

Bord na Móna

Granaghan Bog

Cutaway Bog Decommissioning and Rehabilitation Plan 2024

This document seeks to address the requirements of Condition 10.2 of IPC License 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 Granaghan 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 Granaghan 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 Granaghan 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 Granaghan 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 Granaghan Bog, such as amenity, will be conducted in adherence to the relevant planning guidelines and consultation with relevant authorities and will be considered within the framework of this rehabilitation plan.

Document Control Sheet						
Document Name:	Granaghan Bog - Cutaway Bog Decommissioning and Rehabilitation Plan 2024					
Document File Path:	Granaghan Rehabilitation Plan					
Document Status:	Final					
This document comprises:	DCS	TOC	Text (Body)	References	Maps	No. of Appendices
	1	1	40	4	0	13
Rev.	0.1	Author(s):		Checked By:		Approved By:
	Name(s):	SD		JOS		DMN
	Date:	19/10/2022		24/10/2023		27/10/2023
Rev.	1	Author(s):		Checked By:		Approved By:
	Name(s):	LC		CC		DK
	Date:	05/03/24		13/03/2024		13/03/2024
Rev.	1.1	Author(s):		Checked By:		Approved By:
	Name(s):					
	Date:					

Table of Contents

1. Introduction.....	1
1.1 Constraints and Limitations	2
2. Methodology	4
2.1 Desk Study.....	4
2.2 Consultation	6
2.3 Field Surveys.....	6
3. Site Description.....	7
3.1 Status and Situation	7
3.1.1 Site history	7
3.1.2 Current land-use	7
3.1.3. Socio-Economic conditions.....	7
3.2 Geology and Peat Depths.....	8
3.3 Key Biodiversity Features of Interest	9
3.3.1 Current habitats.....	9
3.3.2 Species of conservation interest.....	11
3.3.3 Invasive species.....	12
3.4 Statutory Nature Conservation Designations	12
3.4.1 Other Nature Conservation Designations.....	12
3.5 Hydrology and Hydrogeology.....	12
3.6 Emissions to surface-water and watercourses	14
3.7 Fugitive Emissions to Air	17
3.8 Carbon Emissions	17
3.9 Current Ecological Rating	17
4. Consultation	18
4.1 Consultation to Date	18
4.2 Issues raised by consultees	18
4.2.1 Consultation.....	19
4.2.2 Assessments of rehabilitation.....	19
4.2.3 Restoration scope	19
4.2.4 Monitoring.....	19
4.2.5 Flooding, drainage or other impacts on adjacent land.	19
4.2.6 Amenity	20

4.2.7	Water Quality.....	20
4.2.8	Future management.....	20
4.2.9	Other issues	20
4.3	Bord na Móna response to issues raised during consultation.....	20
4.3.1	Consultation.....	20
4.3.2	Assessments of rehabilitation.....	20
4.3.3	Restoration scope	21
4.3.4	Monitoring.....	22
4.3.5	Flooding, drainage or other impacts on adjacent land.....	22
4.3.6	Amenity.....	23
4.3.7	Water quality	23
4.3.8	Future management.....	23
4.3.9	Other issues	23
4.3.10	Concluding statement	23
5.	Rehabilitation Goals and Outcomes	25
6.	Scope of Rehabilitation.....	27
6.1	Key Constraints	27
6.2	Key Assumptions	28
6.3	Key Exclusions	28
7.	Criteria for successful rehabilitation	29
7.1.	Criteria for successful rehabilitation to meet EPA IPC licence conditions:.....	29
7.2.	Critical success factors needed to achieve successful rehabilitation as outlined in the plan.....	33
8.	Rehabilitation Actions and Time Frame	34
8.1	Short-term planning actions (0-1 years)	36
8.2	Short-term Practical Actions (0-2 years).....	37
8.3	Long-term (>3 years).....	37
8.5	Budget and Costing	37
9.	Aftercare and Maintenance.....	39
9.1	Programme for monitoring, aftercare and maintenance	39
9.2	Rehabilitation plan validation and licence surrender – report as required under condition 10.4	40
10.	References.....	41
	Granaghan Decommissioning and Rehabilitation Plan - Addendum 1	45
	APPENDIX I: A standard peatland rehabilitation plan to meet conditions of the IPC Licence	46
	APPENDIX II: Bog Group Context.....	50

APPENDIX III: Ecological Survey Report.....	55
APPENDIX IV: Environmental Control Measures to be applied to bog rehabilitation.....	58
APPENDIX V: Biosecurity.....	59
Appendix VI: Policy and Regulatory Framework	60
APPENDIX VII: Decommissioning.....	68
APPENDIX VIII: Glossary.....	72
APPENDIX IX: Extractive Waste Management Plan.....	74
APPENDIX X: Mitigation Measures for the Application of Fertiliser	78
APPENDIX XI: Consultation Summaries	79
APPENDIX XII: Archaeology	87
APPENDIX XIII: Initial water quality Data from Granaghan	90

Non-Technical Summary

- Bord na Móna is planning to finalise the rehabilitation of Granaghan Bog.
- Industrial peat harvesting is now finished at Granaghan Bog.
- This rehabilitation is being undertaken as Bord na Móna are obliged to carry out peatland rehabilitation via an IPC License issued by the Environmental Protection Agency (EPA). 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 creating conditions for the development of vegetation and associated habitats on the current bare peat dominated cutover bog, and thereby minimising impacts on receiving watercourse downstream. The bog was drained in the past to allow peat production. Improvements in water quality, reduction of carbon emissions, climate action benefits and biodiversity enhancement are achieved when the remaining peat is re-wetted. This means blocking drains and other measures to raise the water table 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, Heather and Reeds will thrive.
- Many Bord na Móna bogs cannot be restored back to raised bog, as the acrotelm (surface layer of vegetation) and large quantities of peat has been removed and the environmental conditions have been significantly modified. However other natural habitats will develop such as shallow wetlands with Reedbeds and Birch woodland, and in time naturalised peatland habitats can be restored.
- The development of a range of habitats in Granaghan Bog will support biodiversity including plants, insects, birds and mammals. This includes some species that are rare and protected in the wider landscape. It will increase the national area of native woodland. Many wetland habitats in the wider landscape have been reclaimed for agriculture and other uses and peatland rehabilitation is an opportunity to create new wetland habitats that will have significant biodiversity and climate benefits.
- Granaghan Bog was drained and developed for industrial peat production in the 1980s and much of the site contains residual deep peat which is mostly bare. Granaghan Bog formerly had a pumped drainage regime.
- Rehabilitation measures proposed for Granaghan Bog include deep peat rewetting via cell bunding and drain blocking along with the use of fertiliser to be spread on headlands and other areas (a small part of the overall area). This will encourage vegetation growth. In addition, some targeted drain blocking is proposed in small parts of the bog margins and hydrological modelling has been undertaken to inform the adjustment of outfalls to optimise summer wetland water levels. Such measures will promote the development of wetland vegetation.
- Bord na Mona plan to carry out this work in 2024.
- These rehabilitation measures will be planned by a team consisting of ecologists, hydrologists and engineers. It is a principle of Bord na Móna rehabilitation planning that no actions will be taken that would negatively impact on adjacent land. No boundary drains will be blocked. Water will still leave the site via the existing outlets.
- It will take some time for vegetation and habitats to fully develop at Granaghan, and a peatland ecosystem to be restored. However, it is expected that most of the site will be developing pioneer habitats after 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, such as renewable energy. Any other proposed development will be planned in adherence to relevant planning guidelines and will consider the rehabilitation and the condition of the site.
- Peatland rehabilitation of these bogs will bring a range of benefits to the local community via improvements to the local landscape and is also important for supporting national policies and strategies in relation to reduction of carbon emissions from these peatlands, supporting biodiversity and improvements to water quality.

1. INTRODUCTION

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Moundillon bog group (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. Granaghan bog is part of the Moundillon bog group (see Appendix II for details of the bog areas within the Moundillon bog group). Granaghan Bog is located in Co. Roscommon.

This 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 European Union's Recovery and Resilience Facility as part of 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 have now announced the complete cessation of industrial peat production across its estate (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:

- 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 will be used in an attempt to ensure 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). 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.

Granaghan 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 **Granaghan Bog**.

Industrial peat extraction at Granaghan Bog permanently ceased in 2020 (having commenced bog development in 1980's). Currently the cutover area of the bog is dominated by bare peat. However, there is some pioneer poor fen and open drier cutaway vegetation communities spreading over some areas of bare peat. There is Birch scrub and establishing woodland and pioneering cutaway habitats developing in the marginal areas. Some of the site contains small areas of wetland. A small conifer plantation (WD4) occurs within the northern boundary of the bog. There are two areas of remnant raised bog, in poor condition, now dominated by heather (dry heath type vegetation) located within the northeast boundary of the site. There are another two small areas of remnant bog situated south of the road close to the silt ponds on the southern boundary of the bog.

Parts of Granaghan Bog (within and outside the areas owned and under the control of Bord na Móna) are possibly being used by domestic turf cutters. These areas are ecologically and hydrologically linked to the area owned by

Bord na Móna where rehabilitation is planned. It is beyond the scope of this rehabilitation plan to address turf cutting issues on Granaghan Bog that are outside of the control of Bord na Móna. Nevertheless, Bord na Móna are aware of such issues which may constrain the proposed rehabilitation actions, and this rehabilitation plan considered potential impacts of these on the delivery of the stated objectives.

Rehabilitation in other areas of the bog may also be constrained due to other property issues or issues such as rights of way, if present.

The rail line on site, located along the southern boundary, connects to Lough Ree Power Station. It is anticipated that this rail line will be decommissioned in 2024.

2. METHODOLOGY

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

The ecological information and site information collected during the Bord na Móna ecological baseline survey, additional confirmatory site visits (covering the period 2012 to 2022 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 Granaghan 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.
- Feehan, J. (2004). A long-lived wilderness. The future of the north midlands peatland network. Department of Environmental Resource Management, UCD.

- Foss, P.J., Crushell, P. & Gallagher, M.C. (2017) Title: Counties Longford & Roscommon Wetland Study. Report prepared for Longford and Roscommon County Councils.
- 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);
- EPA Guidance on Requests for Alterations to a Licensed Industrial or Waste Activity;
- BirdWatch Ireland online data (including I-WeBS and CBS datasets; www.birdwatchireland.ie);
- Geological Survey of Ireland - National Draft Bedrock Aquifer map;

- Geological Survey of Ireland - Groundwater Database (www.gsi.ie);
- Historic Environment Viewer at <https://webgis.archaeology.ie/historicenvironment/>
- National Parks & Wildlife Services Public Map Viewer (www.npws.ie);
- Water Framework Directive catchments.ie/maps/ Map Viewer (www.catchments.ie);
- OPW Indicative Flood Maps (www.floodmaps.ie);
- CFRAM Preliminary Flood Risk Assessment (PFRA) maps (www.cfram.ie);
- River Basin Management Plan for Ireland 2022-2027
- Bord na Móna Annual Report 2021 & 2022.
- 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. Additional ecological walk-over surveys and visits have taken place at Granaghan Bog between 2012-2022. As part of this exercise, a walkover survey of Granaghan Bog was conducted in November 2022 and July 2023 to further inform 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 (2010), while mosses and liverworts nomenclature follows identification keys published by the British Bryological Society (2010). A more detailed Bord na Móna classification system was 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 site visit was used to categorise any changes in habitat extent at Granaghan in September 2022.

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

3. SITE DESCRIPTION

Granaghan Bog is located approximately 7km to the North of Lanesborough in County Roscommon, just off the R371 Lanesborough to Strokestown road. Granaghan is part of the Mount Dillon bog group with Mountdillon Bog located immediately to the south and south-east. A rail link connects the bog with Mount Dillon Bog to the South. The land adjoining Granaghan bog immediately to the east, west and north is primarily agricultural pastoral land.

The area of Granaghan Bog within the PCAS rehabilitation extent can be split into two sections; a large main section, and a small area of remnant raised bog to the SE of this area. The local road L1426 bisects these two parcels of land. The main section of Granaghan was used for peat production in the past. The small area of remnant raised bog to the southeast was never put into peat production, although turf cutting has taken place around the margins of the bog.

The northern sub-catchment of the bog discharges to a boundary drain to the north which flows east and discharges to the northeast of the bog to the tributary stream of the Curraghroe (Stream). The southern sub-catchments of Granaghan Bog discharge via adjacent drains to the south to the Curraghroe Stream 010 which flows to the Feorish (Tarmonbarry)_020 east of the bog. The Feorish (Tarmonbarry)_020 flows east to the River Shannon. Granaghan Bog has a partially pumped drainage system. A single automatic pump drains the bog, discharging water into a network on silt ponds on the south-eastern side of the bog.

See Drawing number BNM-DR-25-10-01 titled **Granaghan Bog: Bog Site Location**, included in the accompanying Mapbook, which illustrates the location of Granaghan Bog in context to the surrounding area.

3.1 Status and Situation

3.1.1 Site history

The majority of Granaghan bog was in active industrial peat production since the late 1980's. The peat harvested from the bog was used as fuel peat in Lough Ree Power in Lanesborough. All industrial peat extraction at Granaghan Bog ceased in 2020.

Small sections of remnant raised bog exist on the northern, eastern, southern and western boundaries of the site. There are a number of sections of old domestic cutover bog. A small area of conifer forestry can be found on the northeastern bog boundary.

3.1.2 Current land-use

Industrial peat production has now permanently ceased at Granaghan Bog. The site has some remaining stock.

The majority of the ground cover on Granaghan Bog is bare peat.

As described above, raised bog remnants occurs along the margins of the bog along with cutover bog. These bog remnants have been subject to drainage, associated with domestic turf cutting, which is ongoing.

Site infrastructure and structures are mapped in the accompanying Mapbook.

3.1.3 Socio-Economic conditions

Bord na Móna has historically been a vital employer for the rural community of the Midlands of Ireland. Bord na Móna compiled a report on the role of peat extraction in the midlands historically in which they report that in

1986, by the end of Bord na Móna's Third Development Programme, a total of twenty-three work locations had been established around the country. The company had an average employment of approximately 4,688 in the mid 1980's, with a peak employment of 6,100 during the production season, which placed it among the country's largest commercial employers. The importance of such levels of employment were largely due to its regional concentration in the Midlands and the lack of alternative employment opportunities at the time.

According to the Energy Crop Socio-Economic Study undertaken by Fitzpatrick Associates in 2011, there were an estimated 1,443 jobs supported by the peat-to-power industry in Ireland at the time, some 81% of which were located in the catchment areas of the three peat-fired generating stations (Lough Ree, West Offaly, and Edenderry Power Stations). These constituted jobs in the plants and in peat extraction, jobs indirectly supported in upstream supply industries and jobs induced through the trickle-down effects of the wages and salaries of those supported directly or indirectly. These job numbers have now declined with the cessation of peat extraction.

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

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

These job numbers have now declined with the cessation of peat extraction at this bog. It is anticipated that the 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. There are approximately 225 roles directly involved in PCAS.

3.2 Geology and Peat Depths

3.2.1 Sub-soil geology

GSI data indicates that the western section of Granaghan Bog is underlain by the Moathill Formation, with most of the remaining area of the bog underlain by the Ballysteen Formation and a small area underlain by Argillaceous Limestone (Visean). All of these bedrock units are classified as locally important aquifers as they are moderately productive in local zones. Geological Survey of Ireland (GSI) mapping does not identify any karst features in close proximity to the bog. No data exists concerning depth to bedrock, however, there are small pockets of bedrock outcrops in close proximity to the bog. Quaternary geology maps show Granaghan underlain by peat, yet surrounded by inorganic deposits, including till derived from limestone which occurs to the east of the bog, till derived from sandstone and shale to the west of the bog and till derived from sandstone north of the bog.

3.2.2 Peat type and depths

The remaining peat deposits are relatively deep across most of Granaghan, typically ranging from 2-4m, with thicker deposits in the south-western area where the peat is up to 5.5m thick. However, there are pockets with only shallow peat remaining, typically corresponding to the areas of elevated till ridges, as outlined in the Figure titled "*Indicative peat depth map derived from 2020 LiDAR survey and GPR data*".

3.3 Key Biodiversity Features of Interest

The majority of Granaghan Bog within the Bord na Móna boundary consists of bare peat, as this site was subject to peat extraction until 2020. Due to the recent cessation of peat production, there has been little opportunity for post-production habitats to develop, and habitats of biodiversity interest are therefore largely confined to the marginal habitats fringing the cutaway.

The largest area of Granaghan Bog is still dominated by bare peat. There are small fragments of remnant high bog in the margins of the site. These are small, dry, fragmented and in poor condition. In the southwest corner of the former production area, wetter peat conditions have enabled the development of a small patch of pioneering poor fen vegetation. There is a small conifer plantation located in the north-east margins of the site. A small section of agricultural pasture exists within the BnM boundary of the eastern bog margin. The remaining marginal areas of the bog are developing scrub (WS1), cutover bog (PB4) or disturbed high bog (PB1). Table 3.1 below provides a number of representative photos of the dominant habitats occurring within the bog.

There are records of Otter *Lutra lutra* using the Curraroe Stream to the south of the bog.

3.3.1 Current habitats

The most common habitats present at Granaghan include (in order of dominance):

- Bare peat (BP) (*Codes refer BnM classification of pioneer habitats of production bog¹*).
- Pioneer poor fen dominated by Soft Rush (pJeff) (frequently in mosaic with either bare peat or with Birch scrub)
- Emergent and open Birch scrub (eBir, oBir)
- Birch woodland (WN7)
- Purple Moorgrass-dominated vegetation (gMol)
- Pioneer dry Heath (dHeath) associated with drier disturbed areas
- Riparian zones (Rip)
- Access zones (railway along the south side)
- Conifer Plantation (WD4)

See Drawing number BNM-DR-25-10-17 titled **Granaghan Bog: Current Habitat Map**, included in the accompanying Mapbook, which illustrates the habitats at Granaghan Bog and Table 3.1 which illustrates a sample of habitats.

¹ See Appendix II – “An Overview of the Bord na Móna Habitat Classification” of the BnM [Biodiversity Action Plan 2016-2021](#)

Table 3-1 Photos of Habitats at Granaghan Bog (2023).

Photos of Habitats at Granaghan	
	
<p><i>Bare peat in the northeast of the Granaghan. This is the dominant habitat within the bog.</i></p>	<p><i>Dry bare peat in the central elevated area underlain by limestone.</i></p>
	
<p><i>Pioneer open habitats developing along northern headland.</i></p>	<p><i>Stockpiles in the southeast of the bog.</i></p>

Photos of Habitats at Granaghan



Bare peat cutaway, with wetland in the SE of the bog.

3.3.2 Species of conservation interest

A review of available biodiversity records from the National Biodiversity Data Centre (hereafter NBDC) of species records in the wider area of Granaghan bog was undertaken as part of a desk study. The 2007-2011 Bird Atlas, found 96 species of birds have been recorded on or near Granaghan Bog, including 20 red listed species and 29 amber listed species on the list of Irish Birds of conservation concern 2020-2026. Note that although these species have been recorded within the wider area of Granaghan bog, it is considered likely that the bare peat dominated habitats occurring within Granaghan bog are likely to be currently unsuitable for many species.

A review of available NBDC data for flora and fauna occurring within the area of Granaghan Bog also produced the following records;

- Eight species of Butterfly including; Green-veined White (*Pieris napi*), Small Tortoiseshell (*Aglais urticae*), Meadow Brown (*Maniola jurtina*), Orange-tip (*Anthocharis cardamines*), Ringlet (*Aphantopus hyperantus*), Small Copper (*Lycaena phlaeas*) Small White (*Pieris rapae*) and Speckled Wood (*Pararge aegeria*).
- Six species of terrestrial mammal namely Eurasian Badger (*Meles meles*), Otter (*Lutra lutra*), Irish Hare (*Lepus timidus subsp. hibernicus*), Pine Marten (*Martes martes*), Fallow deer (*Dama dama*) and Red Fox (*Vulpes vulpes*).
- Three species of odonata including; Black Darter (*Sympetrum danae*), Common Darter (*Sympetrum striolatum*) and Common Hawker (*Aeshna juncea*).

As per the above, although these species have been recorded within the wider area of Granaghan bog, it is considered likely that the bare peat dominated habitats occurring within Granaghan bog are likely to be currently unsuitable for many species.

On the most recent visit to Granaghan in September of 2022, species of bird were recorded utilising or associating with habitats onsite including Meadow pipit (*Anthus pratensis*) (Red-listed²), Pied Wagtail (*Motacilla alba*) (Green

² Gilbert G, Stanbury A and Lewis L (2021), "Birds of Conservation Concern in Ireland 2020 –2026". Irish Birds 9: 523—544

Listed), Common Kestrel (*Falco tinnunculus*) (Amber listed) and Common Snipe (*Gallinago gallinago*) (Amber listed). Wintering Teal (*Anas crecca*) (Amber listed) and Mallard (*Anas platyrhynchos*) (Amber listed) were also observed on site.

3.3.3 Invasive species

There are no known invasive species at Granaghan 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 no European Sites (SAC's or SPA's) within close proximity (i.e. within a 5 km radius at minimum) to Granaghan Bog. The closest EU Designated Sites to Granaghan Bog are:

- Lough Forbes Complex SAC (Site code: 001818, located approximately 6km east of Granaghan Bog.
- Lough Ree SAC (Site code: 000440), located approximately 6 km south of Granaghan Bog.
- Lough Ree SPA (Site code: 004064), located approximately 6 km south of Granaghan Bog.
- Ballykenny-Fisherstown Bog SPA (Site code: 004101), located approximately 6km east of Granaghan Bog
- Corbo Bog SAC (Site code: 002349), located approximately 7.5km south-west of Granaghan Bog.
- Annaghmore Lough (Roscommon) SAC (Site code: 001626, located approximately 9km north-west of Granaghan Bog.

A number of NHA's (Natural Heritage Areas) and pNHA's (proposed Natural Heritage Areas) also occur within 10Km of Granaghan Bog including; Derrycannon Bog NHA (site code: 000605) located 5.5 km west of Granaghan Bog and Lisnanarriagh Bog NHA (site code: 002072) located 4.2Km south west of Granaghan bog. Cordara Turlough pNHA, Fortwilliam Turlough pNHA, Lough Ree pNHA, Royal Canal pNHA, Lough Bannow pNHA, Corbo Bog pNHA and Lough Forbes Complex pNHA are all located within 10Km of Granaghan Bog.

See map book drawing no: BNM-DR-25-10-23: Proximity Designated Sites in the accompanying mapbook.

3.4.1 Other Nature Conservation Designations

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

Lough Gara (site code 852) is the closest Ramsar site to Granaghan Bog and is located approximately 35Km north west.

3.5 Hydrology and Hydrogeology

Granaghan 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. The bog is located approximately 6km north of Lanesborough. The bog contains several drainage pathways and discharge locations which all drain into the Feorish River, which flows north-east before discharging into the River Shannon.

Granaghan Bog has a partially pumped drainage system. A single automatic pump drains the bog, discharging water into a network on silt ponds on the southeastern side of the bog.

Hydrological modelling (BNM-DR-25-10-09 titled Granaghan **Bog: Depression analysis**) indicates that parts of the bog margins form 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 Granaghan receives average precipitation of 979mm/yr (1981-2010), with an estimated annual effective rainfall rate of 594 mm/yr based on GSI data. The GSI estimate a recharge rate of 23.8mm/yr for Granaghan. In areas underlain by lacustrine deposits, or where peat thickness is in excess of 1.5m (even where the bog is underlain by limestone till) this is expected to be an accurate estimate. However, in areas where peat depth is less than 1.5m and the area is underlain by an elevated mound of limestone till, losses to depth are expected to be more significant. An estimate of 60mm/yr for these areas would be considered reasonable based on other bogs. In low-lying parts of the bog, underlain by lacustrine deposits with shallow peat (<1.5m), contributions from groundwater are considered likely, with an estimated contribution of 50mm/yr considered reasonable. This is particularly the case for the low-lying depression in the south-west of the bog.

Overall, this suggests that assuming no change in storage, the annual runoff rate for areas with limited losses would be 5,702m³/ha compared to 5,340m³/ha and 6,440 m³/ha for areas with elevated losses and areas with groundwater contributions respectively. In both cases, the average annual runoff rate is relatively high compared to typical midland bogs and therefore ideal water depths can be achieved in areas of where topographic slopes are suitable. Despite this, it may be difficult to rewet the elevated areas, with thin peat underlain by limestone till since there will be a limited contributing catchment area.

Examples of results from other sites with similar hydrogeological settings are outlined below. In the case of deep peat areas underlain by a low permeability substrate, UM_009_S (Ummeras Bog) demonstrates the results that can be expected from deep peat measures in this type of scenario. This location has deep peat (3m) and is underlain by a low permeability substrate. This cell is located at the margin of the bog and is elevated and does not receive any flow from any incoming cells. This is a similar scenario to large parts of Granaghan bog, although the rate of effective rainfall is notably higher at Granaghan than Ummeras, meaning measures would be expected to be even more successful at this bog.

GSI data indicates that the western section of Granaghan Bog is underlain by the Moathill Formation, with most of the remaining area of the bog underlain by the Ballysteen Formation and a small area underlain by Argillaceous Limestone (Visean). All of these bedrock units are classified as locally important aquifers as they are moderately productive in local zones. Geological Survey of Ireland (GSI) mapping does not identify any karst features in close proximity to the bog. No data exists concerning depth to bedrock, however, there are small pockets of bedrock outcrops in close proximity to the bog.

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

Regionally important aquifers are those in which the network of fractures, fissures and joints, through which groundwater flows, is well connected and widely dispersed, resulting in a relatively even distribution of highly permeable zones. There is good aquifer storage and groundwater flow paths can be up to several kilometres in

length. There is likely to be substantial groundwater discharge to surface waters ('baseflow') and large (>2,000 m³/d), dependable springs may be associated with these aquifers.

Groundwater Vulnerability is typically used to indicate the susceptibility to groundwater pollution; however, it can provide a useful proxy indication of likely groundwater flow rates in the surrounding area. Groundwater vulnerability for the surrounding areas is generally moderate to high, with some areas of extreme vulnerability mapped in areas where bedrock outcrop occurs.

3.6 Emissions to surface-water and watercourses

Drainage is an important feature of industrial peat production and there were extensive field drains maintained throughout bog areas to facilitate industrial peat production annually, each of which eventually drains into a terminal silt pond that allows for settlement of suspended solids before entering the main river systems. In accordance with the existing Integrated Pollution Control licence, all drainage water from boglands in a licensed area is discharged via an appropriately designed silt pond treatment arrangement as required in Condition 6.6. of the licence. Industrial peat production has now permanently ceased at Granaghan Bog.

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

Granaghan bog has four treated surface water outlets from previously active peat extraction catchments, which discharge to the Curraghroe Stream (IE_SH_26C150180 Curraghroe Stream_010) and the Feorish River (IE_SH_26F030400 Feorish (Tarmonbarry)_020).

Details of silt ponds, associated surface water emission points and those being monitored and sampled as part of the PCAS scheme are detailed on the accompanying structures map along with water quality map. See Drawing number BNM-DR-25-10-02 titled **Granaghan Bog: Structures and Sampling**, along with Drawing number BNM-DR-25-10-WQ01 titled **Granaghan Bog: Water Quality Map** included in the accompanying Mapbook, which illustrate the various drainage and water quality infrastructure present at Granaghan.

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 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, under the trigger level for Ammonia and broadly under the trigger level for COD, excepting an occasion in 2017.

Ammonia averaged 0.31mg/l and ranged from 0.03 to 1.26mg/l with Suspended Solids ranging from 2 to 15 mg/l and averaging 4.41mg/l.

Table 3-2 Decommissioning and Rehabilitation Programme Water Quality Monitoring.

Bog	SW	Monitoring	pH	SS	TS	Ammonia	TP	COD	Colour
Grannaghan	SW-21	Q4 22	7.2	2	212	0.083	0.05	46	150
Grannaghan	SW-22	Q4 22	6	2	166	0.201	0.05	60	230
Grannaghan	SW-22A	Q4 22	5.7	8	70	0.24	0.05	64	289
Grannaghan	SW-23	Q4 22	6.9	2	252	0.057	0.058	70	261
Grannaghan	SW-21	Q2 20	8	2	317	0.14	0.05	52	125
Grannaghan	SW-22	Q2 20	7.2	2	308	0.445	0.05	93	317
Grannaghan	SW-22A	Q2 20	7.7	2	303	0.208	0.05	35	146
Grannaghan	SW-23	Q2 20	7.2	2	201	1.26	0.05	54	185
Grannaghan	SW-21	Q4 17	7.8	6	304	0.21	0.05	98	233
Grannaghan	SW-22	Q4 17	7.5	15	202	0.46	0.05	107	193
Grannaghan	SW-22A	Q4 17	6.3	5	82	0.44	0.05	72	199
Grannaghan	SW-23	Q4 17	7.5	5	218	0.03	0.05	89	178

Rehabilitation of cutaway peatland is closely linked with control of emissions. One of the criteria for successful rehabilitation is stabilisation through re-vegetation, which will stabilise all substrates and in turn remove the need for further silt control measures. Re-wet peat also aids the primary objective of stabilizing peat, as when peat is re-wetted it is not vulnerable to wind erosion. Re-wet peat and the development of wet peatland habitats can also act as sinks for silt and mobile peat, and increases additional retention time for solids, and the peatland vegetation can quickly stabilise this material within blocked drains on site (by acting like constructed wetlands).

Water quality of water discharges from restored peatlands normally improves as a result of bog restoration measures and the restoration of natural peatland processes (Bonn *et al.*, 20017). Bog restoration is also expected to improve water attenuation of the site as the drains are blocked, slowing water movement and water release from the site. Restored peatlands help slow the release of water and aid the natural regulation of floods downstream (Minayeva *et al.*, 2017). The National River Basin Management Plan (NRBMP) 2022-2027 (DHLGH, 2021) 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 NWBMP deliver its objectives in relation to the WFD.

Decommissioning and Rehabilitation Programme Water Quality Monitoring.

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

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

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

Initial monthly results are included in Appendix XIII. These results cover the period from August 2020 to October 2023 and are from some of the surface water outlet from the sections of bog to be rehabilitated in 2023. 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 very slight downward trend from SW23 during the period and no trend at SW22A, all well below any limits of concern. During this same period there was a mixed trend in Ammonia for both SW22A and 23, with all other parameters fluctuated slightly, most likely influenced by normal weather patterns, including rainfall.

Monthly ammonia concentrations from both bogs from August 2020 to October 2023 had a range of 0.01 to 0.659 mg/l with an average of 0.140 mg/l. Results for suspended solids for the same period indicate a range of 2 to 10mg/l with an average of 3.45 mg/l.

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

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

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

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

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

Rehabilitation of cutaway peatland is closely linked with control of emissions. One of the criteria for successful rehabilitation is stabilisation through re-vegetation, which will stabilise all substrates and in turn remove the need for further silt control measures. Re-wetted peat also aids the primary objective of stabilizing peat, as when peat is re-wetted it minimises risk to wind erosion. Re-wetted peat and the development of wet peatland habitats can also act as sinks for any 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 will still discharge from designated emission points when rehabilitation at Granaghan Bog has been completed. This discharge will have improving water quality and there will be increased wetland attenuation, meaning slower release of water. This is expected to have a positive impact on status of downstream watercourses.

As the monthly monitoring program at Granaghan Bog continues in 2023 and 2024 and during the rehabilitation works planned for 2024, with data from the 2022/23 monitoring program, further trending will be produced to verify any ongoing trends.

3.7 Fugitive Emissions to Air

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

3.8 Carbon Emissions

Irish peatlands are a huge carbon store, containing more than 75% of the national soil organic carbon (Renou-Wilson et al. 2012). Peatland drainage and extraction transforms a natural peatland which acts as a modest carbon sink (taking in 0.1 to 1.1 t of carbon as CO₂-C /ha/yr) into a cutaway ecosystem which is a large source of carbon dioxide (releasing 1.3 to 2.2 t of carbon as CO₂-C /ha/yr) based on Tier 1 Emission factors (Evans et al. 2017). Renou-Wilson et al. (2018) reported losses of between 0.81 – 1.51 CO₂-C /ha/yr from drained peatlands located in Ireland.

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

It is expected that Granaghan 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 regenerating wet deep peat vegetation on deep peat areas, and wetland habitats on shallow peat with open water, reed swamp and fen habitats with alkaline emission factors. Birch woodland is expected to develop on the drier mounds and peripheral headlands.

3.9 Current Ecological Rating

(Following NRA (2009) Evaluation Criteria)

The majority of this site is deemed to be of Local Importance (lower value) due to the dominance of bare peat. A small proportion of the site is rated as Local Importance (higher value) as the site supports developing semi-natural habitats and pioneer cutaway habitats.

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 group bogs including Granaghan 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).
- 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 & Roscommon Wetland Study. Report prepared for Longford and Roscommon County Councils.
- Midlands & East Regional WFD Operational Committee (River Basin Management Plans).
- Sub-committee on Shannon Flooding Work Programme and Measures (OPW, Waterways Ireland, ESB, LA's, Fisheries Ireland, NPWs etc).
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).
- General consultation with range of stakeholders at annual Bord na Mona Biodiversity Action Plan review days 2010-2018.
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).
- Bird surveys and monitoring carried out by Birdwatch Ireland for Bord na Móna.

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

To date, a number of issues have been raised by consultees during the consultation process for both the current and previous drafts of the rehabilitation plan for Granaghan Bog – these are summarised below. A number of general submissions in respect of previous PCAS consultation are also referenced where applicable.

4.2.1 *Consultation*

During the initial commencement of PCAS, a number of consultees including: the Irish Farmers Association (IFA), the Irish Creamery Milk Suppliers Association (ICMSA) and Trinity College Dublin have raised concerns regarding the duration and scope of consultation period. Stakeholders suggested that the consultation period should be extended to allow all potential stakeholders to make submissions where required.

4.2.2 *Assessments of rehabilitation*

During the initial commencement of PCAS, a number of consultees including: the Irish Farmers Association (IFA), the Irish Creamery Milk Suppliers Association (ICMSA) and Trinity College Dublin have raised concerns regarding the duration and scope of consultation period. Stakeholders suggested that the consultation period should be extended to allow all potential stakeholders to make submissions where required.

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

4.2.3 *Restoration scope*

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

4.2.4 *Monitoring*

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

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

The Irish Farmers Association (IFA), The Department of Agriculture Food and the Marine, individual local residents and ICMSA queried likely impacts relating to the finalisation of several bog rehabilitation plans in 2021 and 2022, arising from the proposed re-wetting in relation to flooding on adjoining lands and, specifically, with regards to the maintenance of drains. In previous submissions, the IFA also raised the issue of Health and Safety in relation to raising water levels as well as possible impacts on land and property prices.

4.2.6 *Amenity*

Since the beginning of consultation by BnM relating to Peatlands Climate Action Scheme funded, several consultees including various politicians, have requested information regarding the development of amenities on BnM bogs.

4.2.7 *Water Quality*

A number of consultees including Uisce Eireann Irish Water have contacted BnM to express their concerns regarding the potential impact of PCAS related activities on water quality within waterbodies that are hydrologically connect to BnM bogs.

4.2.8 *Future management*

In submissions made on earlier PCAS plans the Irish Farmers Association (IFA) expressed concerns regarding the future ownership of the BnM bogs subject to rehabilitation. They expressed a desire for contingency planning for potential future ownership of designated bogs so as to ensure no negative impacts arise on adjacent properties from any new ownership.

4.2.9 *Other issues*

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

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

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

4.3 Bord na Móna response to issues raised during consultation

4.3.1 *Consultation*

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

4.3.2 *Assessments of rehabilitation*

Appropriate Assessment screening will be undertaken on all the bogs as part of PCAS and has been undertaken by external consultants for Granaghan Bog. A Natura Impact Statement was not required and an Appropriate

Assessment Screening Report has been prepared in respect of Granaghan Bog, see Addendum 1. In relation to the SEA Directive and EIAR Directive, this has been considered and the legal advice to date is that the scheme does not come under these Directives.

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

An Archaeological Impact Assessment (AIA) will be undertaken on all the bogs in PCAS (Appendix XII). In addition, the National Monuments Service commissioned a survey of this bog in January 2024 and the output from this will further inform any required mitigation measures. The aim for known archaeology on these bogs is to accomplish preservation in situ and we are taking steps to identify and avoid all known archaeology. Bord na Móna aim to achieve this through including all known archaeology in the planning process of rehabilitation works and implementing an exclusion or buffer zone around these features as prescribed by the Project Archaeologist. These measures will sufficiently protect any known archaeology in these areas, during any ground works in the final plan. It is anticipated that any archaeology will benefit from the ultimate remit of the rehabilitation, in that water tables will be raised thereby preserving in-situ. There is also an identified procedure for managing reports of stray finds that may arise during rehabilitation works.

4.3.3 *Restoration scope*

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

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

The local environmental conditions of Granaghan Bog means that deep peat measures along with some additional works measures are the most suitable rehabilitation approach for this site to optimise benefits for climate. Granaghan Bog is predominantly a deep peat bog. At present, there is very little development of pioneer cutaway habitats within the bog, and this area is predominately bare peat. The majority of area proposed for rehabilitation is expected to develop as deep peat habitat. A key expected habitat is raised bog habitat on deeper residual peat. Degraded raised bog within the site will improve in overall habitat condition. Granaghan Bog has a partially pumped drainage system.

4.3.4 *Monitoring*

As part of the PCAS, a monitoring and verification plan has been developed to support climate action and biodiversity objectives. This will include stratified monitoring of bog condition, habitats and biodiversity at several different scales. It is proposed to monitor the improvement of some biodiversity ecosystem services. The appearance of key species such as *Sphagnum* moss will be monitored during walk-over surveys and general monitoring visits. It is not proposed to carry out any additional monitoring of biodiversity ecosystem services at this site. Biodiversity monitoring for PCAS planned for a stratified approach with different targeted monitoring at different sites based on the site characteristics.

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

An overview of the Water Quality Monitoring plan was provided to Irish Water, and confirmation given that water flow and dissolved organic carbon (DOC) is being monitored.

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

It was also confirmed that rehabilitation of bogs in the same catchment is likely to result in beneficial impacts on water quality in the catchment. This will be captured by the results from EPA monitoring stations in the vicinity of the bogs.

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

It is the intention of Bord na Móna that the re-wetting of the bogs will be carried out in such a manner that does not impact on third party lands. Where it is deemed that blocking of a shared drain would cause any adjoining lands to be adversely affected, this will be avoided, and alterations made to the rehabilitation plan. In general, drains around the margins of the bog will not be blocked.

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

The rehabilitation measures proposed at Granaghan Bog will generally result in reduced runoff and drainage from the existing peat fields through a mixture of techniques including drain blocking, cell bunding and re-profiling. It is intended that these measures will not significantly alter the existing topographical catchments and that the spine of the drainage networks, those which the upstream catchments drain through, will be retained by Bord na Móna.

4.3.6 *Amenity*

Creating amenity developments such as walking tracks is not part of the direct scope of PCAS. However, PCAS will enable and support any future amenity development.

4.3.7 *Water quality*

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

4.3.8 *Future management*

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

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

4.3.9 *Other issues*

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

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

4.3.10 *Concluding statement*

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

- Marginal drains will not be blocked to avoid impacts on adjacent lands or lands under the ownership of third parties or turf-banks. This does not change the overall rehabilitation goals and outcomes and can be integrated with the other rehabilitation measures to allow cutaway re-wetting.
- Turbary rights, if present, will remain unaffected.
- Bord na Móna intend to continue management of this site into the future and issues such as security and trespass will be addressed on an ongoing basis in association with other stakeholders.
- Bord na Móna intends to maintain a “No Shooting” policy on Granaghan Bog.

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 embryonic *Sphagnum*-rich vegetation communities on deep peat where possible, or reed swamp and fen on shallow more alkaline peat and other subsoils, where present.
- Optimising hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future.
- Supporting expected future land uses.
- The main goal and outcome of this plan is the successful rehabilitation (environmental stabilisation) of peatlands used for industrial peat production at the bog in a manner that is acceptable to both external stakeholders and to Bord na Móna and which optimise climate action and other ecosystem service benefits.

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

- It will take some time for stable naturally functioning habitats to fully develop at Granaghan 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/part Carbon sink. In time, the site has the capacity to develop in part as a carbon sink. PCAS is expected to deliver significant contributions to Ireland's climate action.
- It is not expected that the site has the potential to develop active raised bog (ARB) analogous to the priority EU Habitats Directive Annex I habitat within the foreseeable future (c.50 years). Furthermore, only a proportion of the bog has potential to develop *Sphagnum*-rich habitats in this timeframe. Nevertheless, re-wetting across the entire bog, as part of the Scheme, will improve habitat conditions of the whole bog. Other peatland habitats will develop in a wider mosaic that reflects underlying conditions.
- Rehabilitating boglands that were previously used as an industrial peat source will also in the longer-term support other ecosystem services such as such the development of new habitat to support biodiversity and local attenuation of water flows from the bog.
- WFD status in receiving water bodies can be affected by peatlands and peat extraction but is also affected by other sources such as agriculture. In addition, receiving water bodies that are assessed as At Risk from peatlands and from peat extraction are likely to have several contributory sources of impacts (private peat extraction and Bord na Móna). Reducing pressures due to former peat extraction activities at

Granaghan will contribute to stabilising or improving water quality status of receiving water bodies in general. Ultimately, improving the WFD status of the receiving waterbody will depend on reducing pressure from a range of different sources., including peatlands in general (private and Bord na Móna).

- Bord na Móna are also planning rehabilitation measures in some nearby bogs (e.g., Derryarogue) in 2022-2023. There are expected to be cumulative water quality and other ecosystem service benefits to receiving water bodies such as the River Shannon from rehabilitating more than one bog in the same catchment.
- Re-wetting in general will benefit the future preservation of most known and unknown archaeological features. An Archaeological Impact Assessment (AIA) will be carried out under the PCAS scheme.

6. SCOPE OF REHABILITATION

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

- The area of Granaghan 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. Granaghan bog is part of the Mountdillon bog group.
- The Scheme is designed to exceed the stabilisation requirements as defined by the IPC Licence. This scheme is designed to enhance the ecosystem services of Granaghan 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 local environmental conditions of Granaghan Bog mean that deep peat measures along with wetland creation are the most suitable rehabilitation approach for this site. Granaghan Bog does have residual deep peat across much of the cutover area. Granaghan is a partially pumped bog and is likely to develop wetland habitats when pumping is stopped/reduced.
- The key goals and outcomes of rehabilitation set by Bord na Móna. Bord na Móna have defined the key goal and outcome of rehabilitation at Granaghan Bog as **environmental stabilisation, optimising residual peat re-wetting, and the development of embryonic *Sphagnum* moss rich vegetation on deep peat along with wetlands/Reed Swamp and Fen on shallow more alkaline peat and other subsoils**.
- Rehabilitation of Granaghan 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.
- It is not proposed to carry out rehabilitation on all marginal or peripheral cutover bog zones. Generally, these bog remnants are narrow, or are subject to turbary, and do not have positive bog restoration prospects.

6.1 Key Constraints

- **Bog conditions.** Rehabilitation outcomes of sites are constrained by the environmental characteristics of these particular areas. For example, there is potential for raised bog restoration at some sites where there has not been significant industrial peat extraction and the peat body is largely intact (deep peat sites that are drained). At other sites, most of the peat mass has been removed, the environmental characteristics of these areas have therefore changed radically (peat depths, hydrology, water chemistry, substrate type, nutrient status, etc.) and there will therefore be different habitat outcomes (wetlands, fen, heathland, grassland and Birch woodland).
- **Land-use.** Any proposed enhancement measures (i.e., targeted drain-blocking) will be designed so as not to exclude potential future land-uses, where possible.
- **Surrounding landscape and neighbours.** Another key constraint is the interaction between the Bord na Móna sites and the surrounding landscape. Care will be taken to ensure 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.

- **Turbary.** Small areas of remnant raised bog occurring around the margins have previously been used by domestic turf cutters to harvest peat. These areas are ecologically and hydrologically linked to the area owned by Bord na Móna where rehabilitation is planned. It is beyond the scope of the rehabilitation plan to address turf cutting issues on Granaghan Bog.
- **Archaeology.** The discovery of monuments or archaeological objects during peatland rehabilitation may potentially constrain the rehabilitation measures proposed for a particular area. While the rehabilitation will optimise hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future, any new archaeology may require rehabilitation measures will be reviewed and adapted. If this occurs, rehabilitation measures will be reviewed and adapted. An Archaeological Impact Assessment (Appendix XII) will be carried out to mitigate against any impact on found archaeology at Granaghan Bog. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it should be avoided and reported to Bord na Móna Archaeological Liaison Officer and the National Museum of Ireland.
- **Public Rights of Way.** There are no known rights of way at Granaghan 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.
- **Ecological.** Some sensitive ecological receptors if present may require protection through the provision of Environmental Restriction Zones (or ERZ's). However, given the extensive areas of drained bare peat present at Granaghan bog, there are currently no known ecological constraints to the proposed rehabilitation measures.

6.2 Key Assumptions

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

6.3 Key Exclusions

The scope of this rehabilitation plan does not cover:

- The longer-term development of stable naturally functioning habitats to fully develop at Granaghan 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 Granaghan 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 suspended solids run-off).

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

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

- Rewetting of residual peat in the former area of industrial peat production to offset potential run off of suspended solids 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 indicate a downward trend in Ammonia concentrations (Figure 7.1).

Similarly monitoring of surface water ammonia emissions from a Corlea bog in Mountdillon over the past 3 years. post cessation of peat extraction with ongoing rehabilitation, indicate downward trends. Following commencement, and as the monthly monitoring program at Corlea continues in 2022 during the rehabilitation works and data from the 2021 monitoring program is compiled, further trending will be produced to verify any ongoing trends.

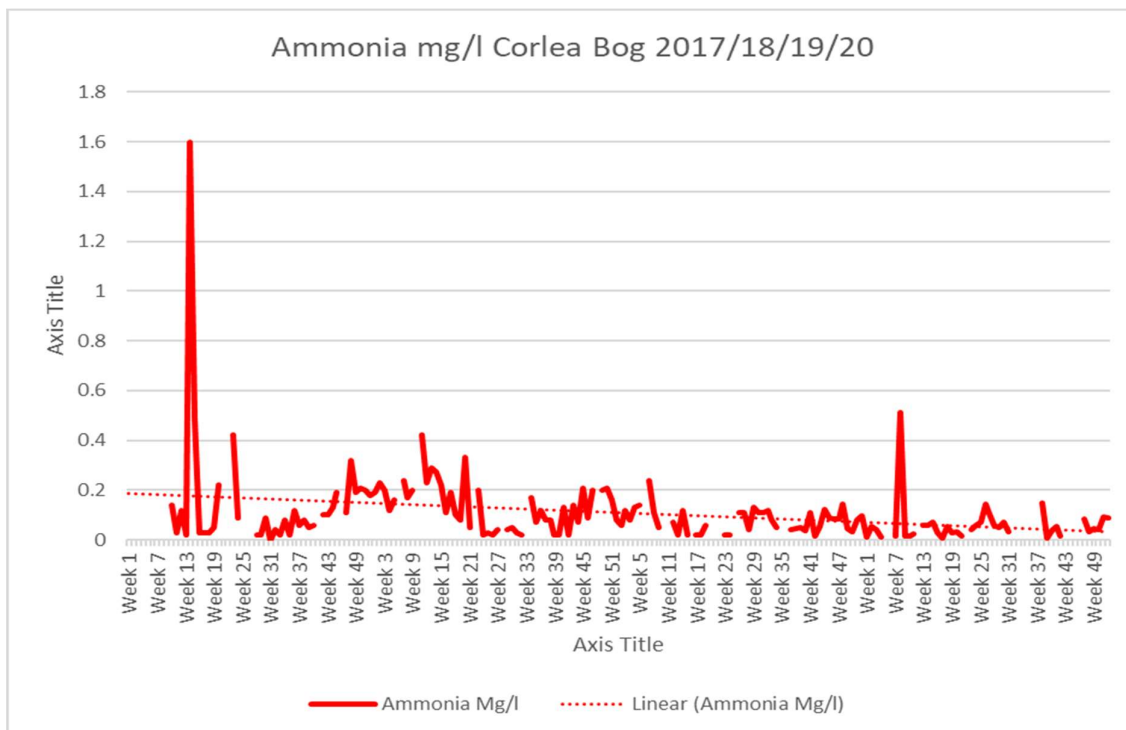
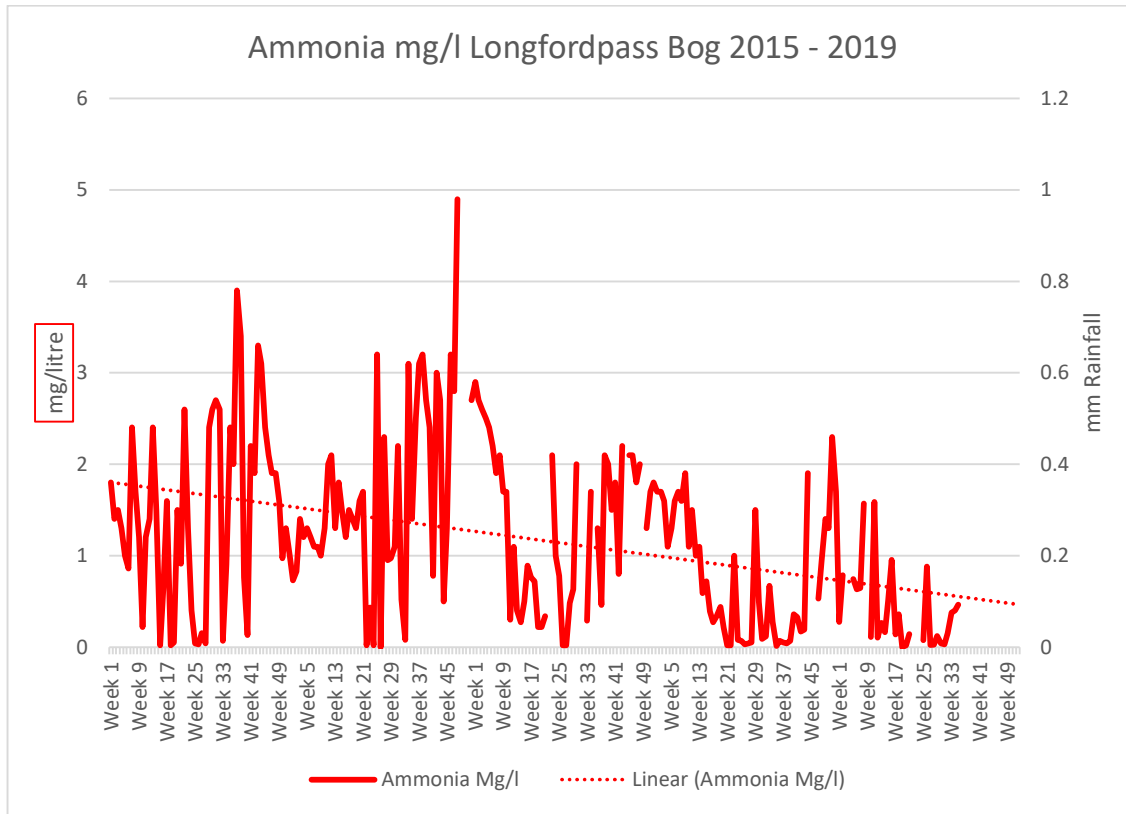


Figure 7.1. Ammonia levels over the period 2015-2019/2020 at Longfordpass and Corlea.

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

- Optimising the extent of suitable hydrological conditions to optimise climate action and other ecosystem service benefits (optimising and maximising residual peat re-wetting). This will be measured by an aerial survey after rehabilitation has been completed.
- Accelerating the trajectory of the 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, Birch woodland, fen, Reed swamp, wet woodland, scrub and heath 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 Granaghan 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.	2024-2025
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	2024-2025
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	2024-2025

Criteria type	Criteria	Target	Measured by	Expected Timeframe
			complete. Sites can be re-monitored in the future and 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.	2024-2025
Climate action verification	Setting the site on a trajectory towards establishment of a mosaic of compatible habitats	Establishment of compatible cutaway habitats	Habitat map, Cutaway bog condition map Baseline monitoring to be carried out during the scheme when rehabilitation is complete. Sites can be re-monitored in the future and compared against this baseline.	2024-2025
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	2024-2024

Meeting climate action verification criteria and monitoring of these criteria after the scheme has been completed is dependent on support from the *Climate Action Fund* and Ireland's National Recovery and Resilience Plan or other sources of funding. Note that monitoring and verification of the overall scheme will be stratified – not all these criteria will be measured at each individual site. 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 effective 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 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-25-10-22 titled Granaghan Bog: Aerial Imagery 2020

BNM-DR-25-10-04 titled Granaghan Bog: Peat Depths

BNM-DR-25-10-09 titled Granaghan Bog: Depression Analysis

BNM-DR-25-10-03 titled Granaghan Bog: LiDAR Map

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-25-10-05 Granaghan Bog: Enhanced Rehabilitation Measures in the accompanying Mapbook (note that the actual distribution of these measures may be subject to change in response to stakeholder consultation and refinement of the enhanced rehabilitation measures.)

These enhanced measures for areas out of peat extraction at Granaghan bog will include:

- Deep Peat measures including field re-profiling, resulting in bunded areas suitable for *Sphagnum* inoculation, on deeper peat;
- Intensive drain blocking around shallow peat areas/modelled depressions on little or no peat to create/promote the spread of wetland habitats,
- Modifying outfalls, and management of water levels with overflow pipes and blocking of internal outfalls;
- Regular drain blocking (3/100m) on dry cutaway along with the blocking of outfalls and management of water levels, along with organic fertiliser application;
- 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.
- Seeding of vegetation and inoculation of *Sphagnum* moss will be undertaken where required.
- Initial hydrological modelling indicates that some parts of the site will develop a mosaic of wetland habitats. 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.

An indication of the areas for these various measures is shown in Table 8.1 and in mapbook ref. no. BNM-DR-25-10-05: Enhanced Rehab Measures.

Table 8-1 Types of and areas for enhanced rehabilitation measures at Granaghan Bog.

Type*	Rehab Code	Enhanced Rehabilitation Measure	Extent (Ha)
Deep Peat	DPT 2	More intensive drain blocking (max 7/100 m) + blocking outfalls and managing overflows	49.1
Deep Peat	DPT 3	More intensive drain blocking (max 7/100 m), + field reprofiling + blocking outfalls and managing overflows	18.2
Deep Peat	DPT 4	Berms and field re-profiling (45x60m cell), modifying outfalls and managing overflows & drainage channels for excess water & <i>Sphagnum</i> inoculation	46.3
Dry Cutaway	DCT2	Regular drain blocking (3/100m) +modifying outfalls and managing water levels with overflow pipes + targeted fertiliser treatment	15.4
Wetland	WLT4	More intensive drain blocking (max 7/100 m), + modifying outfalls and managing overflows + transplanting Reeds and other rhizomes	9.3
Marginal land	MLT1	No work required	7.7
Additional Work	AW2	Targeted Drain Blocking	2.9
Silt ponds	Silt pond	Silt ponds	0.4
Constraint	Constraint	Other Constraints	18.2
Total			168

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

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

- Develop a detailed site plan with engineering drawings outlining how the various rehabilitation methodologies will be applied to Granaghan 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, turbarry/turfcutting and existing land agreements is to be carried out.
- There are peat stocks remaining on the bog. This stock will be moved into existing field drains or where possible will be used in the rehabilitation in the construction of cells.
- 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.

8.2 Short-term Practical Actions (0-2 years)

- Carry out proposed measures as per the detailed site plan. This will include a combination of drain blocking, and fertiliser applications 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 is expected to commence almost immediately once peat production ceases, Phase 2 actions will be carried out in targeted areas to accelerate re-vegetation and colonisation of target species. Phase 2 actions may include seeding of targeted vegetation and inoculation of Sphagnum.
- Silt ponds will be monitored during this period and there will be continued maintenance and cleaning to prevent potential suspended solids run-off from the site during the rehabilitation phase.
- Submit an ex post report to the Scheme regulator to verify the eligible measures to be carried out in year 1 of the Scheme, and an ex ante estimate for year 2 of the Scheme; and so on for each year of the Scheme.

8.3 Long-term (>3 years)

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

8.4 Timeframe

- **2023-2024:** 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.
- **2025-2026:** Decommission silt-ponds, if necessary.

8.5 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.
- 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 License Condition 10.4. *A final validation report to include a certificate of completion for the Rehabilitation Plan, for all or part of the site as necessary, shall be submitted to the Agency within six months of execution of the plan. The licensee shall carry out such tests, investigations or submit certification, as requested by the Agency, to confirm that there is no continuing risk to the environment.*

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

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

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 (2020). Bord na Móna Annual Report 2020. https://www.bordnamona.ie/wp-content/uploads/2020/07/M12822-BORD-NA-MONA_Annual-Report-2020_WEB2.pdf
- Bonn, A., Allott, T., Evans, M., Joosten, H. & Stoneman, R. (2017) *Peatland restoration and ecosystem Services-science, policy and practice*. Cambridge University Press.
- Carroll, J., Anderson, P., Caporn, S., Eades, P., O'Reilly C. & Bonn, A. 2009. Sphagnum in the Peak District. Current Status and Potential for Restoration. *Moors for the Future Report No 16*. Moors for the Future Partnership.
- Clark, D. and Rieley, J. 2010. *Strategy for responsible peatland management*. International Peat Society, Finland.
- Clark, D. (2010). *Brown Gold. A history of Bord na Móna and the Irish peat industry*. Gill Books.
- Cross, J.R. (2006). *The Potential Natural Vegetation of Ireland*. *Biology and Environment: Proceeding of the Royal Irish Academy*, Vol. 106B, No. 2, 65-116 (2006).
- Department of Communications, Climate Action and Environment 2019. *National Climate Action Plan 2019*. <https://www.dccae.gov.ie/en-ie/climate-action/publications/Pages/Climate-Action-Plan.aspx>
- Department of Housing, Planning, Community and Local Government 2017. *Public consultation on the River Basin Management Plan for Ireland*. Department of Housing, Planning, Community and Local Government. https://www.housing.gov.ie/sites/default/files/public-consultation/files/draft_river_basin_management_plan_1.pdf
- Department of Arts, Heritage and the Gaeltacht 2015. *National Peatland Strategy*. Department of Arts, Heritage and the Gaeltacht. <http://www.npws.ie/sites/default/files/general/Final%20National%20Peatlands%20Strategy.pdf>
- 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
- 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>.
- Evans, C., Artz, R., Moxley, J., Smyth, M-A., Taylor, E., Archer, N., Burden, A., Williamson, J., Donnelly, D., Thomson, A., Buys, G., Malcolm, H., Wilson, D., Renou-Wilson, F., Potts J. (2017). Implementation of an emission inventory for UK peatlands. Report to the Department for Business, Energy and Industrial Strategy, Centre for Ecology and Hydrology, Bangor.88pp. https://uk-air.defra.gov.uk/assets/documents/reports/cat07/1904111135_UK_peatland_GHG_emissions.pdf.
- European Commission (2013). Interpretation manual of European Union Habitats. European Commission DG Environment Nature ENV B.3.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.
- Günther, A., Barthelmes, A., Huth, V., Joosten, H., Jurasinski, G., Koebisch, F. & Couwenberg, J. (2020). Prompt rewetting of drained peatlands reduces climate warming despite methane emissions. *Nature Communications* volume 11, Article number: 1644.
- Hinde, S., Rosenburgh, A., Wright, N., Buckler, M. and Caporn, S. 2010. Sphagnum re-introduction project: A report on research into the re-introduction of Sphagnum mosses to degraded moorland. Moors for the Future Research Report 18. Moors For The Future Partnership.
- Holden, J., Walker, J., Evans, M.G., Worrall, F., Bonn, A., 2008. In: DEFRA (Ed.), *A Compendium of Peat Restoration and Management Projects*.
- Joosten, H. and Clarke, D. 2002. *Wise Use of mires and peatlands – Background and Principles including a framework for Decision-making*. I.M.C.G. – I.P.S., Jyväskylä, Finland.
- Lindsay, R., 2010. *Peatbogs and Carbon: a Critical Synthesis to Inform Policy Development in Oceanic Peat Bog Conservation and Restoration in the Context of Climate Change* (Report to RSPB Scotland, Edinburgh).

- Mackin, F., Barr, A., Rath, P., Eakin, M., Ryan, J., Jeffrey, R. & Fernandez Valverde, F. (2017) Best practice in raised bog restoration in Ireland. Irish Wildlife Manuals, No. 99. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.
- McBride, A., Diack, I., Droy, N., Hamill, B., Jones, P., Schutten, J., Skinner, A. and Street, M. 2011. The Fen Management Handbook, (2011), Scottish Natural Heritage, Perth.
- Minayeva, T. et al. (2017). Towards ecosystem-based restoration of peatland biodiversity. Mires and Peat, Volume 19 (2017), Article 01, 1–36, <http://www.mires-and-peat.net>
- McDonagh, E. (1996). Drain blocking by machines on Raised Bogs. Unpublished report for National Parks and Wildlife Service. https://www.npws.ie/sites/default/files/publications/pdf/McDonagh_1996_Drain_Blocking_Raised_Bogs.pdf.
- NPWS. (2014). Review of the raised bog Natural Heritage Area network. Department of Arts, Heritage and the Gaeltacht.
- NPWS. (2017a). National Raised bog Special Areas of Conservation management plan. Department of Arts, Heritage and the Gaeltacht. [https://www.npws.ie/sites/default/files/files/FOR%20UPLOAD%20Plan\(WEB_English\)_05_02_18%20\(1\).pdf](https://www.npws.ie/sites/default/files/files/FOR%20UPLOAD%20Plan(WEB_English)_05_02_18%20(1).pdf)
- NPWS. (2017b). Actions for biodiversity 2017-2021. Ireland's 3rd national biodiversity plan. Department of Arts, Heritage and the Gaeltacht. <https://www.npws.ie/sites/default/files/publications/pdf/National%20Biodiversity%20Action%20Plan%20English.pdf>
- NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill. https://www.npws.ie/sites/default/files/publications/pdf/NPWS_2019_Vol2_Habitats_Article17.pdf
- NRA (2009). Guidelines for Assessment of Ecological Impacts of National Road Schemes (Revision 2). National Roads Authority.
- NRA (2010). Guidelines on The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads. National Roads Authority. <https://www.tii.ie/technical-services/environment/construction/Management-of-Noxious-Weeds-and-Non-Native-Invasive-Plant-Species-on-National-Road-Schemes.pdf>.
- 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, 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.

- 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.
- Wilson, D. & Mackin, F. & Tuovinen, J., Moser, G., & Farrell, C & Renou-Wilson, F. (2022). Carbon and climate implications of rewetting a raised bog in Ireland. Global Change Biology. 10.1111/gcb.16359.
- 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.

GRANAGHAN DECOMMISSIONING AND REHABILITATION PLAN - ADDENDUM 1

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). 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. Granaghan bog is part of the Mount Dillon bog group and is located in Co. Longford.

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

Appropriate Assessment Reporting findings

A Screening for Appropriate Assessment Report³ was commissioned by Bord na Móna to inform whether the proposed PCAS activities at Granaghan Bog had the potential to result in Likely Significant Effects on European Sites. The concluding statement of this report reads as follows:

“It is concluded beyond reasonable scientific doubt, in view of best scientific knowledge, on the basis of objective information and in light of the conservation objectives of the relevant European Sites, that the proposed Decommissioning and Rehabilitation at Granaghan Bog, individually or in combination with other plans and projects, will not have a significant effect on any European Site”.

Therefore, following screening, Appropriate Assessment is not required for the project as it is not directly connected with or necessary to the management of any European Site(s) and as it can be concluded, on the basis of objective information, that the project, individually or in combination with other plans or projects is not likely to have a significant effect on any European Site(s).

³ MKO (2024). Article 6 (3) Appropriate Assessment Screening Report. Granaghan Bog, Co. Longford, Decommissioning and Rehabilitation Plan 2024

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 former peat extraction 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 Granaghan 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. Granaghan bog is part of the Moundillon bog group.
- The current condition of Granaghan Bog. This site has pumped drainage.
- The key objective of rehabilitation, as defined by this licence, is **environmental stabilisation** of the bog.
- To minimise potential impacts on neighbouring land. Some boundary drains around Granaghan Bog will be left unblocked as blocking boundary drains could affect adjacent land.

Rehabilitation goals and outcomes

The key rehabilitation goal and outcome for Granaghan 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 in the former area of industrial peat production to offset potential run-off of suspended solids and to encourage development of vegetation cover via natural colonisation, and reducing the area of bare exposed peat.
- That there is a stabilising/improving concentration of suspended solids and ammonia associated with the measures undertaken to stabilise the peat surface by the blocking of the internal drainage system and the maximised rewetting of the peat surface. This will be demonstrated by developing a stable or downward trajectory of water quality indicators (suspended solids and ammonia) towards what would be typical of a re-wetted cutaway bog. This will be measured via water quality monitoring (suspended solids and ammonia).
- Receiving water bodies have been classified under the River Basin Management Plan and this classification includes waters that are *At Risk* from peatlands and peat extraction. The success criteria will be that the *At Risk* classification will see improvements in the associated pressures from this peatland or if remaining *At Risk*, that there is an improving trajectory in the pressure from this peatland.

Rehabilitation indicators

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

Rehabilitation measures: (see Mapbook drawing no. BNM-DR-25-10-20: Standard Rehab Measures)

- Blocking field drains in the drained raised bog remnant area to create regular peat blockages (three blockages per 100 m) along each field drain;
- No measures are planned for the other surrounding marginal peatland habitats.
- Silt ponds will continue to be maintained during the rehabilitation and decommissioning phase.
- Evaluate success of short-term rehabilitation measures and enhance where necessary.
- Decommissioning of silt-ponds will be assessed and carried out, where required.

Timeframe:

- 2024-2025 1st phase of rehabilitation. Field drain blocking.
- 2025. 2nd phase. Further realignment of piped drainage and other re-wetting measures dependent on success of 1st phase re-wetting, as determined by ongoing monitoring of water levels and re-vegetation.
- Other enhancement measures such as fertiliser treatment will be carried out, if needed. These will be determined by ongoing monitoring.
- 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)
Deep peat	DPT1	Regular drain blocking (3/100 m) + blocking outfalls and managing water levels with overflow pipes	113.6
Dry cutaway	DCT1	Blocking outfalls and managing water levels with overflow pipes	15.4
Wetland	WLT1	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes	9.3
Marginal Land	MLT1	No work required	10.6
Other	Silt Pond	Silt ponds	0.4
Other	Constraint	Constrained areas/buffers/Archaeology	18.6
Total			168

See Drawing number BNM-DR-25-10-20 titled **Granaghan 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.
- The parameters to be included (as per condition 6.2 of the IPC Licence) include monthly monitoring for pH, Flow, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD.
- This sampling regime on a selected number of silt ponds will be carried out over a two-year cycle. The original (licence) requirement was for a quarterly sampling regime.
- Where other uses are proposed for the site, these will be assessed by Bord na Móna in consultation with interested parties. Other after-uses can be proposed for licensed areas and must go through the required assessment and planning procedures.

Validation and IPC Licence surrender

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

- The planned rehabilitation has been completed;

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

APPENDIX II: BOG GROUP CONTEXT

The Mount Dillon Bog Group IPC Licensed area is made up of two sub-groups (Lough Ree (the Mount Dillon Energy Peat Group) and Mostrim) and have been in industrial peat production for several decades. There are 28 defined sites covering a total area of 11,322 ha. Of the 28 sites, 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 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. Remaining milled peat stocks were supplied to Lanesborough (LRP) in 2020. Both power stations ceased using peat by the end of 2020. All remaining horticultural peat stocks were also removed during 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 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 License Ref. PO-504-01-01 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 Dillon and Garryduff 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 2023
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	Draft 2019 To be Finalised 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 1960 and ceased in 2020. 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 Derryadd Windfarm for which planning permissions were granted in 2020.	2020	Draft 2023

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Derryadd2	328	Cutover Bog Industrial peat production commenced at Derryadd 2 Bog in 1960 and ceased in 2020. 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 2 is considered a shallow peat cutover bog.	Much of the former production area at Derryadd 2 has been out of peat production for some time. These areas have already extensively colonised with pioneer wetland and scrub vegetation communities Derryadd 2 Bog will form part of the footprint of Derryadd Windfarm for which planning permissions were granted in 2020.	2020	Rehab Plan Draft 2022 To be Finalised in 2023
Derryarogue	895	Cutover Bog Industrial peat production commenced at Derryarogue Bog in 1941 and ceased in 2020. 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 Derryadd Windfarm for which planning permissions were granted in 2020. An amenity walkway through part of Derryarogue is proposed for the Derryadd Windfarm project	2020	Rehab Plan Draft 2022 To be Finalised in 2023
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	Rehab Plan Draft 2023 To be Finalised in 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	Rehab Plan Draft 2022 To be Finalised in 2023

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Edera	281	Cutover Bog Development for industrial peat production commenced at Edera Bog in 1990's. Active extraction from Edera began in 2003 and ceased in 2018. Edera is considered a deep peat cutover bog.	Edera Bog formerly supplied a range of commercial functions including; fuel peat for Lough Ree Power. The majority of Edera Bog former production area is bare peat.	2020	Finalised 2021 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	Rehab Plan Draft 2022 To be Finalised in 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	Rehab Plan Draft 2022 To be Finalised in 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 the 1960'S, and finished in 2020. 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 Derryadd Windfarm for which planning permissions were granted in 2020.	2020	Draft 2023
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-25-10-24 titled **Mount Dillon Bog Group**, included in the accompanying Mapbook which illustrates the location of Granaghan Bog and the Mount Dillon Bog Group in context to the surrounding area

APPENDIX III: ECOLOGICAL SURVEY REPORT

Ecological Survey Report			
<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>			
Bog Name:	<u>Granaghan</u>	Area (ha):	203ha
Works Name:	Mount Dillon	County:	Roscommon
Recorder(s):	BnM Ecology Section	Survey/ monitoring Date(s):	22 nd August 2012
<p>Habitats present (in order of dominance)</p> <p>The most common habitats present at this site include:</p> <ul style="list-style-type: none"> • Bare peat (BP) (Codes refer BnM classification of pioneer habitats of production bog). • Pioneer dry heath communities (dHeath) • Scrub (eBir, OBir and CBir). • Silt Ponds (Silt) with associated habitats such as scrub, Bracken, rank grassland (GS2), dry calcareous grassland (gCal) and typical pioneer communities of disturbed areas (disTuss). <p>The most common habitats present around the margins at this site include:</p> <ul style="list-style-type: none"> • Birch woodland (WN7) (Codes refer to Heritage Council habitat classification, Fossitt 2000). • Scrub (WS1) (Gorse scrub and Birch scrub developing of dry high bog around margins) • Raised bog (PB1) • Cutover bog (PB4) (several small fragments) • Wet grassland (GS4). 			
<p>Description of site</p> <p>Granaghan Bog is located approximately 7km to the North of Lanesborough in County Roscommon, just off the R371 Lanesborough to Strokestown road. This site is located within one main block; however, a narrow section to the south of the site connects Granaghan with Mount Dillon. A small section of active production bog to the south is part of Granaghan despite being located immediately next to Mount Dillon Bog. Two minor public roads cross the site.</p> <p>A rail link connects the site with Mount Dillon Bog to the South. Granaghan was initially put into full industrial peat production in the late 1980's.</p> <p>The majority of the site is classed as bare peat. A large proportion of the site contains in excess of 2.6m of peat. The deeper peat is referred to as "red" or "Sphagnum" peat.</p> <p>The Curraroe Stream flows across the site. This watercourse is highly modified and has been canalised. No aquatic vegetation was recorded from this stream, however the stream was in flood at the time of the ecological survey.</p>			

An Otter spraint was located next to the stream and bankside vegetation consisted of a mix of scrub and wet grassland. The Curraroe Stream is a tributary of the Feorish River which in turn flows into the River Shannon.

The mid-section of the site between the two public roads. A rail line and a travel path are located in this area and are used to connect Granaghan and Mount Dillon main bog. The main habitats in this area are wet grassland (GS4), scrub (WS1) and remnant sections of raised bog (PB1). The largest section of remnant raised bog in this area is in moderate condition with approximately 50% Sphagnum cover (*Sphagnum capillifolium*, *S. subnitens*, *S. cuspidatum* and *S. magellanicum*). No areas of active bog remain in this area and BnM do not own the entire section of bog. Domestic turf cutting is also carried out in this area.

Habitats along the margins of the site include Birch woodland (WN7), scrub (WS1), remnant sections of raised bog (PB1), lowland depositing river (FW2) and wet grassland. The areas of Birch woodland and scrub are poorly developed and are dominated by Birch, Gorse, Willow, Bracken and Bramble. The wet grassland areas are managed by local farmers.

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

None

Adjacent habitats and land-use

Adjacent habitats include lowland depositing river (FW2), wet grassland (GS4), improved agricultural grassland (GA1), cutaway bog (PB4), conifer plantation and raised bog (PB1).

Watercourses (major water features on/off site)

- The Curraroe Stream flows through the site. The stream is a tributary of the Feorish River which in turn is a tributary of the River Shannon.

Peat type and sub-soils

Granaghan is a relatively young bog in terms of industrial peat production. The majority of the site contains in excess of 2.6m of peat.

The bog is underlain with marl.

Fauna biodiversity

Birds

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

- Mallard
- Snipe
- Other more common species include Grey Crow, Swallow, Blackbird, Robin, Thrush and Magpie.

Mammals

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

- Badger
- Fox
- Otter
- Hare

Other species

Peacock Butterfly

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 plague⁴ will be adhered with throughout all rehabilitation measures and activities.

⁴ <https://www.biodiversityireland.ie/projects/invasive-species/crayfish-plague/>

APPENDIX VI: POLICY AND REGULATORY FRAMEWORK

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

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

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

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

1 EPA IPC Licence

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Mount Dillion 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 Dillion 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 and EU Climate and Biodiversity 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.

Peatlands rehabilitation and restoration is referenced in Section 17.3.3 of the Land Use, Land Use Change, Forestry and Marine Chapter of the National Climate Action Plan 2021 as follows:

“The rehabilitation of degraded peatlands to a condition in which they regain their ability to deliver specific ecosystem services has considerable potential for initial mitigation gains, and future carbon sequestration. Additional benefits of peatland restoration include positive socio-economic outcomes for the Midlands, increased natural capital, enriched biodiversity, improved water quality, and flood attenuation.”

The scheme is included as Action 33 in the Climate Action Plan 2021 Annex of Actions - Deliver the Enhanced Decommissioning, Rehabilitation and Restoration (EDRR) Scheme for Bord na Mona Peatlands.

EDRRS is also referenced in the Climate Action Plan 2021 as a measure to deliver a Just Transition in the Midlands. International research and scientific understanding of peatlands is now reflected in key Irish national policy and strategy documents such as the National Raised Bog Special Areas of Conservation (SACs) Management Plan 2017 - 2022 (Department of Arts, Heritage and the Gaeltacht 2017), The National Peatland Strategy (Department of Arts, Heritage and the Gaeltacht 2015), The National Biodiversity Action Plan (National Parks and Wildlife Service 2017), The River Basin Management Plan for Ireland 2018-2021 (Department of Housing, Planning and Local Government 2018), and the Biodiversity – Climate Change Sectoral Action Plan (Department of Arts, Heritage and the Gaeltacht 2019). Each of the national plans, which are also complemented with the recently published EU Green Deal communication on Biodiversity Strategy for 2030 (COM 2020) have overlapping objectives and actions that focus on the restoration of peatlands damaged by turf-cutting, drainage and other impacts, as well as the re-wetting of Bord na Móna industrial peat extraction bogs.

While not specifically identified as a restoration implementor, EDRRS objectives are in line with those of the United Nations Decade on Ecosystem Restoration 2021-2030 of Preventing, Halting and Reversing the Degradation of Ecosystems worldwide.

EDRRS is also in line with the EU Commission proposal for a Nature Restoration Law which will apply legally binding targets for nature restoration in different eco-systems to every Member State. The aim is to cover at least 20% of the EU's land and sea areas by 2030 with nature restoration measures and eventually extend these to all ecosystems in need of restoration by 2050.

4 National Peatlands Strategy

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

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

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

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

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

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

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

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

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

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

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

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

6 National Biodiversity Action Plan 2016-2021

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

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

A new National Biodiversity Action Plan is currently being developed.

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

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

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

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

The main success criteria pertaining to successfully complying with this condition is ensuring that no environmental liability remains from this infrastructure and material and that the bog can be deemed suitable for surrender of the license 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	Granaghan 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	Not relevant
5	Decommissioning Fuel Tanks and associated facilities	Not relevant
6	Decommissioning and Removal of Bog Pump Sites	Where feasible
7	Decommissioning or Removal of Septic Tanks	De-sludge Septic Tank, if needed

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

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

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

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

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

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

7.3.3 The ultimate destination of the waste.

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

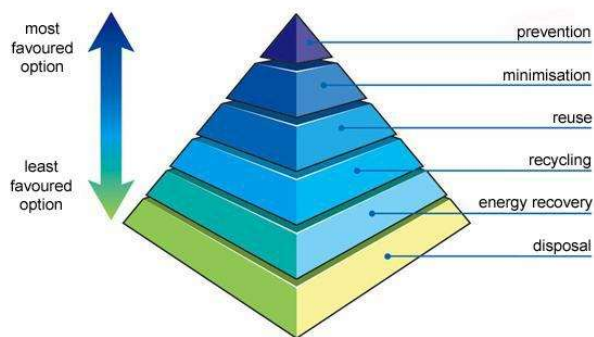
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

7.3.6 Details of any rejected consignments.

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

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

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



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

2. Enhanced Decommissioning.

The remaining infrastructure does not constitute a risk to the environment and would not be a requirement of condition 10 of the license. The removal of these are deemed as enhanced measures. These may enhance the future 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	Granaghan Decommissioning Plan
1	Removal of Railway Lines	Removal of Railway Lines
2	Decommissioning Bridges and Underpasses	Not Applicable
3	Decommissioning Railway Level Crossing	Not Applicable
4	Restricting Access (bogs and silt ponds)	Restricting Access to Bog
5	Removal of High Voltage Power Lines	If feasible

Bord na Móna	Ref #: Com_SDP
	Rev: 1
Date: 17/01/2023	Title: STOCKPILE DECOMMISSIONING PROCEDURE
Approved: PC	

Scope: All IPC licensed peatlands requiring decommissioning and rehabilitation as required by Condition 10.

Condition 10:

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

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

Procedure:

1. Ensure the silt pond servicing this pile field catchment has been cleaned within the last month, if not arrange for it to be cleaned prior to any pile decommissioning.
2. Block both pile field drains at the manholes and every 100 metres by dozing a peat blockage perpendicular to the drain, filling and compacting the blockage with the dozer until it is 300mm above the adjoining field.
3. Doze out any loose peat into the blocked drains either side ensuring an even spread.
4. Track back over each drain with the dozer to ensure good compaction.
5. Only doze out the stockpile in suitable weather and not when heavy rainfall is predicted.

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 embryonic *Sphagnum*-rich plant communities in these conditions if the peat can be re-wetted. This brings the opportunity of re-developing embryonic *Sphagnum*-rich vegetation communities that are considered Carbon sinks or peat-forming habitats and restoring the carbon sequestration function of these sites.

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

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

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

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 in Counties Longford, Roscommon and Westmeath.

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 are serviced by a silt lagoons/ponds. During the excavation of these silt ponds, pre IPPC Licensing in 1999 and since licensing, the excavated material is stored adjacent to the silt pond, where it either remains in situ 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 Ltd 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 31st 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 Mountdillon 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 Mountdillon IPPC Licence P0504-01.

APPENDIX X: MITIGATION MEASURES FOR THE APPLICATION OF FERTILISER

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

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

APPENDIX XI: CONSULTATION SUMMARIES

Table APX -1 Consultees contacted

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Granaghan	Department of Agriculture, Food and the Marine	environmentalco-ordination@agriculture.gov.ie;	09/01/2024	Email		
Granaghan	Head of Ecological Assessment - NPWS	General Email Contact	09/01/2024	Email		
Granaghan	Department of Housing, Local Government and Heritage NPWS	General Email Contact	09/01/2024	Email		
Granaghan	National Museum of Ireland	General Email Contact	09/01/2024	Email		
Granaghan	Dept of Agriculture Food & the Marine	Environmental_Coordination@agriculture.gov.ie;	09/01/2024	Email		
Granaghan	Department of Housing, Local Government and Heritage	General Email Contact	09/01/2024	Email		
Granaghan	Department of Environment, Climate and Communications	General Email Contact	09/01/2024	Email		
Granaghan	Dept of Rural and Community Development	info@dracd.gov.ie;	09/01/2024	Email		
Granaghan	Minister for Environment, Climate and Communications	General Email Contact	09/01/2024			

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Granaghan	Minister of state for Agriculture with responsibility for Land use and Biodiversity	Eoghan.murphy@agriculture.gov.ie;	09/01/2024	Email		
Granaghan	Minister of State for Nature, Heritage and Electoral Reform	General Email Contact	09/01/2024	Email	17/01/2024	
Granaghan	Oireachtas	General Email Contact	09/01/2024	Email		
Granaghan	An Taisce	heritage@antaisce.org;	09/01/2024	Email		
Granaghan	Environmental Protection Agency	General Email Contact	09/01/2024	Email		
Granaghan	Inland Fisheries Ireland	info@fisheriesireland.ie;	09/01/2024	Email		
Granaghan	Local Authority Waters Programme (West and Border Region)	General Email Contact	09/01/2024	Email		
Granaghan	Local Authority Waters Programme	General Email Contact	09/01/2024	Email		
Granaghan	Local Authority Waters Programme (Midlands and Eastern Region)	General Email Contact	09/01/2024	Email		
Granaghan	NWRA	info@nwra.ie;	09/01/2024	Email		
Granaghan	Teagasc	General Email Contact	09/01/2024	Email		
Granaghan	The Heritage Council	General Email Contact	09/01/2024	Email		
Granaghan	Waterways Ireland	info@waterwaysireland.org;	09/01/2024	Email		
Granaghan	An Forum Uisce (The Water Forum)	info@thewaterforum.ie;	09/01/2024	Email		

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Granaghan	Coillte	General Email Contact	09/01/2024	Email		
Granaghan	Irish Water	General Email Contact	09/01/2024	Email	30/01/2024	Email
Granaghan	Irish Water- Water Supply Project Eastern and Midlands Region	General Email Contact	09/01/2024	Email		
Granaghan	Irish Water	General Email Contact	09/01/2024	Email		
Granaghan	Office of Public Works	General Email Contact	09/01/2024	Email		
Granaghan	CARO (Climate Action Regional Office) Eastern and Midlands	General Email Contact	09/01/2024	Email		
Granaghan	An Taisce	General Email Contact	09/01/2024	Email		
Granaghan	Bat Conservation Ireland	General Email Contact	09/01/2024	Email		
Granaghan	Birdwatch Ireland	General Email Contact	09/01/2024	Email		
Granaghan	Butterfly Conservation Ireland	General Email Contact	09/01/2024	Email	12/02/2024	Email
Granaghan	Eastern and Midland Regional Assembly	General Email Contact	09/01/2024	Email		
Granaghan	Fisheries Ireland	General Email Contact	09/01/2024	Email		
Granaghan	Friends of the Irish Environment	General Email Contact	09/01/2024	Email		
Granaghan	ICMSA (Irish Creamery Milk Suppliers Association)	General Email Contact	09/01/2024	Email		

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Granaghan	ICSA (Irish Cattle and Sheep Farmers Association)	General Email Contact	09/01/2024	Email		
Granaghan	Irish Environmental Network (Agriculture and Land Use Policy and Advocacy Officer)	General Email Contact	09/01/2024	Email		
Granaghan	Irish Farmers Association	General Email Contact	09/01/2024	Email		
Granaghan	Irish Farmers Association (Senior Policy Exec)	General Email Contact	09/01/2024	Email		
Granaghan	Irish Farmers Association (Galway/Leitrim/Longford/Rosc/Sligo)	General Email Contact	09/01/2024	Email		
Granaghan	Irish Peatlands Conservation Council	General Email Contact	09/01/2024	Email		
Granaghan	Irish Raptor Study Group	General Email Contact	09/01/2024	Email		
Granaghan	Irish Rural Link (Community Wetlands Forum)	General Email Contact	09/01/2024	Email		
Granaghan	Irish Rural Link	General Email Contact	09/01/2024	Email		
Granaghan	Irish Wildlife Trust	General Email Contact	09/01/2024	Email	12/01/2024	
Granaghan	IWAI	General Email Contact	09/01/2024	Email		
Granaghan	National Association of Regional Game Councils	General Email Contact	09/01/2024	Email		

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Granaghan	NPWS Rangers North Midlands	General Email Contact	09/01/2024	Email		
Granaghan	NUIG Galway	General Email Contact	09/01/2024	Email		
Granaghan	Roscommon Public Participation Network	info@roscommonppn.ie	09/01/2024	Email		
Granaghan	ORNI	General Email Contact	09/01/2024	Email		
Granaghan	Ranger Association Committee	General Email Contact	09/01/2024	Email		
Granaghan	Mid-Shannon Wilderness Park Awareness Group	General Email Contact	09/01/2024			
Granaghan	Sustainable Water Action Network (SWAN)	http://www.swanireland.ie/	09/01/2024	Email		
Granaghan	Trinity College Dublin	General Email Contact	09/01/2024	Email		
Granaghan	Turf Cutters and Contractors Association	General Email Contact	09/01/2024	Email		
Granaghan	UCD / Irish Rural Link	General Email Contact	09/01/2024	Email		
Granaghan	University College Dublin	General Email Contact	09/01/2024	Email		
Granaghan	Waterways Ireland Org	General Email Contact	09/01/2024	Email		
Granaghan	Woodlands of Ireland	info@woodlandsofireland	09/01/2024	Email		
Granaghan	University of Galway	General Email Contact	09/01/2024	Email		
Granaghan	Clontuskert Community Group	General Email Contact	09/01/2024	Email		

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Granaghan	Chief Executive Roscommon County Council	chiefexecutive@roscommoncoco.ie	09/01/2024	Email		
Granaghan	Director of Services Environment, Assets and Climate	General Email Contact	09/01/2024	Email		
Granaghan	Director of Services for Planning	General Email Contact	09/01/2024	Email		
Granaghan	Director of Services for Planning	General Email Contact	09/01/2024	Email		
Granaghan	Heritage Officer	General Email Contact	09/01/2024	Email		
Granaghan	Roscommon Customer Services	customerservice@roscommoncoco.ie	09/01/2024	Email		
Granaghan	Roscommon Municipal District	General Email Contact	09/01/2024	Email		
Granaghan	TD/Roscommon-Galway	Michael Fitzmaurice TD	09/01/2024	Email		
Granaghan	TD/ Roscommon-Galway	Denis Naughton TD	09/01/2024	Email		
Granaghan	TD/ Roscommon-Galway	Claire Kerrane TD	09/01/2024	Email		
Granaghan	Local landowners			Phone	11/01/2024	
Granaghan	All Land- owners in vicinity of bog	Leaflet Drop	09/01/2024	Leaflet		

Table APX -2 Response summary from Consultees contacted

Organisation	Summary of Response by Stakeholder	BnM Response
Department of Housing, Local Government and Heritage	The Department of Housing, Local Government and Heritage responded via email on 17/01/2024 to acknowledge receipt of the rehabilitation consultation email.	No response required.
Butterfly Conservation Ireland	BCI had an email query on 12/02/24 regarding a section of remnant bog to the south east of Granaghan PCAS area and why this was not included in the rehabilitation plan.	BnM responded by email on 14/02/24 to clarify that part of the area in question was not within BnM ownership and that the remaining area was constrained as there were no rehab measures proposed for this area. .
Irish Farmers Association	The IFA have not made a submission on any specific PCAS rehab plan this year but dialogue is ongoing regarding PCAS and consultation with IFA members in the vicinity of PCAS bogs	Dialogue is ongoing.
ICMSA (Irish Creamery Milk Suppliers Association)	The ICMSA have not made a submission on any specific PCAS rehab plan this year but dialogue is ongoing regarding PCAS and consultation with ICMSA members in the vicinity of PCAS bogs	Dialogue is ongoing.

Organisation	Summary of Response by Stakeholder	BnM Response
IPCC	The IPCC have not made a specific submission on Granaghan Bog in particular but have regularly made submissions on other PCAS rehabilitation plans throughout the duration of the project. A number of key points regarding climate resilience, biodiversity opportunities and issues, and hydrology have been discussed.	Dialogue is ongoing.
Uisce Eireann/Irish Water	Uisce Eireann/Irish Water emailed on the 30/01/24 with recommendations regarding water quality monitoring, silt ponds and cumulative effects.	BnM responded by email on 07/02/24 addressing these points.
Local Landowners	Two local landowners raised concerns over impact of PCAS on their land on 11/01/2024.	BnM landowner liaison met with landowners on site 16/01/24.

APPENDIX XII: ARCHAEOLOGY

Role of the Archaeological Liaison Officer

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



Code of Practice

22

Code of Practice

5. To arrange for the delivery or collection of the stray find, as directed by the Duty Officer of the National Museum of Ireland.
6. To complete the Report of Discovery of Archaeological Object(s) in Bogs (Appendix V), as directed by the Duty Officer of the National Museum of Ireland.
7. To maintain a file of all stray finds and associated documentation and provide copies to the Project Archaeologist.
8. To provide assistance, where required, to the Department during archaeological surveys.
9. To provide assistance, where required, to Bord na Móna's Consultant Archaeologists, during investigation and mitigation of monuments.
10. To report to the Bord na Móna members on the Archaeology Management Liaison Committee any planned developments or new activities on cutaway peatland areas within his/her group of bogs.



	Procedure: ENV017	Rev: 1
Title: Archaeological Findings	Approved: EM	Date:

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			
2			



**Archaeological Impact Assessment of Proposed Bog
Decommissioning and Rehabilitation at Granaghan Bog, Co.
Roscommon**

Report For

Bord Na Móna Energy Ltd.

Author

Dr. Charles Mount

Bord Na Móna Project Archaeologist



Introduction

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

- Deep Peat measures including field re-profiling, resulting in bunded areas suitable for Sphagnum inoculation, on deeper peat;
- Intensive drain blocking around shallow peat areas/modelled depressions on little or no peat to create/promote the spread of wetland habitats,
- Modifying outfalls, and management of water levels with overflow pipes and blocking of internal outfalls;
- Regular drain blocking (3/100m) on dry cutaway along with the blocking of outfalls and management of water levels, along with organic fertiliser application;
- 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.
- Seeding of vegetation and inoculation of Sphagnum will be undertaken where required.
- Initial hydrological modelling indicates that some parts of the site will develop a mosaic of wetland habitats 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.

Granaghan bog is located 6.5km north-northwest of Lanesborough. It is located to the east of the R371 and is accessed by an unclassified road that connects the R371 with the N5, to the northeast (see Fig 1). The bog rehabilitation area occupies the townlands of Granaghan (Dillon), Granaghan (Martin), Mongagh and Drinagh on OS 6-inch sheets Roscommon numbers 29 and 30.

Methodology

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

- The Record of Monuments and Places
- The Sites and Monuments Record (SMR) that is maintained by the Dept of Housing, Local Government and Heritage
- The Excavations database
- Previous assessments

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

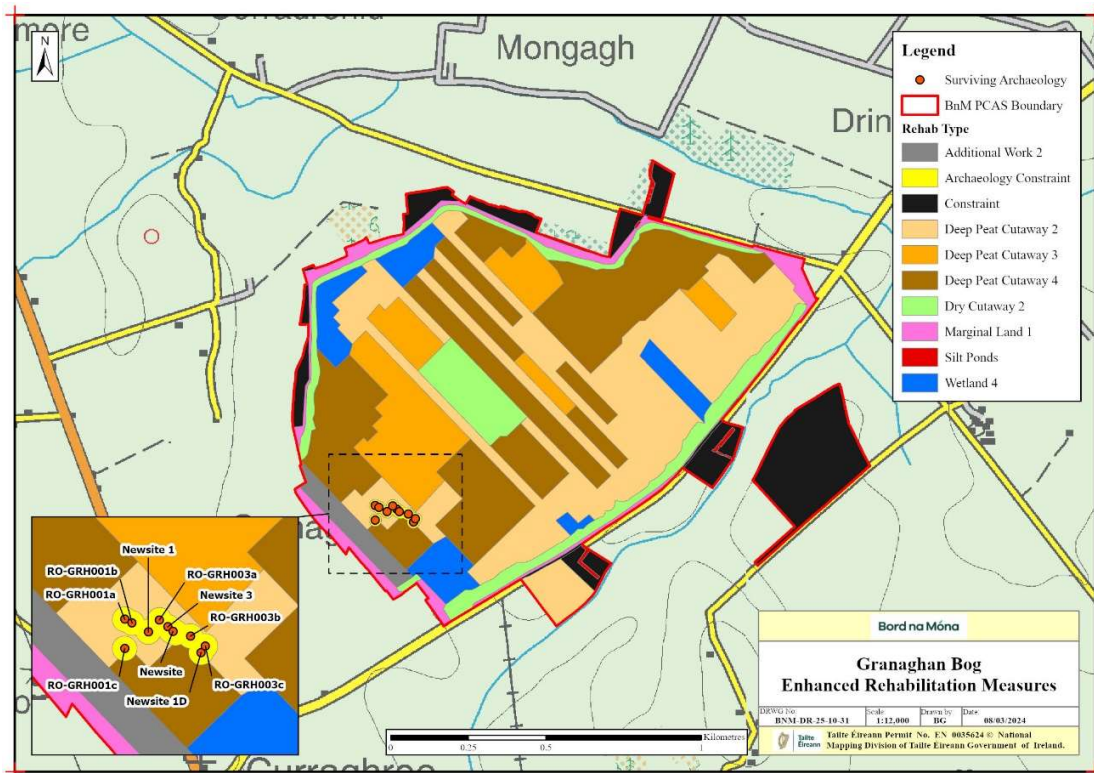


Fig. 1. Granaghan bog, Co. Roscommon, the proposed rehabilitation measures, and archaeology sightings.

Type*	Rehab Code	Enhanced Rehabilitation Measure	Extent (Ha)
Deep Peat	DPT 2	More intensive drain blocking (max 7/100 m) + blocking outfalls and managing overflows	49.1
Deep Peat	DPT 3	More intensive drain blocking (max 7/100 m), + field reprofiling + blocking outfalls and managing overflows	18.2
Deep Peat	DPT 4	Berms and field re-profiling (45x60m cell), modifying outfalls and managing overflows & drainage channels for excess water & <i>Sphagnum</i> inoculation	46.3
Dry Cutaway	DCT2	Regular drain blocking (3/100m) +modifying outfalls and managing water levels with overflow pipes + targeted fertiliser treatment	15.4
Wetland	WLT4	More intensive drain blocking (max 7/100 m), + modifying outfalls and managing overflows + transplanting Reeds and other rhizomes	9.3
Marginal land	MLT1	No work required	7.7
Additional Work	AW2	Targeted Drain Blocking	2.9
Silt ponds	Silt pond	Silt ponds	0.4
Constraint	Constraint	Other Constraints	18.2
Total			168

Table 1 Enhanced Rehabilitation Measures and Rehab Areas

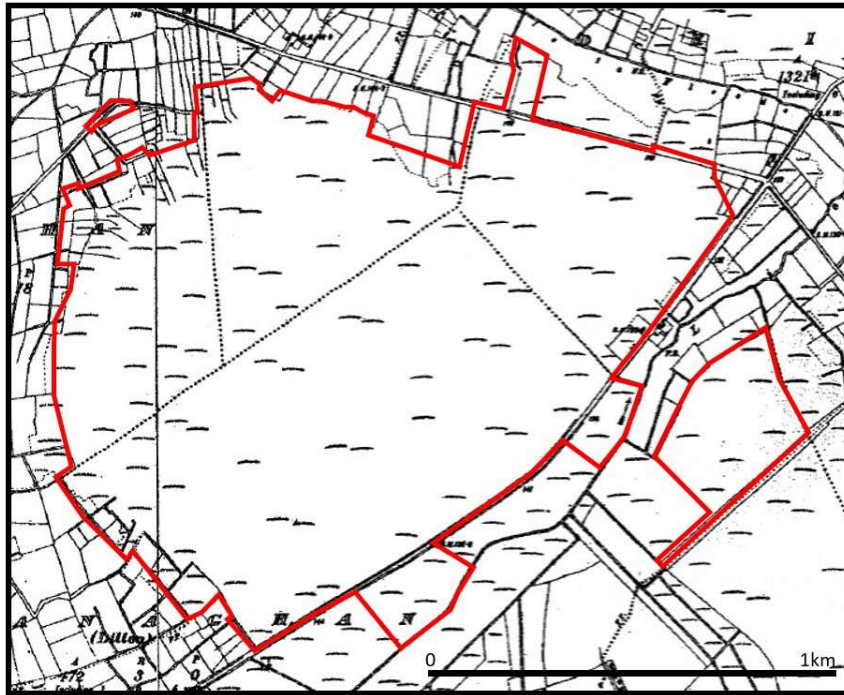


Fig. 2. Granaghan bog, Co. Roscommon, detail of the Record of Monuments and Places map sheets Roscommon numbers 29 and 30. The proposed rehabilitation area is outlined with the red line.

Desktop assessment

Peatland survey

Granaghan bog was archaeologically surveyed in 2008 by ADS Ltd as part of the 2007 & 2008 Archaeological Survey of Ireland Peatland Survey under licence 08E0643 (Rohan 2009). Eight sightings representing two toghers and two sightings of archaeological wood were found on the western side of Granaghan bog. A ninth sighting of brushwood and roundwood RO-GRH005 was dated and proved to be modern. Note, none of these sightings are included in the SMR.

SMR	Cat. Code	Class	Townland	NGR E	NGR N	ITM Easting	ITM Northing	Depth m
-	RO-GRH001a	class 2 togher	Granaghan (Dillon)	198805	275853	598756.1983	775870.9291	0.06
-	RO-GRH001b	class 2 togher	Granaghan (Dillon)	198817	275847	598768.1957	775864.9303	0.12
-	RO-GRH001c	class 2 togher	Granaghan (Dillon)	198805	275806	598756.1980	775823.9392	0.05
-	RO-GRH002	Archaeological Wood	Granaghan (Dillon)	198845	275838	598796.1895	775855.9321	0.07
-	RO-GRH003a	class 2 togher	Granaghan (Dillon)	198861	275852	598812.1861	775869.9290	0.025
-	RO-GRH003b	class 2 togher	Granaghan (Dillon)	198911	275826	598862.1751	775843.9343	0.03
-	RO-GRH003c	class 2 togher	Granaghan (Dillon)	198935	275810	598886.1699	775827.9376	0.04
-	RO-GRH004	Archaeological Wood	Granaghan (Dillon)	198875	275864	598826.1832	775881.9264	0.05



Table 2. Sightings of archaeological in the rehabilitation area of Granaghan bog made during the 2008 Archaeological Survey of Ireland Peatland Survey.

Recorded Monuments

The Record of Monuments and Places (RMP) for Co. Roscommon which was established under Section 12 of the National Monuments (Amendment) Act, 1994 was examined as part of the assessment (DAHGI 1998). These records were published by the Minister in 1998 and include sites and monuments that were known in Granaghan bog before that date. This review established that there are no RMPs located in the proposed rehabilitation area (see Fig. 2).

Sites and Monuments Record

The Sites and Monuments Record (SMR) which is maintained by the Department of Housing, Local Government and Heritage was examined as part of the assessment on the 3 November 2023. This review established that there are no SMRs located in the proposed rehabilitation area (see Fig. 3).

Archaeological Excavations

The Excavations Bulletin at excavations.ie was checked for reports of licenced excavations carried out in the rehabilitation area on the 6th of November 2023. There have been no licenced excavations carried out in the rehabilitation area.

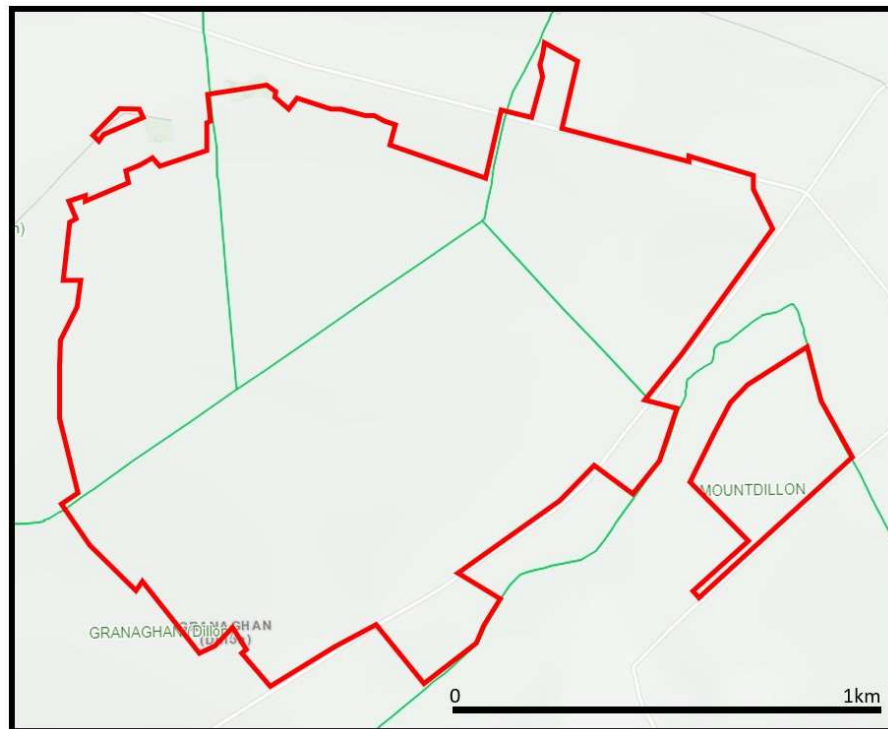


Fig. 3. Granaghan bog, Co. Roscommon, detail of the Sites and Monuments Record. The proposed rehabilitation area is outlined with the red line.



Previous assessments

2018 Environmental Impact Assessment Report

Granaghan bog has been the subject of an Environmental Impact Assessment Report (EIAR) carried out by Irish Archaeological Consultancy LTD in 2018 for Bord na Móna Energy Limited in relation to IPC Licence P0500-01. The assessment noted the sightings made by the 2008 Archaeological Survey of Ireland Peatland Survey under licence 08E0643. The assessment included a review of the topographical files and finds registers of the National Museum of Ireland intended to identify all archaeological objects from the bog reported to the Museum by that date and these are included below in Table 1 (Pers Comm. Jane Whitaker). The assessment noted that there was a high potential for archaeological heritage to be uncovered during the course of any future development works in Granaghan bog.

2024 Assessment Survey

In January 2024 Granaghan bog was the subject of an archaeological assessment carried out by Jane Whitaker for Irish Archaeological Consultancy LTD and the National Monuments Service (Whitaker 2024). The objective of the assessment was to assess the current status of previously recorded peatland sites. The assessment found that six of the sightings made in the 2008 survey were still extant, the rest had been removed. The assessment also made four new sightings of archaeological material (see Table 3). The assessment recommended that the bog be the subject of a full fieldwalking survey under licence.

SMR	Cat. Code	Class	Townland	ITM Easting	ITM Northing
-	RO-GRH001a	class 2 togher	Granaghan (Dillon)	598756.1983	775870.9291
-	RO-GRH001b	class 2 togher	Granaghan (Dillon)	598768.1957	775864.9303
-	RO-GRH001c	class 2 togher	Granaghan (Dillon)	598756.1980	775823.9392
-	RO-GRH003a	class 2 togher	Granaghan (Dillon)	598812.1861	775869.9290
-	RO-GRH003b	class 2 togher	Granaghan (Dillon)	598862.1751	775843.9343
-	RO-GRH003c	class 2 togher	Granaghan (Dillon)	598886.1699	775827.9376
-	Newsite 1	-	Granaghan (Dillon)	598794.00	775851.00
-	Newsite 3	-	Granaghan (Dillon)	598826.00	775859.00
-	Newsite 1D	-	Granaghan (Dillon)	598879.00	775818.00
-	Newsite	-	Granaghan (Dillon)	598834.00	775851.00

Table 3. Sightings of archaeological material by made the 2024 assessment survey.

Reported finds

As noted above the EIAR carried out by Irish Archaeological Consultancy LTD in relation to IPC Licence P0504-01 contains a complete list of known archaeological objects from Granaghan bog reported to the National Museum of Ireland up to 2018 (see Table 2).

Townland	Museum No./ catalogue No.	Description
Drinagh	1945:146	Human remains and wool fragments

Table 3. List of archaeological finds from Granaghan bog reported to the National Museum of Ireland.

Impact assessment

There are ten sightings of archaeological material in the rehabilitation area that may be impacted by the rehabilitation works (see Table 3).



Recommendations

There are ten sightings of known archaeological material in the rehabilitation area (see table 3). These sightings should each be protected within a 20m buffer zone. There is one archaeological find known from the bog that has been removed to the National Museum. The 2024 Assessment has recommended that Granaghan bog be the subject of a full fieldwalking survey under licence. Should any previously unknown archaeological heritage be uncovered during the rehabilitation works, it should be avoided and reported to the Bord na Móna Archaeological Liaison Officer and the National Museum of Ireland.

Conclusion

This is a desk-based archaeological assessment and includes a collation of existing written and graphic information to identify the likely archaeological potential of the proposed rehabilitation area. There are ten sightings of known archaeological material in the rehabilitation area (see table 3). These sightings should each be protected within a 20m buffer zone. There is one archaeological find known from the bog that has been removed to the National Museum. The 2024 Assessment has recommended that Granaghan bog be the subject of a full fieldwalking survey under licence. Should any previously unknown archaeological heritage be uncovered during the rehabilitation works, it should be avoided and reported to the Bord na Móna Archaeological Liaison Officer and the National Museum of Ireland.

References

- DAHGI 1998. Recorded Monuments Protected under Section 12 of the National Monuments (Amendment) Act, 1994. County Roscommon.
- EPA 2020. Guidance on the process of preparing and implementing a bog rehabilitation plan.
- Mackin *et al.* 2017. Best practice in raised bog restoration in Ireland. Irish Wildlife Manuals, No. 99. National Parks and Wildlife Service.
- Rohan, N. 2009. Peatland Survey 2007 & 2008 Blackwater, Derryfadda, Coolnagun Mountdillon Group of Bogs. Unpublished report for DOEHLG & Bord na Mona.
- Whitaker, J. 2024. Archaeological Assessment At Granaghan Bog, Mountdillon Co Roscommon. Unpublished report for the national Monuments Service.

Dr. Charles Mount
8 March 2024

APPENDIX XIII: INITIAL WATER QUALITY DATA FROM GRANAGHAN

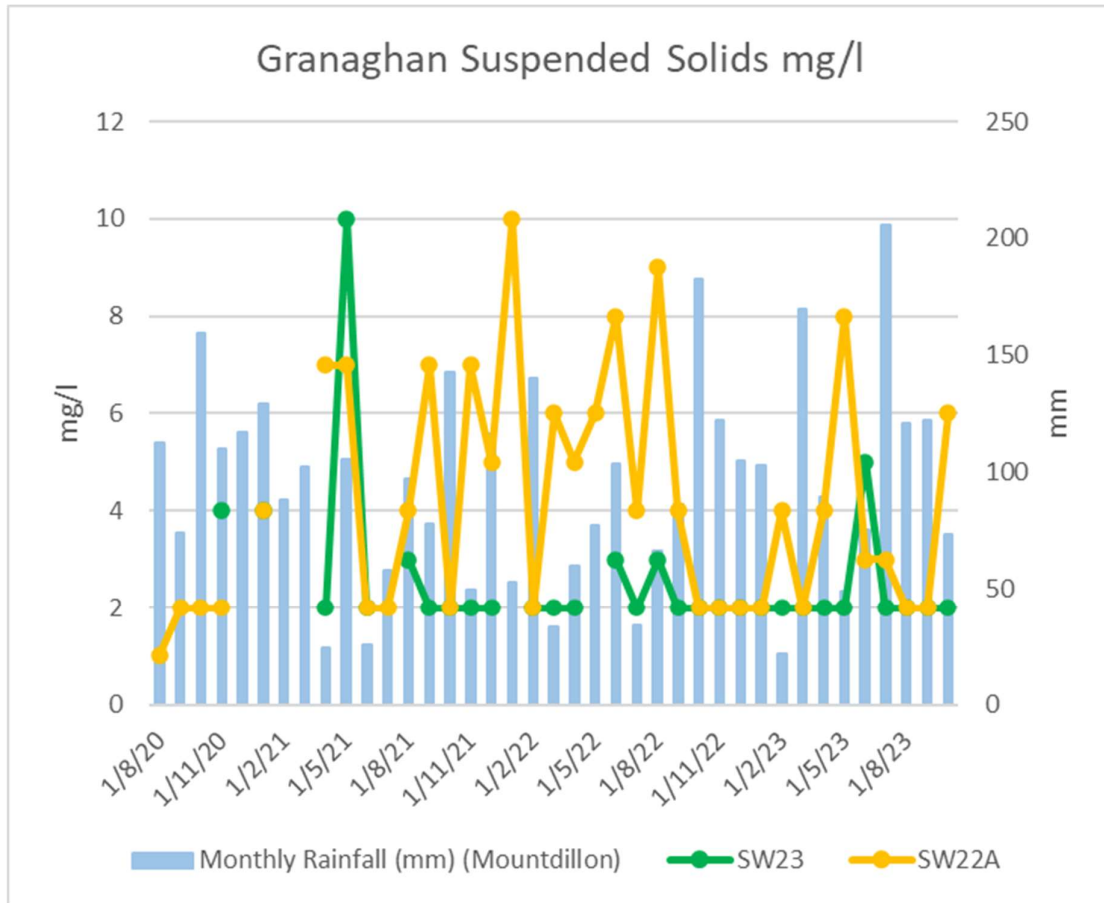


Plate 0-1 Granaghan suspended solids sampling results

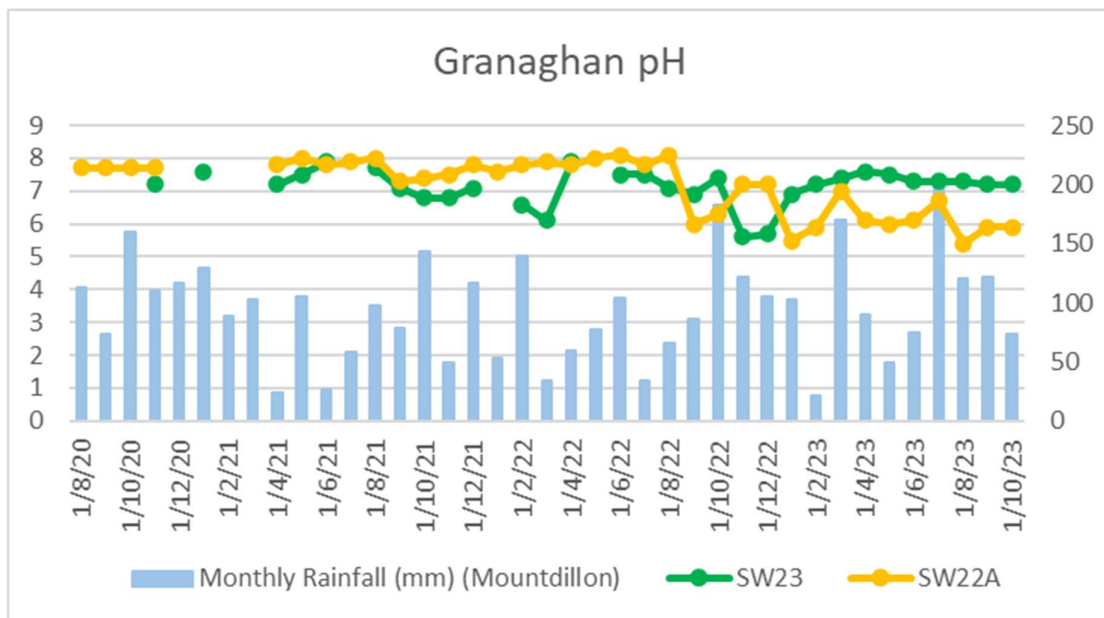


Plate 0-2 Granaghan pH sampling results

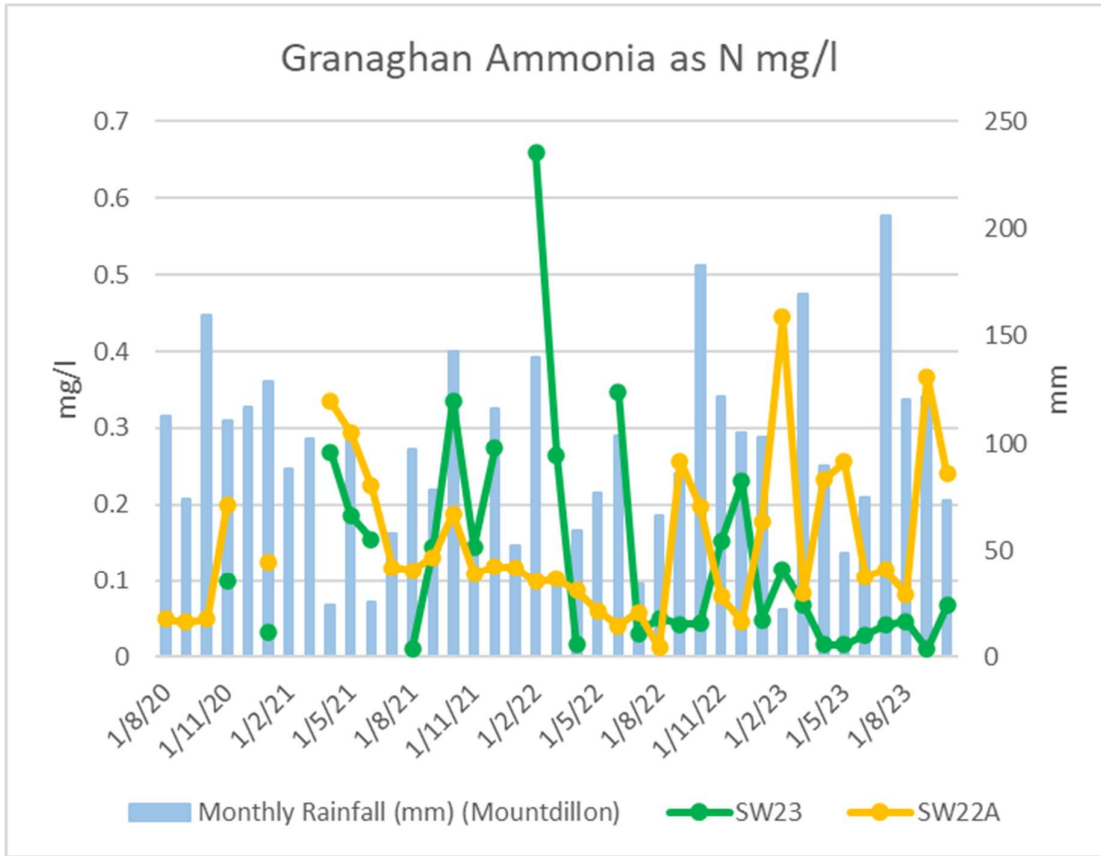


Plate 0-3 Granaghan Ammonia sampling results

Plate 0-4 Granghagh water quality monitoring data

PCAS SW Sampling Scheme	Bog Group	Licence No	Bog Name	SW Code -GIS	Suspended Solids																														
					1/8/20	1/9/20	1/10/20	1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	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	Grannagh	SW23				4		4			2	10	2		3	2	2	2	2	2	2	2	2	3	2	2	3	2	2	2			
	Mountdillon	P0504-01	Grannagh	SW22A	1	2	2	2					7	7	2		4	7	2	7	5	10	2	6	5	6	8	4	9	4	2	2			
				Monthly Rainfall (mm) (Mo)	112.7	73.8	159.7	110.2	116.8	129	88.3	102	24.2	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6		
PCAS SW Sampling Scheme	Bog Group	Licence No	Bog Name	SW Code -GIS	Colour																														
					1/8/20	1/9/20	1/10/20	1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	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	Grannagh	SW23				NF	NF	119	NF	NF	274	211	88.5	NF	134	356	339	337	314	NF	185	169	158	NF	241	237	380	348	263	219	236		
	Mountdillon	P0504-01	Grannagh	SW22A	197	64	197	160	NF	158	NF	NF	136	144	102	107	87	222	197	276	122	241	157	166	118	107	77.5	174	94.8	438	381	256	236		
PCAS SW Sampling Scheme	Bog Group	Licence No	Bog Name	SW Code -GIS	COD																														
					1/8/20	1/9/20	1/10/20	1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	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	Grannagh	SW23				NF	NF	66	NF	30	NF	NF	58	56	44	NF	49	84	83	68	79	NF	50	30	61	NF	76	61	91	69	65	45	47
	Mountdillon	P0504-01	Grannagh	SW22A	59	22	59	49	NF	48	NF	NF	39	45	53	42	29	89	66	66	51	76	53	37	44	40	14	59	38	105	76	66	57		
PCAS SW Sampling Scheme	Bog Group	Licence No	Bog Name	SW Code -GIS	pH																														
					1/8/20	1/9/20	1/10/20	1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	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	Grannagh	SW23				7.2		7.6			7.2	7.5	7.9		7.7	7.1	6.8	6.8	7.1		6.6	6.1	7.9	7.5	7.5	7.1	6.9	7.4	5.6	5.7			
	Mountdillon	P0504-01	Grannagh	SW22A	7.7	7.7	7.7	7.7					7.8	8	7.8	7.9	8	7.3	7.4	7.5	7.8	7.6	7.8	7.9	7.8	8	8.1	7.8	8.1	6	6.3	7.2	7.2		
				Monthly Rainfall (mm) (Mo)	112.7	73.8	159.7	110.2	116.8	129	88.3	102	24.2	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6		
PCAS SW Sampling Scheme	Bog Group	Licence No	Bog Name	SW Code -GIS	TPasP																														
					1/8/20	1/9/20	1/10/20	1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	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	Grannagh	SW23				NF	NF	0.05	NF	0.05	NF	NF	0.05	0.05	0.06	NF	0.05	0.17	0.08	0.06	0.07	NF	0.05	0.05	0.05	NF	0.05	0.05	0.06	0.06	0.05	0.05	
	Mountdillon	P0504-01	Grannagh	SW22A	0.05	0.05	0.05	0.05	NF	0.05	NF	NF	0.05	0.05	0.05	0.05	0.05	0.08	0.05	0.05	0.08	0.05	0.12	0.05	0.05	0.08	0.08	0.05	0.05	0.06	0.25	0.09	0.05	0.05	
PCAS SW Sampling Scheme	Bog Group	Licence No	Bog Name	SW Code -GIS	TS																														
					1/8/20	1/9/20	1/10/20	1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	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	Grannagh	SW23				NF	NF	225	NF	367	NF	NF	208	288	427	NF	356	222	233	216	195	NF	124	123	262	NF	301	257	211	190	287	118	101
	Mountdillon	P0504-01	Grannagh	SW22A	294	293	294	512	NF	442	NF	NF	108	109	136	955	992	619	450	291	737	365	362	355	153	127	154	514	147	151	104	369	206		
PCAS SW Sampling Scheme	Bog Group	Licence No	Bog Name	SW Code -GIS	Ammonia as N																														
					1/8/20	1/9/20	1/10/20	1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	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	Grannagh	SW23				0.1		0.033			0.269	0.186	0.155		0.01	0.144	0.336	0.145	0.274		0.659	0.265	0.016		0.347	0.031	0.05	0.043	0.044	0.152	0.23		
	Mountdillon	P0504-01	Grannagh	SW22A	0.049	0.045	0.049	0.199		0.124			0.335	0.294	0.224	0.117	0.113	0.131	0.188	0.109	0.148	0.117	0.099	0.103	0.087	0.06	0.041	0.058	0.012	0.257	0.198	0.079	0.046		
				Monthly Rainfall (mm) (Mo)	112.7	73.8	159.7	110.2	116.8	129	88.3	102	24.2	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6		
PCAS SW Sampling Scheme	Bog Group	Licence No	Bog Name	SW Code -GIS	DOC																														
					1/8/20	1/9/20	1/10/20	1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	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	Grannagh	SW23				NF	NF	24.7	NF	13.3	NF	NF	20.3	19.9	13.5	NF	17.5	23.2	29.4	27.9	27.3	NF	18.3	15.4	20.6	NF	29.7	24.7	32.8	39	27	17.3	19.8
	Mountdillon	P0504-01	Grannagh	SW22A	22.9	9.85	22.9	20.7	NF	19.1	NF	NF	15.9	17.5	16	14.7	10.9	25	23.7	26.9	17.8	23.6	21.1	20.2	14.4	16.6	12.6	22.3	14.9	34.1	29.2	25.5	24.9		

Plate 0-4 Granaghan water quality monitoring data (continued)

PCAS SW Sampling Scheme				Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				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
Mountdillon	P0504-01	Grannaghan	SW23	2	2	2	2	2	5	2	2	2	2
Mountdillon	P0504-01	Grannaghan	SW22A	2	4	2	4	8	3	3	2	2	6
			Monthly Rainfall (mm) (Mou	102.9	21.7	169.8	89.4	48.6	74.9	206	120.7	121.8	73.3
PCAS SW Sampling Scheme				Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co
				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
Mountdillon	P0504-01	Grannaghan	SW23	245	201	179	230	254	239	293	302	317	310
Mountdillon	P0504-01	Grannaghan	SW22A	162	207	328	258	332	382	320	267	438	342
PCAS SW Sampling Scheme				COD	COD	COD	COD	COD	COD	COD	COD	COD	COD
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				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
Mountdillon	P0504-01	Grannaghan	SW23	47	62	51	73	57	74	104	82	80	71
Mountdillon	P0504-01	Grannaghan	SW22A	30	48	65	66	27	82	115	55	85	92
PCAS SW Sampling Scheme				pH	pH	pH	pH	pH	pH	pH	pH	pH	pH
Bog Group	Licence No	Bog Name	SW Code -GIS	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units
				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
Mountdillon	P0504-01	Grannaghan	SW23	6.9	7.2	7.4	7.6	7.5	7.3	7.3	7.3	7.2	7.2
Mountdillon	P0504-01	Grannaghan	SW22A	5.5	5.9	7	6.1	6	6.1	6.7	5.4	5.9	5.9
			Monthly Rainfall (mm) (Mou	102.9	21.7	169.8	89.4	48.6	74.9	206	120.7	121.8	73.3
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
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				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
Mountdillon	P0504-01	Grannaghan	SW23	0.05	0.05	0.05	0.07	0.05	0.05	0.06	0.05	0.11	0.05
Mountdillon	P0504-01	Grannaghan	SW22A	0.05	0.05	0.05	0.05	0.05	0.11	0.1	0.05	0.19	0.15
PCAS SW Sampling Scheme				T5	T5	T5	T5	T5	T5	T5	T5	T5	T5
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				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
Mountdillon	P0504-01	Grannaghan	SW23	183	276	246	228	248	242	246	250	322	333
Mountdillon	P0504-01	Grannaghan	SW22A	54	104	277	97	101	154	159	132	110	108
PCAS SW Sampling Scheme				Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				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
Mountdillon	P0504-01	Grannaghan	SW23	0.048	0.114	0.068	0.016	0.016	0.029	0.042	0.046	0.01	0.067
Mountdillon	P0504-01	Grannaghan	SW22A	0.177	0.445	0.083	0.232	0.256	0.105	0.114	0.082	0.367	0.24
			Monthly Rainfall (mm) (Mou	102.9	21.7	169.8	89.4	48.6	74.9	206	120.7	121.8	73.3
PCAS SW Sampling Scheme				DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				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
Mountdillon	P0504-01	Grannaghan	SW23	18.8	22.2	22.1	20.6	21.9	28.5	28.6	28.8	30.5	29.3
Mountdillon	P0504-01	Grannaghan	SW22A	9.93	16.8	24.3	17.6	22.6	29.6	29.2	19.8	32.3	30.7

Any period with no samples results were either during extended dry weather periods or receiving water being back up in flood conditions.