended solids indicating a level trend from all outlets during the period, all well below any limits of concern. During this same period there was a slight downward trend in Ammonia for emission points, with all other parameters fluctuating slightly, most likely influenced by normal weather patterns, including rainfall.

Monthly Ammonia concentrations for this period averaged 0.1132mg/l and ranged from 0.048 to 0.169mg/l, with Suspended Solids ranging from <2 to 3mg/l and averaging 3mg/l.

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. LAWPRO have in turn provided details of their 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.

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 include 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.

Success criteria:

The key water quality success criteria associated with this enhanced rehabilitation are as follows:

- 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.
- 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 any 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.

As the monthly monitoring program at Bawnmore Bogs continues in 2025 and during the rehabilitation works planned for 2025 further trending will be produced to verify any ongoing trends.

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

Irish peatlands are a huge carbon store, containing more than 75% of the national soil organic carbon (Renou-Wilson *et al.* 2012). Peatland drainage and extraction transforms a natural peatland which acts as a modest carbon sink (taking in 0.1 to 1.1 t of carbon as CO2-C /ha/yr) into a cutaway ecosystem which is a large source of carbon dioxide (releasing 1.3 to 2.2 t of carbon as CO2-C /ha/yr) based on Tier 1 Emission factors (Evans *et al*.

2017). Renou-Wilson *et al.* (2018) reported losses of between 0.81 – 1.51 CO2-C /ha/yr from drained peatlands located in Ireland.

Re-wetting of dry peatlands will increase methane emissions (Gunther *et al*. 2020) as a consequence of the anoxic conditions within the peat body that provide a suitable environment for the microbial breakdown of plant litter and root exudates. Tanneberger *et al.* (2021) describes how peatland management has to choose between CO2 emissions from drained peatlands or increased methane (CH4) emissions from rewetted industrial peatlands. However, when radiative effects and atmospheric lifetimes of both GHG gases are considered and modelled, postponing rewetting increases the long-term warming effect of continued CO2 emissions (Gunther *et al*. 2020). This means the increase in methane due to rewetting of dry peatlands is still negated by the CO2 emissions reductions. Further, Wilson *et al.* (2022) confirmed the benefit of rapid rewetting to achieve strong carbon reductions and potentially altering the warming dynamics from warming to cooling depending upon the climate scenario.

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

3.9 Current ecological rating

(Following NRA (2009) Evaluation Criteria)

Areas dominated by bare peat are deemed to be of **Local Importance (lower value)**. A proportion of the bog are rated as **Local Importance (higher value)** where semi-natural habitats, including woodland, scrub, wetlands and pioneer cutaway habitats are developing.

4. CONSULTATION

4.1 Consultation to date

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

There has been ongoing consultation about rehabilitation, biodiversity and other general issues over the years about Littleton bog group, including Bawnmore Bog, with various stakeholders in relation to:

- General consultation with range of stakeholders at annual BnM Biodiversity Action Plan review days 2010-2018.
- Open consultation with range of stakeholders at annual BAP review days 2010-2018
- Consultation with the North Tipperary Heritage Forum during the period 2010-2015
- General consultation at a local community event in Littleton in Dec 2016;
- General consultation with Tipperary County Council and other stakeholders in relation to the Littleton Labyrinth Project Feasibility Study
- Ongoing engagement with Lisheen Mine
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht)
- Midlands & East Regional WFD Operational Committee (River Basin Management Plans)
- Ongoing consultation with Coillte – proposed Coillte/BnM Midlands Native Woodland Project
- Consultation with Tipperary Climate Action Officer and Biodiversity Officer during Bawnmore site visit (April 2024)

There was specific consultation and engagement about rehabilitation of the Littleton Bog group, including Bawnmore Bog, with various stakeholders during the period 2018-2021:

- Lisheen Mine
- Irish Peatland Conservation Council
- NPWS (site visits)
- Tipperary County Council (2018)
- Tipperary Heritage Forum
- Kilkenny County Council
- Consultation with members of the local community
- Consultation with local community groups
- Slieve Ardagh Rural Development
- National University of Galway
- Limerick Institute of Technology
- Irish Wildlife Trust
- Environmental Protection Agency
- Birdwatch Ireland
- Birdwatch Ireland Tipperary Branch
- Forest Service

- Coillte

To inform the original Plan (Phase 1 Rehabilitation), both national and local stakeholders, including neighbours whose land adjoins Bawnmore 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) were contacted. Any identified local interest groups were informed of the opportunity to engage with this rehabilitation plan and were invited to submit their comments or observations in relation to the proposed rehabilitation (Phase 1) at the Bawnmore Bog or the programme in general (see Appendix XI).

All correspondence was acknowledged and reviewed and evaluated against the rehabilitation measures proposed.

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 Bawnmore Bog – these are summarised below. A number of general submissions in respect of previous PCAS consultation are also referenced where applicable.

4.2.1 Consultation

During the initial commencement of PCAS, a number of consultees including: the Irish Farmers Association (IFA), the Irish Creamery Milk Suppliers Association (ICMSA) 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.

4.2.2 Assessments of rehabilitation

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. Further queries regarding AIA were made in a submission by the Department of Housing, Local Government and Heritage – National Monuments Service with specific reference to Bawnmore Bog.

4.2.3 Restoration scope

Restoration/rehabilitation of marginal habitats was raised by the Irish Peatland Conservation Council (IPCC) and Butterfly Conservation Ireland (BCI) relating to the finalisation of several bog rehab plans in 2021 and 2022 as worthy of consideration within the rehabilitation measures to support carbon sequestration and biodiversity objectives.

4.2.4 Monitoring

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

4.2.5 Flooding, drainage or other impacts on adjacent land.

The Irish Farmers Association (IFA), The Department of Agriculture Food and the Marine, individual local residents and ICMSA queried likely impacts relating to the finalisation of several bog rehabilitation plans in 2021 and 2022.

They raised concerns based on the proposed re-wetting in relation to flooding on adjoining lands and, specifically, with regards to the maintenance of drains. In previous submissions, 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. Further queries regarding the perceived potential of increased flood risk arising due to PCAS activities were made in a submission by a local member of the public in possession of land adjoining Bawnmore Bog.

4.2.6 Amenity

Since the beginning of consultation by BnM relating to Peatlands Climate Action Scheme funded, several consultees including various politicians, have requested information regarding the development of amenities on BnM bogs. Further queries regarding the walkways and accessibility onto the bog post rehabilitation was made in a submission by a local homeowner.

4.2.7 Water Quality

A number of consultees have contacted BnM to express their concerns regarding the potential impact of PCAS related activities on water quality within waterbodies that are hydrologically connected to BnM bogs. *Uisce Éireann* have expressed their support for PCAS in general but have also requested information regarding the potential hydrological repercussions of PCAS.

4.2.8 Future management

In submissions made on earlier PCAS plans the Irish Farmers Association (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.

4.2.9 Other issues

Other issues (raised by IPCC) during the finalisation of several bog rehab plans in 2021, 2022 and in 2023 included after use of the bog and turf cutting on the margins of the bog (outside of the area owned by BnM). The IPCC have also requested information regarding the resilience of rehabilitation measures to climate change induced climatic alterations.

In the early stages of PCAS archaeological end of life survey of all the bogs were requested by National Museum of Ireland and National Monuments Unit. The National Museum of Ireland also requested that due diligence be taken during works to protect any archaeologically significant findings or areas. They also reiterated the importance of peatlands for the preservation of archaeology and requested they be consulted as part of any EIA undertaken.

A turbary owner with a holding within Bawnmore bog made an enquiry regarding the red line boundary for proposed PCAS activities.

A separate local landowner expressed concerns over the perceived potential increase in flood risk arising due to PCAS activities.

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

4.3 BnM response to issues raised during consultation

4.3.1 Consultation

BnM are carrying out consultation as part of the process of developing the rehabilitation plan for Bawnmore Bog. This is ongoing with a dedicated Community Liaison Officer communicating with affected and interested parties. A website has been developed to make information available. This will be continually updated. Some PCAS Bogs have been used as demonstration sites so that interested stakeholders can come to organised visits 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. This was undertaken by external consultants for Bawnmore Bog.

Implementation of rehabilitation measures including machine access across the bog will be carried out in conjunction with BnM Ecology Department. Seasonal and other restrictions will be put in place to mitigate against any impacts on biodiversity.

An Archaeological Impact Assessment (AIA) has been undertaken for Bawnmore Bog (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. BnM aim to achieve this through including all known archaeology in the planning process of rehabilitation works and implementing and exclusion or buffer zone around these features. These measures should sufficiently protect any archaeology in these areas, during any ground works in the final plan. 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

Consultees during the Phase 1 rehabilitation (2018-2021) including NPWS and the IPCC suggested the use of more intensive rehabilitation measures such as contouring and bunding. These ultimately were beyond the scope of the rehabilitation budget allocated to these sites by BnM at the time (2018-2021). PCAS is an opportunity to carry out some of these suggested measures (e.g. bunding, recontouring) through the Littleton Bog Group as part of Phase 2 rehabilitation.

As part of 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.

As part of PCAS, one of the objectives for the rehabilitation of bogs is to promote the development of a naturally functioning peatland system. BnM would envisage benefits to biodiversity on these bogs as a result of rehabilitation. The most intensive peatland re-wetting will be applied to bare peat areas. Where there are diverse habitats already present, less intensive, targeted drain-blocking will be applied. While the overall objective is to make the bog wetter and increase the footprint of wet peatland habitats, there will still be a mosaic of habitats present, including a transition from wet to drier areas of peat, in areas that cannot be re-wetted.

The local environmental conditions of Bawnmore Bog means that wetland measures combined with some additional works, dry cutaway and deep peat measures are the most suitable rehabilitation approach for this bog to optimise benefits for desirable climate-based emissions reductions. Since phase 1 rehabilitation, there has been some development of pioneer cutaway habitats and wetland habitats within the main PCAS area of the bog. Phase 2 rehabilitation will aim to optimise water levels.

Sphagnum inoculation is one measure that was initially suggested by IPCC (in 2018) for use at Ballysorrel to support raised bog restoration. This measure was ruled out initially by BnM due to its relatively high cost, lack of resources and other logistical issues such as lack of suitable local *Sphagnum* donor sites. Since then, BnM has developed the Peatlands and People LIFE Project (Home | Ireland's Climate Action Catalyst | Peatlands & People) and one of the main objectives of this project on BnM land is to inoculate approx. 800 ha of suitable residual deep peat with *Sphagnum* plugs to speed up the trajectory of development of *Sphagnum*-rich embryonic bog vegetation. So far, 250 ha has been inoculated across midlands bogs. The future selection of sites within the Littleton Bog Group for *Sphagnum* inoculation will be dependent on availability of resources for planting.

4.3.4 Monitoring

As part of 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. It is proposed to monitor the improvement of some biodiversity ecosystem services. The appearance of key species such as *Sphagnum* moss will be monitored during walk-over surveys and general monitoring visits. It is not proposed to carry out any additional monitoring of biodiversity ecosystem services at this site. Biodiversity monitoring for PCAS planned for a stratified approach with different targeted monitoring at different sites based on the site characteristics.

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.

An overview of the Water Quality Monitoring plan is provided to relevant stakeholders, including that water flow and dissolved organic carbon (DOC) is being monitored.

BnM also informed the relevant stakeholders that decommissioning of silt ponds will only be carried out when the EPA are satisfied that adequate stabilisation of the bog has been achieved and silt ponds are no longer required. This decommissioning will be determined by water quality results and EPA approval.

Rehabilitation of bogs in the same catchment is likely to result in beneficial impacts on water quality in the catchment. This will be captured by the results from EPA monitoring stations in the vicinity of the bogs.

4.3.5 Flooding, drainage or other impacts on adjacent land.

It is the intention of BnM 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. There is no potential for direct impacts on arterial drainage downstream.

The rehabilitation measures proposed at Bawnmore Bog will generally result in increased water attenuation across the site and reduce the speed of drainage from the existing peat fields through a mixture of techniques including drain blocking, cell bunding and re-profiling. This will arrest active drainage systems and enable the return of the peatland to its natural, water retention functionality. 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 BnM.

BnM community liaison officer will meet with a concerned landowner in possession of land adjoining Bawnmore Bog, regarding the perceived potential of increased flood risk arising due to PCAS activities.

4.3.6 Amenity

Creating amenity developments such as walking tracks is not included within the scope of PCAS. However, PCAS rehabilitation will enable and support potential future amenity developments, and this was reiterated to a local homeowner expressing concern about the future accessibility onto the bog following rewetting.

4.3.7 Water Quality

It is the expectation of BnM that PCAS rehabilitation should positively impact the water quality of surrounding water bodies through enhancing water attenuation across rehabilitated sites. The robust water quality monitoring programme implemented as part of the of PCAS will be used to assess the water quality leaving rehabilitated sites at designated points.

4.3.8 Future management

BnM will continue to manage their land bank into the future. As peat production has now ceased on BnM 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 BnM internal drainage system that affects upstream or downstream landowners, then these issues will be addressed by BnM.

BnM 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 Other issues

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

As part of the consultation process, The National Museum of Ireland (NMI) and the National Monuments Service (NMS) were included in the stakeholder consultation process. The Archaeological Impact Assessment (AIA) was in preparation at the time of the submission of the rehabilitation packages to NPWS, it was subsequently provided. The NMS acknowledged that AIA desk-based process and associated outputs designed to ensure any known archaeology was identified and protected during the implementation process, and the Project Archaeologist's recommendations regarding buffering and ongoing vigilance and reporting of any stray finds to NMS. NMS requested that the AIA be supplemented with walking field surveys and that monitoring of rehabilitation measures was undertaken when the work commences.

Security: It is the intention of BnM 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.

A number of local landowners expressed a variety of concerns, within submissions on Bawnmore Bog (see above). These queries were addressed through contact with the BnM land liaison officer.

4.3.10 Concluding statement

- No specific issues were raised during consultation that required significant changes to the substance of the rehabilitation plan.

- Marginal drains will not be blocked to avoid impacts on adjacent lands or lands under the ownership of third parties 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.
- Turbary rights, if present, will remain unaffected.
- BnM intend to continue management of this site into the future and issues such as security and trespass will be addressed on an ongoing basis in association with other stakeholders.
- BnM intends to maintain a “No Shooting” policy on Bawnmore Bog.

5. REHABILITATION GOALS AND OUTCOMES

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

- Meeting conditions of IPC Licence.
- Stabilisation or reduction in water quality parameters of water discharging from the site (e.g. suspended solids).
- Reducing pressure on receiving waterbodies that have been classified as *At Risk* from peatlands and from peat extraction, via stabilization or improving water-quality from this bog, and therefore, reducing pressures.
- Optimising hydrological conditions for **climate action benefits as part of PCAS**.
- Optimising hydrological conditions for the development of reed swamp and fen on shallow more alkaline peat and other subsoils, or *Sphagnum*-rich regenerating wet deep peat vegetation communities on deep residual peat, where present.
- Supporting ongoing and potential future renewable energy, amenity, and other land-uses. Integrating rehabilitation measures with current amenity infrastructure on site. It is not proposed to carry out any rehabilitation actions to change or negatively affect any infrastructure.
- 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 BnM and which optimise climate action and other ecosystem service benefits.

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

- BnM have carried out rehabilitation at Bawnmore Bog between 2018-2021 (Phase 1 rehabilitation). Drain-blocking and re-wetting was carried out during this phase. The pump was decommissioned in 2018 and the bog reverted to gravity drainage.
- It will take some time for stable naturally functioning habitats to fully develop at Bawnmore Bog. This will happen over a longer timeframe than the implementation of this rehabilitation plan.
- Re-wetting residual peat will initially maintain and enhance the carbon storage capacity of the bog. There is scientific consensus that restoration of hydrology in damaged bog can improve carbon storage, water storage and attenuation and help support biodiversity both on the site and in the catchment (See Section 3.8). This will reduce carbon emissions from the site from a larger carbon source to a smaller carbon source. In time, the site has the capacity to develop in part as a carbon sink.
- It is not expected that the cutover bog in the former production area 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, the majority of the cutaway bog is shallow peat and only a small proportion of the bog has potential to develop *Sphagnum*-rich habitats in this timeframe (north-eastern area of remnant raised bog). 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.
- There is potential for the rehabilitated raised bog in the north-east of the Bawnmore to develop active raised bog in the future. Additional works in this section of raised bog, as part of the scheme, will further improve its condition.

- 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 BnM). Reducing pressures due to former peat extraction activities at Bawnmore Bog will contribute to stabilising or improving water quality status of receiving water bodies in general. Ultimately, improving the WFD status of the receiving water body will depend on reducing pressure from a range of different sources, including peatlands in general (private and BnM).
- Re-wetting in general will benefit the future preservation of most known and unknown archaeological features. An Archaeological Impact Assessment (AIA) is to be carried out under the PCAS scheme.

6. SCOPE OF REHABILITATION

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

- The area of Bawnmore Bog within the PCAS rehabilitation footprint.
- EPA IPC Licence - Ref. P0-409-01. 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 Scheme is designed to exceed the stabilisation requirements as defined by the IPC Licence. This scheme is designed to enhance the ecosystem services of Bawnmore Bog, in particular, optimising **climate action benefits**. The proposed interventions will mean that environmental stabilization is achieved (meaning IPC obligations are met) and, in addition, significant other ecosystem service benefits particularly for climate action will be accrued.
- The majority of the cutaway area has shallow peat reserves remaining, with some pockets of deeper peat. The local environmental conditions of Bawnmore Bog mean that a combination of wetland measures and dry cutaway measures and are the most suitable rehabilitation approach for shallow peat areas, including (fertiliser treatment), targeted drain-blocking, wetland outfall management (phase 2 rehabilitation). Deep peat measures (drain blocking) will be applied to areas of deeper peat, including the area of drained raised bog in the eastern lobe.
- BnM have defined the key goal and outcome of rehabilitation at Bawnmore Bog as **environmental stabilisation** of the site via **optimising climate action benefits, where possible**. The re-wetting of residual peat in the cutaway will be optimised, **setting the site on a trajectory towards the development of wetlands/Reed Swamp and fen on shallow more alkaline peat and other subsoils, and the development of peat-forming communities on residual deep peat, where possible.**
- Rehabilitation of Bawnmore 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).
- The majority of Bawnmore Bog is cutaway with shallow peat reserves and has a gravity-based regime. Post Phase 1 rehabilitation, wetland habitats (fen, wetland, reedswamp) and dry cutaway habitats (birch woodland, scrub and heath) have developed on shallow cutaway in response to re-wetting. Phase 2 rehabilitation will optimise the water levels and increase the rewetted area. The area of drained raised bog remaining in the northeast of Bawnmore is likely to develop active raised bog in time, following Phase 2 rehabilitation.
- **Surrounding landscape and neighbours.** Another key constraint is the interaction between the BnM sites and the surrounding landscape. Care has to be taken that no active rehabilitation management is carried out that could negatively and knowingly impact on surrounding land. This includes any hydrological

management on neighbouring farmland. It is anticipated that the work proposed here (blocking drains and re-wetting cutaway peatlands) will not have any flooding impacts on adjacent land.

- **Archaeology**. The discovery of monuments or archaeological objects during peatland rehabilitation may potentially constrain the rehabilitation measures proposed for a particular area. The rehabilitation will optimise hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future. Any newly discovered archaeology may require rehabilitation measures to be reviewed and adapted. An Archaeological Impact Assessment (Appendix XII) will be carried out to mitigate against any impact on archaeology that may be found at Bawnmore Bog. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it will be avoided and reported to the BnM Archaeological Liaison Officer and the National Museum of Ireland.
- **Public Rights of Way**. There are known rights of way at Bawnmore Bog. Where a public right of way or similar burden exists on BnM property, consideration will be given to ensuring that these 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.
- **Turf-cutting.** There are areas of active turf cutting on the margins of the site which have been mapped as a constraint. These areas are ecologically and hydrologically linked to the area owned by BnM where rehabilitation is planned.
- **Coillte.** Part of the marginal areas around the bog were developed for conifer forestry in the 1990s by Coillte. Areas where Coillte forestry overlaps the bog boundary have been identified as constrained land on the rehabilitation plan.
- **Native Woodland Project.** Bawnmore Bog is proposed for inclusion in the Coillte/BnM Midlands Native Woodland Project, with 39 ha proposed for planting at Bawnmore. This proposed project is currently being considered for consent by the Forest Service. Areas proposed to be included in Native Woodland Project have also been mapped as constrained land in the rehabilitation plan.
- **Access.** Part of the access route at Bawnmore is used for log biomass storage (for Edenderry Power).
- **Marginal Agricultural Grassland.** There are some areas of agricultural grassland along the margins of Bawnmore Bog. These areas will not be subject to rehabilitation and have been identified as constrained land on rehabilitation mapping.

6.2 Key Assumptions

- It is assumed that BnM 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:

- Areas subject to turf cutting and areas proposed for inclusion in the Native Woodland Scheme are excluded.

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

7. CRITERIA FOR SUCCESSFUL REHABILITATION

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

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

Rehabilitation is generally defined by BnM as:

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

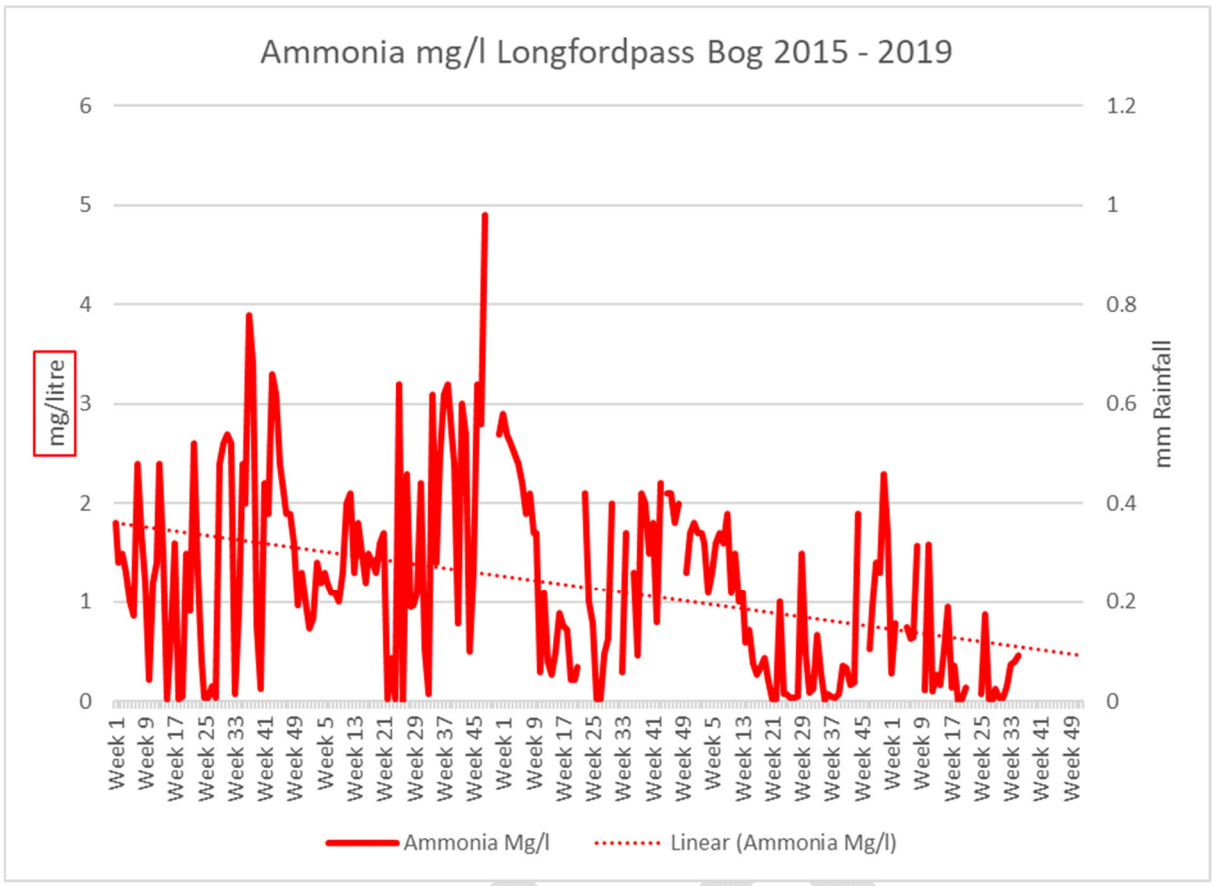
In addition, BnM wish to optimise climate action and other ecosystem service benefits via enhanced rehabilitation measures.

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

- Rewetting of residual peat in the former area of industrial peat production to offset potential silt run off and to encourage and accelerate development of vegetation cover via natural colonisation and reducing the area of bare exposed peat. See Table 7.1 for a summary of the criteria for successful rehabilitation and associated monitoring. The target will be the delivery of measures, and this will be measured by an aerial survey after rehabilitation is completed.
- That there is a stabilizing/improving concentration of suspended solids and ammonia in discharges from BnM 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 years, post cessation of peat extraction with ongoing rehabilitation, were considered. These are indicating a downward trend in Ammonia concentrations (Figure 7.1).

As the monthly monitoring program at Bawnmore Bog continues in 2025 and during the rehabilitation works planned for 2025, further trending will be produced to verify any ongoing trends.



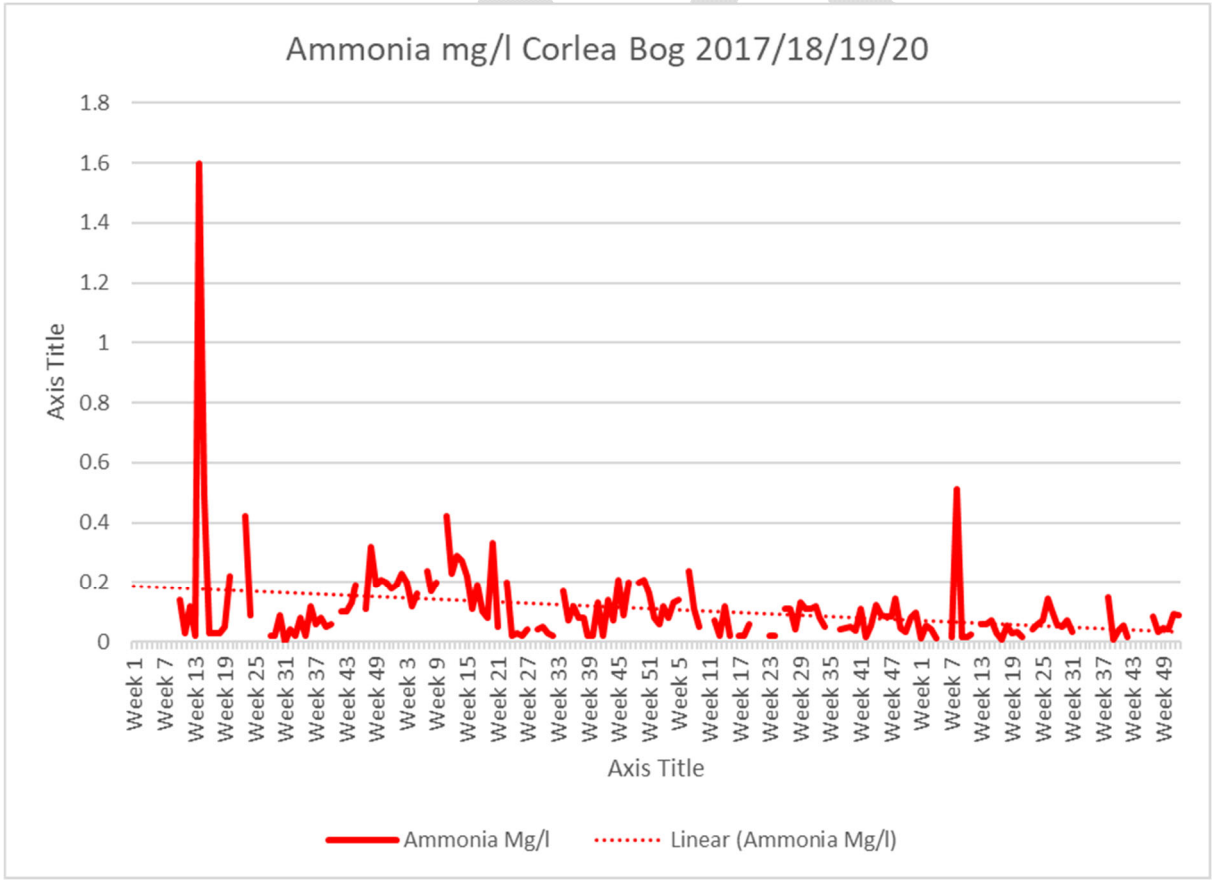


Figure 7.1 Ammonia levels over the period 2015-2019 at Longfordpass and the period 2017-2020 at Corlea.

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

- Optimising the extent of suitable hydrological conditions to optimise climate action and other ecosystem service benefits (optimising and maximising residual peat re-wetting). This will be measured by an aerial survey after rehabilitation has been completed.
- Accelerating the trajectory of the bog 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 *Sphagnum*-rich regenerating wet deep peat vegetation communities, wetland, fen, reed swamp, heath, scrub, poor fen, and birch woodland, where conditions are suitable. Some of these habitats have already in part established as pioneer vegetation/wetlands. It will take some time for stable naturally functioning habitats to fully develop at Bawnmore 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.

Table 7-1 Summary of Success criteria, targets, how various success criteria will be measured and expected timeframes.

Criteria type	Criteria	Target	Measured by	Expected Timeframe
IPC validation	Rewetting in the former area of industrial peat production	Delivery of rehabilitation measures Reduction in bare peat.	Aerial photography after rehabilitation has been completed – to demonstrate measures (drain-blocking) Establishment of a baseline for future monitoring of bare peat, vegetation establishment and habitat condition.	2025-2027
IPC validation	Key water quality parameters Ammonia, Phosphorous, Suspended solids, pH and conductivity	Reduction or stabilisation of key water quality parameters associated with this bog	Water quality monitoring for a period after rehabilitation has been completed	2025-2027
IPC validation	Reducing pressure from peat production on the local water body catchment (WFD)	Where this section of the water body, that this bog drains to, has not been identified as under pressure from peat extraction, that the intervening EPA monitoring programme associated with its Programme of Measures for this water body, confirms that its classification remains at not being at risk from peat extraction associated with activities at this bog.	EPA WFD monitoring programme	WFD schedule
Climate action verification	Optimising the extent of suitable hydrological conditions to optimise climate action	Optimal extent of suitable hydrological conditions	Aerial photography and Habitat mapping to map extent of suitable hydrological conditions. Baseline monitoring to be carried out during the scheme when rehabilitation is complete. Sites can be re-monitored in the future and	2025-2027

Criteria type	Criteria	Target	Measured by	Expected Timeframe
			compared against this baseline.	
Climate action verification	Reduction in carbon emissions.	Reduction in carbon emissions	Carbon emissions – estimated using a bog condition assessment and appropriate carbon emission factors.	2025-2027
Climate action verification	Setting the site on a trajectory towards establishment of a mosaic of compatible habitats	Establishment of compatible cutaway habitats	Habitat map, Cutaway bog condition map Baseline monitoring to be carried out during the scheme when rehabilitation is complete. Sites can be re-monitored in the future and compared against this baseline.	2025-2027

Meeting climate action verification criteria and monitoring of these criteria after the scheme has been completed is dependent on support from the Climate Action Fund or other sources of funding. Note that monitoring and verification of the overall scheme will be stratified – not all these criteria will be measured at each individual site. Baseline monitoring to be carried out during the scheme when rehabilitation is complete. Sites can be re-monitored in the future and compared against this baseline.

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

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

- **Funding to pay for resources required to deliver the planned rehabilitation (BnM and external).** BnM maintains a provision on its balance sheet to pay for these future costs when industrial peat extraction ceases. BnM 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.
- **BnM to have sufficient resources (staff and training) to deliver the planned rehabilitation with required associated skills and competencies.**
- **BnM 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. BnM 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 BnM experience of peatland management and best practice applied internationally in peatland management. Measures proposed in this plan have already been shown to be affective at other sites. BnM will apply a flexible and adaptable approach to the more innovative rehabilitation measures proposed in this plan**.** If measures are not initially effective, BnM will review any requirement for additional practical rehabilitation.
- **Natural colonisation of vegetation to develop semi-natural habitats at a rate within the normal limits.** The development of naturally functioning semi-natural habitats on degraded bog takes time. It may take 30-50 years for active raised bog vegetation to re-develop on suitable cutaway that was previously bare peat. However, BnM experience has demonstrated the effectiveness of these type of measures for re-wetting bog and creating carbon sinks (Renou-Wilson *et al*. 2018).
- Rehabilitation measures have been designed to accelerate and work with natural colonisation and other natural processes. BnM 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-26-08-RP-22: Aerial Imagery 2021

BNM-DR-26-08-RP-04: Peat Depths

BNM-DR-26-08-RP-03: LiDAR Map

BNM-DR-26-08-RP-09: 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-26-08-RP-05: 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.)

Drain-blocking was already carried out as part of Phase 1 rehabilitation between 2018-2022.

Proposed Phase 2 rehabilitation measures for Bawnmore Bog will include (see Table 8.1):

- Wetland measures will be used across the former production area of Bawnmore Bog that has been subject to phase 1 rehabilitation. Previous rehab has increased the height of the water table and several areas of deep, enclosed basins with ponded water have formed. Some additional berms are proposed in these areas. Measures will also include managing outfalls, managing water levels with overflow pipes and targeted blocking of outfalls within the bogs.
- There is an opportunity to review water levels across existing wetlands. 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). The main objective is to increase the potential for wetland habitats to develop and reduce the extent of deeper water. Part of these basins will always have some extent of deeper permanent open water due to the original topography, as these basins are quite low-lying relative to external drainage features. Wetland measures will examine how water flows across the site and will look to install taps or overflow pipes, where needed, to optimise water levels across the site.
- Targeted drain blocking to optimise hydrological conditions/rewet (degraded) raised bog remnants around the margins of the bog. Re-wetting, where possible, using drain blocking (max 7/100 m) and modifying outfalls and managing overflows.
- Deep Peat measures on high fields will include field re-profiling, creation of shallow depressions and management of water levels with overflow pipes and blocking of outfalls and managing overflows.
- Targeted drain blocking (3/100 m) on dry cutaway.

- Targeted fertiliser applications to accelerate vegetation establishment on areas of **bare peat** on headlands and high fields, and within certain areas of dry cutaway. Areas where vegetation has established do not need fertiliser application.

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

Type	Rehab Code	Enhanced Rehabilitation Measure	Area (Ha)
Dry Cutaway	DCT1	Blocking outfalls and managing water levels with overflow pipes	1.6
Dry Cutaway	DCT2	Regular drain blocking (3/100m), modifying outfalls and managing water levels with overflow pipes and targeted fertiliser treatment.	13.8
Wetland	WLT1	Turn off or reduce pumping to re-wet cutaway, blocking outfalls and managing water levels with overflow pipes.	4.6
	WLT2	Turn off or reduce pumping to re-wet cutaway + modifying outfalls and managing water levels with overflow pipes + Targeted modifying of outfalls within a site+ targeted fertiliser application.	295.4
	WLT3	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes + Targeted blocking of outfalls within a site + constructing larger berms to re-wet cutaway + transplanting Reeds and other rhizomes.	3.3
	WLT4	More intensive drain blocking (max 7/100 m), modifying outfalls and managing overflows, transplanting Reeds and other rhizomes.	0.6
Deep Peat	DPT2	More intensive drain blocking (max 7/100 m) and modifying outfalls and managing overflows.	10.3
	DPT7	Field Depressions 2 x (6m x 10m x 0.2mDp) at spacings of between 25m and 50m + targeted fertiliser treatment.	26.2
Marginal land	MLT1	No work required.	22.5
Additional Work	AW1	No work required.	11.0
	AW2	Targeted Drain Blocking.	20.3
Silt ponds	Silt pond	Silt ponds.	1.1
Constraint	Constraint	Other constraints (rights of way, turf cutting areas, coillte, native woodland scheme, agricultural grassland, access, successfully rehabbed area).	120.1
Total			530.8

Note that the types of rehab and areas of rehab may change in response to stakeholder consultation and refinement of the enhanced rehabilitation measures.

8.1 Completed and ongoing

- BnM carried out rehabilitation at Bawnmore Bog between 2018-2021 (Phase 1 rehabilitation). Derryville received some drain-blocking and hydrological management of outfalls. Pumping ceased during this period (See figure *BNM-DR-26-08-RP-30: Previous Rehabilitation*).
- Part of the bog has already re-vegetated, with significant cover of pioneer vegetation developing a mosaic of typical cutaway peatland and wetland habitats developing in basins. Since the cessation of pumping and the sites reversion to gravity drainage, large wetlands have formed.
- Natural re-colonisation of the cutaway so far has been effective. Bare peat areas within the cutaway are reducing as vegetation develops and consolidates.

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

- Seek formal approval of the enhanced plan, noting the alternative standard plan should funding from the Scheme not materialise from the EPA.
- Agree an *ex ante* budget of eligible costs (based on the approved enhanced plan) with the Scheme regulator.
- Develop a detailed site plan with engineering drawings outlining how the various rehabilitation methodologies (The Scheme PCAS) will be applied to Bawnmore Bog. This will take account of peat depths, topography, drainage, and hydrological modelling (see map for an indicative view of the application of different rehabilitation methodologies).
- A drainage management assessment of the proposed enhanced rehabilitation measures will be carried out and any issues identified resolved and the rehabilitation plan adapted.
- A review of known archaeology and an archaeological impact assessment (AIA), of the proposed rehabilitation will be carried out. The results of this assessment will be incorporated into the rehabilitation plan to minimise known archaeological disturbance, where possible.
- A review of issues that may constrain rehabilitation such as known rights of way, turbary and existing land agreements is to be carried out.
- A review of remaining milled peat stocks is to be carried out.
- An ecological appraisal of the potential impacts of the planned rehabilitation on the presence of sensitive ground-nesting bird breeding species (e.g. breeding waders) is to be carried out. The scheduling of rehabilitation operations will be adapted, where required.
- Ensure all activities comply with the environmental protection requirements of the IPC Licence.
- Carry out Appropriate Assessment of the Rehabilitation Plan.
- Track implementation and enforcement of the relevant IPC Licence conditions, the mitigation measures (AA) and other environmental control measures during the implantation of the rehabilitation plan.

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

- Carry out proposed measures as per the detailed site plan. This will include a combination of bunding and drain blocking on deep peat, and fertiliser application targeting bare peat areas of headlands, high fields and other areas (where required) in addition to wetland creation and management prescriptions. All

rehabilitation will be carried out with regard to best practice environmental control measures (Appendix IV).

- Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions.
- Carry out the proposed monitoring, as outlined.
- While natural colonisation has commenced since peat production ceased, Phase 2 actions will be carried out in targeted areas to accelerate re-vegetation and colonisation of target species.
- Silt ponds will be monitored during this period and there will be continued maintenance and cleaning to prevent potential run-off of suspended solids from the site during the rehabilitation phase.
- Submit an ex post report to the Scheme regulator to verify the eligible measures to be carried out in year 1 of the Scheme, and an ex ante estimate for year 2 of the Scheme; and so on for each year of the Scheme.

8.4 Long-term (>3 years)

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

8.5 Timeframe

- **2025**: Short-term planning actions.
- **2025-2026**: Short-term delivery actions.
- **2026-2027**: Long term delivery actions. Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- **2028**: Decommission silt-ponds, if necessary.

8.6 Budget and costing

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

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

BnM 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 BnM Annual Report (Bord na Móna, 2024). BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

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

9. AFTERCARE AND MAINTENANCE

9.1 Programme for monitoring, aftercare and maintenance

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

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

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

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

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

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

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

IPC Licence 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 Licence 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 have 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.

10. REFERENCES

Atherton, I, Bosanquet, SDS & Lawley, M (2010). Mosses and liverworts of Britain and Ireland - a field guide. British Bryological Society.

Anderson, R., Farrell, C., Graf, M., Muller, F., Calvar, E., Frankard, P., Caporn, S., Anderson, P. (2017). An overview of the progress and challenges of peatland restoration in Western Europe. Restoration Ecology, Issue 2 Pages 271-282.

Barry, T.A. *et al.* (1973). A survey of cutover peats and underlying mineral soils. Soil Survey Bulletin No. 30. Dublin, Bord na Móna and An Foras Taluntais.

Bord na Móna 2014. Blocking Drains in Irish raised bogs. The Bord na Móna Raised Bog Restoration Project. Cris, R. Buckmaster, S. Bain, C. Reed, M. (Eds) (2014) Global Peatland Restoration demonstrating SUCCESS. IUCN UK National Committee Peatland Programme, Edinburgh. http://www.iucn-uk-peatlandprogramme.org/sites/www.iucn-uk-peatlandprogramme.org/files/IUCNGlobalSuccessApril2014.pdf

Bord na Móna. 2016. Bord na Móna Biodiversity Action Plan 2016-2021. Brosna Press, Ferbane. http://www.bordnamona.ie/wp-content/uploads/2016/04/Biodiversity-Action-Plan-2016-2021.pdf.

Bord na Móna (2022). *Methodology Paper for the Enhanced Decommissioning, Rehabilitation and Restoration on Bord na Móna Peatlands – Preliminary Study Nov 2022 Version 19.* Bord na Móna. Available online at : https://www.bnmpcas.ie/supporting-material/

Bord na Móna (2024). Bord na Móna Annual Report 2024. https://www.bordnamona.ie/wp-content/uploads/2024/07/M15957-BnM_Annual-Report-2024-Interior_Front-back-V6.pdf

Bonn, A., Allott, T., Evans, M., Joosten, H. & Stoneman, R. (2017) Peatland restoration and ecosystem Services-science, policy and practice. Cambridge University Press.

Carroll, J., Anderson, P., Caporn, S., Eades, P., O'Reilly C. & Bonn, A. 2009. Sphagnum in the Peak District. Current Status and Potential for Restoration. Moors for the Future Report No 16. Moors for the Future Partnership.

Clark, D. and Rieley, J. 2010. Strategy for responsible peatland management. International Peat Society, Finland.

Clark, D. (2010). Brown Gold. A history of Bord na Móna and the Irish peat industry. Gill Books.

Cross, J.R. (2006). The Potential Natural Vegetation of Ireland. Biology and Environment: Proceeding of the Royal Irish Academy, Vol. 106B, No. 2, 65-116 (2006).

Department of Communications, Climate Action and Environment 2019. National Climate Action Plan 2019. https://www.dccae.gov.ie/en-ie/climate-action/publications/Pages/Climate-Action-Plan.aspx

Department of Housing, Planning, Community and Local Government 2017. Public consultation on the River Basin Management Plan for Ireland. Department of Housing, Planning, Community and Local Government. https://www.housing.gov.ie/sites/default/files/public-consultation/files/draft_river_basin_management_plan_1.pdf

Department of Arts, Heritage and the Gaeltacht 2015. National Peatland Strategy. Department of Arts, Heritage and the Gaeltacht. http://www.npws.ie/sites/default/files/general/Final%20National%20Peatlands%20Strategy.pdf

Department of Housing, Local Government and Heritage (2022). Draft River Basin Management Plan for Ireland 2022 – 2027

Eades, P., Bardsley, L., Giles, N. & Crofts, A. (2003). The Wetland Restoration Manual. The Wildlife Trusts, Newark.

Environment Agency (2013). The Knotweed code of practice. Managing Japanese Knotweed on development sites. Environment Agency, Bristol, UK. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/536762/LIT_2695.pdf

European Commission (2013). Interpretation manual of European Union Habitats. European Commission DG Environment Nature ENV B.3.

EPA (2012). Guidance to Licensees on Surrender, Cessation and Closure of Licensed Sites. https://www.epa.ie/publications/licensing--permitting/industrial/ied/Guidance-on-Cessation_.pdf

EPA (2020). Guidance on the process of preparing and implementing a bog rehabilitation plan. http://www.epa.ie/pubs/reports/enforcement/guidanceontheprocessofpreparingandimplementingabogrehabilitationplan.html.

EPA (2023). http://gis.epa.ie/Envision. EPA Envision Map Viewer. (Last Viewed: 18/10/2023)

Farrell, C. A. and Doyle, G. J. 2003. Rehabilitation of Industrial Cutaway Atlantic Blanket Bog, NW Mayo, Ireland. Wetlands Ecology and Management, 11, 21-35.

Fernandez, F., Connolly K., Crowley W., Denyer J., Duff K. & Smith G. (2014) Raised Bog Monitoring and Assessment Survey (2013). Irish Wildlife Manuals, No. 81. National Parks and Wildlife Service, Department of Arts, Heritage and Gaeltacht, Dublin, Ireland.

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

Gann, G.D., McDonald, T., Walder, B., Aronson, J., Nelson, C.R., Jonson, J., Hallett, ,J.G., Eisenberg, C., Guariguata, M.R., Liu, J., Hua,F., Echeverría, C., Gonzales, E., Shaw, N., Decleer, K. & Dixon, K.W. (2019). International Principles and Standards for the practice of Ecological Restoration. Restoration Ecology 27(S1): S1–S46.

Grand-Clement, E., Anderson, K., Smith D., Angus, M., Luscombe D.J., Gatis, N., Bray L.S., Brazier R.E. (2015). New approaches to the restoration of shallow marginal peatlands Journal of Environmental Management 161.

Hinde, S., Rosenburgh, A., Wright, N., Buckler, M. and Caporn, S. 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. Moors For the Future Partnership.

Holden, J., Walker, J., Evans, M.G., Worrall, F., Bonn, A., 2008. In: DEFRA (Ed.), A Compendium of Peat Restoration and Management Projects.

Joosten, H. and Clarke, D. 2002. Wise Use of mires and peatlands – Background and Principles including a framework for Decision-making. I.M.C.G. – I.P.S., Jyväskylä, Finland.

Lindsay, R., 2010. Peatbogs and Carbon: a Critical Synthesis to Inform Policy Development in Oceanic Peat Bog Conservation and Restoration in the Context of Climate Change (Report to RSPB Scotland, Edinburgh).

Mackin, F., Barr, A., Rath, P., Eakin, M., Ryan, J., Jeffrey, R. & Fernandez Valverde, F. (2017) Best practice in raised bog restoration in Ireland. Irish Wildlife Manuals, No. 99. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.

McBride, A., Diack, I., Droy, N., Hamill, B., Jones, P., Schutten, J., Skinner, A. and Street, M. 2011. The Fen Management Handbook, (2011), Scottish Natural Heritage, Perth.

Minayeva, T. *et al.* (2017). Towards ecosystem-based restoration of peatland biodiversity. Mires and Peat, Volume 19 (2017), Article 01, 1–36, http://www.mires-and-peat.net

McDonagh, E. (1996). Drain blocking by machines on Raised Bogs. Unpublished report for National Parks and Wildlife Service. https://www.npws.ie/sites/default/files/publications/pdf/McDonagh_1996_Drain_Blocking_Raised_Bogs.pdf.

NPWS. (2014). Review of the raised bog Natural Heritage Area network. Department of Arts, Heritage and the Gaeltacht.

NPWS. (2017a). National Raised bog Special Areas of Conservation management plan. Department of Arts, Heritage and the Gaeltacht. https://www.npws.ie/sites/default/files/files/FOR%20UPLOAD%20Plan(WEB_English)_05_02_18%20(1).pdf

NPWS. (2017b). Actions for biodiversity 2017-2021. Ireland's 3rd national biodiversity plan. Department of Arts, Heritage and the Gaeltacht. https://www.npws.ie/sites/default/files/publications/pdf/National%20Biodiversity%20Action%20Plan%20English.pdf

NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill. https://www.npws.ie/sites/default/files/publications/pdf/NPWS_2019_Vol2_Habitats_Article17.pdf

NRA (2009). Guidelines for Assessment of Ecological Impacts of National Road Schemes (Revision 2). National Roads Authority.

NRA (2010). Guidelines on The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads. National Roads Authority. https://www.tii.ie/technical-services/environment/construction/Management-of-Noxious-Weeds-and-Non-Native-Invasive-Plant-Species-on-National-Road-Schemes.pdf

Pschenyckyj, C., Riondata, E., Wilson, D., Flood, K., O'Driscoll, C., Renou-Wilson, F. (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 18/10/2023

Quinty, F. and L. Rochefort, 2003. Peatland Restoration Guide, second edition. Canadian Sphagnum Peat Moss Association and New Brunswick Department of Natural Resources and Energy. Québec, Québec.

Regan, S., Swenson, M., O'Connor, M. & Gill, L. (2020). Ecohydrology, Greenhouse Gas Dynamics and Restoration Guidelines for Degraded Raised Bogs. EPA RESEARCH PROGRAMME 2014–2020. Report No.342. (2014-NC-MS-2). EPA Research Report. Prepared for the Environmental Protection Agency by Trinity College Dublin. www.epa.ie.

Renou-Wilson F., Bolger T., Bullock C., Convery F., Curry J. P., Ward S., Wilson D. & Müller C. (2011). BOGLAND - Sustainable Management of Peatlands in Ireland. STRIVE Report No 75 prepared for the Environmental Protection Agency. Johnstown Castle, Co. Wexford.

Renou-Wilson, F., Wilson, D., Rigney, D., Byrne, K., Farrell, C. and Müller C. (2018). Network Monitoring Rewetted and Restored Peatlands/Organic Soils for Climate and Biodiversity Benefits (NEROS). Report No. 238. Report prepared for the Environmental Protection Agency. Johnstown Castle, Co. Wexford.

Schouten, M.G.C. 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; Staatsbosbeheer, the Netherlands; Geological Survey of Ireland; Dublin.

Smith, G., O'Donoghue, P., O'Hora, K. & Delaney, E. (2011). Best Practice Guidance for Habitat Survey and Mapping. The Heritage Council.

Stace, C. A. (1997). New Flora of the British Isles. Cambridge: Cambridge University Press.

Thom, T., Hanlon, A., Lindsay, R., Richards, J., Stoneman R. & Brooks, S. (2019). Conserving Bogs – Management Handbook. https://www.iucn-uk-peatlandprogramme.org/sites/default/files/header-images/Conserving%20Bogs%20the%20management%20handbook.pdf.

Wilson, D., Renou-Wilson, F., Farrell, C., Bullock, C. and Muller, C. (2012). Carbon Restore – the potential of restored Irish peatlands for carbon uptake and storage; CCRP Report. EPA Wexford.

Wilson, D., Dixon, S.D., Artz, R.R., Smith, T.E.L., Evans, C.D., Owen, H.J.F., Archer, E., & Renou-Wilson, F. (2015). Derivation of greenhouse gas emission factors for peatlands managed for extraction in the Republic of Ireland and the UK. Biogeosciences Discuss., 12, 7491–7535.

Wheeler, B. D., & Shaw, S. C. (1995). Restoration of Damaged Peatlands – with Particular Reference to Lowland Raised Bogs Affected by Peat Extraction. London: HMSO.

Wittram, B. W., Roberts, G., Buckler, M., King, L., & Walker, J. S. (2015). A Practitioners Guide to Sphagnum Reintroduction. Edale: Moors for the Future Partnership.

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

BnM operates under IPC Licence issued and administered by the EPA to extract peat within the Littleton Bog Group (Ref. PO-409-01). 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.

This document seeks to address the requirements of Condition 10.2 of IPC Licence Ref. P0-409-01:

> "*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.*"

Bawnmore Bog is part of the Littleton Bog Group and supplied the Littleton Brickette Factory. BnM made the decision to close this brickette factory in 2017 and to rehabilitate the Littleton Bog Group. BnM carried out rehabilitation at Bawnmore Bog between 2018-2021 (Phase 1 rehabilitation). Bawnmore Bog received some drain-blocking and hydrological management of outfalls. Pumping ceased during this period.

The standard peatland rehabilitation plan is outlined here to **demonstrate rehabilitation that was completed** between 2018-2021.

BnM have covered the costs that 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 BnM. However, the expenditure necessary to deliver the additional and enhanced decommissioning, rehabilitation and restoration (EDRRS/PCAS) proposed for 2025 and the benefits that flow from these measures and interventions/improvements will be eligible for funding by the EU through Ireland's National Recovery and Resilience Plan.

Scope of rehabilitation

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

- The area of Bawnmore Bog.
- EPA IPC Licence - Ref. P0-409-01. 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. Bawnmore Bog is part of the Littleton (Lough Ree) Bog Group.
- The current condition of Bawnmore Bog.
- The key objective of rehabilitation, as defined by this licence, is **environmental stabilisation** of the bog.
- To minimise potential impacts on neighbouring land. Boundary drains around Bawnmore Bog will be left unblocked as blocking boundary drains could affect adjacent land.
- Land-use.

Rehabilitation goals and outcomes

The key rehabilitation goal and outcome for Bawnmore Bog is environmental stabilisation of the site via wetland creation. 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 and shallow cutaway in the former area of industrial peat production to offset potential silt run off and to encourage development of vegetation cover via natural colonisation and reducing the area of bare exposed peat.
- That there is a stabilising/improving concentration of suspended solids and ammonia associated with the measures undertaken to stabilise the peat surface by the blocking of the internal drainage system and the maximised rewetting of the peat surface. This will be demonstrated by developing a stable or downward trajectory of water quality indicators (suspended solids and ammonia) towards what would be typical of a re-wetted cutaway bog. This will be measured via water quality monitoring (suspended solids and ammonia).
- 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 targets

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

Rehabilitation measures:

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

Timeframe:

- 2018-2021. 1st phase of rehabilitation. Removal of milled peat stock.
- 2018-2021. 1st phase of rehabilitation. Field drain blocking across the bog. Cessation of pumping.
- > 2026. Decommission silt-ponds, if necessary.

Table AP-1. Rehabilitation measures and target area.

Type	Code	Description	Area (Ha)
Dry cutaway	DCT1	Blocking outfalls and managing water levels with overflow pipes	15.4
Deep peat	DPT1	Regular drain blocking (3/100 m) + blocking outfalls and managing water levels with overflow pipes	36.5
Wetland	WLT1	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes	303.9
Marginal Land	MLT1	No work required	22.5
Additional Works	AW1	Targeted drain blocking	31.3
Other	Silt Pond	Silt ponds	1.1
Other	Constraint	Rights of Ways, Turf Cutting, Access, Coillte, Native Woodland Scheme	120.1
Total			**530.8**

See Drawing number *BNM-DR-26-08-RP-20: Standard Rehab Measures* included in the accompanying Mapbook which illustrates the standard rehab measures to be applied.

Monitoring, after-care and maintenance

- There will be initial quarterly monitoring assessments of the site to determine the general status of the site, the condition of the silt-ponds, assess the condition of the rehabilitation work, assess the progress of natural colonisation, monitoring of any potential impacts on neighbouring land and general land security. The number of site visits will reduce after 2 years to bi-annually. These site visits will assess the need to additional rehabilitation.
- Water quality monitoring will be established.
- Monitoring results will be maintained, trended and reported on each year as part of the requirement to report on Condition 10.1 of the IPC Licence on Bog Rehabilitation in the Annual Environmental Report, which will be available in April each year at www.epa.ie.
- The parameters to be included (as per condition 6.2 of the IPC Licence) include monthly monitoring for pH, Flow, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD.
- This sampling regime on a selected number of silt ponds will be carried out over a two-year cycle. The original (licence) requirement was for a quarterly sampling regime.
- Where other uses are proposed for the site, these will be assessed by BnM 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 Licence 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 Littleton Bog Group IPC Licenced area was in industrial peat production for several decades until 2017. There are 11 defined bog units covering a total area of 4,421 ha. Each bog area further comprises a range of habitats from bare milled peat former production areas to re-colonising cutaway to workshops areas and transport infrastructure. Industrial peat extraction from these sites mainly supplied briquettes (Littleton Brickette Factory), horticulture and commercial turf for domestic use.

Industrial peat extraction across the majority of the Littleton Bog Group ceased in 2017 (Killeen extended to 2021). Littleton Brickette Factory finally ceased production in 2021. All licences for sod turf production also ceased during this period.

The Littleton Rehabilitation Programme started in 2018. Rehabilitation was planned and implemented across all of the Littleton Bogs. A range of different strategies was implemented across different sites, which reflect variable underlying environmental conditions and land-uses and potential future land-uses at the time.

Drain-blocking was carried out at Ballysorrel Bog and Knockahaw Bogs with the objective of raised bog restoration. These bogs had not had significant peat extraction and retained raised bog restoration potential. Rehabilitation measures at Templetouhy took account of the Bruckana Windfarm, which was is operational since 2015. Bawnmore, Littleton, and Templetouhy were developing cutaway habitats already as scrub and wetland, and targeted measures were carried out through these sites to enhance these developing habitats. More intensive drain-blocking was carried out across Carrickhill, Inch, Ballybeg, Derryvilla, Longfordpass and Killeen Bogs, particularly where there was recent industrial peat extraction and there were functional drains and bare peat dominated. Pumping ceased at Carrickhill, Inch and Bawnmore. Some pumping continued for various periods at Derryville, Longfordpass and Littleton, due to operational issues. Some fertiliser treatments were carried out at Carrickhill and Derryvilla in 2020 as a pilot rehabilitation project.

A project called the BnM/Coillte Midlands Native Woodland Project was developed over the same period (Midlands Native Woodland - Coillte). It was proposed to be funded and administered by the Forest Service. The main objective of this proposed project is to develop and enhance native woodland in areas of cutaway that would remain naturally dry, developing woodland habitat that would naturally complement wetland and peatland habitats already developing across these sites. An initial feasibility study was carried out in 2018 and a project was developed across the Littleton bogs, which finally identified 225 ha of cutaway to be developed as woodland. This project has piloted alternative methods to establish native woodland, including seeding, and these trials were carried out at Bawnmore. This proposed project has not been approved by the Forest Service yet. Areas of cutaway at Carrickhill, Bawnmore, Inch, Ballybeg, Lanespark and Killeen have been proposed as part of this project.

The Littleton Labyrinth is a proposed amenity project that was also developed during this period, in partnership with Tipperary County Council. Initially a feasibility study was carried out that looked at developing greenway amenity, and associated facilities across the Littleton Bogs, and potential links to existing infrastructure and local villages/towns. The first phase of this project was developed by Tipperary County Council in 2023/24, and a greenway was constructed on former BnM industrial railway though Killeen and Lanespark Bog to link with Loch Doire Bhile amenity, north of Lanespark. There are proposals to develop a Phase 2 shortly, with additional links being planned in Ballybeg and Derryvilla Bogs. This project is in pre-planning and is funded via Failte Ireland.

BnM and SSE are currently developing a renewable energy project called Littleton Windfarm, which will overlap Littleton Bog and Lanespark Bogs and a small part of Longfordpass. This project is in pre-planning (Bord na Móna Wind Farm | Littleton Wind Farm).

Rehabilitation measures so far has been very effective. The majority of the targeted areas have been re-wetted. Ballysorrel and Knockahaw Bogs are responding quite quickly to the new conditions with the development of Sphagnum and improvement in bog conditions. Areas at Templetuohy, Bawnmore, Littleton and Derryvilla are changing quickly with the development of existing habitats and new pioneer vegetation where there was bare peat. Habitats at Killeen and Lanespark are developing and integrating with the new greenway amenity. Areas in Carrickhill, Inch and Killeen that where large areas of bare peat in 2018 have been slower to recolonise due to underlying environmental factors (deeper residual peat).

BnM are proposing to bring several bogs in the Littleton Bog Group into the Peatland Climate Action Scheme in 2025. The main objective of this proposed phase 2 rehabilitation is to look at enhancing re-wetting and development of pioneer vegetation to support climate action, where possible. Measures are likely to include targeted drain-blocking, use of fertiliser to encourage pioneer vegetation growth, water-level management (adjustment of outfalls and use of over-flows).

A breakdown of the component bog areas for the Littleton Bog Group IPC Licence Ref. P0-409-01 is outlined in Table Ap-2. Industrial peat production history varies across the Littleton bog group, so there is a wide range of peat depths at present.

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

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Carrickhill	171 ha	Cutover Bog Industrial peat production started in the 1970's and ceased in 2017. There is residual deep peat across much of this site. Carrickhill had a partially pumped drainage system.	Carrickhill Bog formerly supplied peat to the Littleton briquette factory. Some areas of shallow peat cutaway on site are developing pioneer cutaway vegetation communities. The pump was decommissioned in 2018. Drain blocking was carried out in 2018. A fertiliser treatment on part of the headland was carried out in 2021. The majority of the site is still mostly bare peat. Carrickhill is proposed for the Coillte/BnM Midlands Native Woodland Project. 28 ha is proposed for planting at this site. This proposed project is currently being considered for consent by the Forest Service.	2017	Final 2018, Rehab measures implemented 2018-2021 Updated 2025
Templetouhy	737 ha	Cutover Bog Industrial peat production commenced at Templetouhy Bog in 1940's. Areas began to develop as cutaway during the 1980s as peat extraction ceased on a phased basis. Industrial peat extraction finally ceased in 2017.	Templetouhy Bog formerly was developed to supply fuel sod peat and also supplied peat to the Littleton briquette factory. BnM have constructed a 40MW Wind Farm with 14 turbines and road network on cutaway at Templetouhy bog called Bruckana Wind Farm. This windfarm is operational. Pumping is still operational across this site to support the windfarm infrastructure.	2017	Draft 2018 Rehab measures implemented 2018-2021 Updated 2025

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
		This bog has a partially pumped drainage system. Part of the site has developed pioneer cutaway habitats. Areas re-developed for peat extraction in 2015-17 are now revegetating quickly. Areas that were used for peat extraction upto 2017 are a mosaic of re-wetted bare peat and pioneer communities.			
Derryville	250 ha	Cutover Bog Industrial peat production commenced at Derryville Bog in 1970's. Areas began to develop as cutaway during the 2000s as peat extraction ceased on a phased basis. Peat extraction finally ceased in 2017. This bog has a partially pumped drainage system.	Derryville Bog formerly supplied peat to the Littleton briquette factory. Part of the site has been developed for conifer forestry and is leased to Coillte. Part of the site was sold to Lisheen Mine and removed from the IPC Licence in the 2000s. Much of the former production area on site is developing pioneer cutaway vegetation communities, the remainder of the site is bare peat and developing wetland. Pumping continued at Derryville until 2022. Pumping has now ceased, and measures have been implemented in 2024 to manage water levels across the site and to decommission the pump.	2017	Updated 2025
Bawnmore	531 ha	Revegetating cutover bog. Industrial peat production commenced at Bawnmore Bog in 1970's. Areas began to develop as cutaway during the 2000s as peat extraction ceased on a phased basis. Peat extraction finally ceased in 2017. Much of the site is now developing a mosaic of woodland, peatland and wetland habitats. Bawnmore had a partially pumped drainage regime.	Bawnmore Bog formerly supplied peat to the Littleton briquette factory. Much of the site is developing pioneer cutaway habitats and the site has significant biodiversity value. Pumping ceased in 2018. Part of the access is used for log biomass storage (for Edenderry Power). Bawnmore is proposed for the Coillte/BnM Midlands Native Woodland Project. 39 ha is proposed for planting at this site. This proposed project is currently being considered for consent by the Forest Service.	2017	Updated 2025
Ballysorrel	196 ha	Drained raised bog – This site was initially drained for peat extraction. It was developed for peat production in the 1970s, but milled peat harvesting only occurred over a short 2 year timeframe. The site was then left as a peat reserve to be re-developed in the future. Restoration/drain blocking carried out in in 2018.	Much of the site was bare peat in the early 2000s. The site has since re-vegetated naturally (in a drier situation) since then and is now responding quickly to the recent re-wetting. Much of the high bog has re-colonised with Heather-dominated vegetation. Small hummocks of *Sphagnum* capillifolium and S. subnitens are present. *Sphagnum* spp. are also present in some low-lying areas that are permanently waterlogged and are spreading.	2017	Final 2019
Inch	120 ha	Cutover Bog Industrial peat production since 1970s. Finallyceased in 2017.	Inch Bog formerly supplied peat to the Littleton briquette factory. Some areas of shallow peat cutaway on site are developing pioneer cutaway vegetation	2017	Updated 2025

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
		Inch had a partially pumped drainage regime.	communities with deep peat areas slow to colonise and remaining mostly bare peat. Pumping ceased in 2018. Inch is proposed for the Coillte/BnM Midlands Native Woodland Project. 19 ha is proposed for planting at this site. This proposed project is currently being considered for consent by the Forest Service .		
Longford Pass (Popes Bog)		Cutaway Bog Peat production at Longfordpass bog commenced in the 1940's and finally ceased in 2017. Peat extraction ceased and cutaway habitats began to develop on a phased basis. Longfordpass has a partially pumped drainage system.	Longford Pass Bog initially was developed as a sod turf production site. It then formerly supplied peat to the Littleton briquette factory. The site was bisected by the construction of the N8 Motorway in 2000s. A small area between the new motorway and R639 (old main road) was leased and developed for farmland in 2018. Longford Pass is part of the proposed Littleton Windfarm Project. This project is currently in pre-planning. Some areas of shallow peat cutaway on site are developing pioneer cutaway vegetation communities with deep peat areas slower to colonise. Pumping continued at the site until 2022, when the pumping failed. Since then, measures have been carried out to manage water-levels.	2017	Draft 2018
Ballybeg, Lanespark and Derryvilla		Cutaway Bog Industrial peat production since 1970s and finally ceased in 2017. Peat extraction ceased and cutaway habitats developed on a phased basis during this period. .	Ballybeg, Lanespark and Derryvilla initially were developed for sod turf production, and then formerly supplied peat to the Littleton briquette factory. Part of the site has been developed for conifer forestry and is leased to Coillte. Part of Lanespark/Derryvilla (Loch Doire Bhile) was developed as fishing lake and an amenity site in 1999-2002. This site is leased to Slieve Ardagh Rural Development. Lanespark is part of the proposed Littleton Windfarm Project. This project is currently in pre-planning. A greenway was constructed across the site as part of the Littleton Labyrinth Project in 2024, connecting the historical site of Derrynaflan to Loch Doire Bhile amenity, via Lanespark. Additional greenway is proposed to extend amenity through Derryvilla and Ballybeg as part of Failte Ireland. Midlands Trail project. This is currently in pre-planning. Ballybeg and Lanespark are proposed for the Coillte/BnM Midlands Native Woodland Project. 21 ha is proposed for planting at this	2017	Updated 2025

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
			site. This proposed project is currently being considered for consent by the Forest Service .		
Killeen	632 ha	Industrial peat production commenced at Killeen Bog in 1980s. Industrial peat extraction finally ceased in 2021.	Killeen bog formerly supplied peat to the Littleton briquette factory and the horticultural market. Re-wetting was carried out across the site in 2021. Some areas of shallow peat cutaway on site are developing pioneer cutaway vegetation communities with deep peat areas slower to colonise since the site was re-wetted. A greenway was constructed across the site as part of the Littleton Labyrinth Project in 2024, connecting the historical site of Derrynaflan to Loch Doire Bhile amenity, via Lanespark. Killeen is proposed for the Coillte/BnM Midlands Native Woodland Project. 31 ha is proposed for planting at this site. This proposed project is currently being considered for consent by the Forest Service .	2017	Updated 2025
Littleton	1,020 ha	Cutaway Bog Littleton is a relatively old industrial peat production bog. Large-scale industrial peat production began in the 1940's where sod peat was produced for fuel. Sod peat production was mechanised during the 1950's. Milled peat production began in the 1970's and milled peat was supplied to the Briquette factory (constructed in 1981) at Lanespark. Peat extraction ceased and cutaway habitats developed on a phased basis since the 1890s and some well-established cutaway habitats have developed. Industrial peat extraction finally ceased in 2018. Littleton has a partially pumped drainage system.	Littleton Bog formerly supplied sod peat before supplying peat to the Littleton briquette factory. Older cutaway has already extensively colonised with pioneer cutaway, wetland and scrub habitats. Part of the site has been developed for conifer forestry and is leased to Coillte. A small area (10 ha) was used as a pilot biomass project and Eucalyptus was planted in 2018. Littleton is part of the proposed Littleton Windfarm Project. This project is currently in pre-planning. Some pumps in Littleton Bog have been decommissioned and some have been retained and are still operational.	2017	Updated 2025

See Drawing number *BNM-DR-26-08-RP-24: Littleton Bog Group*, included in the accompanying Mapbook which illustrates the location of Templetouhy Bog and the Littleton 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:	Bawnmore	**Area (ha):**	531ha
Works Name:	Littleton	**County:**	Tipperary
Recorder(s):	BnM Ecology Section	**Survey Date(s):**	9th & 10th of August 2012

Habitats present (in order of dominance)

The most common habitats present at this site include:

- Bare peat (0-50% cover) (BP)
- Pioneer Soft Rush-dominated poor fen (pJeff)
- Willow-dominated scrub (eWill) (in mosaic with pJeff) (in those areas that are flooded regularly)
- Open water (OW) (permanent) and Temporary open water (TOW)
- Wetlands with pioneering *Tyhpa latifolia* (pTyp) and *Phragmites australis* (pPhrag)
- Birch-dominated scrub (eBir, oBir) (on drier higher ground that is not flooded)
- Heather dominated vegetation/Pioneer dry heath (dHeath) (in mosaic with Birch scrub and along the raised bog remnant along the powerline route)
- Dry pioneer Purple Moorgrass-dominated grassland (gMol)
- Access routes (Acc)
- Riparian zones (Rip) (with drains and associated habitats such as scrub and Birch woodland)
- Silt ponds (Silt) with Gorse/Birch scrub and Purple Moorgrass-dominated grassland (gMol)

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

- Raised bog (PB1) (Codes refer to Heritage Council habitat classification, Fossitt 2000), See Appendix II)
- Cutover Bog (PB4)
- Scrub (WS1)
- Wet Grassland (GS4)
- Birch Woodland (WN7)
- Dense Bracken (HD1)
- Improved grassland (GA1) around the boundary where the GIS boundary extends into adjacent fields

Description of site

Bawnmore is located 3km east of Urlingford. The Tipperary/Kilkenny border passes through the site, dividing the site into roughly equal sections. It is part of the Littleton bog group with Inch located to the south and Derryville to the north. A BnM railway passes through the site and connects the northern BnM sites to the wider Littleton network. Bawnmore is found in a lowland landscape and is mostly surrounded by farmland. Coillte forestry does border parts of the western and

eastern margins. The Lisheen Mine development and wind farm is located close by (< 1 km) to the north-east of the site. Up until 2017/2018, the majority of Bawnmore was managed for industrial milled peat production and is dominated by bare peat and recolonising vegetation. In 2017, Bord na Móna announced the closure of the Littleton Briquette factory and the cessation of industrial peat production in a number of cutaway bogs within the Littleton Bog Group, including Bawnmore.

Bawnmore has an irregular shape with one main lobe (O'Gorman's Bog to the north-east) and several main sub-sections that are divided by the railway network. It has been in industrial peat production for some time and a significant part of the bog is now considered production-related cutaway and is developing typical cutaway habitats. Underlying shell marl and gravel is already being exposed in some of this bog. Bawnmore also contains a relatively large area of marginal high bog that was formerly considered a peat reserve (43 ha). This area borders O' Gormans Bog to the north-east.

Bawnmore has a partially pumped drainage system. There were two main pump stations. The LiDAR dataset indicates that the topography of Bawnmore is quite variable with a relatively high contrast between the highest and lowest parts of the bog. The highest sections are found to the east and include the reserve high bog found along the margins. The lowest parts of the bog are found in the western and southern sections and tend to be underlain by shell marl. Sub-soil (mixed till) mounds and ridges have been exposed around some of the bog and these have affected hydrology in places, for example near the tea centre/Works area where some water is trapped between one of these ridges and the margin of the site.

South-East Section

The majority of the south-west section (south of the railway) was in active milled peat production until 2017. Peat depths increase towards the east and shell marl is being exposed in the western part of this section, where there is a relatively deep basin. This area is pumped towards a silt-pond on the other side of the railway. Several small areas have come out of production in the past around the south-east section. These mainly include higher ground where mounds/ridges have been exposed. These mounds are generally underlain with a mixed till sub-soil with gravel, cobbles and silt/mud. They are being vegetated mainly by Soft Rush-dominated poor fen and Birch scrub. The Birch scrub is developing mostly along the edges of the drains. The small ridge to the north of this section and adjacent to the tea centre has trapped some water to a sub-basin and has created a small wetland. This is relatively young in development with Soft Rush and Bog Cotton-dominated poor fen mainly found around the edges. Some of the drier edges of fields on the mounds are also vegetated with a dry grassland pioneer community (gAn-Ho-Eq) with Sweet Vernal-grass and Bent-grass prominent. Some of the exposed gravel is also being vegetated by disturbed vegetation communities with species such as Colt's-foot. Deeper peat tends to be vegetated by Soft Rush.

The small area of pioneer cutaway located along the southern margin has much more developed Birch scrub compared to the other mounds. There has been some recent drainage work along the southern margin with a new deep outfall dug into the former milled peat production bog.

North-East section (O'Gorman's Bog)

The majority of this area was also still in milled peat production until recently. This area has pumped drainage. There is a small amount of developing pioneer cutaway located towards the north-west. Vegetation tends to be dominated by scattered Soft Rush as well as Birch scrub along the margins of the field-drains. There is a small area with impeded drainage here and this section is being colonised by Bog Cotton as well as Soft Rush. A pump was located midway along the eastern margin of this section. The western margin does have some higher fields that have been out of milled peat production for some time and have re-generated with dry heath and scrub.

There is a large area of partially developed high bog located at the northern end and along the eastern margin of this section. This high bog was ditched in the past but not fully developed (some of the bog may have been screw-levelled). The high bog also has older drains criss-crossing more recent excavated BnM drains and there are also signs of older natural drainage features over the high bog. The original high bog is also surrounded by former cutover bog that has been abandoned for some time and has also regenerated. The whole section has regenerated to some extent, with some sections having infilled drains. At present it seems quite disturbed overall, with Purple Moor-grass scattered through the vegetation and

dominating some sections. It is difficult to determine if some sections are original high bog, secondary cutover bog or natural flushed features due to the disturbance to the high bog vegetation and the topography. A large naturally flushed feature may have been formerly present in this part of the bog.

The western margin contains some original flush vegetation (PF2) dominated by Purple Moorgrass and also containing Bog Asphodel, Tormentil, Hare's-tail Bog Cotton, Common Reed, Devil's-Bit, Carnation Sedge, Spotted Orchid, Bog Myrtle, and Cross-leaved Heath. This side of the bog was not ditched. Gorse scrub has colonised the flush/high bog/secondary cutover further north along the margin, and the flush vegetation is characterised by Common Reed. Purple Moorgrass dominates along the northern margin along with patches of Gorse scrub. This may be former flushed sections or redevelopment of secondary cutover bog. The eastern margin is also dominated by a mosaic of Gorse scrub and Purple Moorgrass. This has more definitely developed as secondary cutover bog as there is a more obvious boundary with the uncut high bog.

The high bog is underlain by a mound along the southern margin with the milled peat production bog. This higher ground has dried out and firm, and the vegetation is dominated by Heather and is more typical of facebank vegetation. Further north into the high bog there are more frequent typical high bog indicators, with patches dominated by Bog Asphodel and Carnation Sedge. Both Bog Cotton species are also present as well as Deergrass and White Beak-sedge. Purple Moorgrass is also present but is not frequent. The bog is still quite firm. *Sphagnum* cover tends to be dominated by hummocks of S. *papillosum*, *S. subnitens* and *S. capillifolium*. Some areas seem to have been screw-levelled and are more typical of pioneer dry heath vegetation where *Sphagnum* is absent. Further north towards the margin the bog gets wetter with significant surface water. The cover of Purple Moorgrass also increases. There is also significant *Sphagnum* cover (50-75%) in places and the drains have also infilled. This may have been as a result of subsidence, creating a basin that collects surface water. There are no indications that the bog is quaking, although it is quite wet. Much of the *Sphagnum* cover is dominated by *S. subnitens* and *S. capillifolium* indicating that it is probably recent regeneration. These sections could be considered as 'active regenerating bog', although there have a quite disturbed appearance (either due to the development or naturally as a result of flushing).

There is a large gravel mound at the southern margin of this section. The railway and some deep drainage ditches pass through this section. The vegetation is well-established and is dominated by Gorse scrub with some Birch. There are also significant grassy areas that have been disturbed more recently. The grassy areas tend to be dominated by Sweet Vernal-grass and Bentgrass (gA-Ho-Eq), although there are also some sections more typically dominated by Purple Moorgrass.

Northern section –east of railway

This section is bounded on one side by the railway and on the other by the long access road that serves as the main point of access to the bog. There are some grassy areas at the entrance to the bog that are grazed by tethered ponies. These grassy areas tend to be on peat and can be characterised as GS3 dry acidic grassland dominated by Purple Moorgrass and Bentgrass. A long narrow strip of bog along the access track has come out of milled peat production. This is mainly dominated by pioneer Purple Moorgrass in mosaic with other vegetation including Birch scrub. There is also some colonisation of Common Reed and Bottle Sedge in association with the Purple Moorgrass. Some of this ground, although still on a pioneer phase, seems to have characteristics of future potential rich fen with the mixture of Purple Moorgrass, Bottle Sedge and Yellow Sedge. One tussock of Black Bog-rush was noted in this area. Further out and adjacent to the industrial peat production area in this section, the younger fields tend to be colonising with Marsh Arrow-grass.

There is some wetland development at the northern end of the industrial peat production bog in this section. These wetlands are poorly developed so far and consist of Bottle Sedge-dominated vegetation in mosaic with open water. There is some colonisation of Common Reed in patches and some colonisation of Purple Moorgrass in association with the Bottle Sedge where it is drier.

There is a small section of partially developed bog midway along this section, adjacent to the access track. This has now regenerated very well as a mosaic of dry heath, Purple Moorgrass-dominated vegetation and patches of scrub. There were several small patches where Devil's Bit dominated the vegetation and this area could be suitable Marsh Fritillary habitat.

Northern section – west of railway

This sub-section is quite variable. There is a long narrow strip of well-established cutaway along the north-western margin of the bog. The eastern section was in active milled peat production until recently. Shell marl is being exposed and some of this ground is being colonised by Marsh Arrowgrass-dominated poor fen. Further west the ground is higher and there are fields at different peat depths. This section is underlain by a mixed till gravel mound, which is being exposed in places. Some fields are only lightly vegetated and only recently have become inactive. These tend to be dominated by Marsh Arrowgrass and Bog Cotton towards the southern end where the ground is lower. Further north there is more dominance of Soft Rush on high ground with Marsh Arrowgrass where gravel is being exposed in places.

Further west there is a larger low mound with exposed gravel and older pioneer cutaway vegetation. Here there is a mosaic of pioneer dry heath and Soft Rush-dominated poor fen along with open Birch scrub. Around this mound there are some areas with bare peat, along with some wetland areas where water has been trapped between the mound/ridge, high fields and the higher marginal ground. The wetlands in the south-west section are typically colonised with a mosaic of Bottle Sedge, Bog Cotton and Common Reed-dominated vegetation. This forms a mosaic with open water in places.

The long narrow strip of well-established vegetation along the northern western margin of the bog is generally dominated by a mosaic of Purple Moorgrass, dry heath and scrub. The oldest sections are at the southern end where there is extensive Gorse and Birch scrub establishing. The northern end is much younger and there is more poor-fen development in association with Purple Moorgrass. Both Soft Rush and Bottle Sedge dominate some of the vegetation at the northern end of this zone. Purple Moorgrass and Heather appear along the edges of drains. Some water is also trapped in this zone at the northern end creating some shallow wetland or areas with impeded drainage. Some of these areas are developing typical potential rich fen communities with Purple Moorgrass, Bottle Sedge and Yellow Sedge, similar to the vegetation at Lough Doire Bhile. This vegetation is not as diverse yet as that found at Lough Doire Bhile with the moss layer dominated by *Calliergonella cuspidata*.

South-west section – wetland

This section has been out of industrial peat production for some time. It is separated from the cutaway and production bog to the north by a travel path and is bounded by the railway along the east and to the south. The majority of this area is developing wetland vegetation. It is located in one of the lowest topological areas of the bog and is underlain by shell marl, which is exposed in places. A shallow basin has formed here, with high ground along the margins of the bog and the railway. It is divided into several different sub-sections by regular high fields that act as travel paths and also act as berms or embankments within the wetland. There are several large areas of open water. This area is surrounded by Bottle Sedge-dominated poor fen vegetation and in some cases the Bottle Sedge-dominated areas have re-wetted and form mosaics with the open water. There is a lower abundance of Bog Cotton-dominated vegetation in association with the Bottle Sedge. Other species present include Marsh Pennywort, Marsh bedstraw, Purple Loosestrife, Creeping Bent, Jointed Rush and Bulbous Rush. Reedmace is also present. Some Reedbeds are developing in the centre of some of the sub-sections to the west. The drier zones around the edges of the sub-sections tend to be colonised by a mosaic of pioneer Marsh Arrow-grass and Bog Cotton-dominated poor fen. These drier sections may have potential for Yellow Sedge colonisation (and potential rich fen development) in the future. There are also several sections within the wetland where there is some colonisation of Willow and Birch, along with Soft Rush.

These wetlands are likely to have significant bird usage. Fourteen Snipe were flushed along one of the travel paths, and Heron (5), Moorhen and Little Grebe were all noted within the wetland. Local staff report swans, duck and waders (Plover/Lapwing) during the winter.

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

None

Adjacent habitats and land-use

Adjacent habitats include wet grassland (GS4), improved agricultural grassland (GA1), raised bog (PB1), scrub (WS1), Birch woodland (WD7), conifer plantation (WD4) along with active and inactive cutover bog (PB4).

Watercourses (major water features on/off site)

- Bawnmore is located within the Suir catchment. The Black River flows south along the western margin of the site and then joins the Drish River flowing west until it meets the River Suir.
- There are several main sub-catchments within the bog, with the main catchments separated by the railway. Both the north-east section (O'Gormans Bog), and the northern half of the western section drains into the same silt-ponds along the central railway. Further west, there are two other sub-catchments with drain into silt-ponds located at the south-west corner of the site. The south-west section (south of the railway), is divided into two different catchments, both of which drain towards silt-ponds along the southern margin.
- There are channelized streams/drains along the southern and western margins of the bog. These flow into the Black River. The western channel drains siltponds that treat runoff from Derryville to the north. All of the silt-ponds eventually drain into the Black River.
- There is anecdotal evidence that bogs around the Lisheen mine development including Bawnmore have seen a drop in overall water levels since the development of the mine. This has been correlated with drainage and pumping around the mine affecting the surrounding hydrology. It could be expected that when the mine ceases production, there could be impacts on the surrounding bogs including increasing water levels.

Peat type and sub-soils

The main peat type exposed at Bawnmore is fen peat. However, some of the cutaway around the margins where peat was thin and overlying mixed till has developed dry heath and Purple Moorgrass-dominated mosaics, which usually indicate more acidic remnant peat.

Mixed till glacial sub-soil is exposed at several locations around the bog including along the northern and north-western margins, the south-west drainage system and in some of the north-west drains. There are also some typical gravel mounds exposed in the cutaway of the western bog. Shell marl is exposed or is being exposed in other sections of the bog including the south-west section the northern section and south of the railway. The shell marl deposits correspond with the lowest sections of the bog and are found in the basins.

Fauna biodiversity

Birds

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

- Little Grebe, Moorhen, Snipe (12) and Heron (4) on SW wetland.
- Yellowhammer singing over Works area in Derryville.
- Reed Bunting, Swallow, Grey Crow, Wood Pigeon, Blackbird, Wren, Willow Warbler, Stonechat, Kestrel (2) and Meadow Pipit.
- Local staff report that Lapwing are attempting to breed on the site in the past year or two. The wetland also attracts wintering swans, duck and waders.

Mammals

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

- Badger tracks noted at several locations including the north-east section.
- Hares spotted on bog at several locations. Droppings and prints sighted around the site.
- Fox spoor noted at several locations. Local staff report breeding Foxes on site.

Other species

- Several butterflies were noted on site including Meadow Brown, Ringlet, Common Blue, Small Tortoiseshell Green-veined White, Small White, Small Copper. The cutaway along the access road had numerous butterflies including Meadow Brown (32), Green-veined White (5), Ringlet (5) and Small White (1).
- Frog
- Brown Hawker, 6-spotted Burnet Moth.

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 BnM staff and updated as required.

APPENDIX V: BIOSECURITY

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

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

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

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

In addition to the above, Best Practice measures around the prevention and spread of Crayfish plague[7] will be adhered with throughout all rehabilitation measures and activities.

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

APPENDIX VI: POLICY AND REGULATORY FRAMEWORK

BnM 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, BnM 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 BnM 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.

BnM 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 BnM. 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 BnM peatland rehabilitation plan. BnM have also developed and operate various policies and strategies that also inform the development of this rehabilitation plan.

1 EPA IPC Licence

BnM operates under IPC Licence issued and administered by the EPA to extract peat within the Littleton bog group (Ref. P0-409-01). 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 Littleton group. This regulatory requirement is the main driver of the development of this rehabilitation plan.

2 The Peatlands Climate Action Scheme (PCAS)

BnM understand that it is the Minister's (DECC) intention to impose an obligation on BnM 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 BnM carry out an enhanced decommissioning, rehabilitation and restoration, under the Scheme (PCAS), and supported by the Climate Action Fund and Ireland's National Recovery and Resilience Plan across a footprint of 33,000 ha. This scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations under existing EPA IPC licence conditions. Interventions and measures supported by the Scheme will ensure that environmental stabilisation is achieved (meaning IPC obligations are met), and importantly, significant additional benefits, particularly relating to climate action and other ecosystem services, will also be delivered. However, only the additional costs associated with the additional and enhanced

rehabilitation, i.e., those activities which go beyond the existing decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support under the Scheme.

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

For the avoidance of doubt, should the Scheme and the associated statutory obligation on BnM not materialise, BnM will not carry out the enhanced decommissioning, rehabilitation and restoration measures described in this plan. BnM 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.

BnM 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 BnM.

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.

BnM is a key stakeholder in the National Peatlands Strategy and the Peatlands Strategy Implementation Group. The strategy recognises the potential for some BnM 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 BnM) for the after-use of cutaway bog.

- BnM 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 BnM is not to open up any undrained new bogs for peat production.
- Lands identified by BnM as having high biodiversity value and/or priority habitats will be reserved for these purposes as the principal future land use.
- Generally, BnM 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 BnM's Strategic Framework for the Future Use of Peatlands.

The National Peatlands Strategy highlights the importance and value of developing peatland rehabilitation plans for BnM 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 National River Basin Management Plan 2022-2027 (Water Framework Directive)

The Draft River Basin Management Plan for Ireland 2022-2027 (Department of Housing, Local Government and Heritage, 2022) 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 2022-2027 outlined how peat extraction can be a potentially significant pressure on various water quality parameters. Peatland rehabilitation of BnM cutaway (in addition to other measures) was part of the WFD (2022-2027) programme of measures. The NRBMP 2022-2027 takes account of the fact that BnM 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 2022-2027 rehabilitation target was superseded by the acceleration of the BnM de-carbonisation programme and the Scheme (PCAS).

The development of site rehabilitation plans and the delivery of peatland rehabilitation by BnM was expected to have a positive impact on water quality and will help the NRBMP 2022-2027 deliver its objectives in relation to the Water Framework Directive and is one of the five key principle actions.

The draft NRBMP 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 NRBMP 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 BnM 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 NRBMP 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 BnM 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

BnM 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). BnM 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.

BnM 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 BnM 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 BnM 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.

BnM 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. BnM 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 BnM specific action in this plan includes the adoption of pollinator-friendly management within the BnM 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 BnM 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. BnM 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 BnM heritage, tourism, biodiversity/conservation, landscape, renewable energy, and economy/enterprise.

11 National Archaeology Code of Practice

BnM operated under an agreed Code of Practice (COP) regarding archaeology with the Department of Arts, Heritage and the Gaeltacht and the National Museum of Ireland which provided 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)

Under the Code, BnM, the Minister and Director worked together to ensure that appropriate archaeological survey and mitigation was carried out in advance of peat extraction.

As peat extraction ceased in 2019, the remaining elements of the COP that are still applicable include:

- BnM must ensure that any newly discovered monuments on BnM 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 BnM lands are reported immediately to the Duty Officer of the National Museum of Ireland.
- BnM will adhere to the Archaeology Code of Practice relating to management of any archaeological finds that may arise during cutaway peatland rehabilitation and decommissioning.

Under the Peatlands Climate Action Scheme, an Archaeological Impact Assessments is prepared for each bog in advance, from a review of historical data and desk-based searches of:

- The IAWU Peatland Survey
- BnM 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
- Field survey

The Draft AIA determines and advises on any known archaeology and its required protection, and determines what is required to be undertaken if archaeology is found during the rehabilitation.

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 BnM 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 BnM 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 BnM Commitments

BnM 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 BnM'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 BnM. 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 BnM Strategic Framework for the future use of cutaway peatlands 2020 (Draft)

The general after-use strategy of BnM is outlined in the BnM Strategic Framework for Future-Use of Cutaway Bogs 2020 (draft document). This document outlines how BnM'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, BnM 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 BnM 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

Decommissioning 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 BnM 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	Bawnmore 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
4	Decommissioning or Removal of Buildings and Compounds	Decommissioning or Removal of Buildings and Compounds
5	Decommissioning Fuel Tanks and associated facilities	Where relevant
6	Decommissioning and Removal of Bog Pump Sites	Where relevant
7	Decommissioning or Removal of Septic Tanks	Where relevant

In addition, condition 7 of the licence requires these now defined waste items to be disposed of or recovered as follows:

7.1 Disposal or recovery of waste shall take place only as specified in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* of this licence and in accordance with the appropriate National and European legislation and protocols. No other waste shall be disposed of/recovered either on-site or off-site without prior notice to, and prior written agreement of, the Agency.

7.2 Waste sent off-site for recovery or disposal shall only be conveyed to a waste contractor, as agreed by the Agency, and only transported from the site of the activity to the site of recovery/disposal in a manner which will not adversely affect the environment.

7.3 A full record, which shall be open to inspection by authorized persons of the Agency at all times, shall be kept by the licensee on matters relating to the waste management operations and practices at this site. This record shall as a minimum contain details of the following:

7.3.1 The names of the agent and transporter of the waste.

7.3.2 The name of the persons responsible for the ultimate disposal/recovery of the

waste.

7.3.3 The ultimate destination of the waste.

7.3.4 Written confirmation of the acceptance and disposal/recovery of any hazardous waste consignments sent off-site.

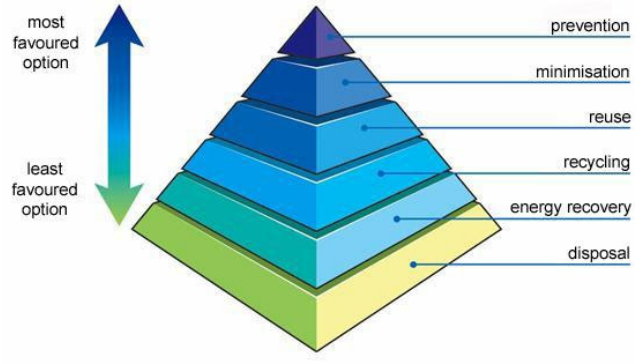
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

7.3.6 Details of any rejected consignments.

A copy of this Waste Management record shall be submitted to the Agency as part of the AER for the site.

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

Where possible, BnM 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 after use 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	Bawnmore Decommissioning Plan
1	Removal of Railway Lines	Removal of Railway Lines
2	Decommissioning Bridges and Underpasses	Where Applicable
3	Decommissioning Railway Level Crossing	Where Applicable
4	Restricting Access (bogs and silt ponds)	Restricting Access to Bog
5	Removal of High Voltage Power Lines	Where Applicable

APPENDIX VIII: GLOSSARY

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

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

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

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

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

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

Rehabilitation: Rehabilitation is defined in general by BnM 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, BnM 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 BnM sites have pumped drainage and these sites are likely to develop a mosaic of wetland habitats when pumping in reduced or stopped. The water chemistry of wetland cutaway frequently is strongly influenced by the more alkaline sub-soils that have been exposed during peat production. This means that pioneer vegetation is more typical of fen and wetland, rather than raised bog. Wetland cutaway will have a broad range of hydrological conditions depending on the local topography. In some cases, these wetlands may form deep water (> 0.5 m) whilst other areas may have the water table at or just below the surface of the ground.

APPENDIX IX: EXTRACTIVE WASTE MANAGEMENT PLAN

(Minimisation, treatment, recovery and disposal)

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

Scope:
This plan covers IPPC Licence's Ref PO-409-01, Littleton Group of Bogs located in Co. Tipperary/Co. Kilkenny.

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

1.2 Power Station screenings:
Lough Ree Power Station 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 PO-409-01 IPPC Licence Extractive Waste Conditions

2.1 Condition 7.5 Extractive Waste Management
The licensee shall draw up a Waste Management Plan (to be known as an Extractive Waste Management Plan) for the minimisation, treatment, recovery and disposal of extractive waste. This Plan shall meet the requirements of regulation 5 of the Waste Management (Management of Waste from the Extractive Industries) Regulations,2009. The Plan shall be submitted for agreement by the Agency by the 31' December 2012. The Plan shall be reviewed at least once every five years thereafter in a manner agreeable to the Agency and amended in

the event of substantial changes to the operation of a waste facility or to the waste deposited. Any amendments shall be notified to the Agency.
All extractive waste shall be managed in accordance with the Extractive Waste Management Plan. A report on the implementation of the Extractive Waste Management Plan shall be provided in the AER.

2.2 Condition 7.6 Waste Facility

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

2.3 Condition 7.7 Excavation Voids

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

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

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

3.0 Minimisation.

3.1 Silt Pond excavation material and cleanings.

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

3.2 Power Station Screenings.

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

3.3 Bog Timbers.

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

4.0 Treatment

4.1 Silt Pond excavation material and cleanings.

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

4.2 Power Station Screenings.

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

4.3 Bog Timbers

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

5.0 Recovery

5.1 Silt Pond excavation material and cleanings.

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

5.2 Power Station Screenings.

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

5.3 Bog Timbers

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

6.0 Disposal

6.1 Silt Pond excavation material and cleanings.

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

6.2 Power Station Screenings.

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

6.3 Bog Timbers

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

7.0 Extractive Waste Management Plan

5 (2a) (i)

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

5 (2a) (ii)

Given the nature and expanse of peat bogs, the stockpiling and storage of these waste materials do not present a visual, storage or stability problem. As required under Condition 10 of the IPPC Licence, the silt pond excavations and screenings will be utilised to backfill the silt pond voids once the bogs have finished and stabilised in accordance with 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	Classification	Chemical Process treatment	Deposition description	Transport System
Silt Pond Excavations and cleanings	Peat and mineral soils associated with peatlands. Stored for reuse during bog rehabilitation, with no displacement of overburden	01 01 02	None	Excavated from silt ponds by excavator and deposited adjacent to the silt pond.	Excavator
Peat Screenings	Stones, timbers and oversized peat particles, reincorporated into low areas, agreed with the Agency, and stabilized under normal natural bog conditions	01 01 02	None	Removed by screen at the factory and transported by tractor and trailer to the designated and agreed locations	Tractor and trailer.
Bog Timbers	Pine, Oak and Yew species, stored at locations in each bog. Not subject to any stability issues due to exposure to atmospheric/meteorological conditions.	01 01 02	None	Removed from the bog surface by excavator and transported by tractor and trailer to the agreed locations	Tractor and Trailer

Description of operations.

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

Closure plan. (Bog Rehabilitation Plan).

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

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

- 10.1.1 Decommission, render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution.
- 10.1.2 Implement the agreed cutaway bog rehabilitation plan (refer Condition 10.2).

10.2 Cutaway Bog Rehabilitation Plan:

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

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

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

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

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

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

The lands under where these materials are deposited are peatlands and are un-effected by the placing of this material.

Review.

This plan will be reviewed every five years, the first review to take place in September 2017. This review will entail an inspection of these waste facilities to ensure their placing, management, maintenance and stability comply with the requirements of the Extractive Waste Management requirements and condition 7.5, 7.6 and 7.7 of the Littleton IPPC Licence PO-409-01.

APPENDIX X: MITIGATION MEASURES FOR THE APPLICATION OF FERTILISER

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

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

APPENDIX XI: CONSULTATION SUMMARIES

Table APXI -1 Consultees contacted

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Baunmore	Private individual A		27/11/2017	Letter		
Littleton Bog Group	Irish Peatland Conservation Council	Several staff members		letter	14/02/2018	
Ballysorrell, Templetouhy, Baunmore	National Parks and Wildlife Service	Several staff members	6/02/2018	Site meeting	8/3/2018	
Lanespark	Private individual B		11/04/2018	Site Visit	11/04/2018	
Ballysorrell, Carrickhill Baunmore	University of Galway	Several staff members	23/04/2018	Site Visit	23/04/2018	
Littleton Bog Group	Private individual C		25/04/2018	Phone	25/04/2018	
Derryvilla	Slieve Ardagh Rural Development Group	Several staff members	1/06/2018	Meeting	1/6/2018	
Littleton Bog Group	National Parks and Wildlife Service	Regional staff members	24/05/2018	Email	1/06/2018	
Littleton Bog Group	General community meeting – Loch Doire Bhile, site visit to Baunmore		12/06/2018	Site Visit/meeting	12/06/2018	
Littleton Bog Group	National Parks and Wildlife Service	Regional staff members	14/06/2018	Site visit	14/06/2018	
Littleton Bog Group	Tipperary County Council	Heritage Officer	23/06/2018	Phone	23/06/2018	
Derryvilla	Private Individual D		27/06/2018	Meeting	27/06/2018	
Littleton Bog Group	Birdwatch Ireland	Several staff members	1/08/2018	Email	3/08/2018	
Littleton Bog Group	Irish Peatland Conservation Council	Several staff members	1/08/2018	Letter	15/08/2018	
Littleton Bog Group	Kilkenny County Council	Heritage Officer	1/08/2018	Email	3/08/2018	

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Littleton Bog Group	National Parks and Wildlife Service	Several staff members	1/08/2018	Letter	9/10/2018	
Littleton Bog Group	Irish Peatland Conservation Council	Several staff members	30/08/2018	Meeting	30/08/2018	
Littleton	Forest Service	Several staff members	14/08/2018	Email	14/08/2018	
Baunmore & Littleton	Birdwatch Ireland – Tipparary Branch	Several staff members	1/10/2018	Site visit	1/10/2018	
Littleton Bog Group	Tipperary County Council	Several staff members)	5/11/2018	Email	19/11/2018	
Littleton Bog Group	Tipperary Heritage Forum	Several staff members	15/02/2019	Presentation	15/02/2019	
Knockahaw	Private Individual E		1/02/2019	Site Visit	1/02/2019	
Littleton Bog Group	Environmental Protection Agency, National Parks and Wildlife Service, Irish Peatland Conservation Council	Several staff members	26/02/2019	Presentation meeting	26/02/2019	
Baunmore	Irish Wildlife Trust	Several staff members	12/05/2019	Site Visit/Walk	12/05/2019	
Lanespark Derryvilla	National Parks and Wildlife Service and Slieve Ardagh Rural Development Group – Loch Doire Bhile	Several staff members	22/05/2019	Meeting	22/05/2019	
Longfordpass	Private Individual F		5/07/2019	Site visit	5/07/2019	
Ballysorrell	Heritage Week Walk - Ballysorrell	Several staff members	17/08/2019	Site Visit/Wak	17/08/2019	
Baunmore Carrickhill	Limerick Institute of Technology	Several staff members	13/09/2019	Site visit	13/09/2019	

APXI -2 Response summary from Consultees contacted

Organisation	Summary of Response by Stakeholder
NPWS 8/3/2018	Ballysorrell All walked over the bog and viewed the bog restoration works. MCC outlined work carried out so far and work planned for the future. Planned work is > 75% complete. NPWS very complementary of the bog restoration work (drain-blocking with peat dams) carried out so far. All agreed that the bog had significant potential for bog restoration, and future nature conservation. Signs that the bog is already re-wetting in places due to drain-blocking. Discussions about potential for designation of the site for nature conservation by NPWS in future. Review and discussion of NPWS degraded raised bog model outputs for Ballysorrell. Model predicted that 9 ha would have potential for development into active raised bog in the future. General view was that this was probably an under-estimate and that the model likely to be affected by the intensive BnM drainage network. Discussion of potential measures to further increase re-wetting of the bog including berms across high bog at southern section. Bruckana All visited the Bruckana Windfarm. Viewed a cutaway bog area within the windfarm complex where there has been significant natural colonisation for at least 20 years and some targeted hydrological management. Discussion of the former history of Templetuohy Bog as a sod turf production bog. Sod turf cutaway tends to have deeper remnant peat, which in turn can develop Sphagnum-rich vegetation, where conditions suit. Attendees viewed some wet cutaway where there has been some Sphagnum colonisation. Discussion of environmental conditions that led to the development of this specific vegetation type. Discussion of potential to re-wet similar cutaway, with similar environmental conditions and deeper peat, to encourage development of Sphagnum-rich peat-forming vegetation. Discussion of different constraints and opportunities for this type of re-wetting. This Sphagnum-rich peat-forming vegetation only has potential to develop in certain environmental conditions in association with deeper peat. NPWS suggested that intensive bunding would have potential to increase the overall re-wetted area. There was general discussion of potential larger project opportunities, in association with planned BnM rehabilitation or future BnM afteruse development. These larger projects could potentially focus on GHG emission reduction, creation of peat-forming habitats, biodiversity enhancement, other ecosystem services enhancement/restoration. Baunmore All visited Baunmore cutaway. Baunmore is a typical milled peat cutaway with pumped drainage and with shallower remnant peat more typical of milled cutaway in the Littleton Bog Group, in contrast to Bruckana. All walked part of the bog where some recent rehabilitation trials have been carried out. MMC pointed out the recent field drain blocking using a bull-dozer that has been carried out so far. The target here was to block drains, re-establish surface drainage and re-wet peat. This work has already successfully held back surface water in places. The cambered fields and variable topography mean that a proportion of the peat fields remain dry. The expected habitat development is a mosaic of poor fen wetland communities, Reed swamp and scrub/wet woodland. MMC explained how blocking the field drains is Phase 1 of the planned rehab trial and that Phase 2 will involve blocking outfalls and cutting new overflow drains to further manipulate overall water levels. The overall strategy is to maximise the area of re-wetted peat with water levels close to the peat surface and emergent wetland communities. NPWS staff suggested that more intensive bunding would have potential to increase the overall re-wetted area and help manage water levels. All then examined some cutaway that is colonising naturally with pioneer vegetation. This cutaway is much more alkaline compared to Bruckana with indicators such as the presence of Black Bog-rush.

Organisation	Summary of Response by Stakeholder
Tipperary Cunty Council	The draft plan is an overview of the rehabilitation within the Littleton bog group this comprises of 12 bog areas. The plan is developed under Condition 10 of IPC Licence Ref. P0499-01. (An incorrect licence ref. is given in the plan.) Any consideration for future after uses for the bog areas will be subject to the planning regulatory framework and the Environment section will be obliged to comment at this time on a more detailed proposal. The rehabilitation plan should include best practice measures for the restoration of an optimal range of biodiversity and ecosystems. The aftercare management activities on the level, quantity and quality of water both on site and in the surrounding landscape should avoid any unnecessary deterioration in the quality and quantity of ground and surface waters. After use, peatland water levels and flow regimes should be restored to as close to the natural reference conditions as possible. Any works carried out must be detailed and all stakeholders consulted.
Irish Peatland Conservation Council	The IPCC welcome the zonation of Ballysorrell Bog for biodiversity and the decision not to develop it for peat resources (Page 3). Ballysorrell Bog is quite southerly in its location and its rehabilitation and zonation for biodiversity will help to extend the range of raised bog habitat in Ireland, which according to "The Status of EU Protected Habitats and Species in Ireland | 2013" (NPWS, 2013) is "BAD". We have a few questions and points to make on the draft re-habilitation plan with the aim to improving its content. It is good to see that Bord na Móna will be restoring the hydrology of the high bog through drain blocking as mentioned on Page 4 and that you also intend to carry out a trial rehab programme of a selected area for training purposes. Could you please elaborate on this? What training/trials do you intend to conduct and is it only inhouse training for Bord na Móna staff? The rehabilitation process may be a good time to test the Canadian method of Sphagnum transfer as there would be time to prepare the site prior to drain blocking. Please give this suggestion consideration as you indicated the peat present as light red brown Sphagnum peat (Page 9). There is Sphagnum on site that could be harvested and used as a donor inoculum for a Sphagnum trial. Page 5 gives information on the short and long-term time-frames of the plan. Could you give more details on the methods that will be utilised to monitor the hydrology i.e. will piezometers be used to measure water levels and will they be measured before drain blocking? This could ensure that any hydrological successes will be shown. In addition, how frequently will the ecotope mapping be conducted? Page 3 details the time-line for the development of Ballysorrell ("Ballysorrell was originally developed……"). Could this historical timeline be re-written as it is difficult to follow. For instance, when did the private sodpeat cutting around the bog cease? When did the milled peat production cease? Could you please specify how Ballysorrell Bog will help to achieve the national conservation target for active raised bog and supporting habitat in Ireland? Are there plans to formally designate this site in the future? Thank you for giving us this opportunity to make some comments on this welcome initiative by Bord na Mona.
Birdwatch Ireland	Many thanks for this – good to see it! He didn't get any curlew on site this year, but we now know (due to a communication breakdown!) that he didn't survey the main area; he did go and have a look last week at Derryhogan and not surprisingly, didn't find anything, it being probably too late. Next year, we will be better organised and hopefully will be able to monitor the occurrence of the pair on site, as well as the Lapwing, if present. When do you think any rehabilitation works on the Curlew and Lapwing areas might start? I know the planned AA will cover timing of works in relation the breeding bird season season, however, it would be good to know timescales for these areas. Just one initial comment, the breeding Lapwing would be important nationally (not just at county level) , as they are red listed and being now very scare, even small populations are important in the context of maintaining the geographical spread of the resource.

Organisation	Summary of Response by Stakeholder
Private Individual A	Seeking return of land at Baunmore CPOed by Bord na Móna
NPWS 09/10/2018	The Department, particularly, welcomes the restoration measures proposed for Ballysorrell Bog and Knockahaw Bog which will result in the development of active raised bog habitat and acknowledge that this will significantly aid Ireland in meeting its commitments under the EU Habitats Directive. Whilst it is appreciated that "the rehabilitation measures will be adapted to the various baseline conditions" (Part 1, pg.20) the Department recommends that Bord na Móna consider more fully the potential for forward-planning during production phases of its operation so that the topography of the commercial fields could be engineered so as to best facilitate rewetting of the sites. Such an approach would better conform to Principle 17 (afteruse of cutaway peatlands) of the National Peatlands Strategy (2015). The Department recommends that the ongoing research into the interaction between rehabilitation measures and carbon emissions is prioritized so as to better inform future rehabilitation plans. In the absence of the assimilation of such research outputs into rehabilitation planning it is nonetheless recommended that serious consideration is giving to reprofiling works within the Littleton Bog Group. In relevant sites this could greatly improve the baseline conditions for rewetting and would be justified on the basis that rewetted cutaway has lower carbon emissions that dry, bare cutaway. The foregoing is in line with Principle 19 (contribution of peatland rehabilitation and restoration to climate change mitigation and adaption) of the National Peatlands Strategy. There is some difficulty interpreting the maps due to their complexity and the size of the legend. Maps showing specific restoration actions would be useful, possibly in the form of an overview grid at a scale 1:35,000 with more detailed mapping as per grid squares. Eco-hydrological modelling based on LiDAR/DTM would be essential to ascertain the potential to achieve wet habitats with the potential to turn into carbon sinks. ….. 2 The Department is keen to continue engagement with Bord na Móna as regards investigating more engineered restoration techniques likely to provide results in line with the principles of the National Peatlands Strategy. The NPWS of the Department would welcome an opportunity to meet with you to allow for the Plan to be presented by your Ecology Team and to further explore the options of external funding such as EU LIFE funding, as discussed in previous meetings.
IPCC 15/08/2018	Could you please clarify the correct area for the group of 12 sites included: is it 5050ha (Page 11, Section 4.2) or is it 4824ha (Page 11, Table 1). If it is the latter could you clarify what the other 226ha constitutes please. IPCC's principal interest in this plan lies in the future of existing acid peat bog remnants, the potential of the cutaway areas to provide biodiversity value and priority habitats for nature conservation, climate change mitigation and the extent to which the plan meets requirements of the National Peatlands Strategy 2015. The area of peatland included in the Littleton Bog Group is significant in the county of Tipperary as it represents one third of the original area of raised bog that occurred in the whole County particularly concentrated in South Tipperary (Hammond 1979 Peatland Map of Ireland) the southern distribution range for raised bogs described in the Status of EU Protected Habitats and Species. In your plan on Table 5 only two bog restoration sites (Ballysorrell and Knockahaw) are proposed covering an area of 567ha. Can you explain the method used in choosing these areas for bog restoration and were any other sites considered within the group? IPCC maintain that two sites is far too little considering the area of the land in the Littleton Group and the lack of any sites of conservation value in this area of former raised bog distribution. We note that Killeen Bog contains acidic peat and that it appears to be earmarked for horticultural peat (sod moss judging from the satellite photograph) should this be required. On Page 16 in conclusion 5 the plan states that this bog could be restored if horticultural peat extraction is stopped. IPCC strongly recommend the immediate cessation of this activity on this site and its inclusion in the restoration sites plan. We have reasoned with Bord na Móna on numerous occasions about the continued national production of horticultural peat as we do not agree that this use represents responsible management as defined in principle P24 in the National Peatlands Strategy. We understand that Sod Moss is regarded in economic terms as a "lost leader" product which negates any economic argument for keeping this site in production. Here in Littleton where Bord na Móna have exploited over 5000ha of Tipperary's natural peatland resources, all peat production should cease and every effort should be made to restore suitable acid peat resources to living bog

Organisation	Summary of Response by Stakeholder
	where they exist. In this regard on Page 15 (Section 4.3.1.1 [ii]) two further sites with acid peat are mentioned - Carrickhill (substantial raised bog cutover east and west of the cutaway) & Inch (raised bog cutover to the south west of the cutaway) - why are these sites not being included in the bog restoration sites line-up? In the IPCC Sites Database we have a site named Longford Pass - Littleton Bog which is a remnant raised bog that we surveyed with a former Bord na Móna employee Sean Canney and which we subsequently used for educational purposes with local schools with the agreement of Bord na Móna. We would like to see this site included in the bog sites restoration list. (Grid ref. = S 23023 59319). IPCC are very unclear about your aims for the non-designated sites with considerable wildlife interest described on Page 21 of the plan. We estimate that there are 10 sites mentioned that are noteworthy for birds, crustaceans and invertebrates. In addition a further 3 rehabilitation sites are included in the Bord na Móna Biodiversity Plan. On the one hand Bord na Móna makes use of the fact that cutaway bogs are rich in biodiversity as part of the "Naturally Driven" image you like to portray but we can see no substantial commitment to undertake targeted management actions in relation to enhancing and maintaining these species on the sites. For example on Page 19 you state that without additional funding targeted conservation works for breeding birds will not be a feature of this plan. This is wrong and is at odds with Principle 15 in the National Peatlands Strategy 2015. In relation to climate change this rehabilitation plan needs to ensure that all of the cutaway bogs within the Littleton Group are rewetted to prevent carbon leakage. In our experience through visits to Mount Lucas, Ballycon and Lullymore cutaway bogs there are substantial areas within these rehabilitated sites that are dry and emitting carbon. Why does Bord na Móna not recontour sites with un-even topography to ensure that the majority of the bare peat is rewetted? Surely at the peat production stage more effort could be made to extract the peat so that flat substrate remains. Can you indicate within the plan the percentage of peat that will be rewetted and be carbon neutral? This is an important consideration in line with national climate change policy. IPCC find that the plan is overstating the company's intention to cease peat production for electricity by 2030 as their contribution to climate change policy
Private Individual B	Meeting to discuss land security issues and leasing of land at Lanespark and Derryvilla.
Private Individual C	Phone call to discuss potential to develop greenway amenity across the Littleton Bog Group.
Private Individual D	Meeting to discuss boundary issues and potential impact of rehabilitation on adjoining land
Private Individual E	Meeting to discuss potential gun club project at Knockahaw Bog.
Private Individual F	Meeting to discuss rare orchids at Longfordpass railway cutting

APPENDIX XII: ARCHAEOLOGY

Role of the Archaeological Liaison Officer

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

Code of Practice

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.

BnM	Land & Habitats– Bog Operations **Archaeological Findings**		
Document Approved By:	**Revision Date:**	**Doc No:**	**Revision No:**
EMD	13/08/2024	ENV017	2
	Control Location		**Page**
	Environment Department		1 of 5

Purpose

The purpose of this procedure is to describe the arrangements in BnM for findings of Archaeological material (Stray Finds).
All objects, sites or monuments, no matter how fragmentary, are important elements of our heritage.

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 manmade 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.

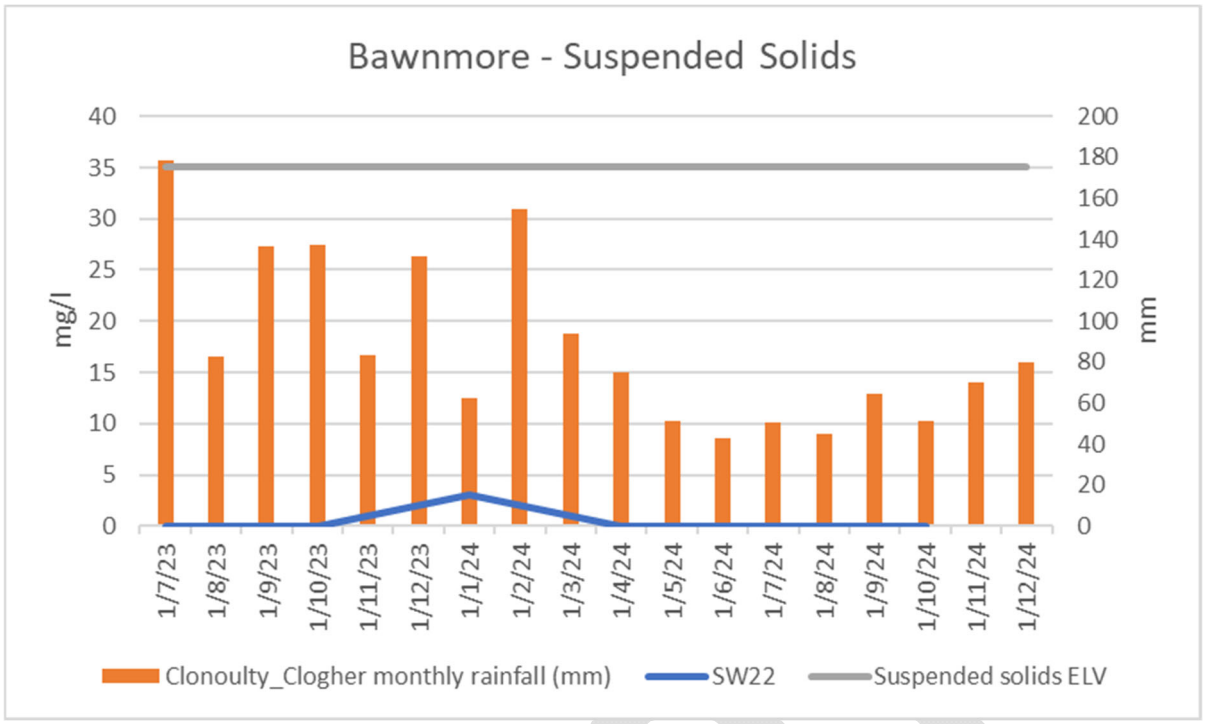
NOTE: Our archaeological heritage is a finite, non-renewable resource. Once a site is destroyed its information is lost forever and we have lost the chance to understand a little more about our past, where we have come from and perhaps the opportunity to learn for the future.

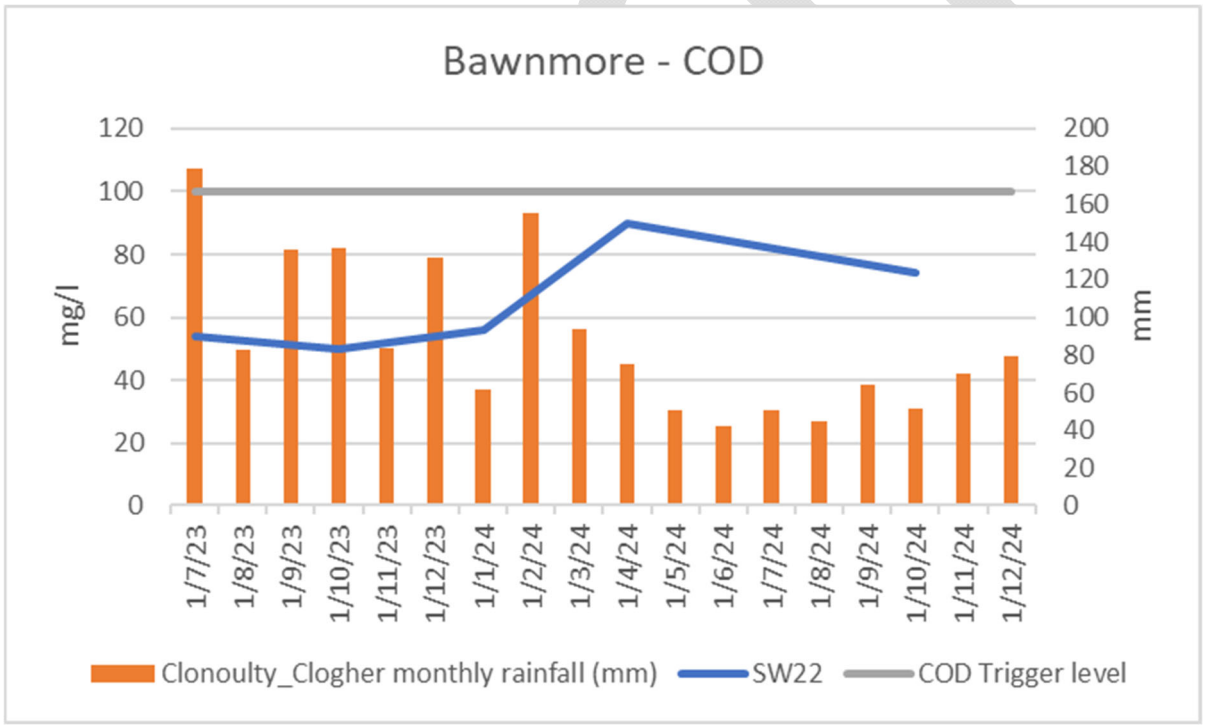
Your Archaeological Liaison Officer is Enda McDonagh.

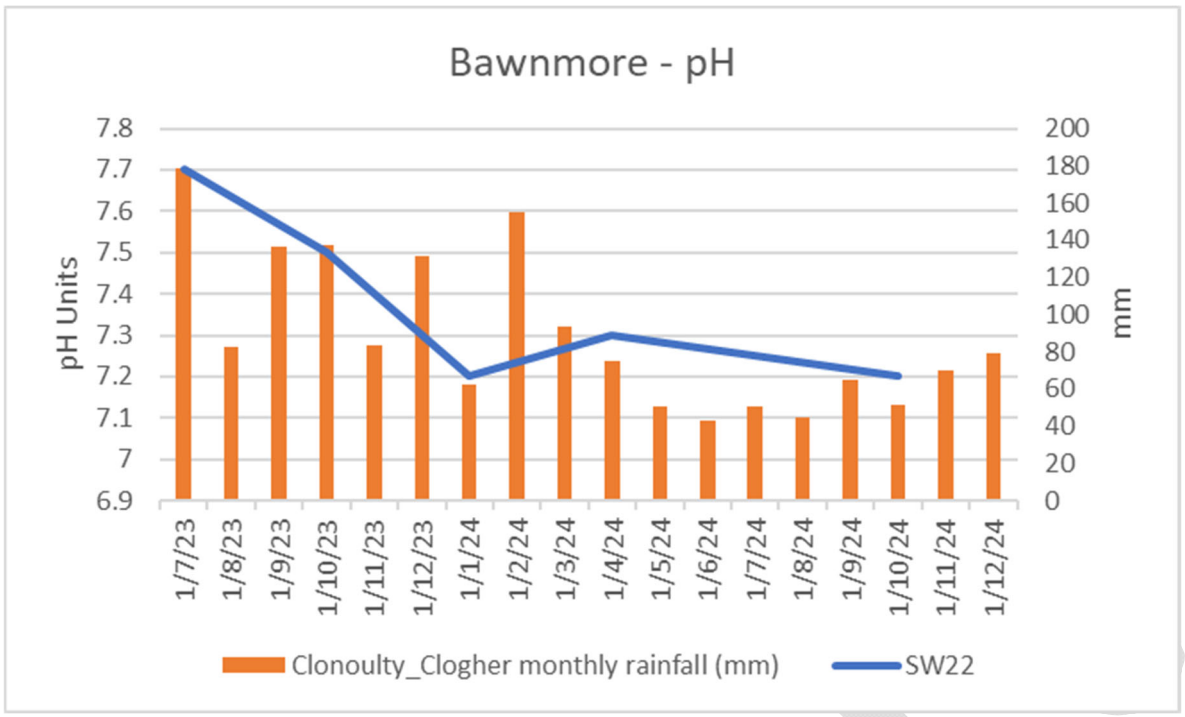
2) Records

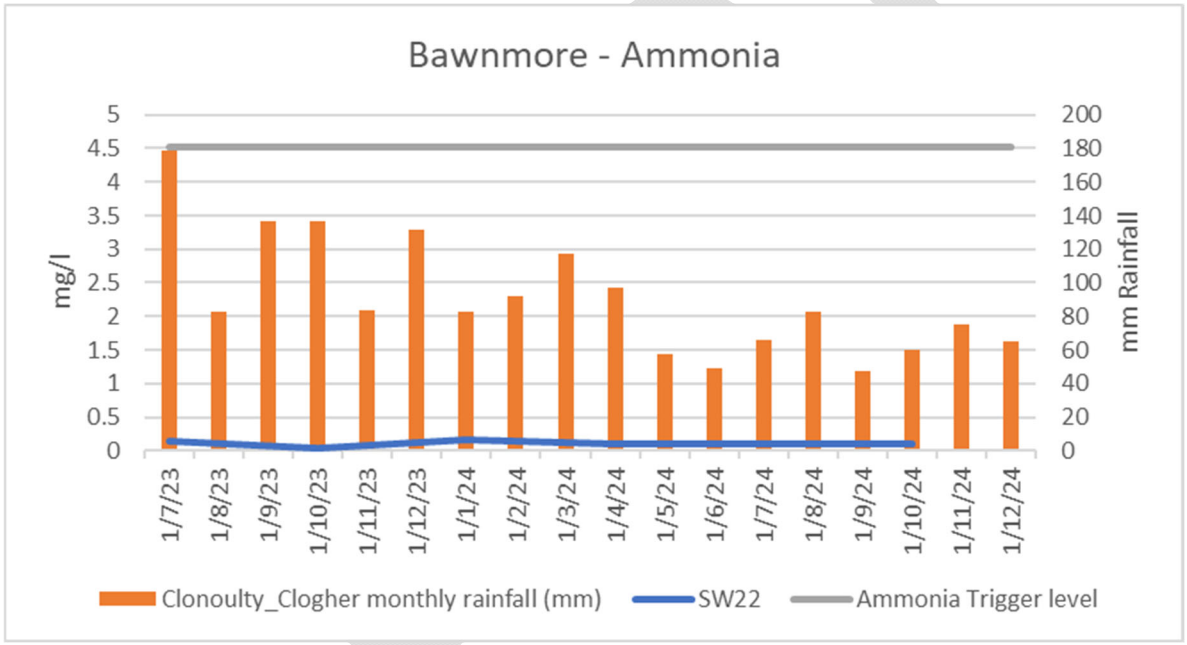
Revision Index			
Revision	Date	Description of change	Approved
1	13/19/2020	First release	EMcD
2	13/08/2024	Second release	EMcD

APPENDIX XIV: WATER QUALITY MONITORING RESULTS FOR BAWNMORE BOG






Bawnmore - pH
pH Units
mm
7.8
7.7
7.6
7.5
7.4
7.3
7.2
7.1
7
6.9
200
180
160
140
120
100
80
60
40
20
0
1/7/23
1/8/23
1/9/23
1/10/23
1/11/23
1/12/23
1/1/24
1/2/24
1/3/24
1/4/24
1/5/24
1/6/24
1/7/24
1/8/24
1/9/24
1/10/24
1/11/24
1/12/24
Clonoulty_Clogher monthly rainfall (mm)
SW22


Bawnmore - Ammonia
mg/l
mm Rainfall
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
200
180
160
140
120
100
80
60
40
20
0
1/7/23
1/8/23
1/9/23
1/10/23
1/11/23
1/12/23
1/1/24
1/2/24
1/3/24
1/4/24
1/5/24
1/6/24
1/7/24
1/8/24
1/9/24
1/10/24
1/11/24
1/12/24
Clonoulty_Clogher monthly rainfall (mm)
SW22
Ammonia Trigger level

PCAS SW Sampling Scheme				Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids
Bog Group	**Licence No**	**Bog Name**	**SW Code**	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
			-GIS	1/7/23	1/8/23	1/9/23	1/10/23	1/11/23	1/12/23	1/1/24	1/2/24	1/3/24	1/4/24	1/5/24	1/6/24	1/7/24	1/8/24	1/9/24	1/10/24	1/11/24	1/12/24
Littleton Group	P0499-01	Bawnmore	SW22	<2			<2			3			<2			N/R			<2		
Clonoulty_Clogher monthly rainfall (mm)				178.5	82.5	136.2	137	83.7	131.3	62.1	155	93.9	74.9	50.9	42.8	50.7	44.7	64.6	51.5	70.3	79.6
		Suspended solids ELV		35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35

PCAS SW Sampling Scheme				Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour
Bog Group	**Licence No**	**Bog Name**	**SW Code**	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co
			-GIS	1/7/23	1/8/23	1/9/23	1/10/23	1/11/23	1/12/23	1/1/24	1/2/24	1/3/24	1/4/24	1/5/24	1/6/24	1/7/24	1/8/24	1/9/24	1/10/24	1/11/24	1/12/24
Littleton Group	P0499-01	Bawnmore	SW22	212			167			231			256			N/R			234		
Clonoulty_Clogher monthly rainfall (mm)				178.5	82.5	136.2	137	83.7	131.3	62.1	155	93.9	74.9	50.9	42.8	50.7	44.7	64.6	51.5	70.3	79.6

PCAS SW Sampling Scheme				COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD
Bog Group	**Licence No**	**Bog Name**	**SW Code**	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
			-GIS	1/7/23	1/8/23	1/9/23	1/10/23	1/11/23	1/12/23	1/1/24	1/2/24	1/3/24	1/4/24	1/5/24	1/6/24	1/7/24	1/8/24	1/9/24	1/10/24	1/11/24	1/12/24
Littleton Group	P0499-01	Bawnmore	SW22	54			50			56			90			N/R			74		
Clonoulty_Clogher monthly rainfall (mm)				178.5	82.5	136.2	137	83.7	131.3	62.1	155	93.9	74.9	50.9	42.8	50.7	44.7	64.6	51.5	70.3	79.6
		COD Trigger level		100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

PCAS SW Sampling Scheme				pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH
Bog Group	**Licence No**	**Bog Name**	**SW Code**	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units
			-GIS	1/7/23	1/8/23	1/9/23	1/10/23	1/11/23	1/12/23	1/1/24	1/2/24	1/3/24	1/4/24	1/5/24	1/6/24	1/7/24	1/8/24	1/9/24	1/10/24	1/11/24	1/12/24
Littleton Group	P0499-01	Bawnmore	SW22	7.7			7.5			7.2			7.3			N/R			7.2		
Clonoulty_Clogher monthly rainfall (mm)				178.5	82.5	136.2	137	83.7	131.3	62.1	155	93.9	74.9	50.9	42.8	50.7	44.7	64.6	51.5	70.3	79.6

PCAS SW Sampling Scheme				TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P
Bog Group	**Licence No**	**Bog Name**	**SW Code**	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
			-GIS	1/7/23	1/8/23	1/9/23	1/10/23	1/11/23	1/12/23	1/1/24	1/2/24	1/3/24	1/4/24	1/5/24	1/6/24	1/7/24	1/8/24	1/9/24	1/10/24	1/11/24	1/12/24
Littleton Group	P0499-01	Bawnmore	SW22	<0.05			<0.05			<0.05			<0.05			N/R			<0.05		
Clonoulty_Clogher monthly rainfall (mm)				178.5	82.5	136.2	137	83.7	131.3	62.1	155	93.9	74.9	50.9	42.8	50.7	44.7	64.6	51.5	70.3	79.6

PCAS SW Sampling Scheme				TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS
Bog Group	**Licence No**	**Bog Name**	**SW Code**	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
			-GIS	1/7/23	1/8/23	1/9/23	1/10/23	1/11/23	1/12/23	1/1/24	1/2/24	1/3/24	1/4/24	1/5/24	1/6/24	1/7/24	1/8/24	1/9/24	1/10/24	1/11/24	1/12/24
Littleton Group	P0499-01	Bawnmore	SW22	246			434			217			202			N/R			257		
Clonoulty_Clogher monthly rainfall (mm)				178.5	82.5	136.2	137	83.7	131.3	62.1	155	93.9	74.9	50.9	42.8	50.7	44.7	64.6	51.5	70.3	79.6

PCAS SW Sampling Scheme				Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N
Bog Group	**Licence No**	**Bog Name**	**SW Code**	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
			-GIS	1/7/23	1/8/23	1/9/23	1/10/23	1/11/23	1/12/23	1/1/24	1/2/24	1/3/24	1/4/24	1/5/24	1/6/24	1/7/24	1/8/24	1/9/24	1/10/24	1/11/24	1/12/24
Littleton Group	P0499-01	Bawnmore	SW22	0.136			0.048			0.169			0.102			N/R			0.111		
Clonoulty_Clogher monthly rainfall (mm)				178.5	82.5	136.2	137	83.7	131.3	83.1	91.9	117.3	97	57.1	49.4	65.6	82.7	47.5	59.9	75.2	64.8
		Ammonia Trigger level		4.53	4.53	4.53	4.53	4.53	4.53	4.53	4.53	4.53	4.53	4.53	4.53	4.53	4.53	4.53	4.53	4.53	4.53

PCAS SW Sampling Scheme				DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC
Bog Group	**Licence No**	**Bog Name**	**SW Code**	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
			-GIS	1/7/23	1/8/23	1/9/23	1/10/23	1/11/23	1/12/23	1/1/24	1/2/24	1/3/24	1/4/24	1/5/24	1/6/24	1/7/24	1/8/24	1/9/24	1/10/24	1/11/24	1/12/24
Littleton Group	P0499-01	Bawnmore	SW22	19			18.8			24.3			20.1			N/R			N/R		
Clonoulty_Clogher monthly rainfall (mm)				178.5	82.5	136.2	137	83.7	131.3	62.1	155	93.9	74.9	50.9	42.8	50.7	44.7	64.6	51.5	70.3	79.6

Blank spaces - No results available during times of the year when rivers are in flood or during extended dry spells

APPENDIX XIII: STOCKPILE DECOMMISSIONING PROCEDURE

Scope
All IPC licensed peatlands with residual peat stockpiles requiring decommissioning and rehabilitation, as required by Condition 10.

The aim of this Stockpile Decommissioning Procedure is to stabilise any remaining stockpiles by depositing the peat in the two drains located immediately adjacent to the stockpile field, enabling the re-shaping of the stockpile to facilitate stabilization and revegetation.

Condition 10:
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.

Procedure:

1. Strip any remaining stockpile protection and remove using the poly wrapper for recycling.
2. Ensure the silt pond servicing this pile field catchment has been cleaned within the last six months as per condition 6.8, and visually inspected as per condition 6.7, prior to any pile decommissioning.
3. Where stockpiles occur within areas planned for rehabilitation, such planned rehabilitation measures (regular drain blocking) will be implemented in advance of any stockpile decommissioning, with priority given to the required adjacent stockpile field drains.
4. Once the rehabilitation measure above has been completed, proceed to reprofile the stockpile as per below.
5. Using suitable available excavator/dozer to make a safe ramp up onto the end of the pile.
6. Track up onto the pile and establish a safe level base.
7. Using the machine to reduce and reprofile the pile height and deposit into the adjoining pile field drains. The residual height to be determined based on stockpile size and area required to reprofile.
8. Work along the pile using this method until reaching the pile end.
9. Using a suitable machine, track the peat into the pile field drain along both sides of the pile, ensuring the final level is below the existing drain blocks and any damage to existing drain blocks avoided.
10. If required, use a suitable machine to track along the top of the reprofiled stockpile to level and flatten the profile to reduce the runoff gradient.
11. Fertiliser application and any grass seed mix should be applied to each stockpile following completion of the above steps, to accelerate the stabilisation.