

# **Bord na Móna**

**Cloonshannagh Bog**

**Cutaway Bog Decommissioning and  
Rehabilitation Plan**

**2024**

This document seeks to address the requirements of Condition 10.2 of IPC Licence Ref. P0504-01:

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

*This licence condition requires Bord na Móna agree with the EPA the measures that will provide for rehabilitation, i.e., stabilisation of Cloonshannagh 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 Cloonshannagh Bog.*

*In addition, to preparing this document to comply with Condition 10 of IPC Licence Ref. P0504-01, due regard was also given to the Peatlands Climate Action Scheme (PCAS) announced by the Minister. This Scheme will see the Minister support, via the Climate Action Fund and Ireland’s National Recovery and Resilience Plan, Bord na Móna in developing a package of measures, ‘the Scheme’, for enhanced decommissioning, rehabilitation and restoration of cutaway peatlands referred to as, the Peatlands Climate Action Scheme’. However, only the additional costs associated with the additional and enhanced rehabilitation, i.e., measures which go beyond the existing standard mandatory decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support. The additional costs of the Scheme will be supported by Government, 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 Cloonshannagh bog, activities which goes beyond that required by Condition 10 in the Licence, rehabilitation necessary to comply with the ‘standard’ requirement of Condition 10 (in the absence of the Scheme) is also included, to estimate costs. The inclusion of the ‘standard’ rehabilitation together with the enhanced rehabilitation in this document allows the Scheme Regulator to distinguish and objectively determine the specific activities (and their associated costs) eligible for support under the Scheme.*

*Bord na Móna have defined the key rehabilitation outcome at Cloonshannagh 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 Cloonshannagh Bog will be conducted in adherence to the relevant planning guidelines and consultation with relevant authorities and will be considered within the framework of this rehabilitation plan.*

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## NON-TECHNICAL SUMMARY

- Bord na Móna is planning to rehabilitate Cloonshannagh Bog, located in Co. Roscommon.
- Industrial peat harvesting has now finished at Cloonshannagh Bog.
- Bord na Móna 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 Bord na Móna.
- 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. Cloonshannagh was drained in the past to allow peat production. Better results for water quality improvements, climate action, the reduction of carbon emissions and biodiversity are achieved when the remaining peat is re-wetted. This means drain-blocking and other measures to raise water levels to the surface of the bog and to encourage the natural colonisation of vegetation.
- In general, soggy ground conditions are preferred. This means the remaining peat is wet and that plants that prefer wetter conditions, like Bog Cotton 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 Bord na Móna 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 Cloonshannagh 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.
- Cloonshannagh Bog was in industrial peat production since 1985, some sections of the bog still retain a significant depth of peat (“red” or “*sphagnum*” peat also). All of the peat harvested on the site was used as fuel peat in Lough Ree Power in Lanesborough, Co. Longford. A relatively large section of intact raised bog is still present on the site. Rehabilitation was carried out in this remnant raised bog in 2014/15.
- The majority of the former cutaway area currently comprises bare peat with a mosaic of pioneer cutaway habitats already developing across the site. The environmental conditions of Cloonshannagh mean that wetland habitats (reedbeds, fen, wet woodland, open water) will develop across the majority of the site in mosaic with Birch woodland developing the drier areas. Cloonshannagh has a gravity-based drainage system.
- Measures proposed for Cloonshannagh Bog include drain blocking and additional measures required to raise water levels to the surface of the peat (bundling for example). Some fertiliser will be spread on headlands and other areas (a small part of the overall area) to encourage vegetation growth.
- Bord na Móna plan to carry out this work in 2024.
- These rehabilitation measures will be planned by a team consisting of expert ecologists, hydrologists and engineers. It is a guiding principle of Bord na Móna 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.

- A large portion of Cloonshannagh is already developing pioneer vegetation. It will take some time for vegetation and habitats to fully develop at the most recently peat harvested areas of Cloonshannagh, and 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. Bord na Móna 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.

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## 1. INTRODUCTION

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Mount Dillon Bog Group (Ref. P0504-01) (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. Cloonshannagh Bog is located in Co. Roscommon.

This document seeks to address the requirements of Condition 10.2 of IPC Licence Ref. P0504-01:

*“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.

It is proposed by Government that Bord na Móna carry out a Peatlands Enhanced Decommissioning, Rehabilitation and Restoration Scheme on its peatlands. Note this proposal is also known colloquially as the ‘Peatlands Climate Action Scheme’ (PCAS). The additional costs of the Scheme will be supported by Government through the Climate Action Fund, and Ireland’s National Recovery and Resilience Plan administered by the Department of Environment, Climate and Communications (DECC), while the National Parks and Wildlife Service (NPWS) will act as the Scheme regulator. Bord na Móna have 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.

Only the costs associated with the additional, enhanced, and accelerated rehabilitation, i.e. those measures which go beyond the existing decommissioning and rehabilitation requirements arising from Condition 10, will be eligible for support under the Scheme. Bord na Móna 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.

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

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

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

These measures are designed to encourage the development of peat-forming habitats, where possible. They are also designed to further slow the movement of water across the site (with the site acting similarly to a constructed wetland), slowing the release of water (improving local water attenuation) and water quality is also expected to improve as the site returns to a naturally functioning peatland ecosystem. It is anticipated that the combination of active enhanced rehabilitation measures and natural colonisation will quickly accelerate environmental stabilisation. Nevertheless, it will still take some time (30-50 years) for naturally functioning wetland and peatland ecosystems to fully re-establish.

The measures will also accelerate the development of new habitats for a range of species under pressure in the wider landscape and will have the potential to develop habitats (e.g. Annex I raised bog, wetlands that support wader water birds of conservation interest) that will contribute towards the delivery of national biodiversity objectives.

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

## 1.1 Constraints and Limitations

This document covers the area of **Cloonshannagh Bog** shown in drawing number BNM-DR-25-02-RP-01.

The parts of Cloonshannagh Bog (within the areas owned and under the control of Bord na Móna) that are currently used by domestic turf cutters to harvest peat are ecologically and hydrologically linked to the area owned by Bord na Móna where rehabilitation is planned. Nevertheless, Bord na Móna are aware of such issues which may constrain the proposed rehabilitation actions, and this rehabilitation plan considered potential impacts of turf cutting on the delivery of the stated objectives.

There are known rights of way around the margins of Cloonshannagh Bog. Where a public right of way or similar burden exists on Bord na Móna 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 currently known archaeological features present at Cloonshannagh Bog, which may constrain PCAS activities.

Bord na Móna are aware of the potential development of the former rail line for amenity use. However, the proposed rehabilitation measures do not overlap with these features and there is no constraint to rehabilitation.

There are some areas of agricultural grassland along the margins of Cloonshannagh 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 Bord na Móna 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 Bord na Móna 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 Cloonshannagh 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:

- Mountdillon Integrated Pollution Control Licence;
- Mountdillon Annual Environmental Reports;
- Review of the National Biodiversity Data Centre (NBDC) webmapper;
- Inland Fisheries Ireland (IFI) Reports;
- Environmental Protection Agency database ([www.epa.ie](http://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](http://www.birdwatchireland.ie));
- Geological Survey of Ireland - National Draft Bedrock Aquifer map;
- Geological Survey of Ireland - Groundwater Database ([www.gsi.ie](http://www.gsi.ie));
- Historic Environment Viewer at <https://webgis.archaeology.ie/historicenvironment/>
- National Parks & Wildlife Services Public Map Viewer ([www.npws.ie](http://www.npws.ie));
- Water Framework Directive catchments.ie/maps/ Map Viewer ([www.catchments.ie](http://www.catchments.ie));
- OPW Indicative Flood Maps ([www.floodmaps.ie](http://www.floodmaps.ie));
- CFRAM Preliminary Flood Risk Assessment (PFRA) maps ([www.cfram.ie](http://www.cfram.ie));
- River Basin Management Plan for Ireland 2022-2027
- Bord na Móna Annual Report 2021 - 2023.
- Spatial data in respect of Article 17 reporting, available online at <https://www.npws.ie/maps-and-data/habitat-and-species-data/article-17>.

## 2.2 Consultation

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

## 2.3 Field Surveys

Bord na Móna carried out a baseline ecological survey of all of its properties in 2009-2012 and developed habitat maps. As part of this exercise, Cloonshannagh Bog was surveyed in 2012. Habitat maps were updated in 2017. A survey also took place in January 2024, 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 Bord na Móna classification system was previously developed for classifying pioneer cutaway habitats as Fossitt categories were deemed not to be detailed enough for cutaway bog (much of cutaway bog could be classified as Cutover Bog - PB4). Much of the pioneer cutaway vegetation is still at an early stage of its development and cannot be assigned to Fossitt Level 3 categories yet.

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

### 3. SITE DESCRIPTION

Cloonshannagh Bog is located approximately four kilometres northwest of Termonbarry in County Roscommon. The PCAS extent of Cloonshannagh Bog is located within one main section. It is part of the Mountdillon group (Lough Ree sub-group) of bogs. Cloonshannagh Bog is one of a cluster of bogs that has developed along the floodplains of the River Shannon. The total combined area of the rehabilitation footprint of the bog is 445 ha.

The surrounding landscape is dominated by a mosaic of farmland, largely consisting of improved grassland, conifer plantation and other bogs, many owned and managed by Bord na Móna. Rail lines within Cloonshannagh connect the site with Derrymoylin to the north, while a southern rail link connects the site with Derrycashel. A local road runs along the southern and northern boundary providing access to Cloonshannagh Bog.

There are no mapped EPA watercourses within the boundary of Cloonshannagh bog. The Slattaghmore (EPA Code: 26S14) stream flows in a southerly direction outside the western bog boundary. This watercourse then flows into the Feorish [Tarmonbarry] stream which flows in a southerly direction outside the southwestern bog boundary, eventually discharging to the River Shannon (Upper). An unnamed stream also runs in an easterly direction outside the northern bog boundary. This watercourse then flows into the River Shannon (Upper). Cloonshannagh Bog has a gravity-based drainage system.

The majority of the site is dominated by bare peat and is developing pioneer vegetation. A mineral island is located towards the centre of the site and an area of remnant bog to the north.

Bord na Móna propose to rehabilitate Cloonshannagh Bog in 2024. See Drawing number BNM-DR-25-02-RP-01: Bog Site Location, included in the accompanying Mapbook<sup>1</sup>, which illustrates the location of Cloonshannagh Bog in context to the surrounding area.

#### 3.1 Status and Situation

##### 3.1.1 Site history

Cloonshannagh Bog was used to supply fuel peat in Lough Ree Power in Lanesborough, Co. Longford. Cloonshannagh Bog was in industrial peat production from 1985 to 2020. Some sections of the bog still retain a significant depth of peat (“red” or “sphagnum” peat also).

A relatively large section of raised bog (38ha) is present in the northern part of the bog. This area was rehabilitated during the winter of 2014/15. Peat dams were installed in order to block the drainage system and hold water on the site.

##### 3.1.2 Current land-use

Industrial peat extraction has now completely ceased. The majority of the Cloonshannagh Bog former production area is bare peat.

Cloonshannagh Bog still has some remaining peat stockpiles. It is envisaged that all the peat stock on the bog will be removed before the rehabilitation measures commence.

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<sup>1</sup> Cutaway Bog Decommissioning and Rehabilitation Plan – Cloonshannagh Bog Map Book

Sections of intact raised bog are present along the margins of the site; however, these areas are drying out and are for the most part subject to domestic turf cutting. Some areas have also been constrained from the rehabilitation plan due to landownership considerations that are being investigated.

A network of railway lines occurs in Cloonshannagh. It is anticipated that the rail lines will be decommissioned in 2024. However, the rail bed may be left in place and may be used for amenity infrastructure. Bord na Móna are aware of the potential development of the former rail line and an existing access track to the west of the site for amenity use. However, the proposed rehabilitation measures do not overlap with these features and there is no constraint to rehabilitation. Any future such land use will be subject to the requirements for planning permission and is not part of the current Scheme.

Various different habitats including Cutover Bog (PB4), Scrub (WS1), Wet Grassland (GS4), Birch Woodland (WN7), Dense Bracken (HD1) and Improved grassland (GA1) are located along the margins. There are a number of areas of Cloonshannagh within the IPC boundary that are outside of the PCAS rehabilitation footprint. These areas have been identified as constrained areas.

### *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.

In respect of Cloonshannagh Bog, jobs included in the above study would have included those to facilitate extraction of peat at this site and associated processing and transfer to Lough Ree power station.

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.

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 Bord na Móna at present, with approximately 225 roles directly involved in PCAS.

## 3.2 Geology and Peat Depths

### 3.2.1 Sub-soil geology

The underlying geology<sup>2</sup> at Cloonshannagh Bog comprises Meath Formation (Limestone, calcareous, sandstone), Moathill Formation (Limestone, calcareous, sandstone), Ballysteen Formation (Dark muddy limestone, shale), Agrillaceous Limestones (Visean) (Dark limestone & shale, chert) and Visean Limestones (undifferentiated).

Quaternary Sediment maps show Cloonshannagh underlain by peat, yet surrounded by inorganic deposits, including till derived from limestone to the south and east of the bog, as well as till derived from Lower Palaeozoic and Carboniferous sandstones and shales to the west and north (including the elevated mound of mineral subsoil within the centre of the bog).

### 3.2.2 Peat type and depths

Peat depths have been mapped across the bog using GPR and are provided in figure *BNM-DR-25-02-RP-04: Peat depths*. A significant portion of Cloonshannagh Bog has very shallow peat remaining (0-1m), with several areas where subsoil is exposed. Thicker deposits remain on the lobe of high bog and in pockets to the north-west, east and south-west where peat thickness is up to 5m.

## 3.3 Key Biodiversity Features of Interest

The majority of Cloonshannagh Bog comprises a mosaic of bare peat along with post-production habitats.

### 3.3.1 Current habitats

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

- Bare peat (0-50% cover) (BP)
- Pioneer Soft Rush-dominated poor fen (pJeff) with less frequent Bog Cotton (pEang) or Bottle Sedge (pRos)-dominated poor fen.
- Willow-dominated scrub (eWill) (in mosaic with pJeff) (in those areas that are flooded regularly)
- Open water (OW) (permanent) and Temporary open water (TOW)
- Birch-dominated scrub (eBir, oBir) (on drier higher ground that is not flooded))
- Pioneer dry heath (dHeath) (mainly in mosaic with Birch scrub)
- Dry pioneer Purple Moorgrass-dominated grassland (gMol)
- Access routes (Acc)
- Riparian zones (Rip) (with drains and associated habitats such as scrub and Birch woodland)

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<sup>2</sup> <https://www.gsi.ie/en-ie/data-and-maps/Pages/Bedrock.aspx>

<sup>3</sup> Codes refer BnM classification of pioneer habitats of production bog



- Silt ponds (Silt) with Gorse/Birch scrub and Purple Moorgrass-dominated grassland (gMol)
- Embryonic bog community (PBa with *Juncus* sp.). This community represented by a mat of *Sphagnum* sp. cover is found on an area of cutaway.

The most common habitats found around the margins 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 extending into adjacent fields

See Drawing number BNM-DR-25-02-RP-17 titled **Cloonshannagh Bog: Current Habitat Map**, included in the accompanying Mapbook, which illustrates the habitats at Cloonshannagh Bog. See also Table 1 for photographic plates of habitats (taken in 2024).

#### Photos of Habitats at Cloonshannagh (2024)



*Area of turbary/domestic turf cutting in the northwest of Cloonshannagh, with remnant raised bog in the background.*



*Area of raised bog in the north of Cloonshannagh that has undergone previous rehabilitation in 2014.*



Photos of Habitats at Cloonshannagh (2024)



*Birch woodland (BirWD)/Scrub in the northeast of Cloonshannagh with pioneer Juncus effusus in the foreground.*



*Cutover with pioneer vegetation dominated by Juncus effusus in the northern part of the Bog.*



*Cutover dominated by bare peat and with pioneer vegetation in the background.*



*Cutover dominated by bare peat with remaining peat stockpile.*

*Table 1: Photos of Habitats at Cloonshannagh Bog (January 2024).*

### 3.3.2 Species of conservation interest

A number of species of conservation concern utilize the habitats available at Cloonshannagh 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*), Red Fox (*Vulpes vulpes*) and Pine Marten (*Martes martes*).
- Records of other species of conservation interest associated with Cloonshannagh Bog are available from the NBDC database including; Eurasian Curlew (*Numenius arquata*) (recorded on the rehabilitated raised bog), Badger (*Meles meles*), Pine Marten (*Martes martes*), Fox (*Vulpes vulpes*) and Large Heath (*Coenonympha tullia*).

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.<sup>4</sup>

### 3.3.3 Invasive species

The invasive species American Mink (*Mustela vison*) has previously been recorded from Cloonshannagh Bog. There are no other 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 Bord na Móna bogs, and although spatial overlap with the PCAS is expected to be limited, these are, where necessary, to be treated in line with best practice during PCAS activities.

## 3.4 Statutory Nature Conservation Designations

There are a number of European Sites in close proximity (i.e. within a 5km radius at minimum) to Cloonshannagh Bog.

Ballykenny-Fisherstown Bog SPA (site code: 004101) is located approximately 1.8km to the east of the site and has been designated due to the use of the site by Greenland white Fronted Geese. Lough Forbes Complex SAC (site code 001818) is also located approximately 1.8km to the east of the site. The site comprises a complex of raised bog, woodland and lake. Clooneen Bog SAC (site code: 002348) is located approximately 2.7km north east of the site and is designated for raised bog and bog woodland.

A number of NHA's (Natural Heritage Areas) and pNHA's (Proposed Natural Heritage Areas) also occur within 5km of Cloonshannagh Bog including:

- Lough Forbes Complex pNHA (site code: 001818) 1.8km east
- Clooneen Bog pNHA (site code: 000445) lies 2.7km north-east
- Rinn River NHA (site code: 000691) lies 3.8km north-east
- Lough Boderg and Lough Bofin pNHA (site code: 001642) lies 4.3km north
- Kilglass and Grange Loughs pNHA (site code: 000608) lies 4.3km north-west
- Aghnamona Lough NHA (site code: 000422) lies 4.5km north-east

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<sup>4</sup> [https://www.bnmpcas.ie/wp-content/uploads/sites/18/2023/08/Annual-Monitoring-Report\\_Final-Rev-A\\_Redacted.pdf](https://www.bnmpcas.ie/wp-content/uploads/sites/18/2023/08/Annual-Monitoring-Report_Final-Rev-A_Redacted.pdf)

#### 3.4.1 *Other Nature Conservation Designations*

The Ramsar Convention entered into force in Ireland on 15<sup>th</sup> 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 Cloonshannagh Bog.

### 3.5 Hydrology and Hydrogeology

Cloonshannagh forms part of the Upper Shannon Catchment (Catchment ID: 26C) as defined by the EPA under the Water Framework Directive (WFD) and is primarily situated within the Shannon [Upper]\_SC\_070 sub-catchment which flows to the south via the Slattaghmore Stream and Feorish [Tarmonbarry] stream. The eastern portion of the bog is situated within the Shannon [Upper]\_SC\_050 sub-catchment which flows to the River Shannon to the east. Cloonshannagh has a gravity-based drainage system.

Hydrological modelling (BNM-DR-25-02-RP-09: Depression analysis) indicates that parts of the bog are in a natural basin with significant potential for re-wetting, with the assumption that all drains would be blocked. It is likely that a portion of the basins in target areas will re-wet with deeper water, creating a mosaic of wetland habitats, when drains are blocked.

Regional hydrological data suggest that Cloonshannagh receives average precipitation of 981mm/yr (1981-2010), with an estimated annual effective rainfall rate of 685 mm/yr based on GSI data. The GSI also estimate an annual average recharge rate of 26-27mm/year for Cloonshannagh. In areas underlain by lacustrine clay, this is anticipated to be a reasonable estimate of recharge rate. However, in areas underlain by more permeable glacial material this is likely to be an underestimate, particularly where there are elevated mounds of glacial till combined with shallow peat deposits. A higher recharge rate is expected in areas where shallow peat underlain by glacial till, which would lead to increased losses of water to depth. In these areas an estimated recharge rate of 50-100mm/yr would be considered a reasonable estimate, with a higher recharge rate expected where peat is shallow (<1m).

GSI data indicates that Cloonshannagh Bog is underlain five different bedrock units, including the Meath formation, Moathill formation, Ballysteen formation, Argillaceous limestones and Visean limestones. The Visean limestone unit underlies the eastern portion of the bog and is classified as a regionally important aquifer (RKc) as it is subject to karstification (conduit). All other bedrock units are classified as Locally important aquifers (LI) as they are moderately productive only in local zones. Geological Survey of Ireland (GSI) mapping identifies several karst features (including a spring to the south of the bog) within 1km of the bog. No data exists concerning depth to bedrock, however, there are several small areas of bedrock mapped as occurring close to the surface to the east of the bog.

An aquifer is an underground body of water-bearing rock or unconsolidated materials (gravel or sand) from which groundwater can be extracted in useful amounts. GSIs Aquifer classes are divided into three main groups based on their resource potential, and further subdivided based on the type of openings through which groundwater flows. There are nine aquifer categories in total. Locally important aquifers are capable of supplying locally important abstractions (e.g. smaller public water supplies, group schemes), or good yields (100-400 m<sup>3</sup>/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 m<sup>3</sup>/d), dependable springs may be associated with these aquifers.

The entirety of the bog is located in an area mapped by GSI as of low groundwater vulnerability (GSI Mapviewer). Groundwater vulnerability for the area surrounding Cloonshannagh 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**

Cloonshannagh Bog has 9 treated surface water outlets from a previously active peat extraction catchments, all which discharge to the Feorish River (IE\_SH\_26F030200 FEORISH (Tarmonbarry)\_010) & (IE\_SH\_26F030400 Feorish (Tarmonbarry)\_020), the River Shannon Upper (IE\_SH\_26S021510 Shannon (Upper)\_080)

The Feorish River along both applicable stretches is classed as at Poor water quality status with the downstream Shannon Upper at Good Status (Ecological Status or Potential SW 2016-2021) – Water Framework Directive, (BNM-DR-25-02-RP-WQ01: Water Quality Map)

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-25-02-RP-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 was not identified as pressure in the second cycle of the river basin management plan is indicated as remaining so in the third cycle, currently under preparation.

The main emission limit value (ELV) associated with this bog is 35mg/l suspended solids, with trigger levels for ammonia of 1.42mg/l and COD 100mg/l.

From an analysis of any results over number of years of the IPC licence environmental monitoring of some of the discharges from this bog, these indicate that results were under the Emission Limit Value for Suspended Solids 96% of the period, same level of compliance for COD and under the trigger level for Ammonia.

Ammonia averaged 0.311mg/l and ranged from 0.05 to 1.2mg/l with Suspended Solids ranging from 2 to 36 mg/l and averaging 6.7mg/l.

Bog	SW	Monitoring	pH	SS	TS	Ammonia	TP	COD	Colour
Cloonshannagh	SW-6	Q3 20	7.4	2	246	0.069	0.07	83	312
Cloonshannagh	SW-7	Q3 20	7.7	3	414	0.593	0.29	50	138
Cloonshannagh	SW-8	Q3 20	7.5	2	342	0.258	0.05	42	105
Cloonshannagh	SW-10	Q3 20							
Cloonshannagh	SW-11	Q3 20	7.9	2	362	0.169	0.05	49	141
Cloonshannagh	SW-11A	Q3 20	8	2	301	0.153	0.05	46	97.6
Cloonshannagh	SW-12	Q3 20	7.7	2	353	0.14	0.05	39	113
Cloonshannagh	SW-9	Q4 20	7.3	2	171	0.271	0.05	61	264
Cloonshannagh	SW-9A	Q4 20	7.1	3	143	0.281	0.05	85	432
Cloonshannagh	SW-6	Q1 18	7.9	5	286	0.23	0.09	38	124
Cloonshannagh	SW-7	Q1 18	6.2	36	100	0.61	0.05	99	124
Cloonshannagh	SW-8	Q1 18	7.8	5	420	0.05	0.05	52	112
Cloonshannagh	SW-10	Q1 18	7.7	5	330	0.36	0.05	40	82
Cloonshannagh	SW-11	Q1 18	7.9	5	478	0.3	0.05	40	100
Cloonshannagh	SW-11A	Q1 18	7.9	5	464	0.25	0.05	65	133
Cloonshannagh	SW-12	Q1 18	7.9	5	401	0.25	0.07	63	164
Cloonshannagh	SW-9	Q2 18	7.7	5	332	0.35	0.05	28	286
Cloonshannagh	SW-9A	Q2 18	8	5	296	0.17	0.05	49	334
Cloonshannagh	SW-6	Q2 13	8.1	9	346	0.1	0.09	63	135
Cloonshannagh	SW-7	Q2 13	7.8	17	312	0.32	0.13	53	71
Cloonshannagh	SW-11	Q3 13	7	5	128	0.47	0.16	100	305
Cloonshannagh	SW-11A	Q3 13	7.1	15	126	0.8	0.07	114	290
Cloonshannagh	SW-12	Q3 13	7.5	12	178	0.39	0.05	91	206
Cloonshannagh	SW-8	Q2 14	7.8	7	454	0.07	0.05	26	37
Cloonshannagh	SW-9	Q2 14	7.3	5	326	1.2	0.05	60	186
Cloonshannagh	SW-9A	Q3 14	7.8	5	394	0.13	0.05	29	54
Cloonshannagh	SW-10	Q3 14	7.8	5	387	0.11	0.3	24	66

Table 3.1 Decommissioning and Rehabilitation Programme Water Quality Monitoring.

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 Bord na Móna 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 Cloonshannagh 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 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 November 2020 and is enabling a baseline to be established, with sampling to progress during the scheduled works, and for a period of up to 2 years post rehabilitation. Depending on the period required to confirm that the main two parameters, suspended solids, and ammonia 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, the monitoring programme and intensity will be periodically reviewed and amended.

Initial monthly results are included in appendix XIII, for Cloonshannagh bog. These results cover the period from November 2022 to November 2023 and are from some of the surface water outlet from the sections of bog to be rehabilitated in 2024. Peat extraction ceased in this bog in 2020 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 three outlets during the period, all well below any limits of concern. During this same period there was a slight downward trend in Ammonia for all three emission points, with all other parameters fluctuated slightly, most likely influenced by normal weather patterns, including rainfall.

Monthly ammonia concentrations from both emission points for November 2020 to December 2023 had a range of 0.005 to 1.42 mg/l with an average of 0.238 mg/l. Results for suspended solids for the same period indicated a range of 2 to 29mg/l with an average of 3.24 mg/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 and will be amending some of the proposed monitoring locations on foot of this engagement. 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](http://www.epa.ie).

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

**Success criteria:**

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

- 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 Cloonshannagh Bog continues in 2024 and during the rehabilitation works planned for 2024, 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 CO<sub>2</sub>-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 CO<sub>2</sub>-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 CO<sub>2</sub>-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 CO<sub>2</sub> emissions from drained peatlands or increased methane (CH<sub>4</sub>) 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 CO<sub>2</sub> emissions (Gunther *et al.* 2020). This means the increase in methane due to rewetting of dry peatlands is still negated by the CO<sub>2</sub> 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 Cloonshannagh 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 and along peripheral headlands.

### 3.9 Current ecological rating

(Following NRA (2009) Evaluation Criteria)

The majority of this site is deemed to be of **Local Importance (lower value)** due to the dominance of bare peat managed for industrial peat production. Some pioneer and semi-natural habitats such as raised bog, scrub and poor fen are rated higher and are deemed to be of **Local Importance (higher value)**. The site serves as a wildlife refuge for some breeding waders.

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## **4. CONSULTATION**

### **4.1 Consultation to date**

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

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

- General consultation with range of stakeholders at annual Bord na Móna Biodiversity Action Plan review days 2010-2018.
- Longford Wetland Wilderness (general proposal led by Longford County Council and other stakeholders. This has had several iterations. See Lough Ree and Mid Shannon, Spirit Level 2017. A feasibility study for Longford County Council).
- Feehan, J. (2004) A Long-Lived Wilderness; the future of the north midlands peatland network UCD/NWWPC.
- Lauder, A. & O'Toole L. (2017). Concept development for a landscape-scale Wetland Wilderness Park in the Mid Shannon Region. A report funded by the Heritage Council's Heritage Grant Scheme.
- Foss, P.J., Crushell, P. & Gallagher, M.C. (2017). Counties Longford and Roscommon Wetland Study. Report prepared for Longford and Roscommon County Councils.
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).
- Midlands & East Regional WFD Operational Committee (River Basin Management Plans).
- Sub-committee on Shannon Flooding Work Programme and Measures (OPW, Waterways Ireland, ESB, LA's, Fisheries Ireland, NPWs etc.).

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

All correspondence received has been acknowledged and reviewed and evaluated against the rehabilitation work proposed.

### **4.2 Issues raised by consultees**

N/A yet as consultation has not been completed.

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

N/A yet as consultation has not been completed.

## 5. REHABILITATION GOALS AND OUTCOMES

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

- Meeting conditions of IPC Licence.
- Stabilisation or reduction in water quality parameters of water discharging from the site (e.g. suspended solids).
- Reducing pressure on receiving 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 Bord na Móna and which optimise climate action and other ecosystem service benefits.

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

- It will take some time for stable naturally functioning habitats to fully develop at Cloonshannagh 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. PCAS is expected to deliver significant contributions to Ireland's climate action.
- 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 bog is shallow peat and only a small proportion of the bog has potential to develop *Sphagnum*-rich habitats in this timeframe. Nevertheless, re-wetting across the entire bog, as part of the Scheme, will improve habitat conditions of the whole bog. Other peatland habitats will develop in a wider mosaic that reflects underlying conditions.
- There is potential for the rehabilitated raised bog in the north of the Cloonshannagh 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 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 contributory sources of impacts (private peat extraction and Bord na Mona). Reducing pressures due to former peat extraction activities at Cloonshannagh 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 Bord na Mona).
- 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.

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## 6. SCOPE OF REHABILITATION

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

- The area of Cloonshannagh Bog within the PCAS rehabilitation footprint.
- EPA IPC Licence - Ref. P0504-01. 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 Cloonshannagh 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 Cloonshannagh Bog mean that a combination of dry cutaway measures and wetland creation are the most suitable rehabilitation approach for shallow peat areas. Deep peat measures will be applied to areas of deeper peat.
- Bord na Móna have defined the key goal and outcome of rehabilitation at Cloonshannagh 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 Cloonshannagh Bog will support multiple national strategies of climate action, biodiversity action and other key environmental strategies such as 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 Cloonshannagh is cutaway with shallow peat reserves and has a gravity based regime, therefore wetland habitats (fen, wetland, reedswamp) and dry cutaway habitats (birch woodland, scrub and heath) are the most likely habitats to develop in these areas in response to re-wetting. There are small areas of residual deeper peat remaining in the northeast and northwest of the site, which are likely to develop more typical bog vegetation communities in time.
- **Surrounding landscape and neighbours.** Another key constraint is the interaction between the Bord na Móna sites and the surrounding landscape. Care has to be taken that no active rehabilitation management is carried out that could negatively and knowingly impact on surrounding land. This includes any hydrological management on neighbouring farmland. It is anticipated that the work proposed here (blocking drains and re-wetting cutaway peatlands) will not have any flooding impacts on adjacent land.

- **Archaeology.** The discovery of monuments or archaeological objects during peatland rehabilitation may potentially constrain the rehabilitation measures proposed for a particular area. 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 Cloonshannagh Bog. In the worst-case scenario works affecting the surface and sub-surface of the bog might disturb previously unknown archaeological deposits or artefacts without preservation by record taking place. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it will be avoided and reported to the Bord na Móna Archaeological Liaison Officer and the National Museum of Ireland.
- **Public Rights of Way.** There are known rights of way at Cloonshannagh Bog. Where a public right of way or similar burden exists on Bord na Móna 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 north-west and north-east margins of the site which have been mapped as a constraint. These areas are ecologically and hydrologically linked to the area owned by Bord na Móna where rehabilitation is planned.
- **Future Amenity development.** Bord na Móna are aware of the potential development of the former rail line and an existing access track to the west of the site for amenity use. However, the proposed rehabilitation measures do not overlap with these features and there is no constraint to rehabilitation.

## 6.2 Key Assumptions

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

## 6.3 Key Exclusions

The scope of this rehabilitation plan does not cover:

- Areas subject to turf cutting are excluded.
- The longer-term development of stable naturally functioning habitats at Cloonshannagh 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 Cloonshannagh Bog.
- The longer-term management of this site, potentially as a nature conservation site, or for amenity, or for other uses in the future.

## 7. CRITERIA FOR SUCCESSFUL REHABILITATION

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

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

Rehabilitation is generally defined by Bord na Móna as:

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

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

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

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

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

Similarly monitoring of surface water ammonia emissions from a Corlea bog in Mountdillon over the past 4 yrs. post cessation of peat extraction with ongoing rehabilitation, indicate downward trends.

As the monthly monitoring program at Cloonshannagh Bog continues in 2023/2024 during the rehabilitation measures planned for 2024, and data from the 2023 monitoring program is compiled, further analysis will be completed to identify any ongoing trends.

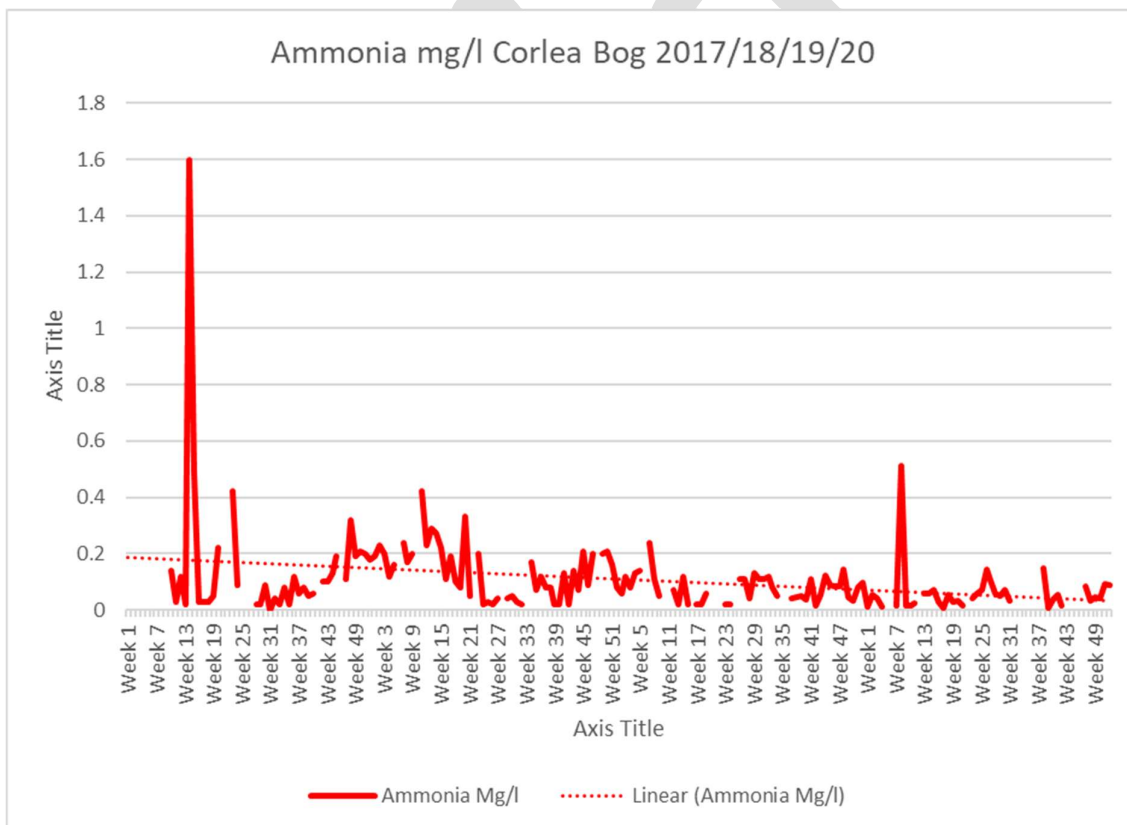
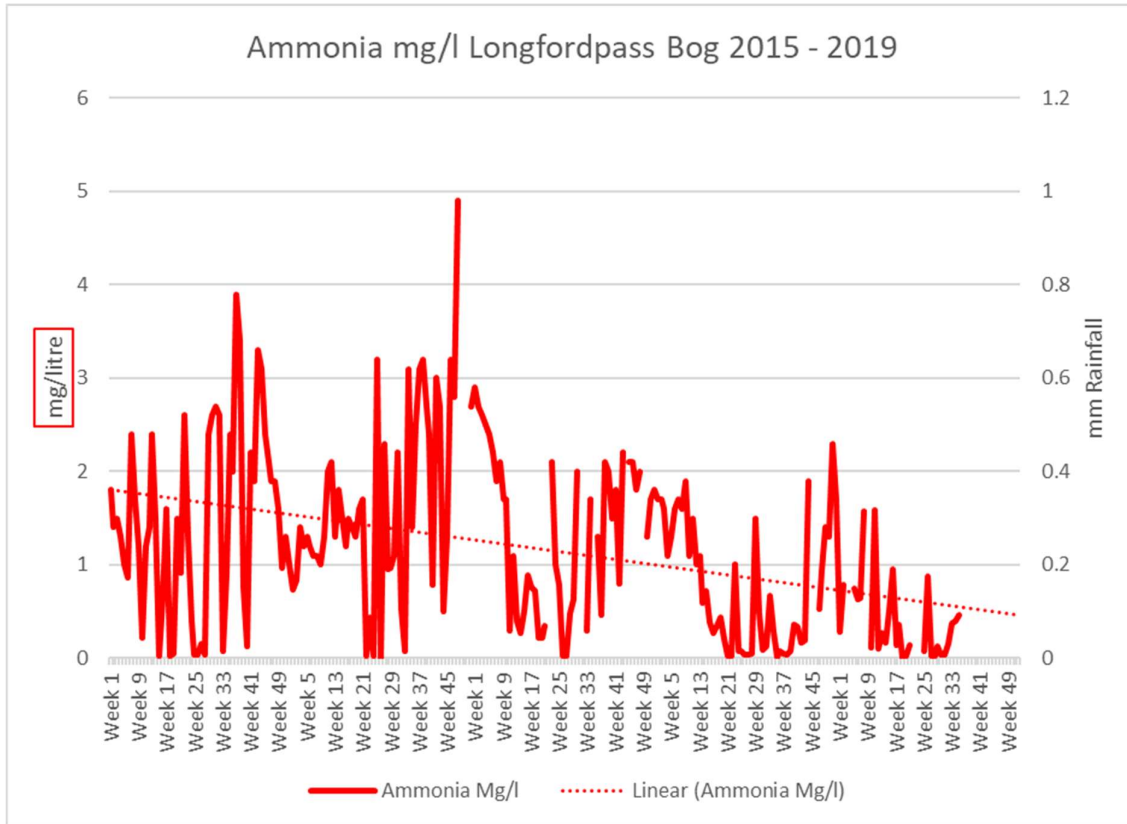


Figure 7.1. Ammonia levels over the period 2015-2019 at Longfordpass and the period 2017-2020 at Corlea.

**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 Cloonshannagh 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.	2024-2026
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	2024-2026
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	2024-2026

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.	2024-2026
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.	2024-2026

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

- **Rehabilitation measures to be effective.** The rehabilitation measures proposed in this plan are based on 40 years of Bord na Móna experience of peatland management and best practice applied internationally in peatland management. Measures proposed in this plan have already been shown to be affective at other sites. Bord na Móna will apply a flexible and adaptable approach to the more innovative rehabilitation measures proposed in this plan. If measures are not initially effective, Bord na Móna will review any requirement for additional practical rehabilitation.
- **Natural colonisation of vegetation to develop semi-natural habitats at a rate within the normal limits.** The development of naturally functioning semi-natural habitats on 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, Bord na Móna 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. Bord na Móna experience of rehabilitation has shown that re-wetting improves conditions for natural colonisation and that natural colonisation is accelerated where the environmental conditions are most suitable. Rehabilitation measures have been designed to modify the conditions of areas within sites where conditions are less suitable for natural colonisation (modifying hydrology, topography, nutrient status or availability of potential seed sources).
- **Monitoring to be robust and effective.** Rehabilitation Monitoring will be established to validate the success of rehabilitation as required by Condition 10 of the IPC Licence and to verify the benefits of the proposed enhanced measures to optimise climate action. This will focus on a collecting a range of scientific data that can then quickly be adapted and into metrics that can be used to measure changes in various ecosystem services.

## 8. REHABILITATION ACTIONS AND TIME FRAME

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

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

BNM-DR-25-02-RP-22 titled **Cloonshannagh Bog: Aerial Imagery 2020**

BNM-DR-25-02-RP-04 titled **Cloonshannagh Bog: Peat Depths**

BNM-DR-25-02-RP-03 titled **Cloonshannagh Bog: LiDAR Map**

BNM-DR-25-02-RP-09 titled **Cloonshannagh Bog: Depression Analysis**

The rehabilitation actions themselves will be a combination of PCAS measures to re-wet peat. The distribution of these measures is provisionally outlined in drawing titled **BNM-DR-25-02-RP-05 Cloonshannagh Bog: Rehabilitation Measures** in the accompanying Mapbook (note that the actual distribution of these measures may be subject to change in response to stakeholder consultation and refinement of the enhanced rehabilitation measures.)

These enhanced measures for Cloonshannagh will include (see Table 8.1):

- Deep Peat measures including field re-profiling, on deeper peat; intensive drain blocking (max 7/100 m) and modifying outfalls, and management of water levels with overflow pipes and blocking of internal outfalls;
- Regular drain blocking (3/100) on dry cutaway along with the blocking of outfalls and management of water levels, along with organic fertiliser application;
- Targeted drain blocking to optimise hydrological conditions/rewet the residual peat in targeted marginal (degraded) raised bog remnants around the margins of the site and the section of raised bog in the north of Cloonshannagh and re-wetting, where possible, using an excavator to install peat blockages.
- 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.
- Initial hydrological modelling indicates low lying parts of the site will develop a mosaic of wetland habitats with the potential for some deeper water. Hydrological management will look to optimise summer water levels to maximise the development of wetland vegetation (by looking to set water depths at < 0.5 m, where possible. It is inevitable that some small sections will naturally have deeper water due to the topography at this site). Water-levels will be adjusted at outfalls and by adjusting piped drainage.

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

Type	Rehab Code	Enhanced Rehabilitation Measure	Extent (Ha)
Dry Cutaway	DCT1	Blocking outfalls and managing water levels with overflow pipes	35.4
	DCT2	Regular drain blocking (3/100m), modifying outfalls and managing water levels with overflow pipes and targeted fertiliser treatment.	121.1
Wetland	WLT4	More intensive drain blocking (max 7/100 m), modifying outfalls and managing overflows, transplanting Reeds and other rhizomes.	109.4
Deep Peat	DPT2	More intensive drain blocking (max 7/100 m) and modifying outfalls and managing overflows	63.6
	DPT3	More intensive drain blocking (max 7/100 m), + field reprofiling + blocking outfalls and managing overflows.	47.8
Marginal land	MLT1	No work required.	34.1
Additional Work	AW2	Targeted Drain Blocking	17.2
Silt ponds	Silt pond	Silt ponds.	0.5
Constraint	Constraint	Other Constraints (Rights of Way, Turf cutting, Amenity, Archaeology, extant high bog).	66.4
<b>Total</b>			<b>495.5</b>

### 8.1 Completed and ongoing

- A significant part of the site has already re-vegetating, with significant cover of pioneer vegetation developing a mosaic of typical cutaway peatland and wetland habitats. Natural re-colonisation of the cutaway so far has been quite effective. Bare peat areas within the cutaway parts of the site 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 Cloonshannagh 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 appraisal 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. Phase 2 actions may include seeding of targeted vegetation and inoculation of *Sphagnum*.
- Silt ponds will be monitored during this period and there will be continued maintenance and cleaning to prevent potential 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

- **2024:** Short-term planning actions.
- **2024-2025:** Short-term practical actions.
- **2025-2026:** Long term practical actions. Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- **2027:** Decommission silt-ponds, if necessary.

## 8.6 Budget and costing

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

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

Bord na Móna maintains a provision on its balance sheet to pay for the future costs of **standard** rehabilitation and decommissioning when industrial peat extraction ceases. This is updated every year - for more information see the Bord na Móna Annual Report (Bord na Móna, 2022). Bord na Móna is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

At this time, a 'standard' rehabilitation provision (sufficient to discharge the requirement of Condition 10 in the licence) has been 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](http://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 Bord na Móna 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, Fербane. <http://www.bordnamona.ie/wp-content/uploads/2016/04/Biodiversity-Action-Plan-2016-2021.pdf>.
- Bord na Móna (2022). Bord na Móna Annual Report 2022. [Publications - Newsroom | Bord na Móna \(bordnamona.ie\)](http://www.bordnamona.ie/publications-newsroom)
- 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.bnmecas.ie/supporting-material/>
- Bord na Móna (2023). Bord na Móna Annual Report 2023. [https://www.bordnamona.ie/wp-content/uploads/2023/09/Bord-na-Mona\\_Annual-Report-2023.pdf](https://www.bordnamona.ie/wp-content/uploads/2023/09/Bord-na-Mona_Annual-Report-2023.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](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](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](https://www.epa.ie/publications/licensing-permitting/industrial/ied/Guidance-on-Cessation_.pdf)
- EPA (2019). <http://gis.epa.ie/Envision>. EPA Envision Map Viewer. (Last Viewed: 31/12/2019).
- 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: 17.01.2023)
- 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., Decler, 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](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](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](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>.
- Pschenyckj, 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](https://thewaterforum.ie/app/uploads/2021/04/Peatlands_Full_Report_Final_March2021b.pdf), Accessed 17.08.2021
- 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](http://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

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

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

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

### Scope of rehabilitation

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

- The area of Cloonshannagh Bog.
- EPA IPC Licence - Ref. P0504-01. 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. Cloonshannagh Bog is part of the Mount Dillon (Lough Ree) Bog Group.
- The current condition of Cloonshannagh 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 Cloonshannagh 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 Cloonshannagh 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 using a dozer 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.
- No measures are 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:**

- 2024. 1<sup>st</sup> phase of rehabilitation. Field drain blocking.
- 2025. 2<sup>nd</sup> phase. Further realignment of piped drainage and other re-wetting measures dependent on success of 1<sup>st</sup> phase re-wetting, as determined by ongoing monitoring of water levels and re-vegetation.
- Other enhancement measures such as fertiliser treatment will be carried out, if needed. These will be determined by ongoing monitoring.
- 2025-2026. Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.

- 2025-2026. 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	156.5
Deep peat	DPT1	Regular drain blocking (3/100 m) + blocking outfalls and managing water levels with overflow pipes	111.4
Wetland	WLT1	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes	109.4
Marginal Land	MLT1	No work required	34.1
Additional Works	AW1	Targeted drain blocking	17.2
Other	Silt Pond	Silt ponds	0.5
Other	Constraint	Rights of Ways, Turf Cutting, Amenity, Archaeology	66.4
<b>Total</b>			<b>495.5</b>

See Drawing number BNM-DR-25-02-RP-20 titled Cloonshannagh Bog: Standard Rehab Measures included in the accompanying Mapbook which illustrates the standard rehab measures to be applied.

#### **Monitoring, after-care and maintenance**

- There will be initial quarterly monitoring assessments of the site to determine the general status of the site, the condition of the silt-ponds, assess the condition of the rehabilitation work, 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](http://www.epa.ie).
- The parameters to be included (as per condition 6.2 of the IPC Licence) include monthly monitoring for pH, Flow, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD.
- This sampling regime on a selected number of silt ponds will be carried out over a two-year cycle. The original (licence) requirement was for a quarterly sampling regime.
- Where other uses are proposed for the site, these will be assessed by Bord na Móna in consultation with interested parties. Other after-uses can be proposed for licensed areas and must go through the required assessment and planning procedures.

#### **Validation and IPC Licence surrender**

Reporting to the EPA will continue until the IPC 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.

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## APPENDIX II: BOG GROUP CONTEXT

The Mount Dillon Bog Group IPC Licenced area is made up of two sub-groups (Lough Ree- the Mount Dillon Energy Peat Group) and Mostrim) and the bog units within the group have been in industrial peat production for several decades. There are 28 defined bog units covering a total area of 11,322 ha. Of the 28 units, 23 mainly straddle the River Shannon within counties Roscommon and Longford, with five sites partially in County Westmeath to the east. 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 ESB power stations at Lanesborough (LRP) or for horticultural peat products.

Industrial peat extraction in the Mount Dillon Bog Group ceased in 2019. Peat stockpiles which were harvested within the Bog Group prior to 2019 continued to be delivered to Lough Ree Power Station until its closure in 2020. Intensive decommissioning and rehabilitation for the Mount Dillon Bog Group started in 2020/2021.

One bog site, Cloonmore, was never used for industrial peat production and several bogs in the Mostrim group have been drained but never fully developed and still retain typical high bog characteristics. These include Clonwhelan, Glenlough and a section of Mostrim. These sites have been zoned for biodiversity and a high bog drain blocking will be used to re-wet the high bog and encourage restoration of the raised bog habitat. Several sites (Glenlough, Mostrim, Clonwhelan and Clynan) were assessed by consultants for NPWS as part of the review of the raised bog Natural Heritage Area network (NPWS 2014).

The rehabilitation plan for the Mount Dillon Bog Group encompasses all areas involved in industrial peat production including former industrial production areas and associated facilities. It also includes rehabilitation measures for those bogs that were initially drained but not fully developed.

A breakdown of the component bog areas for the Mount Dillon Bog Group IPC Licence Ref. P0-504-01 is outlined in Table Ap-2.

Industrial peat production history varies across the Mount Dillon bog group, so there is a wide range of peat depths at present. Bogs close to Lanesborough tend to have shallower peat depths or have been cutaway, while some bogs on the periphery of the group tend to have deeper peat reserves. Several sites such as Mount Dillion and Derrycashel have been mostly cutaway to the fen peat layers or in some cases to expose the underlying gravel/sub-soil. Several bogs in the Mostrim group have only been partially developed or have had no industrial peat production, and have relatively deep peat depths.

*Table Ap-2: Mount Dillon Bog Group names, area and indicative status (Mount Dillon Energy Peat sub-group)*

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Begnagh	265	Cutover Bog  Industrial peat production commenced at Begnagh Bog in 1977 and ceased in 2020. Deep peat reserves remain on much of the former production area. Begnagh is considered a deep peat cutover bog.	Begnagh Bog formerly supplied a range of commercial functions including; fuel peat for Lough Ree Power  Some areas of cutaway on site are developing pioneer cutaway vegetation communities.	2020	Finalised 2022  Rehab started in 2022

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Clooneeny	358	Cutover Bog  Industrial peat production commenced at Clooneeny Bog in 1985 and ceased in 2020. Deep peat reserves remain on much of the former production area. Clooneeny is considered a deep peat cutover bog.	Clooneeny Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat for Lough Ree Power  Most of the former production area on site is bare peat.  Some areas of cutaway on site are developing pioneer cutaway vegetation communities.	2020	Finalised 2022  Rehab started in 2022
Cloonmore	102	N/A	Never developed for industrial peat production; scattered plots.	N/A	N/A
Cloonshannagh	494	Cutover Bog  Industrial peat production commenced at Cloonshannagh Bog in 1985 and ceased in 2020. Deep peat reserves remain across the former production area. Cloonshannagh is considered a deep peat cutover bog.	Cloonshannagh Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat for Lough Ree Power  Restoration work has been carried out on a 38ha section of high bog within Cloonshannagh Bog.  Some of the former production area on site is developing pioneer cutaway vegetation communities, the remainder of the site is bare peat.	2020	Draft 2024
Cloonshannagh Rail Link	28	Cloonshannagh rail link is a link between sites.	N/A	N/A	N/A
Corlea	163	Cutaway Bog  Industrial peat production commenced at Corlea Bog in 1960 and ceased in 2018. Long-term peat extraction has reduced peat reserves on this bog. Corlea is considered a shallow peat cutaway bog.	The former production area at Corlea has already extensively colonised. Pioneer wetland and scrub development has occurred over much of the site.  Some wetland and rehabilitation management was undertaken between 2016-2018.  Part of site leased to local community development group to develop amenity walkway in association with Longford County Council.	2018	Finalised in 2023  Rehab started in 2023
Derraghan	289	Cutover Bog  Industrial peat production commenced at Derraghan Bog in the 1940's and ceased in 2020. Most of the former production area has shallow peat reserves. Some pockets of deep peat remain. Derraghan is considered a shallow peat cutover bog.	Derraghan Bog formerly supplied a range of commercial functions including; fuel peat for Lough Ree Power  Much of the former production area at Derraghan has been out of production for some time. These areas have already extensively colonised with pioneer wetland and scrub vegetation communities.	2020	Plan Finalised 2021  Rehab commenced 2022
Derryadd	653	Cutover Bog  Industrial peat production commenced at Derryadd Bog in 1964 and ceased in 2019. Long-term peat extraction has reduced peat reserves on this bog. Most of the former production area has shallow peat reserves. Some pockets of deep peat remain. Derryadd is considered a shallow peat cutover bog.	Much of the former production area at Derryadd has been out of production for some time. These areas have already extensively colonised with pioneer wetland and scrub vegetation communities  Derryadd Bog will form part of the footprint of the proposed Derryadd Wind Farm Project (in pre-planning).  An amenity walkway through part of Derryadd Bog is proposed for the Derryadd Wind Farm project	2019	Draft 2024
Derryadd2	328	Cutover Bog  Industrial peat production commenced at Derryadd 2 Bog in 1960 and ceased in 2020. Long-	Much of the former production area at Derryadd 2 has been out of peat production for some time. These areas have already	2020	Finalised 2023

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
		term peat extraction has reduced peat reserves on this bog. Most of the former production area has shallow peat reserves. Some pockets of deep peat remain. Derryadd 2 is considered a shallow peat cutover bog.	extensively colonised with pioneer wetland and scrub vegetation communities		Rehab started 2023
Derryarogue	895	Cutover Bog Industrial peat production commenced at Derryarogue Bog in 1952 and ceased in 2019. Long-term peat extraction has reduced peat reserves on this bog. Most of the former production area has shallow peat reserves. Some pockets of deep peat remain. Derryarogue is considered a shallow peat cutover bog.	Much of the former production area at Derryarogue has been out of production for some time. These areas have already extensively colonised with pioneer wetland, cutaway and scrub vegetation communities.  Derryarogue Bog will form part of the footprint of the proposed Derryadd Wind Farm project (in pre-planning).  An amenity walkway through part of Derryarogue is proposed for the Derryadd Wind Farm project	2019	Derryarogue West Finalised in 2023  Rehab started in 2023  Derryarogue Draft 2024 (remainder of site)
Derrycashel	388	Cutover Bog Industrial peat production commenced at Derrycashel Bog in 1951 and ceased in 2018. Long-term peat extraction has reduced peat reserves on this bog. Most of the former production area has shallow peat reserves. Some pockets of deep peat remain. Derrycashel is considered a shallow peat cutover bog.	Derrycashel Bog formerly supplied a range of commercial functions including; fuel peat for Lough Ree Power  Much of the former production area at Derryarogue has been out of production for some time. These areas have already extensively colonised with pioneer wetland and scrub vegetation communities.  Some wetland and rehabilitation management was undertaken (c.60ha) between 2014-2015.	2018	Finalised 2021  Rehab started in 2021
Derrycolumb	454	Cutover Bog Industrial peat production commenced at Derrycolumb Bog in the 1980's and ceased in 2019. Most of the former production area still has deep peat reserves. Derrycolumb is considered a deep peat cutover bog.	Derrycolumb Bog formerly supplied a range of commercial functions including; fuel peat for Lough Ree Power  Much of the former production area at Derrycolumb has been out of production for some time. These areas have already extensively colonised with pioneer wetland and scrub vegetation communities.	2018	Finalised 2021  Rehab started in 2021
Derrymoylin	356	Cutover Bog Industrial peat production commenced at Derrymoylin Bog in 1985 and ceased in 2020. Long-term peat extraction has reduced peat reserves on this bog. Derrymoylin is considered a shallow peat cutover bog.	Derrymoylin Bog formerly supplied a range of commercial functions including; fuel peat for Lough Ree Power.  Most of the former production area on site is bare peat.	2020	To be finalised 2024
Derryshannoge	452	Cutover Bog Industrial peat production commenced at Derryshannoge Bog in 1985 and ceased in 2020. Deep peat reserves remain across most of the site. Derryshannoge is considered a deep peat cutover bog.	Derryshannoge Bog formerly supplied a range of commercial functions including; fuel peat for Lough Ree Power.  Much of the former production area at Derryshannoge has been out of production for some time. These areas have already extensively colonised with pioneer cutaway and scrub vegetation communities.	2020	Finalised 2023
Edera	281	Cutover Bog Development for industrial peat production commenced at Edera Bog in 1990's. Active extraction	Edera Bog formerly supplied a range of commercial functions including; fuel peat for Lough Ree Power.	2020	Finalised 2021

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
		from Edera began in 2003 and ceased in 2018. Edera is considered a deep peat cutover bog.	The majority of Edera Bog former production area is bare peat.		Rehab started in 2021
Erenagh	93	Cutover Bog  Development for industrial peat production commenced at Erenagh Bog in 1970's. Erenagh is considered a deep peat cutover bog.	Erenagh Bog formerly supplied a range of commercial functions including; fuel peat for Lough Ree Power.  Much of the former production area at Erenagh has been out of production for some time. These areas have already extensively colonised with pioneer cutaway and scrub vegetation communities.	2020	Draft 2017
Granaghan	212	Cutover Bog  Development for industrial peat production commenced at Granaghan Bog in 1980's. Long-term peat extraction has reduced peat reserves on this bog but deep peat reserves remain on site. Granaghan is considered a deep peat cutover bog.	Granaghan Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat for Lough Ree Power.  The majority of Granaghan Bog former production area is bare peat.	2020	Finalised 2023
Killashee	110	Cutover Bog  Development for industrial peat production commenced at Killashee Bog in 1985.  Killashee is considered a deep peat cutover bog.	Killashee Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat for Lough Ree Power.  The majority of Killashee Bog former production area is bare peat. Some areas have colonised with pioneer cutaway and scrub vegetation communities.	2020	Finalised 2023
Knappoge	313	Cutaway Bog Peat Production at Knappoge bog commenced in 1963, and finished in 2018. Peat depths on the former production area are generally shallow. There are some pockets of deeper peat. Knappoge is considered a shallow peat cutaway bog.	Knappoge Bog formerly supplied a range of commercial functions including; fuel peat for Lough Ree Power.  The majority of Knappoge Bog former production area is bare peat. Some areas have colonised with pioneer cutaway and scrub vegetation communities.	2018	Finalised 2021  Rehab started in 2022
Lough Bannow	739	Cutaway Bog Peat Production at Lough Bannow bog commenced in 1964 and finished in 2019. Peat depths on the former production area are generally shallow. There are some pockets of deeper peat. Lough Bannow is considered a shallow peat cutaway bog.	Much of the former production area at Lough Bannow has been out of production for some time. These areas have already extensively colonised with pioneer cutaway and scrub vegetation communities.  A small (35ha) conifer plantation was established in 1980's.  Lough Bannow will form part of the footprint of proposed Derryadd Wind Farm Project (in pre-planning).  An amenity walkway through part of Lough Bannow is proposed for the Derryadd Wind Farm project	2019	Draft 2024
Moher	483	Cutover Bog Peat Production at Moher bog commenced in the 1960'S, and finished in 2020. Peat depths on the former production area remain relatively deep. Moher is	Moher Bog formerly supplied a range of commercial functions including; fuel peat for Lough Ree Power.  Much of the former production area at Moher has been out of production for some time. These areas have already extensively colonised	2020	Draft 2021

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
		considered a deep peat cutover bog.	with pioneer cutaway and scrub vegetation communities.		
Mount Dillon	592	Cutaway Bog Peat Production at Mount Dillon bog commenced in the 1940'S, and finished in 2020. Peat depths on the former production largely shallow and the peat is considered cutaway. Some deep peat remains on the west of the site. Mount Dillon is considered a shallow peat cutaway bog.	Mount Dillon Bog formerly supplied a range of commercial functions including; fuel peat for Lough Ree Power.  Much of the former production area at Mount Dillon has been out of production for some time. These areas have already extensively colonised with pioneer cutaway, wetland and scrub vegetation communities.	2020	Draft 2017

See Drawing number BNM-DR-25-02-RP-24 titled **Mount Dillon Bog Group**, included in the accompanying Mapbook which illustrates the location of Cloonshannagh Bog and the Mount Dillon Bog Group in context to the surrounding area.

## APPENDIX III: ECOLOGICAL SURVEY REPORT

<b>Ecological Survey Report</b>			
<p><i>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.</i></p>			
<b>Bog Name:</b>	<u>Cloonshannagh</u>	<b>Area (ha):</b>	498ha
<b>Works Name:</b>	Mount Dillon	<b>County:</b>	Roscommon
<b>Recorder(s):</b>	DF	<b>Survey Date(s):</b>	11 <sup>th</sup> September 2012
<p><b>Habitats present (in order of dominance)</b></p> <p>The most common habitats present at this site include:</p> <ul style="list-style-type: none"> <li>• Bare peat (Codes refer BnM classification of pioneer habitats of production bog. See Appendix II).</li> <li>• Pioneer Soft Rush-dominated poor fen (pJeff) with less frequent Bog Cotton (pEang) or Bottle Sedge (pRos) - dominated poor fen.</li> <li>• Willow-dominated scrub (eWill) (in mosaic with pJeff) (in those areas that are flooded regularly)</li> <li>• Open water (OW) (permanent) and Temporary open water (TOW)</li> <li>• Birch-dominated scrub (eBir, oBir) (on drier higher ground that is not flooded))</li> <li>• Pioneer dry heath (dHeath) (mainly in mosaic with Birch scrub)</li> <li>• Dry pioneer Purple Moorgrass-dominated grassland (gMol)</li> <li>• Access routes (Acc)</li> <li>• Riparian zones (Rip) (with drains and associated habitats such as scrub and Birch woodland)</li> <li>• Silt ponds (Silt) with Gorse/Birch scrub and Purple Moorgrass-dominated grassland (gMol)</li> <li>• Embryonic bog community (PBa with <i>Juncus</i>). This community represented by a mat of <i>Sphagnum</i> sp. cover is found on an area of cutaway.</li> </ul> <p>The most common habitats found around the margins of the site include:</p> <ul style="list-style-type: none"> <li>• Raised bog (PB1) (Codes refer to Heritage Council habitat classification, Fossitt 2000), See Appendix II)</li> <li>• Cutover Bog (PB4)</li> <li>• Scrub (WS1)</li> <li>• Wet (callows-type) grassland (GS4)</li> <li>• Birch woodland (WN7)</li> <li>• Dense Bracken (HD1)</li> <li>• Improved grassland (GA1) around the boundary where the GIS boundary extends into adjacent fields</li> </ul>			
<p><b>Description of site</b></p> <p>Cloonshannagh Bog is located approximately four kilometres to the north west of Tarmonbarry in County Roscommon. This bog is located within one main section. A mineral island is located close to the centre of the site. Cloonshannagh Bog has only been in industrial peat production since 1985, some sections of the bog still retain a significant depth of peat (“red” or</p>			

“sphagnum” peat also). A relatively large section of intact raised bog is still present on the site. All of the peat harvested on the site is used as fuel peat in Lough Ree Power in Lanesborough, Co. Longford.

Rail lines to the north of the site connect the site with Derrymoylin, while a southern rail link connects the site with Derrycashel.

The majority of the site is in active industrial peat production; however the habitat map shows significant areas of the site have been mapped as a mosaic of bare peat and pJeff. These areas are still in production but Soft Rush has become established in the drains and has spread onto the peat fields. In these sections the area of pJeff is estimated to cover up to 40% of these peat fields despite the ongoing industrial peat production. The drains do not appear to have been ditched in a number of years.

Peat depths are low overall across the site. The majority of the site containing less than 2m of peat. Two pockets of deep peat are located in the north eastern and north western corners of the site and these areas contain in-excess of 2.6m of peat. There are no areas on the site that are zoned as cutaway.

A mineral island exists close to the centre of the site and an unpaved road connects this area with the public road to the north. This area is approximately 7.4ha in size and is located on a section of mineral soil. Old field systems are still evident; however it would appear that no management has taken place here for a number of years. Mature Ash and Hawthorn are located in the old hedgerows while the old fields are rapidly developing Blackthorn, Ash and Hawthorn scrub. Bramble, Soft Rush, Willow along with many grass species are also found through this area. A small tea centre is located within this area and a travel path also cuts through it.

A remnant section of raised bog is located in the mid-north of the site. This area encompasses an area of approximately 38ha and it still retained a dome shape. The majority of this area has been ditched, however a smaller proportion of this section appears to have been too wet to ditch. The drains were beginning to become in-filled with Bog Cotton, Purple Moor Grass and small amounts of *Sphagnum cuspidatum*. The areas that have been ditched were dominated with Heather but also contained Bog Cotton, Bog Asphodel, Purple Moor Grass, Sundew, Deer Sedge along with very small amounts of *Sphagnum*. Bare peat was also a feature of this area although it would appear that screw levelling did not occur here. Restoration work on this section was completed in 2014, the aim of this work is to raise the water levels in the drains and in doing so aid the development and recovery of the active bog areas.

The un-ditched area (approximately 8ha) was considerably wetter and still retained a quaking feel to them. Species in these areas included Heather, Bog Asphodel, *Cladonia* sp., Bog Rosemary, Sundew (*Drosera intermedia*), Bog Cotton, Bog Bean, *Sphagnum cuspidatum*, *S. subnitens*, *S. papillosum*, *S. capillifolium* and *S. austinii*. Occasional hummocks of *Racomitrium* sp were also located in this area. Overall this central area that has remained un-ditched was in quite good condition considering the drainage works that have been carried out next to it. An extensive pool system that existed prior to the nearby drainage work is still visible, however it is degraded and most of the pools do not contain any Sphagnum at the centre, the edges of the pools did however appear to be active.

An area of cutaway next to the largest area of remnant raised bog is now re-vegetated with a mix of *Sphagnum cuspidatum* and Soft Rush. This area, although small, can be considered to be a mix pioneer embryonic plant communities. This habitat is rare in the midlands cutaway.

There are no pumps on Cloonshannagh Bog.

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

None

Ballykenny-Fisherstown Bog SPA (site code 004101) has been designated due to the use of the site by Greenland white Fronted Geese. This site is located approximately 2.2 km to the east of the site.

Lough Forbes Complex (site code 001818) is located approximately 3km to the east of the site. The site comprises a complex of raised bog, woodland and lake.



**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 along with active and inactive cutover bog (PB4).

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

- The Feorish River flows along the western edge of the site. This river is a tributary of the River Shannon.

**Peat type and sub-soils**

There are sections of “red” or “sphagnum” peat on the site. The site is underlain with gravel.

**Fauna biodiversity****Birds**

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

- Curlew (calling close to the eastern boundary of the site)
- Skylark
- Snipe
- Other more common species include Rook, Magpie, Swallow, Meadow Pipit, Grey Crow and Blackbird.

**Mammals**

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

- Badger
- Fox
- Pine Marten

**Other species**

Small Tortoiseshell Butterfly.

**References**

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).

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

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

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

## 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 banded 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 banded where there is the possibility of discharge to waters.
- Potential impacts caused by spillages etc. during rehabilitation will be reduced by keeping spill kits and other appropriate equipment on-site.
- Site activities will be carried out in accordance with 'best practice'. In order to ensure compliance and implementation of 'best practice', these measures will be communicated to relevant Bord na Móna staff and updated as required.

## APPENDIX V: BIOSECURITY

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

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

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

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

In addition to the above, Best Practice measures around the prevention and spread of Crayfish plague<sup>5</sup> will be adhered with throughout all rehabilitation measures and activities.

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<sup>5</sup> <https://www.biodiversityireland.ie/projects/invasive-species/crayfish-plague/>

## **APPENDIX VI: POLICY AND REGULATORY FRAMEWORK**

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

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

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

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

### **1 EPA IPC Licence**

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Mount Dillon bog group (Ref. PO-504-01). 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 Mount Dillon group. This regulatory requirement is the main driver of the development of this rehabilitation plan.

### **2 The Peatlands Climate Action Scheme (PCAS)**

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

It is envisaged that Bord na Móna carry out an enhanced decommissioning, rehabilitation and restoration, under the Scheme (PCAS), and supported by the Climate Action Fund and Ireland's National Recovery and Resilience Plan 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 Bord na Móna not materialise, Bord na Móna will not carry out the enhanced decommissioning, rehabilitation and restoration measures described in this plan. Bord na Móna will instead plan to complete an adapted standard decommissioning and rehabilitation measures required under Condition 10 and outlined in Appendix I.

### **3 National Climate Policy**

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

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

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

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

### **4 National Peatlands Strategy**

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

The strategy recognises that Ireland's peatlands will continue to contribute to a wide variety of human needs and to be put to many uses. It aims to ensure that Ireland's peatlands are sustainably managed so that their benefits

can be enjoyed responsibly. It aims to inform appropriate regulatory systems to facilitate good decision making in support of responsible use. It also aims to inform the provision of appropriate incentives, financial supports and disincentives where required. The strategy attempts to strike an appropriate balance between different needs, including local stakeholders like turf-cutters and semi-state bodies such as Bord na Móna.

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

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

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

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

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

The 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 Bord na Móna 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 Bord na Móna was in the process of phasing out the extraction of peat for energy production, that it set a target to rehabilitate 9,000 ha of cutaway bogs (covering 25 peatlands) by 2021 (in 2018) and will look to implement best-available mitigation measures to further reduce water quality impacts caused by peat extraction while the phasing-out process is taking place. This NRBMP 2022-2027 rehabilitation target was superseded by the acceleration of the Bord na Móna de-carbonisation programme and the Scheme (PCAS).

The development of site rehabilitation plans and the delivery of peatland rehabilitation by Bord na Móna was expected to have a positive impact on water quality and will help the NRBMP 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 Bord na Móna in 2021 was expected to have a significant positive impact on water quality of receiving water courses by reducing the impact of peat extraction as a key pressure on particular water courses. This is now being supported by the results and conclusions of the draft 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 2<sup>nd</sup> National Biodiversity Action Plan outlines the main policies, strategies, actions and targets in relation to biodiversity. This plan has several Bord na Móna specific objectives and actions including implementing the BnM Biodiversity Action Plan 2016-2021 and overlaps with both the National Peatlands Strategy and the National Raised Bog Special Areas of Conservation Management Plan 2017-2022.

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

## **7 National conservation designations**

Bord na Móna operates in a wider landscape that also includes a network of European and National nature conservation sites (Special Areas of Conservation (SACs), Special Protection Areas (SPAs), National Heritage Areas

(NHAs, cNHAs) and National Nature Reserves). Bord na Móna will take account of this network of conservation objectives and their conservation objectives when developing these rehabilitation plans. It is expected that peatland rehabilitation will, in general, benefit the conservation objectives of this network of nature conservation sites.

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

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

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

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

## **9 All-Ireland Pollinator Plan 2021-2025**

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

## **10 Land-use planning policies**

As Bord na Móna operates in many counties across Ireland, it is important to note the respective development plans in these counties. Many of the existing development plans recognise the potential that exists in the after-use of cutover/cutaway peatlands. Bord na Móna seeks to work with all of the relevant local authorities to ensure



that the most appropriate after-uses are reflected in local planning policy. The following areas of consistent importance are of both direct and indirect relevance to Bord na Móna: heritage, tourism, biodiversity/conservation, landscape, renewable energy, and economy/enterprise.

## 11 National Archaeology Code of Practice

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

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

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

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

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

One example of a key CBD target is:

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

The EU's 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 policies.

## 13 Bord na Móna commitments

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

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

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

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

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

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

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

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

## APPENDIX VII: DECOMMISSIONING

### 1. Condition 10 Decommissioning

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 Bord na Móna identifying and quantifying any mechanical and infrastructural resources that were installed in the bog to enable the development and production operation at the site. This list is then refined to identify any items that would be deemed as possibly resulting in environmental pollution, should they not be removed.

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

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

Item	Description	Cloonshannagh 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.

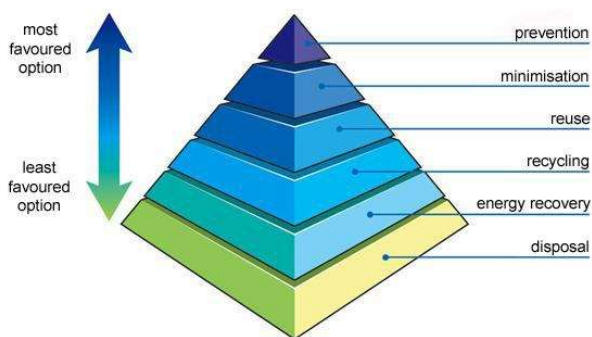
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

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



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

## 2. Enhanced Decommissioning.

The remaining infrastructure does not constitute a risk to the environment and would not be a requirement of condition 10 of the licence. The removal of these are deemed as enhanced measures. These may enhance the future 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	Cloonshannagh 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 Bord na Móna site generally becomes cutaway when it is economically unviable to continue industrial peat extraction or when the majority of peat has been removed.

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

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

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

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

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

**Wetland cutaway bog.** Wetland cutaway bog is defined as former raised bogs that have been in industrial peat production, where production has ceased and the majority of peat has been cutaway, and where this cutaway has the potential to be re-wetted. A significant number of Bord na Móna sites have pumped drainage and these sites are likely to develop a mosaic of wetland habitats when pumping is 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 P0504-01, Mountdillon Group of Bogs located in Co. Longford.

### 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 Mountdillon 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 either remains in situ or 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 than 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 bog 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 P0504-01 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<sup>st</sup> 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 our 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 their 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 Mount dillon IPPC Licence P0504-01.

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## 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 <sup>3</sup> 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 <sup>3</sup> 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**

[Results to follow]

Draft

## 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

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.



<b>Bord na Móna</b>	<b>Procedure: ENV017</b>	<b>Rev: 1</b>
<b>Title: Archaeological Findings</b>	<b>Approved: EM</b>	<b>Date: 13/10/2020</b>

**1) Purpose**

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

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

**2) Procedure**

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

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

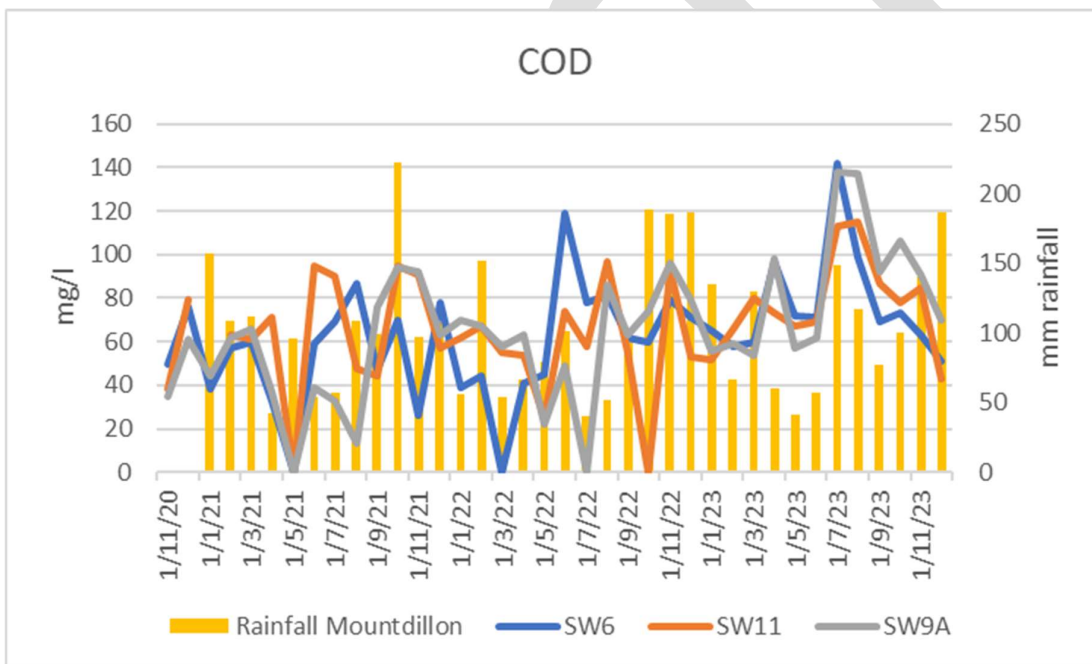
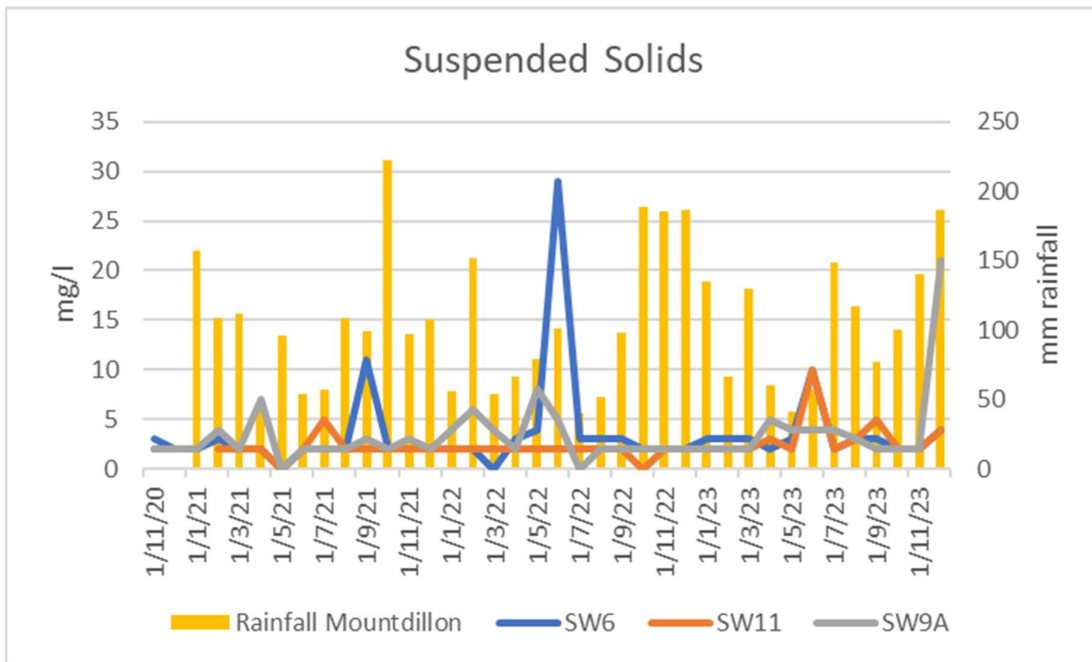
Your Archaeological Liaison Officer is .....

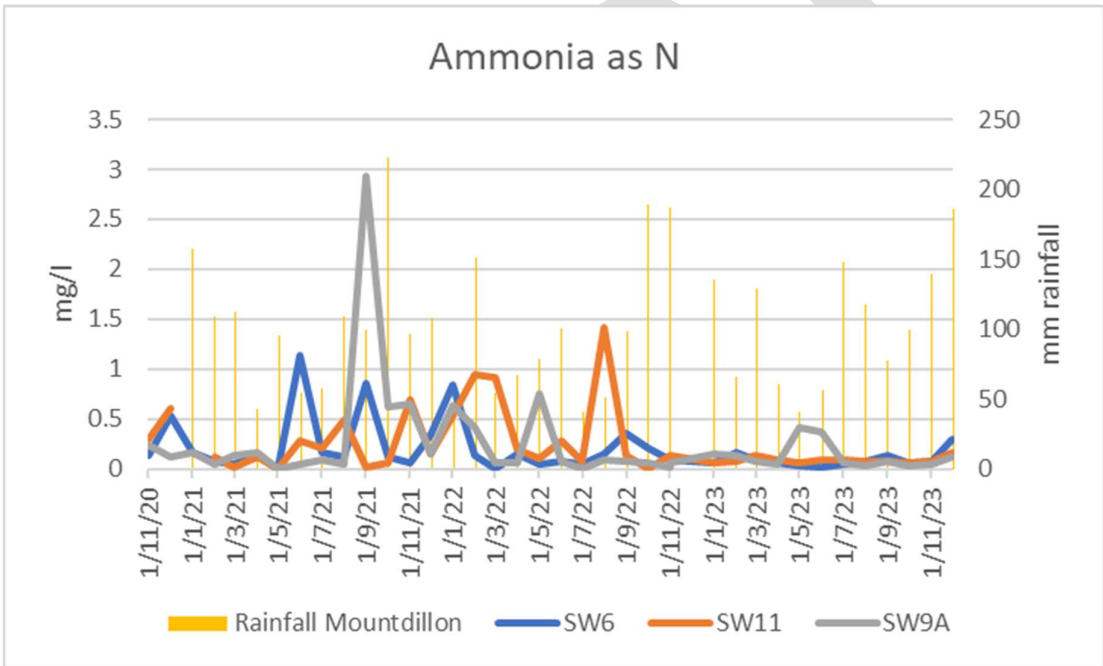
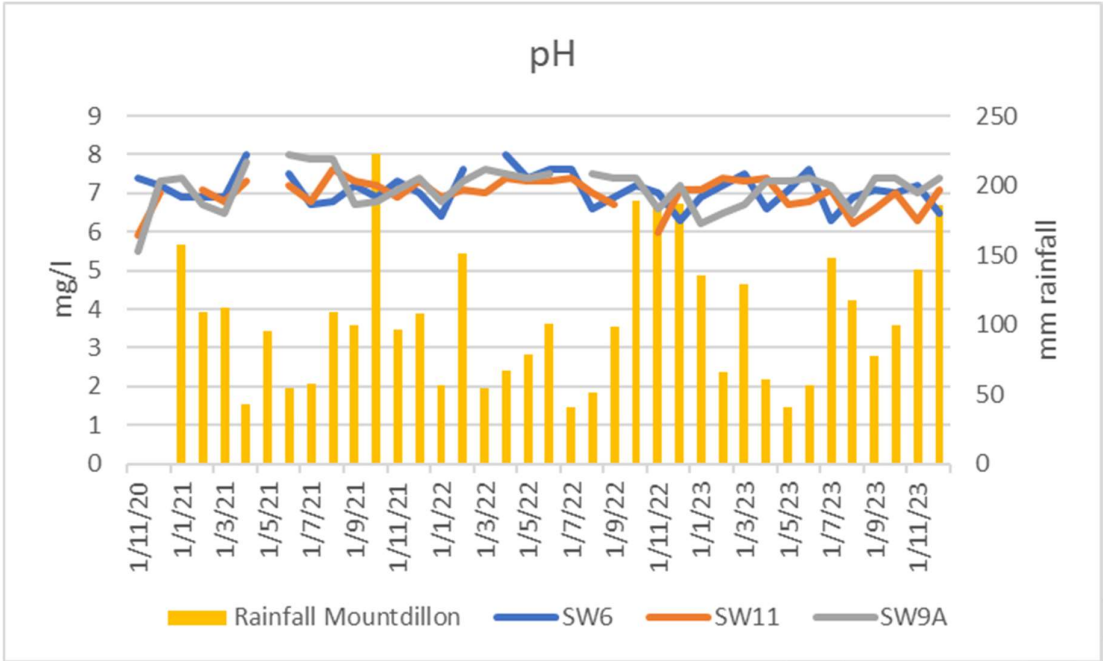
**3) Records**

Revision Index			
Revision	Date	Description of change	Approved
1	13/09/2020	First release	EMcD
2			



### APPENDIX XIII: WATER QUALITY MONITORING RESULTS FOR CLOONSHANNAGH BOG





PCAS SW Sampling Scheme						Suspended Solids		Suspended Solids		Suspended Solids		Suspended Solids		Suspended Solids		Suspended Solids		Suspended Solids		Suspended Solids		Suspended Solids	
Bog Group	Licence No	Bog Name	Unique I.D No.	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
Mountdillon	P0504-01	Cloonsannagh	338	SW6	3	2	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mountdillon	P0504-01	Cloonsannagh	343	SW11	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mountdillon	P0504-01	Cloonsannagh	346	SW9A	2	2	2	4	2	7	2	2	2	2	2	2	2	2	2	2	2	2	2
Rainfall Mountdillon							157.3	108.7	111.7	42.4	95.6	54.4	57.6	108.6	99.4	222.4	96.6	108.1					
PCAS SW Sampling Scheme						Colour		Colour		Colour		Colour		Colour		Colour		Colour		Colour		Colour	
Bog Group	Licence No	Bog Name	Unique I.D No.	SW Code -GIS	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	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	
Mountdillon	P0504-01	Cloonsannagh	338	SW6	186	273	208	293	319	123	NF	202	235	336	336	502	126	347					
Mountdillon	P0504-01	Cloonsannagh	343	SW11	166	300		281	275	278	NF	313	405	142	233	403	298	202					
Mountdillon	P0504-01	Cloonsannagh	346	SW9A	172	234	216	303	297	152	NF	131	86.7	77.8	466	428	484	167					
Rainfall Mountdillon							157.3	108.7	111.7	42.4	95.6	54.4	57.6	108.6	99.4	222.4	96.6	108.1					
PCAS SW Sampling Scheme						COD		COD		COD		COD		COD		COD		COD		COD		COD	
Bog Group	Licence No	Bog Name	Unique I.D No.	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
Mountdillon	P0504-01	Cloonsannagh	338	SW6	50	76	38	57	60	33	NF	59	69	87	47	70	26	78					
Mountdillon	P0504-01	Cloonsannagh	343	SW11	38	79		63	61	71	NF	95	90	48	44	95	91	57					
Mountdillon	P0504-01	Cloonsannagh	346	SW9A	35	61		44	62	66	37	NF	39	33	13	76	94	63					
Rainfall Mountdillon							157.3	108.7	111.7	42.4	95.6	54.4	57.6	108.6	99.4	222.4	96.6	108.1					
PCAS SW Sampling Scheme						pH		pH		pH		pH		pH		pH		pH		pH		pH	
Bog Group	Licence No	Bog Name	Unique I.D No.	SW Code -GIS	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	
Mountdillon	P0504-01	Cloonsannagh	338	SW6	7.4	7.2	6.9	6.9	6.9	8	7.5	6.7	6.8	7.2	6.9	7.3	6.9	7.3					
Mountdillon	P0504-01	Cloonsannagh	343	SW11	5.9	7		7.1	6.8	7.3		7.2	6.8	7.6	7.3	7.2	6.9	7.3					
Mountdillon	P0504-01	Cloonsannagh	346	SW9A	5.5	7.3	7.4	6.7	6.5	7.8		8	7.9	7.9	6.7	6.8	7.1	7.4					
Rainfall Mountdillon							157.3	108.7	111.7	42.4	95.6	54.4	57.6	108.6	99.4	222.4	96.6	108.1					
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	
Bog Group	Licence No	Bog Name	Unique I.D No.	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
Mountdillon	P0504-01	Cloonsannagh	338	SW6	0.06	0.05	0.05	0.05	0.05	0.05	NF	0.09	0.09	0.05	0.12	0.05	0.05	0.05					
Mountdillon	P0504-01	Cloonsannagh	343	SW11	0.05	0.05		0.07	0.05	0.05	NF	0.05	0.13	0.11	0.08	0.09	0.05	0.05					
Mountdillon	P0504-01	Cloonsannagh	346	SW9A	0.05	0.07	0.05	0.05	0.08	0.05	NF	0.05	0.05	0.06	0.06	0.05	0.05	0.05					
Rainfall Mountdillon							157.3	108.7	111.7	42.4	95.6	54.4	57.6	108.6	99.4	222.4	96.6	108.1					
PCAS SW Sampling Scheme						TS		TS		TS		TS		TS		TS		TS		TS		TS	
Bog Group	Licence No	Bog Name	Unique I.D No.	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
Mountdillon	P0504-01	Cloonsannagh	338	SW6	171	208	119	111	130	165	NF	209	132	196	228	275	223	116					
Mountdillon	P0504-01	Cloonsannagh	343	SW11	71	185		209	122	190	NF	204	142	272	310	230	159	126					
Mountdillon	P0504-01	Cloonsannagh	346	SW9A	50	296	223	103	142	313	NF	348	366	384	113	191	250	190					
Rainfall Mountdillon							157.3	108.7	111.7	42.4	95.6	54.4	57.6	108.6	99.4	222.4	96.6	108.1					
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	
Bog Group	Licence No	Bog Name	Unique I.D No.	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
Mountdillon	P0504-01	Cloonsannagh	338	SW6	0.134	0.537	0.169	0.069	0.053	0.131	NF	1.13	0.166	0.126	0.856	0.123	0.068	0.345					
Mountdillon	P0504-01	Cloonsannagh	343	SW11	0.301	0.603		0.119	0.023	0.116	NF	0.288	0.213	0.488	0.02	0.062	0.698	0.15					
Mountdillon	P0504-01	Cloonsannagh	346	SW9A	0.241	0.117		0.162	0.047	0.135	NF	0.051	0.09	0.05	2.93	0.628	0.655	0.155					
Rainfall Mountdillon							157.3	108.7	111.7	42.4	95.6	54.4	57.6	108.6	99.4	222.4	96.6	108.1					
PCAS SW Sampling Scheme						DOC		DOC		DOC		DOC		DOC		DOC		DOC		DOC		DOC	
Bog Group	Licence No	Bog Name	Unique I.D No.	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
Mountdillon	P0504-01	Cloonsannagh	338	SW6	16.1	28.8	14.5	19.1	19.9	14.7	NF	21.1	22.6	40	28.6	39.5	17.8	28.4					
Mountdillon	P0504-01	Cloonsannagh	343	SW11	13.9	29		20.5	21	27.1	NF	32.7	30.1	61.1	28.7	40.4	31.1	20.8					
Mountdillon	P0504-01	Cloonsannagh	346	SW9A	13.3	22.5	19.7	19.4	24.8	16.1	NF	18.5	12.7	72.4	33.7	36.5	32.8	21.3					

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
Bog Group	Licence No	Bog Name	Unique I.D No.	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
					1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22	
Mountdillon	P0504-01	Cloonshannagh	338	SW6	2	2	NF	3	4	29	3	3	3	2	2	2	
Mountdillon	P0504-01	Cloonshannagh	343	SW11	2	2	2	2	2	2	2	2	2	NF	2	2	
Mountdillon	P0504-01	Cloonshannagh	346	SW9A	4	6	4	2	8	5	NF	2	2	2	2	2	
				Rainfall Mountdillc	56.5	151.3	53.9	66.6	78.9	100.9	40.2	51.5	98.2	188.5	185.4	187	
PCAS SW Sampling Scheme					Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour
Bog Group	Licence No	Bog Name	Unique I.D No.	SW Code -GIS	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co
					1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22	
Mountdillon	P0504-01	Cloonshannagh	338	SW6	175	202	NF	162	284	328	333	310	261	269	297	205	
Mountdillon	P0504-01	Cloonshannagh	343	SW11	239	241	208	249	196	210	216	392	496	NF	416	205	
Mountdillon	P0504-01	Cloonshannagh	346	SW9A	334	257	190	224	148	188	NF	329	388	333	412	291	
PCAS SW Sampling Scheme					COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD
Bog Group	Licence No	Bog Name	Unique I.D No.	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
					1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22	
Mountdillon	P0504-01	Cloonshannagh	338	SW6	39	44	NF	41	45	119	78	81	62	60	79	71	
Mountdillon	P0504-01	Cloonshannagh	343	SW11	62	67	55	54	25	74	58	97	55	NF	93	53	
Mountdillon	P0504-01	Cloonshannagh	346	SW9A	70	67	58	63	22	49	NF	86	63	74	96	79	
				Rainfall Mountdillc	56.5	151.3	53.9	66.6	78.9	100.9	40.2	51.5	98.2	188.5	185.4	187	
PCAS SW Sampling Scheme					pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH
Bog Group	Licence No	Bog Name	Unique I.D No.	SW Code -GIS	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units
					1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22	
Mountdillon	P0504-01	Cloonshannagh	338	SW6	6.4	7.6		8	7.4	7.6	7.6	6.6	6.9	7.2	7	6.3	
Mountdillon	P0504-01	Cloonshannagh	343	SW11	6.9	7.1	7	7.4	7.3	7.3	7.4	7	6.7		6	7.1	
Mountdillon	P0504-01	Cloonshannagh	346	SW9A	6.8	7.3	7.6	7.5	7.4	7.5	7.5	7.4	7.4	7.4	6.6	7.2	
				Rainfall Mountdillc	56.5	151.3	53.9	66.6	78.9	100.9	40.2	51.5	98.2	188.5	185.4	187	
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
Bog Group	Licence No	Bog Name	Unique I.D No.	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
					1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22	
Mountdillon	P0504-01	Cloonshannagh	338	SW6	0.05	0.05	NF	0.06	0.06	0.19	0.08	0.05	0.19	0.1	0.11	0.05	
Mountdillon	P0504-01	Cloonshannagh	343	SW11	0.05	0.05	0.09	0.12	0.08	0.05	0.05	0.09	0.07	NF	0.08	0.05	
Mountdillon	P0504-01	Cloonshannagh	346	SW9A	0.05	0.09	0.15	0.09	0.05	0.05	NF	0.17	0.17	0.05	0.14	0.05	
PCAS SW Sampling Scheme					TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS
Bog Group	Licence No	Bog Name	Unique I.D No.	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
					1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22	
Mountdillon	P0504-01	Cloonshannagh	338	SW6	78	248	NF	436	212	367	205	96	193	172	204	145	
Mountdillon	P0504-01	Cloonshannagh	343	SW11	150	197	152	195	221	209	201	443	168	NF	99	246	
Mountdillon	P0504-01	Cloonshannagh	346	SW9A	190	346	282	252	456	441	NF	232	221	247	198	233	
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
Bog Group	Licence No	Bog Name	Unique I.D No.	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
					1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22	
Mountdillon	P0504-01	Cloonshannagh	338	SW6	0.846	0.139	NF	0.152	0.043	0.072	0.054	0.15	0.361	0.205	0.09	0.09	
Mountdillon	P0504-01	Cloonshannagh	343	SW11	0.529	0.946	0.911	0.191	0.112	0.285	0.069	1.42	0.137	NF	0.142	0.133	
Mountdillon	P0504-01	Cloonshannagh	346	SW9A	0.637	0.411	0.062	0.057	0.755	0.073	NF	0.093	0.082	0.055	0.022	0.066	
				Rainfall Mountdillc	56.5	151.3	53.9	66.6	78.9	100.9	40.2	51.5	98.2	188.5	185.4	187	
PCAS SW Sampling Scheme					DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC
Bog Group	Licence No	Bog Name	Unique I.D No.	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
					1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22	
Mountdillon	P0504-01	Cloonshannagh	338	SW6	14.3	17.6	NF	19.6	26.8	31.5	28.6	29.2	28.6	24.9	24.5	28.8	
Mountdillon	P0504-01	Cloonshannagh	343	SW11	24.3	25.4	22	22.6	21.7	25	22.6	35.7	25.2	NF	32.3	23.1	
Mountdillon	P0504-01	Cloonshannagh	346	SW9A	26.5	23.2	20.6	26.5	15.4	18.9	NF	29.2	28.3	29.4	35.9	30.1	

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
Bog Group	Licence No	Bog Name	Unique I.D No.	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
					1/1/23	1/2/23	1/3/23	1/4/23	1/5/23	1/6/23	1/7/23	1/8/23	1/9/23	1/10/23	1/11/23	1/12/23
Mountdillon	P0504-01	Cloonsannagh	338	SW6	3	3	3	2	3	10	2	3	3	2	2	4
Mountdillon	P0504-01	Cloonsannagh	343	SW11	2	2	2	3	2	10	2	3	5	2	2	4
Mountdillon	P0504-01	Cloonsannagh	346	SW9A	2	2	2	5	4	4	4	3	2	2	2	21
				Rainfall Mountdillc	135.3	66.1	129.4	60.5	41.2	56.6	148.5	117.2	77.2	100	139.7	186
PCAS SW Sampling Scheme					Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour
Bog Group	Licence No	Bog Name	Unique I.D No.	SW Code -GIS	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co
					1/1/23	1/2/23	1/3/23	1/4/23	1/5/23	1/6/23	1/7/23	1/8/23	1/9/23	1/10/23	1/11/23	1/12/23
Mountdillon	P0504-01	Cloonsannagh	338	SW6	339	177	236	395	546	212	492	434	227	290	291	281
Mountdillon	P0504-01	Cloonsannagh	343	SW11	240	261	159	235	351	267	356	562	382	426	441	237
Mountdillon	P0504-01	Cloonsannagh	346	SW9A	335	226	199	360	273	234	151	592	401	468	440	313
PCAS SW Sampling Scheme					COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD
Bog Group	Licence No	Bog Name	Unique I.D No.	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
					1/1/23	1/2/23	1/3/23	1/4/23	1/5/23	1/6/23	1/7/23	1/8/23	1/9/23	1/10/23	1/11/23	1/12/23
Mountdillon	P0504-01	Cloonsannagh	338	SW6	65	58	60	97	72	71	142	99	69	73	63	51
Mountdillon	P0504-01	Cloonsannagh	343	SW11	52	66	80	73	67	69	113	115	87	78	85	43
Mountdillon	P0504-01	Cloonsannagh	346	SW9A	56	59	54	98	57	62	138	137	92	106	91	70
				Rainfall Mountdillc	135.3	66.1	129.4	60.5	41.2	56.6	148.5	117.2	77.2	100	139.7	186
PCAS SW Sampling Scheme					pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH
Bog Group	Licence No	Bog Name	Unique I.D No.	SW Code -GIS	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units
					1/1/23	1/2/23	1/3/23	1/4/23	1/5/23	1/6/23	1/7/23	1/8/23	1/9/23	1/10/23	1/11/23	1/12/23
Mountdillon	P0504-01	Cloonsannagh	338	SW6	6.9	7.2	7.5	6.6	7.1	7.6	6.3	6.9	7.1	7	7.2	6.5
Mountdillon	P0504-01	Cloonsannagh	343	SW11	7.1	7.4	7.3	7.4	6.7	6.8	7.1	6.2	6.6	7	6.3	7.1
Mountdillon	P0504-01	Cloonsannagh	346	SW9A	6.2	6.5	6.7	7.3	7.3	7.4	7.2	6.5	7.4	7.4	7	7.4
				Rainfall Mountdillc	135.3	66.1	129.4	60.5	41.2	56.6	148.5	117.2	77.2	100	139.7	186
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
Bog Group	Licence No	Bog Name	Unique I.D No.	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
					1/1/23	1/2/23	1/3/23	1/4/23	1/5/23	1/6/23	1/7/23	1/8/23	1/9/23	1/10/23	1/11/23	1/12/23
Mountdillon	P0504-01	Cloonsannagh	338	SW6	0.05	0.06	0.05	0.06	0.06	0.16	0.05	0.11	0.23	0.12	0.06	0.17
Mountdillon	P0504-01	Cloonsannagh	343	SW11	0.05	0.05	0.07	0.11	0.06	0.13	0.12	0.07	0.11	0.09	0.05	0.09
Mountdillon	P0504-01	Cloonsannagh	346	SW9A	0.05	0.05	0.05	0.07	0.14	0.15	0.14	0.11	0.14	0.09	0.06	0.17
PCAS SW Sampling Scheme					TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS
Bog Group	Licence No	Bog Name	Unique I.D No.	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
					1/1/23	1/2/23	1/3/23	1/4/23	1/5/23	1/6/23	1/7/23	1/8/23	1/9/23	1/10/23	1/11/23	1/12/23
Mountdillon	P0504-01	Cloonsannagh	338	SW6	113	243	243	191	204	243	150	133	292	176	308	116
Mountdillon	P0504-01	Cloonsannagh	343	SW11	181	262	248	185	150	227	218	183	267	258	75	133
Mountdillon	P0504-01	Cloonsannagh	346	SW9A	83	178	207	229	243	309	237	291	255	227	97	141
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
Bog Group	Licence No	Bog Name	Unique I.D No.	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
					1/1/23	1/2/23	1/3/23	1/4/23	1/5/23	1/6/23	1/7/23	1/8/23	1/9/23	1/10/23	1/11/23	1/12/23
Mountdillon	P0504-01	Cloonsannagh	338	SW6	0.06	0.167	0.09	0.063	0.031	0.017	0.042	0.073	0.138	0.067	0.083	0.3
Mountdillon	P0504-01	Cloonsannagh	343	SW11	0.066	0.07	0.134	0.097	0.058	0.092	0.096	0.071	0.077	0.059	0.077	0.167
Mountdillon	P0504-01	Cloonsannagh	346	SW9A	0.15	0.134	0.073	0.043	0.41	0.368	0.059	0.035	0.073	0.039	0.049	0.118
				Rainfall Mountdillc	135.3	66.1	129.4	60.5	41.2	56.6	148.5	117.2	77.2	100	139.7	186
PCAS SW Sampling Scheme					DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC
Bog Group	Licence No	Bog Name	Unique I.D No.	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
					1/1/23	1/2/23	1/3/23	1/4/23	1/5/23	1/6/23	1/7/23	1/8/23	1/9/23	1/10/23	1/11/23	1/12/23
Mountdillon	P0504-01	Cloonsannagh	338	SW6	26.5	20	24.2	28.3	39.8	25	40.3	35.2	24.9	29.1	26.8	21
Mountdillon	P0504-01	Cloonsannagh	343	SW11	19.6	25.1	21.3	21.3	27.1	26.2	29.7	43.1	31.9	35.5	34.3	37.1
Mountdillon	P0504-01	Cloonsannagh	346	SW9A	23.7	22.8	21.9	28.3	23.7	23.1	37.3	48.1	34.3	41.8	38.6	26.1
Total rainfall in millimetres for MT DILLON (Met.ie)																