Derrinboy Bog Decommissioning and Rehabilitation Plan 2021

SCREENING FOR APPROPRIATE ASSESSMENT | JANUARY 2022

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Naturally Driven

Derrinboy Bog Decommissioning and Rehabilitation Plan 2021
Appropriate Assessment Screening Report

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1.0 INTRODUCTION

1.1 Background

Roughan & O'Donovan (ROD) was appointed by Bord na Móna to produce, on its behalf, an Appropriate Assessment (AA) Screening Report in respect of the proposed Derrinboy Bog Decommissioning and Rehabilitation Plan 2021 ("the Plan"). The AA Screening Report is intended to determine whether or not the Plan, either individually or in combination with other plans or projects, is likely to have a significant effect on areas designated as being of European importance for nature conservation ("European sites"), thereby enabling the competent authority, Bord na Móna in this case, to fulfil its obligations under Article 6(3) of Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora ("the Habitats Directive").

This document comprises the AA Screening Report in respect of the Plan and was prepared by ROD on behalf of Bord na Móna and in accordance with the requirements of the Habitats Directive and the European Communities (Birds and Natural Habitats) Regulations, 2011 (as amended) ("the Habitats Regulations"). The aim of this AA Screening Report is to inform and assist the competent authority in carrying out its AA Screening by determining whether or not the Plan, either individually or in combination with other plans and projects, has the potential to significantly affect one or more European sites, in view of their Conservation Objectives.

It is the considered opinion of ROD, as the author of this AA Screening Report, that the Plan, either individually or in combination with other plans or projects, in view of best scientific knowledge, does not have the potential to significantly affect the Slieve Bloom Mountains SPA, the Slieve Bloom Mountains SAC, the Clonaslee Eskers and Derry Bog SAC, the River Shannon Callows SAC and the Middle Shannon Callows SPA, or any other European site, in view of their Conservation Objectives, and, therefore, that AA is not required in respect of the Plan.

1.2 Legislative Context

The Habitats Directive and Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds ("the Birds Directive") list habitats and species which are, in a European context, important for conservation and in need of protection. This protection is afforded in part through the designation of sites that, in a European context, support significant examples of habitats or populations of species. These sites are generally referred to as "European sites". Specifically, sites designated for wild birds are termed "Special Protection Areas" (SPAs) and sites designated for natural habitat types or other species are termed "Special Areas of Conservation" (SACs). The complete network of European sites is referred to as "Natura 2000".

In order to ensure the protection of European sites in the context of land use planning and development, Article 6(3) of the Habitats Directive requires that:

> *"Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives."*

The Court of Justice of the European Union (CJEU) has interpreted this requirement as follows[1]:

> *"Any plan or project not directly connected with or necessary to the management of the site is to be subject to an appropriate assessment of its implications for the site in view of the site's conservation objectives if it cannot be excluded, on the basis of objective information, that it will have a significant effect on that site, either individually or in combination with other plans or projects."*

In accordance with the Precautionary Principle, the CJEU interpreted the word "likely" as meaning that as long as it cannot be conclusively demonstrated that a given effect will not occur, that effect is considered "likely" to occur. A likely effect considered to be "significant" only if it interrupts or causes delays in progress towards achieving the Conservation Objectives[2] of the relevant European site(s).

In Ireland, this requirement for AA is transposed into national law by Part 5 of the Habitats Regulations, and the process is termed "Appropriate Assessment" (AA). Stage 1 of the process, i.e. determining whether or not a plan or project meets the above criteria for requiring AA, is referred to as "AA Screening".

In its judgment in *People Over Wind*[3], the CJEU concluded that the determination of whether or not AA is required in respect of a project must be completed without consideration of "*measures that are intended to avoid or reduce the harmful effects of the envisaged project on the site concerned*".

Article 6(3) of the Habitats Directive specifies that AA must be undertaken by the "*competent national authorities*". In Ireland, the "competent authorities" are the national, regional or local authorities that are charged with or responsible for consenting, authorising, adopting or deciding to proceed with a plan or project. Consequently, the responsibility for carrying out AA Screening lies solely with the competent authority. In that respect, the AA Screening Report is not in itself an AA Screening but provides the competent authority with the information it needs in order to carry out its AA Screening.

1.3 Screening Methodology

At this stage of the process, the AA Screening Report assesses the potential impacts from the plan or project on the European sites within the likely zone of impact and evaluates them in view of the sites' Conservation Objectives.
Best practice in undertaking AA Screening involves five steps as follows:

1. The first step involves gathering the information and data necessary to carry out a screening assessment. These include, but are not limited to, the details of all phases of the plan or project, environmental data pertaining to the area in which the plan or project is located, e.g. rare or protected habitats and species present or likely to be present, and the details of the European sites within the likely zone of impact.
2. The second step involves examining the information gathered in the first step and a scientific analysis of the potential impacts of the plan or project on the

[1] Landelijke Vereniging tot Behoud van de Waddenzee, Nederlandse vereniging tot Bescherming van Vogels *v.* Staatssecretaris van Landbouw, Naturbeheer en Visserij (Waddenzee) [2004] C-127/02 ECR I-7405.

[2] Conservation Objectives are referred to, but not defined, in the Habitats Directive. In Ireland, Conservation Objectives are set for Qualifying Interests (the birds, habitats or other species for which a given European site is selected) and represent the overall target that must be met for that Qualifying Interest to reach or maintain favourable conservation condition in that site and contribute to its favourable conservation status nationally.

[3] People Over Wind and Peter Sweetman *v*. Coillte Teoranta (People Over Wind) [2018] C-323/17.

receiving environment, particularly the European sites in the likely zone of impact.

3. The third step evaluates the impacts analysed in the second step against the Conservation Objectives of the relevant European sites, thereby determining whether or not those impacts constitute "likely significant effects", within the meaning of Article 6(3) of the Habitats Directive.
4. The fourth step involves considering the potential for likely significant effects to arise from the combination of the impacts of the plan or project with those of other plans or projects. If it is determined in the third step that Stage 2 (AA) is required, consideration of potential cumulative impacts may be deferred to that stage.
5. The last step involves the issuing of a statement of the determination of the AA Screening. Notwithstanding the recommendation made in the AA Screening Report, the responsibility for completing this step lies solely with the competent authority.

The following guidance documents informed the assessment methodology:

- DEHLG (2010) *Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities*. Department of the Environment, Heritage and Local Government, Dublin.
- NPWS (2010a) *Appropriate Assessment under Article 6 of the Habitats Directive: Guidance for Planning Authorities*. Circular Letter NPWS 1/10 & PSSP 2/10. National Parks & Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin.
- EC (2021) *Assessment of plans and projects in relation to Natura 2000 sites - Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC*. Environment Directorate-General of the European Commission.
- EC (2018) *Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC*. European Commission, Brussels.

1.4 Ecological Assessment

In order to fully inform this AA Screening Report in respect of the Plan, it was necessary to establish the baseline ecological conditions in the receiving environment, particularly with regard to European sites. The ecology survey and assessment were carried out by ROD Ecologists Patrick O'Shea and Kate Moore. Patrick holds a bachelor's degree in Botany from Trinity College Dublin and an MSc in Ecological Management and Conservation Biology from Queen's University Belfast. He is a full member of the Chartered Institute of Ecological and Environmental Management (CIEEM) and has 9 years' experience in ecological consultancy. Kate is a graduate member of CIEEM with over five years' experience in ecological consultancy. She holds a bachelor's degree in Environmental Biology from University College Dublin.

1.4.1 Desk Study

During the preparation of the AA Screening Report, the statutory consultee, the National Parks & Wildlife Service (NPWS), provided data on designations of sites, habitats and species (including birds) of conservation interest. This included reports pursuant to Article 17 of the Habitats Directive[4] (NPWS, 2019a, NPWS, 2019b), Birds Directive Article 12 Reporting 2008-2012 (NPWS, 2012a) and the Site Synopses,

[4] Under Article 17, to report to the European Commission every six years on their status and on the implementation of the measures taken under the Directive.

Natura 2000 Standard Data Forms and Conservation Objectives (including supporting documents) for the relevant European sites.

The desk study involved a thorough review of existing information relating to ecology in the vicinity of the Plan and in the surrounding area. The following web-based geographic information systems (GISs) were used to obtain information relating to the natural environment surrounding the Plan. These included the NPWS *Designations Viewer* (NPWS, 2022a), which provided information on the locations of protected sites and the Environmental Protection Agency's Unified GIS Application (EPA, 2022) which provided additional information on the wider environment.

The desk study was also informed by the following documents:

- Bord na Móna (2021) *Draft Derrinboy Bog Cutaway Bog Decommissioning and Rehabilitation Plan 2021*
- Bord na Móna and RPS (2021) *Peatlands Climate Action Scheme Derrinboy Bog Site Characterisation and Monitoring*
- Bord na Móna (2021) *Derrinboy Bog - Engineering Report 2022*
- Bord na Móna and RPS (2021) *Derrinboy Bog GIS Map Book 2021*
- RPS (2021*) Bord na Móna – Derrinboy Bog Drainage Management Plan*
- Bord na Móna (2021) *Peatland Climate Action Scheme -Methods for Peatland Rehabilitation*
- Bord na Móna (2021) *Peatland Climate Action Scheme - Environmental Management Plan*

1.4.2 Field Survey

An ecological walkover survey was conducted within the site of the Plan on 18th January 2022 by Patrick O'Shea and Kate Moore. During the site visit the characteristics of the bog and the potential pathways for likely significant effects were recorded.

1.4.3 Assessment

Once established, the ecological baseline of the receiving environment was used to inform the assessment of the ecological effects likely to arise from the Plan, particularly with regard to European sites. Any assumptions that were made in view of gaps in the ecological data were made in strict accordance with the Precautionary Principle.

2.0 DESCRIPTION OF THE PLAN

2.1 Overview

Bord na Móna is planning to rehabilitate Derrinboy Bog, near Cadamstown in Co Offaly. Peat harvesting is now ceased at Derrinboy Bog. Decommissioning is a requirement of the applicable Integrated Pollution Control Licence issued by the Environmental Protection Agency. This condition 10.1 requires the following:

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

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

Funding is provided by the Irish Government through the Peatland Climate Action Scheme (PCAS) and by Bord na Móna.

The key objective of peatland rehabilitation is environmental stabilisation. This means developing habitats and vegetation back onto the bare peat and minimising the impacts downstream. Essentially this means putting the 'skin' of plants and mosses back on the peat. The bog was drained in the past to allow milled peat production. Better results for water quality improvements, climate action, the reduction of carbon emissions and biodiversity are achieved when the remaining peat is re-wetted. This means drain-blocking and other measures to raise water levels to the surface of the bog and to encourage the natural colonisation of vegetation.

Derrinboy bog was drained in 1988 but wasn't brought into peat production until 2003. It still has relatively deep residual acidic peat remaining. In general soggy ground conditions are preferred. This means the remaining peat is wet and that plants that prefer wetter conditions, like Bog Cotton and Sphagnum mosses will thrive. Many Bord na Móna bogs cannot be restored back to raised bog, due the shallow depth of cutaway peat and the environmental conditions that have been modified. However other natural peatland habitats will develop like Sphagnum-rich vegetation, poor fen, Heather and Birch woodland, and in time a naturalised peatland can be restored. Some bogs, like Derrinboy, with deeper residual peat have the capacity to regrow Sphagnum moss again, where there are suitable hydrological conditions. Sphagnum is a key species for restoring naturally functioning peatland conditions. Re-wetting peat is also better for climate action. This reduces carbon emissions as re-wetting the remaining peat reduces carbon losses such as the production of Carbon Dioxide, the main Greenhouse Gas. The site is expected to still be a reduced carbon source for some time, but eventually the carbon sink function can re-establish as peat-forming conditions are restored. The development of a range of habitats in Derrinboy 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 and peatland habitats.

Measures proposed for Derrinboy Bog include drain blocking, cell-bunding and other measures required to raise water levels to the surface of the peat (altering the camber on fields or changing levels of pipes for example). Drain-blocking will be restricted to internal drains. Some fertiliser will be spread on headlands and other areas (a small part of the overall area) to encourage vegetation growth. Bord na Mona plan to carry

out this work in 2022. 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 this bog, and a peatland ecosystem to be restored. However, it is expected that most of the site will be developing pioneer habitats after 5-10 years. This is a peatland rehabilitation plan. This plan does not consider future after-use or development.

"*Derrinboy Bog - Cutaway Bog Decommissioning and Rehabilitation Plan 2021*" is provided in full in Appendix A to this report.

The Plan is neither connected to, nor necessary for the management of any European Site.

2.2 Location of Plan

Derrinboy bog is located in south Co. Offaly, close to Cadamstown Village and 3.5 km south of Kilcormac Town. A local road passes through the centre of Derrinboy bog and divides it into two main sections. The location of the Plan is shown in Plate 1.

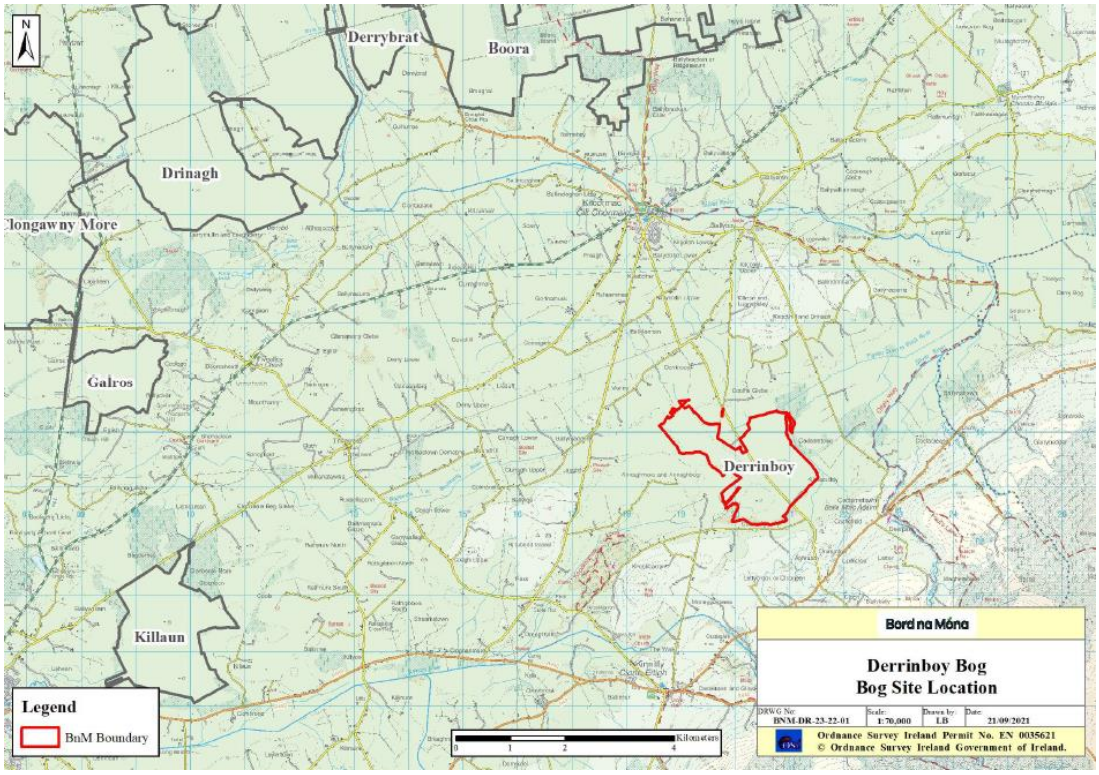

Plate 1 Derrinboy Bog Location

2.3 Receiving Natural Environment

The local landscape is relatively flat and the primary land use, outside of Derrinboy Bog (Plate 2), is agricultural. The foothills of the Slieve Bloom mountains are approximately 2 km to the south. The western side of Derrinboy Bog is drained by the Kyleboher Stream and the eastern side the bog is drained by the Knockhill Stream and Black River. These watercourses are all tributaries of the Silver River which itself is a tributary of the River Brosna and eventually discharges into the River Shannon close to Shannon Harbour.

Bare peat dominates the previous production area which covers most of the site. Cutover bog, birch dominated woodland and heath have developed along the boundaries of the site. There are also four silt ponds which attenuate surface water flows from the bog prior to discharge into watercourses. The habitats found with the site are presented in Plate 3 below.

Plate 2 Derrinboy Bog

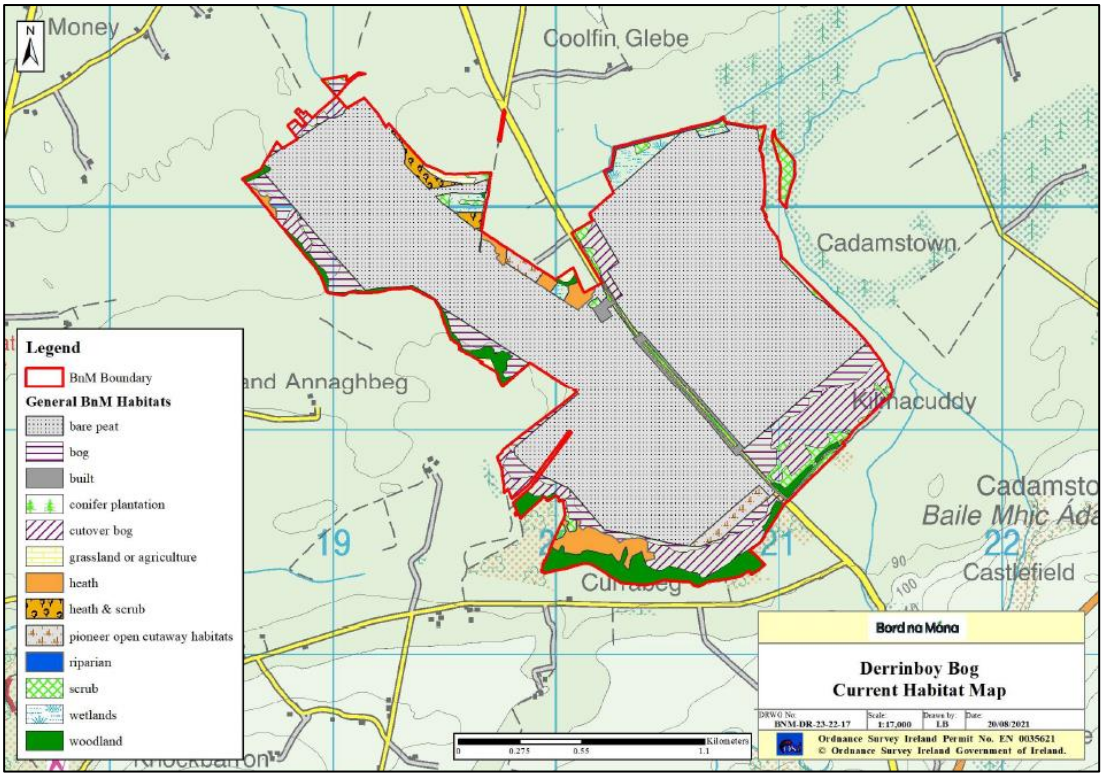

Plate 3 Derrinboy Bog Habitat Map

2.4 Description of the Plan

The following paragraphs describe the rehabilitation measures proposed at Derrinboy Bog:

- Re-assessment of the pumping regime; removal of the pump on site is desired if this has no significant external impact. Hydrological management will look to optimise summer water levels to maximise the development of wet cutaway vegetation (by looking to set water depths at < 0.1 m, where possible). It is inevitable that some sections will naturally have deeper water due to the topography at this site. Water-levels will be adjusted at outfalls and by adjusting piped drainage. More sustainable permanent gravity drainage solutions will be examined. Some targeted bunding may be required. It is expected that a natural seasonal regime of water fluctuation will develop, with water-levels fluctuating in association with levels in the adjacent watercourses and associated groundwater conditions.
- The existing silt pond will be retained and maintained during the rehabilitation phase. A long-term gravity outfall is considered feasible when the onsite pump is turned off permanently, subject to invert level monitoring at the current silt pond. If required a wetland attenuation area and/or modified outfall may be created at this location to accommodate any increase in surface water flows from the bog. Furthermore, all surface water from the bog passes through existing silt ponds before discharging into local watercourses. Observations from previous bog rehabilitation plans have noted a reduction in the downstream run-off, and this is expected to occur following the proposed rehabilitation measures at Derrinboy Bog, where attenuation capacity and evaporation lead to a reduction in downstream flows.

- Re-wetting some areas of the bog through reprofiling former production fields infilling drains and drain blocking, along with the creation of cross berms to avoid surface water flows.
- Re-alignment of piped drainage.
- Blocking drains in targeted extant high bog around the margins of Derrinboy, to accelerate carbon offsetting.
- The creation of berms across some sections of the bog to control/retain water levels. This measure seeks to retain shallow (< 10 cm) water conditions across multiple fields.
- Targeted fertiliser applications to accelerate vegetation establishment on areas of bare peat on headlands and high fields.
- Modifying water levels at outfalls, as it may be desirable to change and control water levels at the site over time, e.g. to increase water levels as the site becomes increasingly vegetated. This will further slow the movement of water through and out of Derrinboy Bog.
- During the monitoring and verification phase the silt pond will be continually inspected and maintained, where appropriate. When it is deemed that the silt pond is not required, as the bog has been successfully stabilised and there is no run-off of suspended solids, the condition of the silt pond will be reviewed. The silt pond will either be de-watered (water levels lowered to a level where the silt pond will naturally develop as a small wetland feature), left in situ, or infilled (where discharges do not require silt control).
- Seeding of vegetation is not required at this site as natural colonisation and the development of pioneer habitats is already significantly progressed.

2.4.1 Rehabiltation Methodology

The following paragraphs describe the methodologies for each of the rehabilitation measures proposed at Derrinboy Bog:

Rehabilitation Method DPT 2 Peat Dam Drain Blocking

1. Before building of dams, the sides and bottom of the ditch is cleaned using the excavator to remove dry degraded peat, to ensure a good peat-to-peat contact. If any vegetation is present, it is carefully removed and left aside for replacement at the end of the process.
2. A 'key' is then cut in either side of the drain approximately 500mm deep, and it is ensured that the width is wider than the actual drain. Approximately 500mm depth of peat is removed from the bottom of the drain also and placed behind the machine for replacement later.
3. An area is opened behind the machine to be used as a borrow pit. Using the surface layer of peat (i.e. the top 100-200mm) is avoided, as it is likely to be very permeable. Only the deeper, more compacted peat is used to build the dam. (again, if any vegetation is present, it is carefully removed and left aside for replacement at the end of the process).
4. Peat is then dug out from the borrow pit and placed into the drain compacting it in 300mm layers. The peat is compacted firmly using the excavator bucket before laying more peat from the borrow pit.
5. The dam is built up to a height at least 300mm-500mm above the ground level of the bog to allow for subsequent shrinkage of the peat as it dries. Any

vegetation taken in step 1 or step 3 is then placed on the top of the dam, to help bind and stabilise the drain block.)

6. The borrow pit is backfilled with the peat extracted from the bottom of the drain in step 2. The sides of the peat borrow hole are firmly pressed with the excavator bucket to grade the sides of the borrow pit.

This enhanced measure's main objective is to block drains with peat dams to raise water levels, re-wetting peat and slowing water movements through the bog.

Rehabilitation Method DPT 4A Field Re-profiling

Typical existing bare peat fields are cambered (higher) in the centre and lower towards the drains, helping drainage of the fields but limiting the re-wetting of the central area. The concept of field re-profiling is to level the surface of the individual peat production fields to retain surface water at the required depth. On peatlands with increased slopes it will be more advantageous to create shallow depressions.

This variation of the process, which uses a screw-leveller and bulldozer, can be described as a number of distinct phases.

Phase 1: Re-Profiling of Field Surface

The first operation in the re-profiling process begins with using a Screw-Leveller to remove the high central camber from individual production fields and deposit the peat on the lower-lying edges of the same production field. The Screw-Leveller, with a level axis, will run up the first side of the production field and down the other side close to the edge of the drain, resulting in some of the peat being tipped into the drain.

Phase 2: Infilling of Drains

Next the Bull-dozer will run up the first side of the production field and down the other side with the front blade at an angle placing the peat in the drain.

Phase 3: Final Levelling of Drains & Field

Next the Bull-dozer will track over the first of the infilled drains and then back down the other drain compacting and levelling the peat. It will also make a pass down the middle of field flattening any peat mounds left between Screw Leveller and Bulldozer runs.

Phase 4: Drain Blocking

Drain blocks are constructed using an Excavator operating at a perpendicular direction to the field drains. A key is cut in the drain approximately 500mm deep ensuring that it is wider than the actual drain. A 500mm depth of peat is removed from bottom of drain also and placed behind the machine for replacement later.

An area behind the machine, within reach of the excavator arm, is selected is to be used as a borrow pit. Turf and degraded peat is removed from the surface. This material is placed close by to be used as cover later. 'Clay' like peat is extracted from pit and compacted in 300mm layers using the excavator bucket, to form the drain block. The peat is firmly compacted using the machine bucket before laying more peat from the borrow pit. The drain block is built up at least 300-500mm above the ground level of the bog to allow for subsequent shrinkage of the peat as it dries.

The borrow pit is then back filled with the peat extracted from the bottom of the drain. The sides of the borrow pit are pressed down and graded with the excavator bucket. (If any vegetation present, it is carefully removed at the start and left aside for

replacement at the end of the process, to help bind and stabilise the top of the drain block.

Phase 5: Cross Berm

Next the Bull-dozer is used to form peat transverse (i.e. across the production field, and perpendicular to the drain on either side) Cross Berms approximately 5.0m wide x 300mm high at given centres along the length of the production field. This reduces sheet flow of water.

Rehabilitation Method DPT 4: 45m x 60m Cell with Berms

Phase 1 Drain Blocking and Re-Profiling of Fields Surface

Drain blocks are constructed using an Excavator operating at a perpendicular direction to the field drains. A key is cut in the drain approximately 500mm deep ensuring that it is wider than the actual drain. A 500mm depth of peat is removed from bottom of drain also and placed behind the machine for replacement later.

An area behind the machine, within reach of the excavator arm, is selected is to be used as a borrow pit. Turf and degraded peat is removed from the surface. This material is placed close by to be used as cover later. 'Clay' like peat is extracted from pit and compacted in 300mm layers using the excavator bucket, to form the drain block. The peat is firmly compacted using the machine bucket before laying more peat from the borrow pit. The drain block is built up at least 300-500mm above the ground level of the bog to allow for subsequent shrinkage of the peat as it dries.

The borrow pit is then back filled with the peat extracted from the bottom of the drain. The sides of the borrow pit are pressed down and graded with the excavator bucket. (If any vegetation present, it is carefully removed at the start and left aside for replacement at the end of the process, to help bind and stabilise the top of the drain block.
The centre of the cambered field is used as one side of the cell. A bulldozer is used to level and flatten the base of the cell and to infill the drains by removing the camber from the fields. Laser levels are mounted on bull-dozers to allow the machine drivers to move peat and create flat surfaces to the appropriate levels.

Phase 2: Formation of Surface Berms and Levelling Base of Cells

Berms are formed 45m in length and 60m across 4 fields to create an enclosed cell. The berms are relatively shallow (300mm high) and are 5.0 m wide.

The berms are constructed using a bull-dozer pushing the peat obtained from the original field camber to form mounds. The mounds of loose peat are then levelled and compacted using the machine's tracks to ensure that the berm retains shallow water in the cell. The top surface level of the berms is constructed with a high level of accuracy.

Phase 3 Final Profile

Drainage pipes are incorporated into the berm construction at specific locations to manage overflows and prevent berm erosion.

Rehabilitation Method DCT 2: 'Speed Bump' Peat Dam

Typical existing bare peat fields are cambered (higher) in the centre and lower towards the drains, helping drainage of the fields but limiting the re-wetting of the central area. The concept of drain blocking is to raise the water levels in the drains to re-wet the cutaway and slow the water movement through the bog. 'Speed Bumps' allow for peat

subsidence and to prevent water from flowing over the drain block and eroding it before it becomes stabilised.

Phase 1 begins with the creation of a 'key' on either side of the drain. The dozer cuts down and pushes out peat 0.5-1m from the edge of the drain, with an equivalent section on the other side of the drain.

The next step comprises forming the 'Speed Bump' itself. A strip of peat is taken from the central camber of the field, pushed into the drain and keyed area and compacted by a bull-dozer tracking over the drain block, to form an approximately 5m Wide 'Speed Bump'.

Fields are then completed with Speed Bumps (at an approximate ratio of 3 Per 100m). Speed bumps are profiled to ensure that the overall field profile is lower in the centre and higher over the drain blocks.

Rehabilitation Method WLT 4: Peat Block

1. Before building of dams, the sides and bottom of the ditch is cleaned using the excavator to remove dry degraded peat, to ensure a good peat-to-peat contact. If any vegetation is present, it is carefully removed and left aside for replacement at the end of the process.
2. A 'key' is then cut in either side of the drain approximately 500mm deep, and it is ensured that the width is wider than the actual drain. Approximately 500mm depth of peat is removed from the bottom of the drain also and placed behind the machine for replacement later.
3. An area is opened behind the machine to be used as a borrow pit. Using the surface layer of peat (i.e. the top 100-200mm) is avoided, as it is likely to be very permeable. Only the deeper, more compacted peat is used to build the dam. (again, if any vegetation is present, it is carefully removed and left aside for replacement at the end of the process).
4. Peat is then dug out from the borrow pit and placed into the drain compacting it in 300mm layers. The peat is compacted firmly using the excavator bucket before laying more peat from the borrow pit.
5. The dam is built up to a height at least 300mm-500mm above the ground level of the bog to allow for subsequent shrinkage of the peat as it dries. Any vegetation taken in step 1 or step 3 is then placed on the top of the dam, to help bind and stabilise the drain block.)
6. The borrow pit is backfilled with the peat extracted from the bottom of the drain in step 2. The sides of the peat borrow hole are firmly pressed with the excavator bucket to grade the sides of the borrow pit.
7. This enhanced measure's main objective is to block drains with peat dams to raise water levels, re-wetting peat and slowing water movements through the bog.
8. This method is the same as that described under Deep Peat methodologies as 'DPT2' and Dry Cutaway methodologies as 'DCT3'.

Rehabilitation Method DPT/DCT/WLT/MLT Modifying of Outfalls & Managing Water Levels

A description of a number of techniques in respect of outfall modification and management of water levels follows. Some, such as blocking of outfalls, are applicable across multiple rehabilitation prescriptions, whilst techniques such as the cutting of 'taps' are more applicable to those bogs which are subject to periodic inundation e.g.

through rainfall or flooding and where water needs to be diverted from one part of the bog to another by way of management, or to create wetland areas.

The cutting of what is colloquially called a 'tap' in a high (production) field is described first. This is effectively a method for diverting standing water from one side of a high field to another, to manage the water level in both fields and eventually direct excess surface water towards an outfall. The blocking of outfalls is a measure to prevent water discharge from a bog through a pre-existing pathway or drainage feature, whilst the raising of pipes works similarly to produce water flow at a higher invert level, within specified areas of the pre-existing drainage network. Both of these measures are essential to the management of water levels.

'V' Tap Across High Field To Control Water Levels

An excavator is used to Create a 'V'-Shaped Tap across a high field to allow water pass from a field with water to a field with little or none. The excavator approaches the proposed 'tap' location along the surface of the high field. It then proceeds to excavate a V-shaped trench or drain to the desired depth to permit water to flow between the fields to either side.

Blocking of Outfall

An Excavator is used to form a key on either side of the drain which forms the outfall from the bog or field. A strip of peat is taken from the centre of the adjacent field, pushed into the drain and compacted by the bull-dozer tracking over the drain block from the opposite side of the drain to the excavator. The approximate width of the block is 3-5 times the width of the drain. Blocks have to be wide enough to prevent water moving around the blockage and to prevent further leakage when the block subsides. Where possible and available, vegetation is used to cover the peat forming the outfall blockage. This measure is strongly linked with the next in respect of water level management.

Raise Piped Culverts to control water levels

The first step is to block the existing drain where the pipe exits to stop flow s. A new transverse field drain and pipe is then placed above the route of the previously blocked and now redundant pipe, to a specified invert level. The drain holding the new, raised pipe, is filled in using an excavator or bulldozer as appropriate.

Methodology Drawings are provided in Appendix B.

2.4.2 Programme

The programme for completion of the Plan are as follows:

- 2022. 1st phase of rehabilitation. Field drain blocking with dozer/excavator.
- 2022. 2nd phase. Further realignment of piped drainage and other re-wetting measures dependent on success of 1st phase re-wetting, as determined by ongoing monitoring of water levels and re-vegetation.
- Other enhancement measures such as fertiliser treatment will be carried out, if needed. These will be determined by ongoing monitoring.
- 2023-2024. Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- 2023-2024. Decommission silt-ponds, if necessary
- All works will be scheduled to take place in the summer months when conditions are drier, and during daylight hours.

2.4.3 Monitoring

A programme for monitoring, aftercare and maintenance has been designed to meet the Conditions of the IPC Licence:

- There will be initial quarterly monitoring assessments of the site to determine the general status of the site, the condition of the silt-ponds, assess the condition of the rehabilitation work, asses the progress of natural colonisation, monitoring of any potential impacts on neighbouring land and general land security. The number of site visits will reduce after 2 years to bi-annually. These site visits will assess the need to any additional rehabilitation.
- A water quality monitoring programme will be established.
- Monitoring results will be 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, DOC 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.

The monitoring, aftercare and maintenance programme is detailed in full in "*Derrinboy Bog - Cutaway Bog Decommissioning and Rehabilitation Plan 2021"* provided in Appendix A to this Report

2.5 Likely Effects of the Natural Environment

Several elements of the Plan are considered likely to give rise to environmental and ecological impacts.

The Plan could lead to an increase in sediment laden runoff, an increase or a reduction in flows and changes to the flooding regime locally and downstream.

The presence of machinery on the bog could lead to disturbance of mammals, birds and other wildlife.

The Plan also has the potential to introduce and spread of invasive species through the movement of equipment to, from, or within the site.

3.0 IDENTIFICATION OF LIKELY SIGNIFICANT EFFECTS

3.1 Establishing the Likely Zone of Impact

Section 3.2.3 of DEHLG (2010) outlines the procedure for selecting the European sites to be considered in AA. It states that European sites potentially affected should be identified and listed, bearing in mind the potential for direct, indirect and cumulative effects. It also states that the specific approach in each case is likely to differ depending on the scale and likely effects of the plan or project. However, it advises that the following sites should generally be included:

- All European sites within or immediately adjacent to the plan or project area;
- All European sites within the likely zone of impact of the plan or project; and,
- In accordance with the Precautionary Principle, all European sites for which there is doubt as to whether or not they might be significantly affected.

The "likely zone of impact" of a plan or project is the geographic extent over which significant ecological effects are likely to occur. In the case of plans, this zone should extend to a distance of 15 km in all directions from the boundary of the plan area. In the case of projects, however, the guidance recognises that the likely zone of impact must be established on a case-by-case basis, with reference to the following key variables:

- The nature, size and location of the project;
- The sensitivities of the ecological receptors; and,
- The potential for in-combination effects.

For example, in the case of a project that could affect a watercourse, it may be necessary to include the entire upstream and/or downstream catchment in order to capture all European sites with water-dependent Qualifying Interests.

Having regard to the above key variables, the likely zone of impact was defined as:

- The entire area within 5 km of the Plan boundary; and,
- All watercourses hydrologically connected to the Plan boundary, downstream as far as the River Shannon.

This was based on the maximum extent of potential impacts associated with the proposed development.

A geographical representation of the likely zone of impact was produced in QGIS 3.16.9 using the proposed development boundary and publicly available OpenStreet Maps. This was used in combination with NPWS shapefiles to identify the boundaries of European sites in relation to the likely zone of impact (Appendix C).

It was determined that five European sites, namely the Slieve Bloom Mountains SPA, the Slieve Bloom Mountains SAC, the Clonaslee Eskers and Derry Bog SAC, the River Shannon Callows SAC and the Middle Shannon Callows SPA occur within the likely zone of impact. These sites are listed in Table 3.1 which also assesses whether or not there are pathways for impacts to the sites. Where pathways exist, a detailed description is provided in Section 3.2.

Table 3.1 European sites with closest proximity to the Plan.

European site [site code]	Are there potential pathways for impacts from the Plan to this site? Explain.
Slieve Bloom Mountains SPA [004160]	**Yes.** This European site is located *c.* 1.4 km to the south east of the Plan. The Black River, which flows along the eastern boundary of Derrinboy Bog, rises 4 km upstream of the Plan boundary in the SPA. This site is designated for Hen Harrier. There is potential for Hen Harrier from the SPA to hunt and roost in suitable habitat around the fringes of the Plan area.
Slieve Bloom Mountains SAC [000412]	**No.** This European site is located *c.* 3.5 km to the south of the Plan. The Plan area is in the same sub-catchment as part of the SAC, however there is no direct hydrological connection. No pathways for effects exist between the Plan and this European site.
Clonaslee Eskers and Derry Bog SAC [000859]	**No.** This European site is located *c.* 3.3 km to the east of the Plan area. The Plan area is in the same sub-catchment as part of the SAC, however there is no direct hydrological connection.
River Shannon Callows SAC [000216]	**Yes**. This European site is located *c.* 17.3 km to the north-west of the Plan. The hydrological distance between the Plan and the SAC is *c.* 34.6 km downstream. Therefore, the effective distance to the SAC is *c.* 34.6 km.
Middle Shannon Callows SPA [004096]	**Yes.** This European site is located *c.* 17.3 km to the north west of the Plan. The hydrological distance between the Plan and the SAC is *c.* 34.6 km downstream (through the Kyleboher, Silver, Falsk and Brosna rivers). Therefore, the effective distance to the SAC is *c.* 34.6 km.

3.2 Site Descriptions

The following sections describe the European Sites where potential pathways for impacts between the Plan and these sites have been identified.

3.2.1 Slieve Bloom Mountains SPA

The description of the Slieve Bloom Mountains SPA provided here is based on the Site Synopsis (NPWS, 2015), Conservation Objectives (NPWS, 2021a), and Natura 2000 Standard Data Form (NPWS, 2018a) for the site.

Site Overview

The Slieve Bloom Mountains SPA is situated on the border between Counties Offaly and Laois, and runs along a north-east/south-west aligned ridge for approximately 25 km. Much of the site is over 200 m in altitude, rising to a maximum height of 527 m at Arderin. The mountains are of Old Red Sandstone, flanked by Silurian rocks. Several important rivers rise within the site, including the Barrow, Delour and Silver.

The site has a near continuous ridge of mountain blanket bog, with wet and dry heaths also well represented. Species present in these habitats include Ling Heather (*Calluna vulgaris*), Crowberry (*Empetrum nigrum*), Bilberry (*Vaccinium myrtillus*), Cottongrasses (*Eriophorum spp*.), Deergrass (*Scirpus cespitosus*) and Bog Asphodel (*Narthecium ossifragum*). Much of the slopes are afforested, and overall coniferous plantations account for c. 60% of the site. The forests include first and second rotation plantations, with both pre-thicket and post-thicket stands present. Substantial areas of clear-fell are also present at any one time. The principal tree species present are Sitka Spruce (*Picea sitchensis*) and Lodgepole Pine (*Pinus contorta*). The remainder of the site is mostly rough grassland that is used for hill farming. This varies in composition

and includes some wet areas with rushes (Juncus spp.) and some areas subject to scrub encroachment. S ome stands of deciduous woodland also occur, especially within the river valleys.

This SPA is one of the strongholds for Hen Harrier in the country and, indeed, is the most easterly regular population. A survey in 2005 recorded eight pairs, whereas eleven pairs had been recorded in the 1998-2000 period. The numbers recorded in 2005 represent c. 3.7% of the all-Ireland total. The mix of forestry and open areas provides optimum habitat conditions for this rare bird. The early stages of new and second-rotation conifer plantations are the most frequently used nesting sites, though some pairs may still nest in tall heather of unplanted bogs and heath. Hen Harriers will forage up to c. 5 km from the nest site, utilising open bog and moorland, young conifer plantations and hill farmland that is not too rank. Birds will often forage in openings and gaps within forests.

The Slieve Bloom Mountains SPA is of ornithological importance because it provides excellent nesting and foraging habitat for breeding Hen Harrier and is one of the top sites in the country for the species.

Qualifying Interests of the Site

[A082] Hen Harrier (*Circus cyaneus*)

3.2.2 River Shannon Callows SAC

The description of the River Shannon Callows SAC provided here is based on the Site Synopsis (NPWS, 2020a), Conservation Objectives (NPWS, 2021b), and Natura 2000 Standard Data Form (NPWS, 2020b) for the site.

Site Overview

The River Shannon Callows is a long and diverse site which consists of seasonally flooded, semi-natural, lowland wet grassland, along and beside the river between the towns of Athlone and Portumna. It is approximately 50km long and averages about 0.75km wide (reaching 1.5km wide in places). Along much of its length the site is bordered by raised bogs (many, but not all, of which are subject to large-scale harvesting), esker ridges and limestone-bedrock hills.

Two habitats listed on Annex I of the E.U. Habitats Directive are well-represented within the site – Molinia meadows and lowland hay meadows. In places these two habitats grade into one another. All these communities are very diverse in their total number of plant species, and include the scarce species Meadow-rue (*Thalictrum flavum*), Summer Snowflake (*Leucojum aestivum*) and Marsh Stitchwort (*Stellaria palustris*). A further two Annex I habitats, both listed with priority status, have a minor though important presence within the site. Alluvial forest occurs on a series of alluvial islands just below the ESB weir near Meelick. Several of the islands are dominated by well-grown woodland consisting mainly of Ash (*Fraxinus excelsior*) and Willows (*Salix spp*.). At Clorhane, an area of limestone pavement represents the only known example in Co. Offaly. An area of low-lying terrestrial land west of the river comprises are large area of the Annex I habitat alkaline fen. The fen comprises a complex of rich-fen plant communities. Sedges (*Carex lasiocarpa*, *Carex acutiformis*) and Bogbean (*Menyanthes trifoliata*) dominate parts of the fens while other small sedges are common throughout.

This site holds a population of Otter, a species listed on Annex II of the E.U. Habitats Directive. The Shannon Callows are used for summer dry-stock grazing (mostly cattle, with some sheep and a few horses), and permanent hay meadow. The River Shannon

is used increasingly for recreational purposes with coarse angling and boating accounting for much of the visitor numbers. Intermittent and scattered damage to the habitats has occurred due to over-deepening of drains and peat silt deposition, water-skiing, ploughing and neglect of hay meadow (or reversion to pasture). However, none of these damaging activities can yet be said to be having a serious impact. Threats to the quality of the site may come from the siting of boating marinas in areas away from centres of population, fertilising of botanically-rich fields, the use of herbicides, reversion of hay meadow to pasture, neglect of pasture and hay meadow, disturbance of birds by boaters, anglers, birdwatchers and the general tourist. The maintenance of generally high water levels in winter and spring benefits all aspects of the flora and fauna, but in this regard, summer flooding is a threat to breeding birds, and may cause neglect of farming.

Qualifying Interests of the Site

[6410] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)

[6510] Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*)

[7230] Alkaline fens

[8240] Limestone pavements

[91E0] Alluvial *forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion,Alnion incanae, Salicion albae)*

[1355] Otter (*Lutra lutra*)

3.2.3 Middle Shannon Callows SPA

The description of the Middle Shannon Callows SAC provided here is based on the Site Synopsis (NPWS, 2012b), Conservation Objectives (NPWS, 2021c), and Natura 2000 Standard Data Form (NPWS, 2020c) for the site.

Site Overview

The Middle Shannon Callows SPA is a long and diverse site which extends for approximately 50 km from the town of Athlone to the town of Portumna; it lies within Counties Galway, Roscommon, Westmeath, Offaly and Tipperary. The site averages about 0.75 km in width though in places is up to 1.5 km wide. Water levels on the site are greatly influenced by the very small fall between Athlone and Portumna and by the weir at Meelick. The site has extensive areas of callow, or seasonally flooded, semi-natural, lowland wet grassland, along both sides of the river. The callows are mainly too soft for intensive farming but are used for hay or silage or for summer grazing. Other habitats of smaller area which occur alongside the river include lowland dry grassland, freshwater marshes, reedbeds and wet woodland. The diversity of semi-natural habitats present, and the sheer size of the site attract an excellent diversity of bird species, including significant populations of several. The site is of special conservation interest for holding an assemblage of over 20,000 wintering waterbirds. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

The Middle Shannon Callows qualifies as a site of international importance as it regularly supports in excess of 20,000 wintering waterbirds (23,656 – four year mean peak for four of the winters between 1995/96 and 1999/2000). The site also supports internationally important populations of Whooper Swan (305 – five year mean peak for the period 1995/96 to 1999/2000) and Black-tailed Godwit (485 – four year mean peak for four of the winters between 1995/96 and 1999/2000). Four further species of

wintering waterbird occur in numbers of national importance, i.e. Wigeon (3,059), Golden Plover (4,133), Lapwing (13,240) and Black-headed Gull (1,209) – all figures are four year mean peaks for four of the winters between 1995/96 and 1999/2000. The Shannon Callows is the largest site monitored as part of I-WeBS and many parts of it are inaccessible on the ground. Annual monitoring of the wintering waterbirds of the Shannon Callows is undertaken by aerial surveys in January/February with some areas also covered by ground counts. The importance of the site for some species may have been underestimated if count coverage missed the brief spring peaks for these species, e.g. peak counts of Lapwing (23,409) and Black-tailed Godwit (1,096) recorded in the baseline period (1995/96 to 1999/2000) have been considerably higher than the four year means. A wide range of other species occurs within the site, including Mute Swan (407), Teal (88), Tufted Duck (41), Dunlin (335), Curlew (162) and Redshank (39). Small numbers of Greenland White-fronted Goose use the Shannon Callows (peak 55 in 1998/99) and these are generally associated with larger flocks which occur on the adjacent Little Brosna Callows and River Suck Callows. The callow grasslands provide optimum feeding grounds for these various species of waterfowl, while many of the birds also roost or rest within the site. The Shannon Callows is also an important site for breeding waders with the total population on the Shannon and Little Brosna Callows being one of three major concentrations in Ireland and Britain in 1987. Numbers of some species have declined since then but a survey of the Shannon Callows in 2002 recorded the following breeding waders - Lapwing (63 pairs), Redshank (116 pairs), Snipe (139 drumming birds) and Curlew (8 pairs). Black-tailed Godwit, a very rare breeding species in Ireland, nests or attempts to nest in small numbers each year within the site. A further scarce breeding species, Shoveler, also nests in small numbers each year (an estimated 12 pairs in 1987). The Middle Shannon Callows SPA supports a breeding population of Corncrake (19 pairs - five year mean peak between 2003 and 2007, based on records of calling males). Corncrake winter in southern and eastern Africa, migrating northwards to arrive on their breeding grounds from early April onwards, departing again in August and September. They require the cover of tall vegetation throughout their breeding cycle and are strongly associated with meadows which are harvested annually, where they nest and feed. Annual cutting of these meadows creates a sward which is easy for the birds to move through. Other habitats, which can provide cover for Corncrake in the early and late stages of the breeding season, are also important for this species. Corncrake is listed on the 2010 International Union for Conservation of Nature (IUCN) Red List of Threatened Species. This is due to population and range declines of more than 50% in the last 25 years across significant parts of its range. Quail, a related, scarce species, is also known to breed within the callow grasslands. A good variety of other bird species are attracted to the site. Birds of prey, including scarce species such as Merlin and wintering Hen Harrier have been recorded hunting over the callows. A range of passerine species associated with grassland and swamp vegetation breed, including Sedge Warbler, Grasshopper Warbler, Skylark and Reed Bunting. Kingfisher is also known to occur within the site. Whinchat, an uncommon breeding species, occurs in small numbers.

Qualifying Interests of the Site

[A038] *Whooper Swan (Cygnus cygnus)*

[A050] Wigeon *(Anas penelope)*

[A122] Corncrake *(Crex crex)*

[A140] Golden Plover *(Pluvialis apricaria)*

[A142] Lapwing *(Vanellus vanellus)*

[A156] Black-tailed Godwit *(Limosa limosa)*

[A179] Black-headed Gull (*Chroicocephalus ridibundus*)

[A999] Wetland and Waterbirds

3.3 Evaluation Against Conservation Objectives

Tables 3.2, 3.3 and 3.4 below detail the evaluation of the likely effects of the Plan in view of the Conservation Objectives of the sites identified in Section 3.1 and described in Section 3.2. As explained in Sections 1.2 and 1.3, AA Screening is carried out in view of the Conservation Objectives of the relevant European sites, which are in turn defined by detailed Attributes and corresponding Targets. Therefore, the evaluation of whether or not a likely effect is significant (in view of the Conservation Objective in question) is made with regard to these Attributes and Targets. Where Site-specific Conservation Objectives have not been developed for a particular European Site, the Attributes and Targets for the same Qualifying Interests in a similar European Site have been used.

Table 3.2 Evaluation of the likely effects of the Plan in view of the Conservation Objectives of the Slieve Bloom Mountains SPA [004160].

Qualifying Interest	Conservation Objective	Does the Plan provide for any potential delay or interruption in the achievement of this Conservation Objective, as defined by its Attributes and Targets?	Likely Significant Effect
Hen Harrier (*Circus cyaneus*) [A082]	*"To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA"* The Attributes and Targets for this Qualifying Interest have been taken from the Slieve Beagh - Mullaghfad - Lisnaskea SPA [UK9020302], which is "*to maintain each feature in favourable condition*" (NIEA, 2015). The Attributes for Hen Harrier are breeding population, habitat extent and habitat quality.	The Slieve Bloom Mountains SPA is located *c.* 1.4 km southeast of the Plan. The desk study found no records of Hen Harrier winter roosts, nesting sites or sightings in the vicinity of the Plan area. Nest site selection for the species is chiefly associated with safety, shelter and proximity to food resources. Derrinboy Bog, until recently, has be harvested for horticultural peat and was therefore heavily disturbed for a significant length of time. There are limited areas of heather which is the predominant nesting habitat for this species. Owing to the nature and scale of the Plan, the lack of Hen Harrier records in the area, the history of disturbance on the bog, the lack of suitable nesting habitat and low densities of prey species, the Plan will not affect the maintenance or restoration of Hen Harrier breeding population, habitat extent or habitat quality. It can therefore be concluded beyond reasonable scientific doubt that the Plan, will not lead to likely significant effects on this Qualifying Interest, in view of their Conservation Objective.	No

Table 3.3 Evaluation of the likely effects of the Plan in view of the Conservation Objectives of the River Shannon Callows SAC [000216]

Qualifying Interest	Conservation Objective (NPWS, 2012c)	Does the Plan provide for any potential delay or interruption in the achievement of this Conservation Objective, as defined by its Attributes and Targets?	Likely Significant Effect
Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410]	*"To restore the favourable conservation condition of Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) in the River Shannon Callows SAC".*	Molinia meadows occur in this SAC which is at least 34.6 km downstream of the Plan. This habitat is terrestrial and therefore there are no pathways for impacts between the Plan and this Qualifying Interest. It can therefore be concluded beyond reasonable scientific doubt that the Plan, will not lead to likely significant effects on this Qualifying Interest, in view of its Conservation Objective.	No
Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*) [6510]	*"To restore the favourable conservation condition of Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis) in the River Shannon Callows SAC".*	Lowland hay meadows occur in this SAC which is at least 34.6 km downstream of the Plan. This habitat is terrestrial and therefore there are no pathways for impacts between the Plan and this Qualifying Interest. It can therefore be concluded beyond reasonable scientific doubt that the Plan, will not lead to likely significant effects on this Qualifying Interest, in view of its Conservation Objective.	No
Alkaline fens [7230]	*"To maintain the favourable conservation condition of Alkaline fens in the River Shannon Callows SAC".*	Alkaline fens occur in this SAC at least 34.6 km downstream from the Plan. There is a potential hydrological connection between the Plan and this Qualifying Interest, however, owing to the nature and scale of the Plan, as well as the location of the Plan over 34.6km upstream of the SAC, there is no potential for effects. It can therefore be concluded beyond reasonable scientific doubt that the Plan, will not lead to likely significant effects on this Qualifying Interest, in view of its Conservation Objective.	No
Limestone pavements [8240]	*"To the favourable conservation condition of Limestone pavements in the River Shannon Callows SAC".*	Limestone pavements occur in this SAC which is at least 34.6 km downstream of the Plan. This habitat is terrestrial and therefore there are no pathways for impacts between the Plan and this Qualifying Interest. It can therefore be concluded beyond reasonable scientific doubt that the Plan, will not lead to likely significant effects on this Qualifying Interest, in view of its Conservation Objective.	No

Qualifying Interest	Conservation Objective (NPWS, 2012c)	Does the Plan provide for any potential delay or interruption in the achievement of this Conservation Objective, as defined by its Attributes and Targets?	Likely Significant Effect
Alluvial forests with Alnus glutinosa and Fraxinus excelsior (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) [91E0]	*"To maintain the favourable conservation condition of Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) in the River Shannon Callows SAC".*	Alkaline fens occur in this SAC at least 34.6 km downstream from the Plan. There is a potential hydrological connection between the Plan and this Qualifying Interest, however, owing to the nature and scale of the Plan, as well as the location of the Plan over 34.6km upstream of the SAC, there is no potential for effects. It can therefore be concluded beyond reasonable scientific doubt that the Plan, will not lead to likely significant effects on this Qualifying Interest, in view of its Conservation Objective.	No
Otter (*Lutra lutra*) [1355]	*"To maintain the favourable conservation condition of Otter in the River Shannon Callows SAC".*	Otter is a Qualifying Interest of this SAC, which is 34.6 km downstream of the Plan. There is a hydrological connection between the Plan and this Qualifying Interest, and the Plan has the potential to affect this species outside the SAC boundary, which could in turn lead to a significant effect on Otter within the SAC. There is considered to be no risk of likely significant effects on Otter for the following reasons: • The works will be temporary and will occur during daylight hours only. • The works will not involve the alteration of any watercourse. • Noise and vibration impacts from machinery will be temporary and very localised. • The SAC boundary is 34.6 km downstream, therefore any water quality impacts at the Plan site would dissipate long before reaching the SAC. It can therefore be concluded beyond reasonable scientific doubt that the Plan, will not lead to likely significant effects on this Qualifying Interest in view of their Conservation Objective.	No

Table 3.4 Evaluation of the likely effects of the Plan in view of the Conservation Objectives of the Middle Shannon Callows SPA [004096]

Qualifying Interest	Conservation Objective	Does the Plan provide for any potential delay or interruption in the achievement of this Conservation Objective, as defined by its Attributes and Targets?	Likely Significant Effect
Whooper Swan (*Cygnus cygnus*) [A038]	*"To maintain or restore the favourable conservation condition of Whooper Swan in the Middle Shannon Callows SPA"* The Attributes and Targets for this Qualifying Interest have been taken from the Conservation Objectives for the River Shannon and River Fergus Estuaries SPA [002165], which is "*To maintain the favourable conservation condition of Whooper Swan in the SPA*" (NPWS, 2012d)	This SPA is 34.6 km downstream, or 17.3km over land, from the Plan. Most of the Plan area is bare peat and therefore it is not suitable feeding, roosting or nesting (where relevant) habitat for any of these species. In addition, up until recently peat harvesting was taking place on the site. Considering the distance between the Plan and this European site as well as the nature and scale of the proposed works, it can be concluded beyond reasonable scientific doubt that the Plan will not lead to likely significant effects on these Qualifying Interest, in view of their Conservation Objectives.	No
Wigeon (*Anas penelope*) [A050]	*"To maintain or restore the favourable conservation condition of Wigeon in the Middle Shannon Callows SPA"* The Attributes and Targets for this Qualifying Interest have been taken from the Conservation Objectives for the River Shannon and River Fergus Estuaries SPA [002165], which is "*To maintain the favourable conservation condition of Wigeon in the SPA*" (NPWS, 2012d)		No

Qualifying Interest	Conservation Objective	Does the Plan provide for any potential delay or interruption in the achievement of this Conservation Objective, as defined by its Attributes and Targets?	Likely Significant Effect
Golden Plover (*Pluvialis apricaria*) [A140]	*"To maintain or restore the favourable conservation condition of Golden Plover in the Middle Shannon Callows SPA"* The Attributes and Targets for this Qualifying Interest have been taken from the Conservation Objectives for the River Shannon and River Fergus Estuaries SPA [002165], which is "*To maintain the favourable conservation condition of Golden Plover in the SPA*" (NPWS, 2012d)		No
Lapwing (*Vanellus vanellus*) [A142]	*"To maintain the favourable conservation condition of Lapwing in the Middle Shannon Callows SPA"* The Attributes and Targets for this Qualifying Interest have been taken from the Conservation Objectives for the River Shannon and River Fergus Estuaries SPA [002165], which is "*To maintain the favourable conservation condition of Lapwing in the SPA*" (NPWS, 2012d)		No

Qualifying Interest	Conservation Objective	Does the Plan provide for any potential delay or interruption in the achievement of this Conservation Objective, as defined by its Attributes and Targets?	Likely Significant Effect
Black-tailed Godwit (*Limosa limosa*) [A156]	*"To maintain or restore the favourable conservation condition of Black-tailed Godwit in the Middle Shannon Callows SPA"* The Attributes and Targets for this Qualifying Interest have been taken from the Conservation Objectives for the River Shannon and River Fergus Estuaries SPA [002165], which is "*To maintain the favourable conservation condition of Black-tailed Godwit in the SPA*" (NPWS, 2012d).		No
Black-headed Gull (*Chroicocephalus ridibundus*) [A179]	*"To maintain or restore the favourable conservation condition of Black-headed Gull in the Middle Shannon Callows SPA"* The Attributes and Targets for this Qualifying Interest have been taken from the Conservation Objectives for the River Shannon and River Fergus Estuaries SPA [002165], which is "*To maintain the favourable conservation condition of Black-headed Gull in the SPA*" (NPWS, 2012d).		No

Qualifying Interest	Conservation Objective	Does the Plan provide for any potential delay or interruption in the achievement of this Conservation Objective, as defined by its Attributes and Targets?	Likely Significant Effect
Corncrake (*Crex crex*) [A122]	"To maintain or restore the favourable conservation condition of Corncrake in the Middle Shannon Callows SPA". The Attributes and Targets for this Qualifying Interest have been taken from the Conservation Objectives for the Coll (Corncrake) SPA, [UK9003033] (NatureScot, 2020), which is: "To avoid deterioration of the habitats of the Qualifying Interest or significant disturbance to the Qualifying Interest, thus ensuring that the integrity of the site is maintained; and to ensure for the Qualifying Interest that the following are maintained in the long term: • Population of the species as a viable component of the site • Distribution of the species within site • Distribution and extent of habitats supporting the species • Structure, function and supporting processes of habitats supporting the species • No significant disturbance of the species".	There is a potential hydrological connection between the Plan and Corncrake habitat, however, owing to the nature and scale of the Plan, as well as the location of the Plan; over 34.6km upstream of the SPA, there is no potential for effects. It can therefore be concluded beyond reasonable scientific doubt that the Plan, will not lead to likely significant effects on this Qualifying Interest in view of its Conservation Objective.	No

Qualifying Interest	Conservation Objective	Does the Plan provide for any potential delay or interruption in the achievement of this Conservation Objective, as defined by its Attributes and Targets?	Likely Significant Effect
Wetland and Waterbirds [A999]	*"To maintain or restore the favourable conservation condition of the wetland habitat in the Middle Shannon Callows SPA as a resource for the regularly-occurring migratory waterbirds that utilise it."* The Attributes and Targets for this Qualifying Interest have been taken from the Conservation Objectives for the River Shannon and River Fergus Estuaries SPA [002165], which is "*To maintain the favourable conservation condition of wetland habitat in the SPA*" (NPWS, 2012d).	The Conservation Objective for Wetlands is defined by a single Attribute, namely "Habitat area", the Target for which is "*The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 765 hectares, other than that occurring from natural patterns of variation*". As the Plan will not lead to any reduction in the permanent area of this habitat within the site, it has no potential to delay or interrupt the achievement of this Conservation Objective nor will the Plan have any effect on the waterbirds associated with the SPA.	No

3.4 Summary of Likely Significant Effects

In Section 3.1, it was established that five European sites, namely the Slieve Bloom Mountains SPA, the Clonaslee Eskers and Derry Bog SAC, the Slieve Bloom Mountains SAC, the River Shannon Callows SAC and the Middle Shannon Callows SPA, occur within the likely zone of impact of the Plan. It was determined that potential pathways for effects exist between the Plan and three of the sites, namely the Slieve Bloom Mountains SPA, the River Shannon Callows SAC and the Middle Shannon Callows SPA. There are no pathways for effects between the Plan and any other European sites. The sites were described in detail in Section 3.2.

In Section 3.3, it was established, in light of best scientific knowledge, that the Plan will not give rise to ecological impacts which would constitute significant effects on any of the sites, in view of the sites' Conservation Objectives. This finding had regard to the nature, size and location of the Plan as well as the sensitivities of the Qualifying Interests of the sites concerned.

4.0 IN-COMBINATION EFFECTS

4.1 Introduction

Article 6(3) of the Habitats Directive requires that AA be carried out in respect of plans and projects that are likely to have significant effects on European sites, "*either individually or in combination with other plans or projects*". Therefore, regardless of whether or not the likely effects of a plan or project are significant when considered on their own, the significance of the combination of the effects of the plan or project under assessment with the effects of other past, present or foreseeable future plans or projects must also be evaluated.

4.2 Methodology

Plans and projects with potential for interactions with the proposed development were selected for assessment. For the purposes of the assessment, small scale and domestic developments were not considered given the nature of the proposed development and the fact that these developments would be subject to stringent planning controls.

The ePlanning website for Offaly County Council and EIA Portal was used to search for planning applications. Information provided by Bord na Móna on other bog rehabilitation plans was also considered.

4.3 Outcome

Table 4.1 below details the assessment of the likelihood of significant effects arising from the Plan in combination with other plans or projects. This assessment was undertaken in view of the Conservation Objectives of the relevant European sites and found that the Plan does not have the potential to significantly affect any European site in combination with other plans or projects.

Table 4.1 Assessment of the potential of likely significant effects in combination with other plans and projects.

Plan or Project	Description of Plan or Project	In-combination effect(s)
Noggusbog Cutaway Bog Decommissioning and Rehabilitation Plan 2022	Bord na Móna propose to 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). Noggusbog Bog is proposed to be part of this this proposed Scheme (PCAS) and this rehabilitation plan outlines the approach taken. The Noggusbog Cutaway Bog is located within the same sub-catchment as the Derrinboy Bog. This Plan is subject to Appropriate Assessment in accordance with Article 6(3).	Owing to the nature and scale of the Plan, it does not have the potential to cause likely significant effects in-combination with the Noggusbog Cutaway Bog Decommissioning and Rehabilitation Plan 2022.
Killaranny Cutaway Bog Decommissioning and Rehabilitation Plan 2022	Bord na Móna propose to 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). Killaranny Bog is proposed to be part of this this proposed Scheme (PCAS) and this rehabilitation plan outlines the approach taken. The Killaranny Cutaway Bog is located within the same sub-catchment as the Derrinboy Bog. This Plan is subject to Appropriate Assessment in accordance with Article 6(3).	Owing to the nature and scale of the Plan, it does not have the potential to cause likely significant effects in-combination with the Killaranny Cutaway Bog Decommissioning and Rehabilitation Plan 2022
Blackwater Cutaway Bog Decommissioning and Rehabilitation Plan 2022	Bord na Móna propose to 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). Blackwater Bog is proposed to be part of this this proposed Scheme (PCAS) and this rehabilitation plan outlines the approach taken. The Blackwater Cutaway Bog is located within a separate sub-catchment to the Derrinboy Bog. This Plan is subject to Appropriate Assessment in accordance with Article 6(3).	Owing to the nature, scale and location of the Plan in a separate sub-catchment, it does not have the potential to cause likely significant effects in-combination with the Blackwater Cutaway Bog Decommissioning and Rehabilitation Plan 2022.
Boora Cutaway Bog Decommissioning and Rehabilitation Plan 2022	Bord na Móna propose to 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). Boora Bog is proposed to be part of this this proposed Scheme (PCAS) and this rehabilitation plan outlines the approach taken. The Boora Cutaway Bog is located within the same sub-catchment as the Derrinboy Bog. This Plan is subject to Appropriate Assessment in accordance with Article 6(3).	Owing to the nature and scale of the Plan, it does not have the potential to cause likely significant effects in-combination with the Boora Cutaway Bog Decommissioning and Rehabilitation Plan 2022
Oughter Cutaway Bog Decommissioning	Bord na Móna propose to 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). Oughter Bog is proposed to be part of this this proposed Scheme (PCAS) and this rehabilitation plan outlines the	Owing to the nature and scale of the Plan, it does not have the potential to cause likely significant effects in-combination with the

Plan or Project	Description of Plan or Project	In-combination effect(s)
and Rehabilitation Plan 2021	approach taken. The Oughter Cutaway Bog is located within the same sub-catchment as the Derrinboy Bog. This Plan is subject to Appropriate Assessment in accordance with Article 6(3).	Oughter Cutaway Bog Decommissioning and Rehabilitation Plan 2022
Turraun Cutaway Bog Decommissioning and Rehabilitation Plan 2021	Bord na Móna propose to 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). Turraun Bog is proposed to be part of this this proposed Scheme (PCAS) and this rehabilitation plan outlines the approach taken. The Turraun Cutaway Bog is located within the same sub-catchment as the Derrinboy Bog. This Plan is subject to Appropriate Assessment in accordance with Article 6(3).	Owing to the nature and scale of the Plan, it does not have the potential to cause likely significant effects in-combination with the Turraun Cutaway Bog Decommissioning and Rehabilitation Plan 2022
Belmont Cutaway Bog Decommissioning and Rehabilitation Plan 2021	Bord na Móna propose to 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). Belmont Bog is proposed to be part of this this proposed Scheme (PCAS) and this rehabilitation plan outlines the approach taken. The Belmont Cutaway Bog is located within the same sub-catchment as the Derrinboy Bog. This Plan is subject to Appropriate Assessment in accordance with Article 6(3).	Owing to the nature and scale of the Plan, it does not have the potential to cause likely significant effects in-combination with the Belmont Cutaway Bog Decommissioning and Rehabilitation Plan 2022
Kilmacshane Cutaway Bog Decommissioning and Rehabilitation Plan 2021	Bord na Móna propose to 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). Kilmacshane Bog is proposed to be part of this this proposed Scheme (PCAS) and this rehabilitation plan outlines the approach taken. The Kilmacshane Cutaway Bog is located within a separate sub-catchment to the Derrinboy Bog. This Plan is subject to Appropriate Assessment in accordance with Article 6(3).	Owing to the nature, scale and location of the Plan in a separate sub-catchment, it does not have the potential to cause likely significant effects in-combination with the Kilmacshane Cutaway Bog Decommissioning and Rehabilitation Plan 2022.
Garryduff Cutaway Bog Decommissioning and Rehabilitation Plan 2021	Bord na Móna propose to 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). Garryduff Bog is proposed to be part of this this proposed Scheme (PCAS) and this rehabilitation plan outlines the approach taken. The Garryduff Cutaway Bog is located within a separate sub-catchment to the Derrinboy Bog. This Plan is subject to Appropriate Assessment in accordance with Article 6(3).	Owing to the nature, scale and location of the Plan in a separate sub-catchment, it does not have the potential to cause likely significant effects in-combination with the Garryduff Cutaway Bog Decommissioning and Rehabilitation Plan 2022.
Lemanaghan Wind Farm	Bord na Móna is proposing to develop a wind farm on Lemanaghan Bog, located in northwest Offaly. Lemanaghan bog is adjacent to the communities of Ballycumber,	Owing to the nature and scale of the Plan, it does not have the potential to cause likely

Plan or Project	Description of Plan or Project	In-combination effect(s)
	Ferbane and Pollagh. Lemanaghan Wind Farm is located within the same sub-catchment as the Derrinboy Bog. It is envisaged that a planning application will be lodged in Autumn 2022 for the proposed development. It is intended to submit the planning permission application directly to An Bord Pleanála, under the provisions of the Planning and Development (Strategic Infrastructure) Act 2006. An initial approach is therefore being made to An Bord Pleanála seeking a determination in relation to the Strategic Infrastructure Development (SID) status, or otherwise, of the proposed wind farm development.	significant effects in-combination with the Lemanaghan Wind Farm.
Derrinlough Wind Farm	Bord na Móna was granted permission to develop a wind farm on Clongowany and Drinagh bogs located in Co. Offaly, approximately 10 km north-west of the Plan. The proposed development will encompass 21 No. wind turbines up to a tip height of 185 m and will have a maximum export capacity (MEC) in excess of 85 MW. Derrinlough Wind Farm is located within the same sub-catchment as the Derrinboy Bog. An NIS was prepared in respect of the proposed development, which concluded that the proposed development, either alone or in-combination with other plans and projects, would not adversely affect the integrity of any European site.	Owing to the nature, scale and location of the Plan, it does not have the potential to cause likely significant effects in-combination with the Derrinlough Wind Farm.
Irish Water (Shannon to Dublin) Corridor	The project comprises of an abstraction of water from the lower River Shannon at Parteen Basin in Co. Tipperary, with a new water treatment plant nearby at Birdhill. Treated water will then be piped 170km to a termination point reservoir at Peamount in County Dublin, connecting into the Greater Dublin Area The project has already gone through extensive non-statutory public consultation and there will be a further round of non-statutory public consultation before a Strategic Infrastructure Development Planning Application is submitted to An Bord Pleanála. Irish Water is continuing to progress the preparation of a Strategic Infrastructure Development planning application to An Bord Pleanála for the project, including an Environmental Impact Assessment Report and Natura Impact Statement following the enactment of new Abstraction legislation. The proposed Irish Water (Shannon to Dublin) Corridor is located adjacent to the northern boundary of Derrinboy Bog.	Owing to the nature, scale and location of the Plan, it does not have the potential to cause likely significant effects in-combination with the Irish Water (Shannon to Dublin) Corridor.
NPWS/ Coillte Raised Bog Restoration Project (LIFE09 222)	This Project "Demonstrating Best Practice in Raised Bog Restoration in Ireland" is a nature conservation project jointly funded by EU DG-Environment, the Department of Arts, Heritage, and the Gaeltacht and Coillte under the EU LIFE-Nature Programme. The project is being managed by Coillte and focuses on the restoration of 636 ha of raised bog habitat on 17 Coillte owned sites within the Natura 2000 Network and in Natural	Owing to the nature, scale and location of the Plan, it does not have the potential to cause likely significant effects in-combination with the Raised Bog Restoration Project.

Plan or Project	Description of Plan or Project	In-combination effect(s)
	Heritage Areas. The closest bogs to the Plan are Cangort Bog NHA (21 km south west of the plan) and Woodtown Bog NHA (50 km north east of the Plan).	

5.0 CONCLUSION

In accordance with Article 6(3) of the Habitats Directive, Regulations 42 of the Habitats Regulations, the relevant case law, established best practice and the Precautionary Principle; this AA Screening Report has examined the details of the Plan and the relevant European sites and has concluded, on the basis of objective information, that the Plan, either individually or in combination with other plans or projects, is not likely to give rise to impacts that would constitute significant effects in view of the Conservation Objectives of those sites.

In light of this conclusion, it is the considered opinion of ROD, as the author of this AA Screening Report, that the Competent Authority, Bord na Móna, may find in completing its AA Screening in respect of the Derrinboy Bog Decommissioning and Rehabilitation Plan, that the Plan, either individually or in combination with other plans and projects, is not likely to have a significant effect on any European site, in view of best scientific knowledge and the Conservation Objectives of the sites concerned. Therefore, it is the recommendation of the author of this AA Screening Report that the Competent Authority may determine that AA is not required in respect of the Plan.

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APPENDIX A
Derrinboy Bog - Cutaway Bog Decommissioning and Rehabilitation Plan 2021

Bord na Móna

Derrinboy Bog

Cutaway Bog Decommissioning and Rehabilitation Plan 2021

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

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

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

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

Industrial peat production has now permanently ceased at Derrinboy Bog.

In addition, to preparing this document to comply with Condition 10 of IPC Licence Ref. P0500-01, due regard was also given to the Peatlands Climate Action Scheme (PCAS) announced by the Minster. This Scheme will see the Minister support, via the Climate Action Fund and Ireland's National Recovery and Resilience Plan,*Bord na Móna in developing a package of measures, 'the Scheme', for enhanced decommissioning, rehabilitation and restoration of cutaway peatlands referred to as, the Peatlands Climate Action Scheme'. However, only the additional costs associated with the additional and enhanced rehabilitation, i.e, measures which go beyond the existing standard mandatory decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support. The additional costs of the Scheme will be supported by Government, administered by the Department of Environment, Climate and Communications (DECC), while the National Parks and Wildlife Service (NPWS) will act as the Scheme regulator.*

While this document outlines the enhanced rehabilitation measures planned for the Derrinboy 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 Derrinboy 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 Derrinboy Bog, such as amenity, will be conducted in adherence to the relevant planning guidelines and consultation with relevant authorities and will be considered within the framework of this rehabilitation plan.

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NON-TECHNICAL SUMMARY

- Bord na Móna is planning to rehabilitate Derrinboy Bog, near Cadamstown in Co Offaly.
- Peat harvesting is now finished at Derrinboy Bog.
- This is happening as Bord na Móna are obliged to carry out peatland rehabilitation via an IPC License issued by the Environmental protection Agency. In addition, the Government has agreed to support peatland rehabilitation via the establishment of the Peatland Climate Action Scheme (PCAS). This is funded via the government and by Bord na Móna.
- The key objective of peatland rehabilitation is environmental stabilisation. This means developing habitats and vegetation back onto the bare peat, and minimising impacts to downstream. Essentially this means putting the 'skin' of plants and mosses back on the peat. The bog was drained in the past to allow milled peat production. Better results for water quality improvements, climate action, the reduction of carbon emissions and biodiversity are achieved when the remaining peat is re-wetted. This means drain-blocking and other measures to raise water levels to the surface of the bog and to encourage the natural colonisation of vegetation.
- Derrinboy bog is a relatively young production bog and horticultural peat was, until recently, being harvested from it. It still has relatively deep residual acidic peat remaining.
- In general soggy ground conditions are preferred. This means the remaining peat is wet and that plants that prefer wetter conditions, like Bog Cotton and Sphagnum mosses will thrive.
- Many Bord na Móna bogs can not be restored back to raised bog, due the shallow depth of cutaway peat and the environmental conditions that have been modified. However other natural peatland habitats will develop like Sphagnum-rich vegetation, poor fen, Heather and Birch woodland, and in time a naturalised peatland can be restored.
- Some bogs, like Derrinboy, with deeper residual peat have the capacity to regrow *Sphagnum* moss again, where there are suitable hydrological conditions. *Sphagnum* is a key species for restoring naturally functioning peatland conditions.
- Re-wetting peat is also better for climate action. This reduces carbon emissions as re-wetting the remaining peat reduces carbon losses such as the production of Carbon Dioxide, the main Greenhouse Gas. The site is expected to still be a reduced carbon source for some time, but eventually the carbon sink function can re-establish as peat-forming conditions are restored. This will take some time.
- The development of a range of habitats in Derrinboy 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 and peatland habitats.
- Measures proposed for Derrinboy Bog include drain blocking, cell-bunding and other measures required to raise water levels to the surface of the peat (altering the camber on fields or changing levels of pipes for example). Drain-blocking will be restricted to internal drains. Some fertiliser will be spread on headlands and other areas (a small part of the overall area) to encourage vegetation growth.
- Bord na Mona plan to carry out this work in 2022.
- 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 this bog, and a peatland ecosystem to be restored. However, it is expected that most of the site will be developing pioneer habitats after 5-10 years.
- This is a peatland rehabilitation plan. 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 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.

SUMMARY

Name of bog: Derrinboy **Area:** 309 Ha

Site description:

- Derrinboy Bog was drained originally in 1988 but first brought into production in 2003. Peat Production was horticultural peat and ceased in 2020.
- The site is divided into two main sections by a local road.
- The former peat production footprint now comprises bare peat. Active drainage channels are present.
- Residual peat depths are relatively high with peat depths over most of the site are approximately 0.5-5m.
- Part of Derrinboy in the west has shallow peat depths
- Derrinboy is considered a **deep peat** bog.
- Drainage of Derrinboy is partially-pumped.
- Derrinboy bog is drained by tributaries of the Silver River which flow north or east before joining with the Silver River east of Kilcormac.

Rehabilitation goals and outcomes

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

This is defined as:

- Carrying out enhanced rehabilitation with the application of enhanced peat rehabilitation measures to re-wet peat and slow water movement across the site. The site has extant deep peat which is highly suitable for rehabilitation. Rehabilitation will focus on targeted actions to raise water levels and areas where there is still significant bare peat cover. This site will develop a mosaic of compatible Sphagnum-rich vegetation, heath, Birch woodland and other cutaway peatland habitats.
- Optimising hydrological conditions for the development of *Sphagnum*-rich, embryonic raised bog on deep peat and, fen, reed swamp and wet woodland on shallow cutaway peat, and eventually naturally functioning peatland and wetland habitats.
- Stabilisation or improvement in water quality parameters (e.g. suspended solids).
- Environmental stabilisation.
- Optimising hydrological conditions for the protection of exposed archaeological structures, their retention *in situ* and preservation into the future.
- Rehabilitation will support the National Policies on Climate Action and Green House Gas (GHG) mitigation by maintaining and enhancing the current condition peat storage capacity of the bog (locking the carbon into the ground). In time, it is expected that the bog will develop as a reduced carbon source with potential to develop as a partial carbon sink. The development of carbon sink function is dependent on the restoration of peat-forming conditions. It will also support Ireland's commitments towards Water Framework Directive and the National River Basin Management Plan 2018-2021.

Scope of rehabilitation

The principal scope of this rehabilitation plan is defined by:

- The area of Derrinboy Bog.
- EPA IPC Licence - Ref. P0500-01. As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. The key objective of 'rehabilitation', as required by this licence, is achieved by the **environmental stabilisation** of the bog.
- The enhanced rehabilitation measures defined in the Scheme (PCAS), which are designed to exceed/meet the standard stabilisation requirements as defined by the IPC Licence and to enhance the ecosystem services of Derrinboy Bog, in particular, optimising **climate action benefits**.

- The local environmental conditions of this bog. Derrinboy Bog has variable environmental characteristics with a range of residual peat depths, hydrology and topography. Derrinboy is suited to development of Sphagnum-rich vegetation.
- The key goals and outcomes of rehabilitation at this bog outlined above.
- Minimising potential impacts on neighbouring land. Some boundary drains around Derrinboy Bog will be left unblocked as blocking boundary drains could affect adjacent land.

Criteria for successful rehabilitation:

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

- Rewetting of residual peat in the former area of industrial peat production to slow water movement across the site to retain silt, accelerating the development of vegetation cover via natural colonisation, and reducing the area of bare exposed peat (IPC Licence validation) through the creation of compatible fen, Reed swamp, wet woodland and other wetland and peatland habitats.
- Stabilising or reducing key emissions to water (e.g. potential silt-run-off) This will be measured via water quality monitoring (suspended solids and ammonia) for at least 2 years after the rehabilitation has been completed (IPC Licence validation).
- Reducing pressure from peat production on the local river catchment (WFD) (IPC Licence validation). This will be measured by the EPA WFD monitoring programme.
- Optimising the extent of suitable hydrological conditions to optimise climate action (Climate action verification).
- Reduction in carbon emissions (Climate action verification). This will be measured by an aerial survey after rehabilitation has been completed.
- Setting the site on a trajectory towards establishment of a mosaic of compatible habitats including embryonic *Sphagnum*-rich peat forming communities, fen, Reed swamp, wet woodland, heath, scrub, Birch woodland habitats, where conditions are suitable, and eventually towards a reduced carbon source/carbon sink (Climate action verification). These habitats will generally establish initially as pioneer vegetation. It will take some time for stable naturally functioning peatland habitats to fully develop at Derrinboy Bog.
- Improvement in biodiversity and ecosystem services. (Climate action verification).

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

Summary of measures:

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

- Planning actions, including developing a detailed site plan and carrying out a drainage management assessment.
- Carry out an ecological appraisal of the potential impacts of the planned rehabilitation.
- Carry out proposed measures, which will be a combination of targeted field re-profiling, drain blocking, creation of cross berms, modifying outfalls and water level management.
- Phase 2 measures may include fertiliser application targeting bare peat areas on headlands, high fields and other areas, and further water level management.
- Silt ponds will continue to be maintained during the rehabilitation and decommissioning schedule.
- Evaluate success of short-term rehabilitation measures outlined above and remediate, where necessary.
- Decommissioning of silt-ponds will be assessed and carried out, where required.

Timeframe:

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

Budget and Costing

- The rehabilitation plan outlined in this document is predicated on the understanding that it is the Minister's intention to impose an obligation on Bord na Móna to develop measures, 'the Scheme' (PCAS). It is understood that additional costs of these measures, required under the Scheme, will be supported from the Climate Action Fund and Ireland's National Recovery and Resilience Plan.
- In relation to the pre-existing Condition 10 IPC Licence requirement to carry out what can be termed the 'standard' decommissioning and rehabilitation, Bord na Móna maintains a Provision on its balance sheet to pay for these future costs when industrial peat extraction ceases. This is updated every year. For more information see the Bord na Móna Annual Report (Bord na Móna, 2021). Bord na Móna is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

Monitoring, after-care and maintenance

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

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

Additional Monitoring:

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

Validation and IPC Licence surrender

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

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

1. INTRODUCTION

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

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

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

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

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

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

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

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

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

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

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

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

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

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

1.1 Constraints and Limitations

This document only covers the area of Derrinboy Bog, see Drawing number BNM-DR-23-22-01 titled **Derrinboy Bog**.

Future land-use at Derrinboy Bog has not been defined by Bord na Móna. Bord na Móna will continue to review the future after-use of its land-bank. Any consideration of any other future after-uses for Derrinboy Bog, will be conducted in adherence to the relevant planning legislation and consultation with relevant authorities and will be considered within the framework of this rehabilitation plan.

Industrial peat extraction (for horticultural peat) at Derrinboy Bog permanently ceased in 2020. Currently the former peat production area comprises largely bare peat. The combination of active rehabilitation measures and natural colonisation will quickly establish and/or increase the extent of pioneer vegetation and will be planned to accelerate environmental stabilisation. Nevertheless, it will take some time (30-50 years) for naturally functioning peatland ecosystems to fully re-establish.

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

Parts of Derrinboy Bog are in close proximity to Coillte plantation forestry.

Some lands along the southern boundary of the eastern half of the bog, within the control of Bord na Móna, has been identified as Turbary. This land has not been subject to peat extraction although some historic drainage has been undertaken.

Rehabilitation in other areas of the bog may also be constrained due to other property issues or issues such as rights of way or archaeology. The proposed Irish Water Shannon Pipeline corridor occurs in close proximity and slightly overlaps the very northern boundary of Derrinboy.

2. METHODOLOGY

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

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

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

2.1 Desk Study

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

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

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

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

- Boora Integrated Pollution Control Licence;
- Boora Annual Environmental Reports;
- Review of the National Biodiversity Data Centre (NBDC) webmapper;
- Inland Fisheries Ireland (IFI) Reports;
- Environmental Protection Agency database (www.epa.ie);
- EPA Guidance on Requests for Alterations to a Licensed Industrial or Waste Activity;
- BirdWatch Ireland online data (including I-WeBS and CBS datasets; www.birdwatchireland.ie);
- Geological Survey of Ireland - National Draft Bedrock Aquifer map;
- Geological Survey of Ireland - Groundwater Database (www.gsi.ie);
- National Parks & Wildlife Services Public Map Viewer (www.npws.ie);
- Water Framework Directive catchments.ie/maps/ Map Viewer (www.catchments.ie);
- OPW Indicative Flood Maps (www.floodmaps.ie);
- CFRAM Preliminary Flood Risk Assessment (PFRA) maps (www.cfram.ie);
- River Basin Management Plan for Ireland 2018 – 2021;
- Bord na Móna Annual Report 2019;
- 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 will be contacted during the rehabilitation planning process for their views. See Section 4.

2.3 Field Surveys

Bord na Móna carried out a baseline ecological survey of all of its properties in 2009-2012 and developed habitat maps. As part of this exercise Derrinboy Bog was originally surveyed in February of 2011.

Additional ecological walk-over surveys and visits have taken place at Derrinboy Bog between 2014-2021 to inform rehabilitation planning and habitat maps have been updated, where required. This rehabilitation plan is informed by the original baseline survey as well as subsequent site walk-over surveys and visits, and updates to baseline data.

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

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

3. SITE DESCRIPTION

Derrinboy bog is located in south Co. Offaly, close to Cadamstown Village and 3.5 km south of Kilcormac Town. A local road passes through the centre of Derrinboy bog and divides it into two main sections. No rail line is present but there is a small works area in the north of the bog adjacent to the public road.

See Drawing number BNM-DR-23-22-01 titled **Derrinboy Bog: Bog Site Location**, included in the accompanying Mapbook[1] , which illustrates the location of Derrinboy Bog in context to the surrounding area.

The local landscape is relatively flat in the local area and the surrounding land is dominated by farmland. The foothills of the Slieve Bloom mountains are relatively close with the ground beginning to rise in height to the south of the bog.

The Kyleboher Stream, a tributary of the Silver river, flows northward from the northwest lobe of Derrinboy. On its east side the bog is drained by the Knockhill and Black (Ballyboy) streams which flow eastwards and join the Silver River east of Kilcormac.

3.1 Status and Situation

3.1.1 Site history

Derrinboy bog is a relatively young production bog and only horticultural peat was ever harvested. It was drained originally in 1988 but first brought into production in 2003. The peat is red/brown acidic *Sphagnum* peat.

One noticeable feature of this bog is that the bog is still relatively high compared to other older production bogs. Nearly all the former production bog is bare peat. There is virtually no recolonisation of production bog on the east side and the only examples of typical pioneer cutaway habitats are in and around the silt pond areas.

3.1.2 Current land-use

Industrial peat production has now permanently ceased at Derrinboy Bog. Future land-use at Derrinboy Bog has not been defined by Bord na Móna.

There are a number of rights of way adjacent to or overlapping this bog.

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

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

located in the catchment areas of the three peat-fired generating stations (Lough Ree, West Offaly, and Edenderry Power Stations). These constituted jobs in the plants and in peat extraction, jobs indirectly supported in upstream supply industries and jobs induced through the trickle-down effects of the wages and salaries of those supported directly or indirectly.

In respect of Derrinboy Bog, jobs would have included those to facilitate extraction of horticultural peat at this site, and associated processing, transfer and sale.

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).

3.2 Geology and Peat Depths

3.2.1 Sub-soil geology

The underlying geology at Derrinboy Bog is 'Dark muddy limestone, shale' as part of the Ballysteen formation[2]. The underlying soils and sub-soils are classed as 'Cutover/Cutaway Peat'.

The peat is underlain by glacial deposits such as lacustrine clays and marls. Coring carried out in 2021 to inform Rehab Planning recorded Gritty GPC, Gravel GPC, Shell Marl and Sandy GPC subsoils. There is limited if any exposure of subsoils due to the deep peat reserves still present across most of the bog.

3.2.2 Peat type and depths

Commercial peat extraction for the horticulture industry was undertaken at Derrinboy Bog from 2003 up until 2018. As a result of the harvesting programme in place at Derrinboy, peat depths vary from ca.0.5m up to ca.5m. The middle portion of the western section contains the shallowest peat reserves at circa 0.5m. To the northwest of this the remaining peat reserves are ca.1-2m deep. The eastern half and the southern half of the western section have the deepest extant peat with between 4m and 5m across much of the former extraction area.

Red/brown acidic Sphagnum peat is the main peat type remaining in Derrinboy.

3.3 Key Biodiversity Features of Interest

The majority of Derrinboy was in production until quite recently and there are few features of biodiversity interest present. Some of the habitats present around the margins of the site such as remnant high bog (PB1), cutover bog and scrub (WS1) have local ecological value as a refuge for local fauna. There are signs that the site is visited by Otter occasionally. Otter is a species of significant conservation interest and is listed on Annex II of the EU habitats Directive.

Prior to its drainage and extraction by Bord na Móna the bog was described in Mooney & O'Connell (1983[3]). In this report the eastern half of the bog (referred to as Cadamstown East) is described as a large domed bog with

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

[3] Mooney, E & O'Connell, C. (1983). A SURVEY TO LOCATE MIDLAND RAISED BOGS OF SCIENTIFIC INTEREST.

some Sphagnum pools in a central area, however bare peat and negative quality effects from recent burning were noted. Fir Clubmoss (*Huperzia selago*) was noted as present. The western half of the bog (Cadamstown West) was described as relatively dry and in poor condition despite the apparent absence of drains however this was attributed to severe damage by fire.

3.3.1 Current habitats

The east side of Derrinboy has some small patches of remnant high bog along the southern boundary. These areas of high bog are quite disturbed from adjacent domestic sod peat cutting and are quite dry with Heather being the dominant vegetation feature. There is still some remnant hummocks of *S. capillifolium* and S. *papillosum* on the high bog surface but these are degrading and there are frequent other indicators of degradation and disturbance. There is intensive domestic sod peat cutting in this area. Some of the older cutover bog has now developed Birch-dominated woodland (WN7) and scrub (WS1). Conifer plantation (WD4) has been developed along the eastern boundary. A drain separates the conifer plantation from the BnM property. Some of the drainage along the headland is poor in this area and the headland is quite wet.

There are several silt ponds along the northern boundary of the east side. These have typical Birch and Gorse colonisation in the unused areas. Spoil heaps contain marl. Purple Moorgrass, Soft Rush and Bog Cotton dominate the vegetation around the ponds. The recolonised areas also contain some regenerating *Sphagnum* where there has been no disturbance and there is some surface water flow. Otter tracks were noted along one of the silt ponds. There is a channelised deep drain/stream (Pigeon Drain/Block River) along the boundary of this section.

The west side of Derrinboy has a similar suite of habitats. All of the former production bog is bare peat. There are small sections of intact raised bog around the margins. The majority of this raised bog is relatively dry. Some of it along the southern boundary is being cut for domestic sod peat from the opposite side while there is also a significant amount of older inactive cutover bog that is regenerating somewhat. There is also a band of well-established Birch woodland along the southern boundary. The western boundary generally has intact high bog with a band of Birch-dominated scrub/Birch woodland along the boundary. There is some inactive cutover bog in places. Some small sections of remnant high bog along the northern boundary are being actively cut for sod peat.

The most common habitats present at this site include:

- Bare peat;
- Birch scrub;
- Silt ponds (Silt) with Gorse/Birch scrub and Purple Moorgrass-dominated grassland;
- Riparian zones (Rip) (with drains and associated habitats such as scrub);
- Access zones (Acc) with Purple Moorgrass-dominated grassland.

The most common habitats found around the margins of the production area include:

- Cutover Bog (PB4) (Codes refer to Heritage Council habitat classification, Fossitt 2000);
- Scrub (WS1);
- Raised bog (PB1) (minor remnants);
- Birch woodland (WN7);

- Conifer plantation (WD4);
- Hedgerows (WL1);
- Improved grassland (GA1) around the boundary where the GIS boundary extends into adjacent fields;
- Wet grassland (GS4) (old cutover).

3.3.2 Species of conservation interest

Several bird species have been noted on Derrinboy during surveys to inform Rehab Planning. These include Raven (*Corvus corax*), Common Snipe (*Gallinago gallinago*) along with commoner species such as Coal Tit (*Periparus ater)*, Robin (*Erithacus rubecula*), Starling (*Sturnis vulgaris*) , Hooded Crow (*Corvus cornix*), Blackbird (*Turdus merula)* and Reed Bunting (*Emberiza schoeniclus*).

Of the above, Common Snipe is currently Red-listed on the Irish BOCCI list[4], whilst Starling is Amber listed.

Several signs of mammals have been recorded at Derrinboy for Otter (*Lutra lutra*), Badger (*Meles meles*), Red Fox (*Vulpes vulpes*) and Irish Hare (*Lepus timidus hibernicus*).

3.3.3 Invasive Alien Species

Invasive alien species known to occur at the subject bog (or desktop review suggests presence is likely), and for which reasonably foreseeable source impact pathways for dispersal may result from the proposed PCAS are described here. No invasive plant species, as listed under Regulation (EU) 1143/2014 on the prevention and management of the introduction and spread of invasive alien species, have been recorded at Derrinboy Bog. A broad range of common garden escapes are occasionally present around the margins of Bord na Mona bogs, and although spatial overlap with the PCAS is expected to be limited, these are, where necessary, to be treated in line with Best Practice during PCAS activities.

3.4 Statutory Nature Conservation Designations

Derrinboy Bog was formerly described as an Area of Scientific Interest (ASI) in County Offaly (Site no.888), evaluated as of Low Importance for Bog Habitats (www.npws.ie[5]).

Regarding European Sites, Clonaslee Eskers and Derry bog pNHA and SAC (Site Code 000859) is located ca.3.5km east of Derrinboy Bog. To the south the Slieve Bloom Mountains SPA (Site Code 004160) is less than 2km from the boundary of Derrinboy Bog. The Slieve Bloom Mountains pNHA and SAC (Site Code 000412) is ca.4km to the south east.

The Slieve Bloom Mountains Nature Reserve is approximately 7km to the south east of Derrinboy.

Other NHA's or pNHA's in close proximity include Camcor Wood pNHA (Site Code 000889),ca.4km to the south, along with Derykeel Meadows pNHA (Site Code 000897), ca. 6km to the south west.

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

[5] https://www.npws.ie/sites/default/files/publications/pdf/Anon_1992_ASI_Offaly_Index.pdf

3.4.1 Other Nature Conservation Designations

The Ramsar Convention entered into force in Ireland on 15th March 1985. Ireland currently has 45 sites/wetlands designated as Wetlands of International Importance (Ramsar Sites). These cover a surface area of 66,994ha. There are no Ramsar Sites in the local vicinity of Derrinboy Bog (i.e. within 3km) The closest Ramsar Site is the Slieve Bloom Mountains Ramsar Site which is ca.5km south east.

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

3.5 Hydrology and Hydrogeology

Derrinboy bog forms part of the Lower Shannon Catchment (Catchment ID : 25A and 25B) as defined by the EPA under the Water Framework Directive (WFD) and is primarily situated within the Silver[Kilcormac]_SC_010 Sub-Catchment with part of the site to the west located within the Camcor_SC_010, Shannon[Lower]_SC_040 and BROSNA_SC_070 Sub-Catchments. The bog is located just North of the Slieve Bloom mountains and east of the town of Birr. Derrinboy bog contains several drainage pathways which primarily drain in a north easterly direction towards the River Brosna.

Regional hydrological data suggest that Derrinboy receives average precipitation of 958mm/yr (1981-2010), with an estimated evapotranspiration rate of c. 503mm/yr, leaving an average effective precipitation of 455/yr. Assuming no recharge to groundwater and no groundwater contribution to discharge from the bog, the available precipitation that may become runoff (assuming no change in storage) is 455mm/yr, which equates to an annual runoff rate of c. 4,550m3/ha.

There are four active silt ponds present on the Derrinboy site. Situated in the north and north east, these silt ponds manage discharges into the Silver River. On its eastern side, the bog has field drains running in a general northeast to southwest orientation. The southern half of the western side is similarly set out, but drains in the northern half run approximately northwest to southeast. A pump is present in the north of the eastern side adjacent to the existing silt ponds.

GSI data indicates that the Ballysteen Formation underlies the majority of the bog, with a small section to the north-west and north-east underlain by Waulsortian Limestones underlies Derrinboy. Both of these units are classified as Locally Important Aquifers (Bedrock which is Moderately Productive only in Local Zones). Several bedrock faults can be observed in the surrounding areas including one which crosses through Derrinboy, trending in a SW-NE direction. No data exists concerning depth to bedrock, however, several bedrock outcrop features have been mapped in the surrounding area, particularly to the north and south-west of the bog. A number of springs are also mapped to the south-west of the bog (<2km).

Quaternary Sediment maps show Derrinboy underlain by peat, yet surrounded by inorganic deposits, including Till derived chiefly from Limestone to the north-west, north and east. However, there are also glacial deposits including gravels derived from limestone to the west and south-east and alluvium to the south. GSI groundwater vulnerability mapping indicates that there is generally low vulnerability in the area of the bog and moderate in the surrounding areas. However, higher groundwater vulnerability is associated with the areas where gravels are mapped and bedrock outcrop features have been mapped. While Groundwater Vulnerability is typically used to indicate the susceptibility to groundwater pollution, it can provide a useful proxy indication of likely groundwater flow rates in the surrounding area.

3.6 Emissions to surface-water and water-courses

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

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 period. Silt pond decommissioning will be considered when sites are deemed to be on a trajectory of environmental stability and peatland rehabilitation has been completed.

Derrinboy bog has three treated surface water outlets to the IE_SH_25S020200 SILVER (KILCORMAC)_020 (Pidgeon Drain or Black River), which is a tributary of the Silver River.

The Silver River 050 Kilcormac is currently classified as At Risk and listed as being under pressure from peat extraction in the third cycle of the river basin management plan, currently under preparation.

The Silver River, Kilcormac is a Priority Area for Action (PAA) for the Local Authority Water Programme (Lawpro). LAWPRO catchment scientists work in specific catchment areas called Priority Areas for Action (PAAs). It consists of four waterbodies, the Ballynacarrig_010 (an incoming tributary), and the Silver_020, the Silver_030 and the Silver_050, which are all sections of the main channel. All 4 waterbodies are categorised as At Risk and are at Moderate Ecological Status (2010-2015). Three of the waterbodies have moderate invertebrate biological status, the Ballynacarrig_010, Silver_020 and the Silver_030, while the Silver_050 has good invertebrate status however the fish status or potential is at moderate status and so its overall ecological status remains at moderate. The aim is to restore these 4 waterbodies to Good Ecological Status by 2022-2027.

The Silver (Kilcormac) River is an important fishery river especially for the “Croneen” trout, which is a genetically distinctive population of brown trout – Salmo trutta). There is a run of “Croneen” trout from Lough Derg to the Silver River particularly from mid-July to September depending on water levels. The Silver River is also an important spawning river for many other species of fish and brook lamprey (Lampetra planeri) due to favourable substrate. It also supports the protected white-clawed crayfish (Austropotamobius pallipes). There is one protected area within the Silver river - the Clonaslee Eskers and Derry Bog SAC (Site Code – 000859).

Details of silt ponds, associated surface water emission points and those being monitored and sampled as part of the PCAS scheme are detailed on the accompanying structures map along with water quality map. See Drawing number BNM-DR-23-22-02 titled **Derrinboy Bog: Structures and Sampling**, along with Drawing number BNM-DR-23-22-WQ01 titled **Derrinboy Bog: Water Quality Map** included in the accompanying Mapbook, which illustrate the various drainage and water quality infrastructure present at Derrinboy.

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

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

From an analysis of any monitoring over the past 5 yrs. of the IPC licence environmental monitoring of some of the discharges from this bog, indicate that results were under the ELV for SS and under the licence trigger levels for ammonia and COD (Table 3.1).

Bog	SW	Monitoring	pH	SS	TS	Ammonia	TP	COD	Colour
Derrinboy	SW-38	Q1 20	7.6	9	226	0.661	<0.05	53	260
Derrinboy	SW-39	Q1 20	7.5	11	244	1.21	<0.05	58	275
Derrinboy	SW-38	Q1 19	8	<5	295	0.72	<0.05	41	87
Derrinboy	SW-39	Q1 19	7.7	8	262	1.8	0.06	39	106
Derrinboy	SW-40	Q1 19	7.4	<5	162	1.6	<0.05	27	129
Derrinboy	SW-38	Q4 18	7.3	18	136	0.67	0.06	84	145
Derrinboy	SW-39	Q4 18	7.2	18	174	0.65	0.05	83	140
Derrinboy	SW-40	Q4 18	7.1	8	84	0.83	0.06	48	170
Derrinboy	SW-38	Q2 17	7.9	5	292	1.3	0.05	66	109
Derrinboy	SW-39	Q2 17	7.4	5	188	0.35	0.05	66	204
Derrinboy	SW-40	Q2 17	7.5	5	236	0.58	0.05	48	101
Derrinboy	SW-38	Q1 16	7.7	5	212	0.54	0.07	37	109
Derrinboy	SW-39	Q1 16	7.4	6	140	1	0.05	49	139
Derrinboy	SW-40	Q1 16	7.2	5	78	0.57	0.06	41	137

Table 3.1 Surface water monitoring results for Derrinboy

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

Water quality of water discharges from restored/rehabilitated peatlands normally improves as a result of bog rehabilitation and restoration measures and the restoration of natural peatland processes (Bonn *et al*., 20017). Peatland rehabilitation is also expected to improve water attenuation of the site as the drains are blocked, slowing water movement and water release from the site. Restored peatlands help slow the release of water and aid the natural regulation of floods downstream (Minayeva *et al*., 2017). The National River Basin Management Plan (NRBMP) 2018-2021 (DHPCLG, 2017) is the key national plan for Ireland to achieve the objectives of the Water Framework Directive (WFD). The NRBMP outlines how key actions such as the Bord na Móna Raised Bog Restoration Project and ongoing Bord na Móna rehabilitation is expected to have a positive impact on water quality and help the NWBMP deliver its objectives in relation to the WFD.

Water will still discharge from designated emission points when rehabilitation at Derrinboy Bog has been completed. The existing silt the silt pond will continue to be maintained and operated as long as required, or such point as they can be decommissioned, with no change in outfall type This discharge will have improving water quality and there will be increased wetland attenuation, meaning slower release of water. This is expected to have a positive impact on status of the key downstream water body receptors, and is expected to support the improvement of the current and future status of Silver River, currently assessed as being of Moderate Status.

Decommissioning and Rehabilitation Programme Water Quality Monitoring.

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

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

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

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

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

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

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

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

3.7 Fugitive Emissions to air

None

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

3.8 Carbon emissions

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

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

It is expected that Derrinboy Bog can become a reduced carbon source/partial carbon sink following rehabilitation. The potential of any cutaway site to develop as a reduced carbon source/carbon sink in the longer-term depends on 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 the site is expected to develop Sphagnum-rich vegetation, where there is deep peat. Birch woodland is expected to develop on the drier mounds and peripheral headlands. A small amount of wetland fen habitats are expected to develop with alkaline emission factors, where there is shallow peat.

3.9 Current ecological rating

(Following NRA (2009) Evaluation Criteria). The majority of Derrinboy can be rated as having a **low local ecological value (E)** as it is dominated by bare peat. Some marginal habitats have higher ecological ratings **(D)**.

4. CONSULTATION

4.1 Consultation to date

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

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

- General consultation with range of stakeholders at annual Bord na Mona Biodiversity Action Plan review days 2010-2018.
- The long-term development of Lough Boora Discovery Park (Offaly County Council, Failte Ireland and multiple stakeholders),
- Site visit to Derrinboy during – Peatlands A New Conservation – International Peat Society Conference – held in Tullamore in 2016.
- Proposed WaterSupply Project – Eastern and Midlands Region pipeline (Irish Water).
- Midlands & East Regional WFD Operational Committee (River Basin Management Plans).
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).

To inform the current Plan, both national and local stakeholders, including neighbours whose land adjoins Toor 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) will be contacted. Any identified local interest groups will 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 Toor Bog.

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

4.2 Issues raised by Consultees

N/A. Not issued to consultees yet.

4.3 Bord na Móna response to issues raised during consultation

N/A

5. REHABILITATION GOALS AND OUTCOMES

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

- Meeting conditions of IPC Licence.
- Stabilisation or reduction in water quality parameters of water discharging from the site (e.g. suspended solids).
- Reducing pressure on receiving water-bodies that have been classified as At Risk from peatlands and from peat extraction, via stabilization or improving water-quality from this bog, and therefore, reducing pressures.
- Optimising hydrological conditions for **climate action benefits as part of PCAS**. Optimising hydrology for the development of embryonic *Sphagnum*-rich vegetation communities on deep peat, and eventually naturally functioning and peatland habitats.
- Optimising hydrological conditions for the development of Reed Swamp and fen on shallow more alkaline peat and other subsoils.
- Optimising hydrological conditions for the protection of exposed archaeological structures, their retention *in situ* and preservation into the future.
- 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.

- Current land-uses. Derrinboy east and west are bisected by a public roadway. It is not proposed to carry out any intensive rehabilitation actions to change or negatively affect any existing infrastructure or existing land-uses.
- Derrinboy bog has mostly bare peat and has relatively deep acidic peat reserves. Rehabilitation will look to optimise the re-wetted footprint and look to adjust water levels across the site to improve conditions for the development of Sphagnum-rich vegetation, the reduction of GHG gases and setting the site on a trajectory towards naturally functioning peatland ecosystems.
- It will take some time for stable naturally functioning habitats to fully develop at Derrinboy Bog. This will happen over a longer time-frame than the implementation of this rehabilitation plan.
- Re-wetting residual peat will initially maintain and enhance the carbon storage capacity of the bog. There is scientific consensus that restoration of hydrology in damaged bog can improve carbon storage, water storage and attenuation and help support biodiversity both on the site and in the catchment (See Section 3.8). This will reduce carbon emissions from the site from a larger carbon source to a smaller carbon source. In time, the site has the capacity to develop in part as a carbon sink. PCAS is expected to deliver significant contributions to Ireland's climate action.
- It is not expected that the site has the potential to develop active raised bog (ARB) analogous to the priority EU Habitats Directive Annex I habitat within the foreseeable future (c.50 years). Furthermore, only a proportion of the bog has potential to develop *Sphagnum*-rich habitats in this timeframe. Nevertheless, re-wetting across the entire bog, as part of the Scheme, will improve habitat conditions of

the whole bog, making the overall bog wetter. Other peatland habitats will develop in a wider mosaic that reflects underlying conditions.

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

6. SCOPE OF REHABILITATION

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

- The area of Derrinboy Bog (See Map-book).
- EPA IPC Licence - Ref. P0500-01. As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the cutaway boglands within the licensed area. Derrinboy bog is part of the Boora 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 Derrinboy Bog, in particular, optimising **climate action benefits**. The proposed interventions will mean that environmental stabilisation is achieved (meaning IPC obligations are met) and, in addition, significant other ecosystem service benefits particularly for climate action will be accrued.
- The local environmental conditions of Derrinboy Bog identify cutaway re-wetting as the most suitable rehabilitation approach for this site. The relatively short period of previous extraction (for horticultural peat only) has resulted in substantial residual peat at this site. This means that re-wetting will lead to the development of embryonic Sphagnum-rich vegetation, heath/degraded bog communities, fen, Reed Swamp and other associated wetland/peatland habitats.
- The key objective of rehabilitation, as defined by this licence, is **environmental stabilisation** of the bog. Bord na Móna have defined the key goal and outcome of rehabilitation at Derrinboy Bog as **environmental stabilisation** and **optimising suitable hydrological conditions, and setting the site on a trajectory towards the development of naturally functioning peatland habitats (*Sphagnum*-rich, embryonic raised bog, fen, Reed swamp and other associated wetland habitats).**
- Rehabilitation of Derrinboy Bog will support multiple National strategies of climate action, biodiversity action and other key environmental strategies such was the Water Framework Directive.
- The time frame for the delivery of the planned rehabilitation will be undertaken according to available resources and appropriate constraints.
- It not proposed to completely rehabilitate the marginal cutover bog zone. Bog restoration i.e. drain blocking, will be carried out in the small bog remnant at the southern tip of the site and to the east.

6.1 Key constraints

- **Bog conditions.** Rehabilitation outcomes of sites are constrained by the environmental characteristics of these particular areas. For example, there is potential for raised bog restoration at some bogs where there has not been significant industrial peat extraction and the peat body is largely intact (deep peat sites that are drained). At other bogs, most of the peat mass has been removed, the environmental characteristics of these areas have therefore changed radically (peat depths, hydrology, water chemistry, substrate type, nutrient status), and there will therefore be different habitat outcomes (wetlands, fen, heathland, grassland and Birch woodland).
- At Derrinboy Bog, the majority of the bog has been cutaway. However this has been recent and for Horticultural Peat only. There are local factors that will influence the future trajectory of this site (such as it was always relatively ‘wet’ bog in the northeast corner or adjacent turbary) which need to be considered as part of the wider rehabilitation work.

- **Current land-use.** Key land-uses are the proximity of a **Public road**, in additional to **agricultural land** and **forestry**. Re-wetting will be planned as to not to impact on adjacent land use or rule out potential future amenity.
- **Surrounding landscape and neighbours.** Another key constraint is the interaction between the Bord na Móna sites and the surrounding landscape. Care must be taken that no active rehabilitation management is carried out that could negatively and knowingly impact on surrounding land. This includes any hydrological management on neighbouring farmland. It is anticipated that the work proposed here (blocking drains and re-wetting cutaway peatlands) will not have any flooding impacts on adjacent land. The site is in close proximity to Coillte plantation forestry.
- **Archaeology**. The discovery of monuments or archaeological objects during peatland rehabilitation may potentially constrain the rehabilitation measures proposed for a particular area. If this occurs, rehabilitation measures will be reviewed and adapted. Optimising hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future is a rehabilitation goal.
- **Public Rights of Way**. Where a public right of way or similar burden exists on Bord na Móna property, consideration will be given to ensuring that this remain intact where possible. In some instances, depending upon previous land-uses and management, alternative solutions may be required. These will be explored in consultation with local communities and statutory bodies during the consultation work associated with the decommissioning and rehabilitation work described here.

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 practical rehabilitation.

6.3 Key Exclusions

The scope of this rehabilitation plan does not cover:

- The longer-term raised bog restoration trajectory of the site. The plan covers the short-term rehabilitation **actions** and **an additional monitoring and after-care programme** to monitor the rehabilitation during the Scheme and to respond to any needs (failure of environmental stabilisation for example). It is expected that this rehabilitation plan will set the site on an enhanced and accelerated trajectory towards environmental stabilisation. The plan does not set any goals or outcomes, for example, the extent (specific area) of active raised bog habitat (ARB) that may develop at this site in the long-term. This is beyond the scope of this rehabilitation plan.
- This plan is not intended to be an after-use or future land-use plan for Derrinboy Bog.
- The longer-term management of this site, potentially as a nature conservation site, or for amenity, or for other uses in the future. This will require further engagement with stakeholders.
- The area of Derrinboy Bog site that is now used as Turbary.
- The small marginal area that is expected to be part of the footprint of the Irish Water pipeline.

7. CRITERIA FOR SUCCESSFUL REHABILITATION

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

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

Rehabilitation is generally defined by Bord na Móna as

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

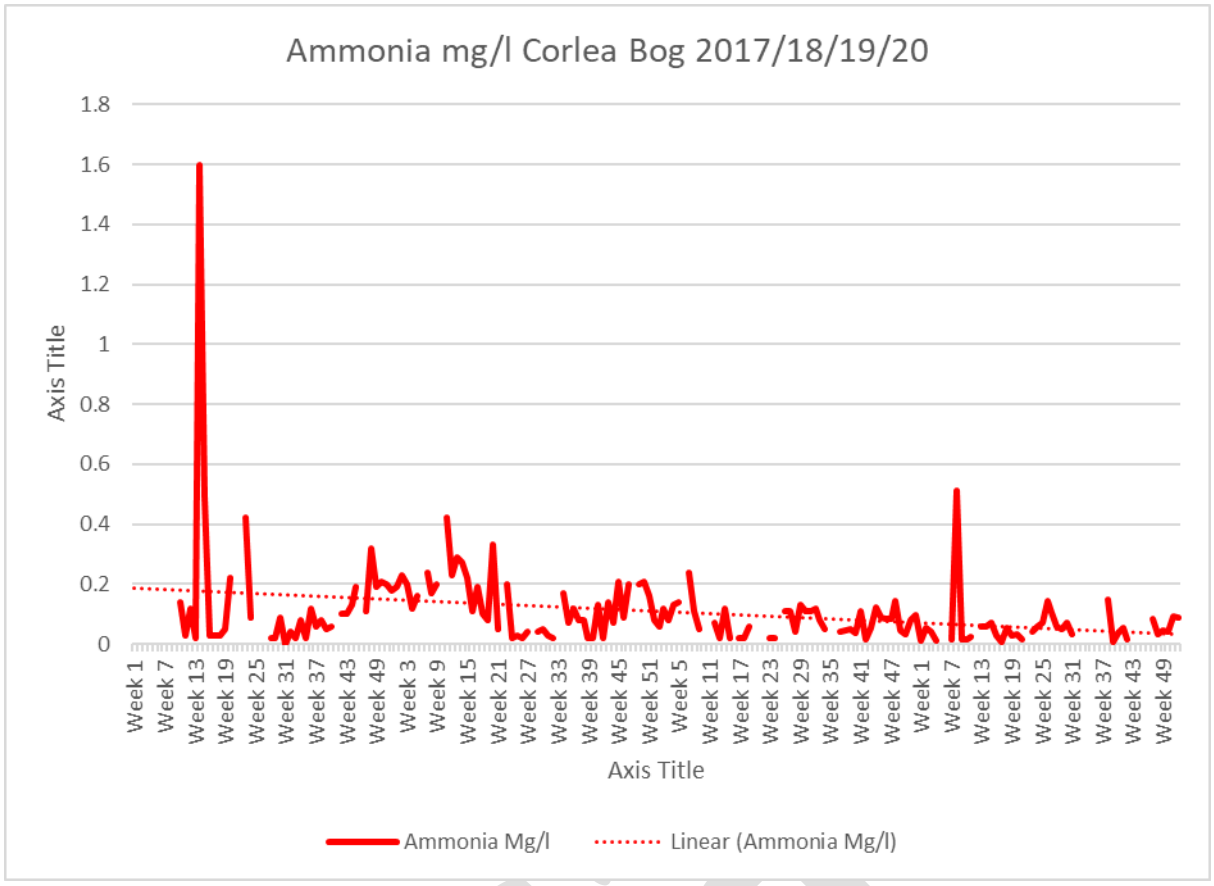
7.1. Criteria for successful rehabilitation to meet EPA IPC licence conditions:

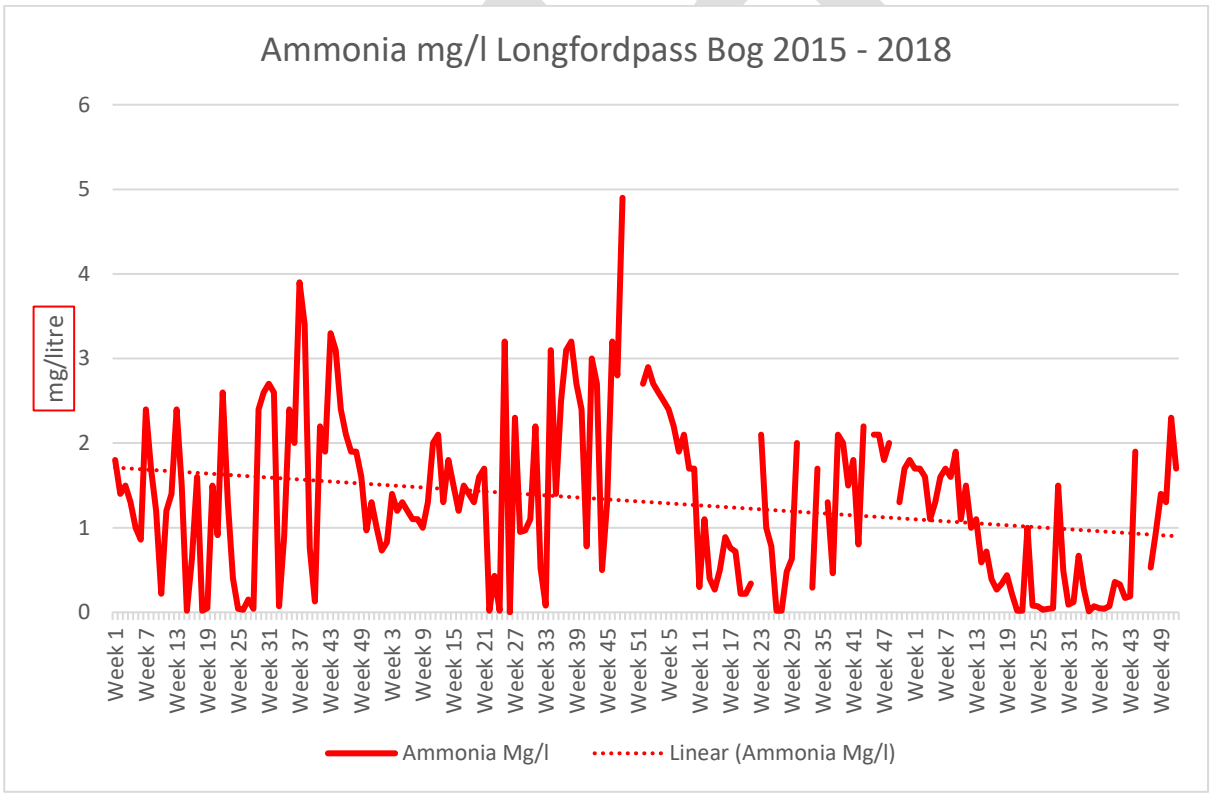
- Rewetting of residual peat in the former area of industrial peat production to offset potential run off of suspended solids and to encourage development of vegetation cover via natural colonisation, and reducing the area of bare exposed peat. See Table 7.1 for a summary of the criteria for successful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

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

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

As the monthly monitoring program at Derrinboy 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.


Ammonia mg/l Corlea Bog 2017/18/19/20
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Axis Title
Week 1
Week 7
Week 13
Week 19
Week 25
Week 31
Week 37
Week 43
Week 49
Week 3
Week 9
Week 15
Week 21
Week 27
Week 33
Week 39
Week 45
Week 51
Week 5
Week 11
Week 17
Week 23
Week 29
Week 35
Week 41
Week 47
Week 1
Week 7
Week 13
Week 19
Week 25
Week 31
Week 37
Week 43
Week 49
Axis Title
Ammonia Mg/l
Linear (Ammonia Mg/l)


Ammonia mg/l Longfordpass Bog 2015 - 2018
6
5
4
3
2
1
0
mg/litre
Week 1
Week 7
Week 13
Week 19
Week 25
Week 31
Week 37
Week 43
Week 49
Week 3
Week 9
Week 15
Week 21
Week 27
Week 33
Week 39
Week 45
Week 51
Week 5
Week 11
Week 17
Week 23
Week 29
Week 35
Week 41
Week 47
Week 1
Week 7
Week 13
Week 19
Week 25
Week 31
Week 37
Week 43
Week 49
Ammonia Mg/l
Linear (Ammonia Mg/l)

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

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

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

Criteria type	Criteria	Target	Measured by	Expected Time-frame
IPC validation	Rewetting in the former area of industrial peat production	Delivery of rehabilitation measures Reduction in bare peat.	Aerial photography after rehabilitation has been completed – to demonstrate measures (drain-blocking) Establishment of a baseline for future monitoring of bare peat, vegetation establishment and habitat condition.	2021-2024
IPC validation	Key water quality parameters Ammonia, Phosphorous, Suspended solids (silt), pH and conductivity	Reduction or stabilisation of key water quality parameters	Water quality monitoring. Started in advance of the proposed rehabilitation.	2021-2023
IPC validation	Reducing pressure from peat production on the local river catchment (WFD)	No decline in the WFD status of the local river catchment	EPA WFD monitoring programme	WFD schedule
Climate action verification	Optimising the extent of suitable hydrological conditions to optimise climate action	Optimal extent of suitable hydrological conditions	Aerial photography and Habitat mapping to map extent of suitable hydrological conditions. Baseline monitoring to be carried out during the Scheme when rehabilitation is complete. Sites can be re-monitored in the future and compared against this baseline.	2022-2025
Climate action verification	Reduction in carbon emissions.	Reduction in carbon emissions	Carbon emissions – estimated using a high bog condition assessment and appropriate carbon emission factors.	2022-2025

Criteria type	Criteria	Target	Measured by	Expected Time-frame
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.	2022-2025
Climate action verification	Biodiversity and ecosystem services. Habitat establishment Presence of key species – Sphagnum	Improvement in biodiversity and ecosystem services.	Metrics that relate to selected biodiversity and ecosystem services (to be defined). Presence of key species – Sphagnum – Walkover survey Baseline monitoring to be carried out during the Scheme when rehabilitation is complete. Sites can be re-monitored in the future and compared against this baseline.	2022-2025

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

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.
- **Bord na Móna to have sufficient resources (staff and training) to deliver the planned rehabilitation with required associated skills and competencies.**
- **Bord na Móna to have sufficient resources (suitable machinery) and staff to maintain this machinery.**
- **Weather conditions to be within normal limits over the rehabilitation plan timeframe.** Long periods of wet weather have the capacity to significantly affect ground conditions and constrain the delivery of rehabilitation. The potential impact of wet weather on ground conditions can be reduced by appropriate

planning and management. Bord na Móna have significant experience of managing these issues through 70 years of working in these peatland environments.

- **Rehabilitation measures to be effective.** The rehabilitation measures proposed in this plan are based on 40 years of Bord na Móna experience of peatland management and best practise applied internationally in peatland management. Measures proposed in this plan have already been shown to be affective at other sites. Bord na Móna will apply a flexible and adaptable approach to the more innovative rehabilitation measures proposed in this plan**.** If measures are not initially effective, Bord na Móna will review any requirement for additional practical rehabilitation.
- **Natural colonisation of vegetation to develop semi-natural habitats at a rate within the normal limits.** The development of naturally functioning semi-natural habitats on cutaway peatland takes time. Pioneer vegetation can develop relatively quickly (3-10 years) and wetland habitats can develop relatively quickly. Birch woodland make take 20-30 years to develop. However, it may take 50 years for active raised bog vegetation to re-develop on ground that was previously cutaway. Different environmental conditions will have a significant impact on the rate of natural colonisation, and as a result of the combination of different environmental conditions and the application of different rehabilitation measures, there will be a variety of habitat outcomes.
- Rehabilitation measures have been designed to accelerate and work with natural colonisation and other natural processes. Bord na Móna experience of rehabilitation has shown that re-wetting improves conditions for natural colonisation and that natural colonisation is accelerated where the environmental conditions are most suitable. Rehabilitation measures have been designed to modify the conditions of areas within sites where conditions are less suitable for natural colonisation (modifying hydrology, topography, nutrient status or availability of potential seed sources).
- **Monitoring to be robust and effective.** Rehabilitation Monitoring will be established to validate the success of rehabilitation as required by Condition 10 of the IPC Licence and to verify the benefits of the proposed measures to optimise climate action. This will focus on a collecting a range of scientific data that can then quickly be adapted and into metrics that can be used to measure changes in various ecosystem services.

8. REHABILITATION ACTIONS AND TIME FRAME

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

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

BNM-DR-23-22-22 titled **Derrinboy Bog: Aerial Imagery2020**

BNM-DR-23-22-04 titled **Derrinboy Bog: PeatDepths**

BNM-DR-23-22-03 titled **Derrinboy Bog: LiDAR Map**

BNM-DR-23-22-09 titled **Derrinboy Bog: Depression Analysis**

The rehabilitation actions themselves will be a combination of PCAS measures to re-wet peat. The distribution of these measures is provisionally outlined in drawing titled **BNM-DR-23-22-05 Derrinboy Bog: Rehabilitation Measures** in the accompanying Mapbook (Note that the actual distribution of these measures may be subject to change in response to stakeholder consultation and refinement of the enhanced rehabilitation measures.)

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

- Re-assessment of the pumping regime; removal of the pump on site is desired if this has no significant external impact. Hydrological management will look to optimise summer water levels to maximise the development of wet cutaway vegetation (by looking to set water depths at < 0.1 m, where possible). It is inevitable that some sections will naturally have deeper water due to the topography at this site. Water-levels will be adjusted at outfalls and by adjusting piped drainage. More sustainable permanent gravity drainage solutions will be examined. Some targeted bunding may be required. It is expected that a natural seasonal regime of water fluctuation will develop, with water-levels fluctuating in association with levels in the adjacent watercourses and associated groundwater conditions.
- The existing silt pond will be retained and maintained during the rehabilitation phase. A long term gravity outfall is considered feasible when the onsite pump is turned off permanently, subject to invert level monitoring at the current silt pond. If required a wetland attenuation area and/or modified outfall may be created at this location to accommodate any increase in surface water flows from the bog.
- Re-wetting some areas of the bog through reprofiling former production fields , infilling drains and drain blocking, along with the creation of cross berms to avoid surface water flows.
- Re-alignment of piped drainage.
- Blocking drains in targeted extant high bog around the margins of Derrinboy, to accelerate carbon offsetting.
- The creation of berms across some sections of the bog to control/retain water levels. This measure seeks to retain shallow (< 10 cm) water conditions across multiple fields.

- Targeted fertiliser applications to accelerate vegetation establishment on areas of bare peat on headlands and high fields, see Mapbook.
- Modifying water levels at outfalls, as it may be desirable to change and control water levels at the site over time, e.g. to increase water levels as the site becomes increasingly vegetated. This will further slow the movement of water through and out of Derrinboy Bog.
- During the monitoring and verification phase the silt pond will be continually inspected and maintained, where appropriate. When it is deemed that the silt pond is not required, as the bog has been successfully stabilised and there is no run-off of suspended solids, the condition of the silt pond will be reviewed. The silt pond will either be de-watered (water levels lowered to a level where the silt pond will naturally develop as a small wetland feature), left in situ, or infilled (where discharges do not require silt control).
- Seeding of vegetation is not required at this site as natural colonisation and the development of pioneer habitats is already significantly progressed.

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

Type	Code	Description	Area (Ha)
Deep peat cutover bog	DPT1	Regular drain blocking (3/100 m) + blocking outfalls and managing water levels with overflow pipes	
	DPT2	More intensive drain blocking (7/100 m) + blocking outfalls and managing overflows	14.74
	DPT3	More intensive drain blocking (7/100 m), + field reprofiling + blocking outfalls and managing overflows	
	DPT4	Berms and field re-profiling (45m x 60m cell) + blocking outfalls and managing overflows + drainage channels for excess water + *Sphagnum* inoculation	184.87
	DPT5	Cut and Fill cell bunding (30m x 30m cell) + blocking outfalls and managing overflows + drainage channels for excess water + *Sphagnum* inoculation	
Dry cutaway	DCT1	Blocking outfalls and managing water levels with overflow pipes	
	DCT2	Regular drain blocking (3/100 m) + blocking outfalls and managing water levels with overflow pipes + targeted fertiliser treatment	28.77
	DCT3	More intensive drain blocking (7/100 m) + blocking outfalls and managing overflows + targeted fertiliser treatment	
Wetland cutaway	WLT1	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes	
	WLT2	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes + Targeted blocking of outfalls within a site	
	WLT3	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes + Targeted blocking of outfalls within a site + constructing larger berms to re-wet cutaway + transplanting Reeds and other rhizomes	
	WLT4	More intensive drain blocking (7/100 m), + blocking outfalls and managing overflows + transplanting Reeds and other rhizomes	14.74
	WLT5	More intensive drain blocking (7/100 m), + field reprofiling + blocking outfalls and managing overflows + transplanting Reeds and other rhizomes	
Marginal land	MLT1	No work required	55.77
	MLT2	More intensive drain blocking (7/100 m)	
	MLT3	More intensive drain blocking (7/100 m) + blocking outfalls and managing overflows + boundary berm	
Constraint	Constraint	No Rehab	3.65
Other		Silt-ponds	3.58
Total			306.12

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

- Seek formal approval of the enhanced plan, noting the alternative adapted standard plan should funding from the Scheme not materialise, from the EPA.
- Agree an *ex ante* budget of eligible costs (based on the approved enhanced plan) with the Scheme regulator.

- Develop a detailed site plan with detailed site drawings outlining how the various rehabilitation methodologies (The Scheme PCAS) will be applied to Derrinboy Bog. This will take account of peat depths, topography, drainage and hydrological modelling. (See map for an indicative view of the application of different rehabilitation methodologies).
- Carry out a drainage management assessment of the proposed rehabilitation measures.
- Carry out a review of known archaeology and an archaeological impact appraisal of the proposed rehabilitation. Incorporate the results of this appraisal into the rehabilitation plan to minimise known archaeological disturbance, where possible.
- Carry out a review of issues that may constrain rehabilitation such as known rights of way, turbary and existing land agreements. There known rights of way at Derrinboy bog.
- Carry out an ecological appraisal of the potential impacts of the planned rehabilitation, such as the presence of sensitive ground-nesting bird breeding species (e.g. Curlew or Lapwing) or larval webs of Marsh Fritillary butterfly, etc. The scheduling of rehabilitation operations will be adapted, if needed. Surreys will be scoped and carried out based on the baseline ecological survey and previous knowledge of sites.
- Ensure all activities comply with the environmental protection requirements of the IPC Licence.
- Carry out Appropriate Assessment of the Rehabilitation Plan. Incorporate any required mitigation measures from the AA in the plan for the delivery of rehabilitation and decommissioning across the site.
- 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 hydrological management, drain blocking, peat field re-profiling and cell-bunding. All rehabilitation will be carried out with regard to best practice environmental control measures (Appendix IV).
- Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions.
- Carry out the proposed monitoring, as outlined.
- While natural colonisation is expected to commence almost immediately once peat production ceases, Phase 2 actions will be carried out in targeted areas to accelerate re-vegetation and colonisation of target species. Phase 2 actions will include fertiliser application on high fields and headlands (where there is bare peat).
- Silt-ponds will be monitored during this period and there will be continued maintenance and cleaning to prevent run-off of suspended solids from the site during the rehabilitation phase.
- Submit an *ex post* report to the Scheme regulator to verify the eligible measures to be carried out in year 1 of the Scheme, and an *ex ante* estimate for year 2 of the Scheme; and so on for each year of the Scheme

8.3 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

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

8.5 Budget and costing

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

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

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

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

9. AFTERCARE AND MAINTENANCE

9.1 Programme for monitoring, aftercare and maintenance

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

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

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

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

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

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

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

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

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

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

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

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

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

Scope of rehabilitation

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

- EPA IPC Licence - Ref. P0500-01. As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. Derrinboy bog is part of the Boora Bog group.
- A key objective of rehabilitation, as defined by this licence, is **environmental stabilisation** of the bog.
- The area of former industrial peat production at Derrinboy Bog (See Mapbook). Industrial peat production has now permanently ceased at Derrinboy Bog.
- Minimising potential impacts on neighbouring land. Some boundary drains around Derrinboy Bog will be left unblocked as blocking boundary drains could affect adjacent land.

Rehabilitation goals and outcomes

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

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

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

Criteria for successful rehabilitation:

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

Rehabilitation targets

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

Rehabilitation measures:

- Blocking field drains in the former industrial production area and creating regular peat barriers (three barriers per 100 m) along each field drain.
- Re-alignment of piped drainage.
- Realignment of gravity outfalls (where needed).
- Fertiliser treatment of high fields and headlands (typically slow to naturally re-colonise) to encourage natural colonisation, if needed.
- No measures are planned for the surrounding marginal peatland habitats.
- Silt ponds will continue to be maintained during the rehabilitation and decommissioning.
- Evaluate success of short-term rehabilitation measures and enhance where necessary.
- Decommissioning of silt-ponds will be assessed and carried out, where required.
- See Drawing number BNM-DR-23-22-20 titled **Derrinboy Bog: Standard Rehab Measures** included in the accompanying Mapbook which illustrates the standard rehab measures to be applied.

Timeframe:

- 2022. 1st phase of rehabilitation. Field drain blocking with dozer/excavator.
- 2022. 2nd phase. Further realignment of piped drainage and other re-wetting measures dependent on success of 1st phase re-wetting, as determined by ongoing monitoring of water levels and re-vegetation.
- Other enhancement measures such as fertiliser treatment will be carried out, if needed. These will be determined by ongoing monitoring.
- 2023-2024. Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- 2023-2024. Decommission silt-ponds, if necessary.

Budget and Costing

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

Table AP-1. Rehabilitation measures and target area.

Type	Code	Description	Area (Ha)
Dry Cutaway	DCT1		28.77
Deep Peat	DPT1		199.61
Wetland	WLT1		14.74
Marginal land	MLT1		55.77
Constraint	Constraint		3.65
Silt ponds	Silt Pond		3.58
Total			**306.12**

Monitoring, after-care and maintenance

- There will be initial quarterly monitoring assessments of the site to determine the general status of the site, the condition of the silt-ponds, assess the condition of the rehabilitation work, asses the progress of natural colonisation, monitoring of any potential impacts on neighbouring land and general land security. The number of site visits will reduce after 2 years to bi-annually. These site visits will assess the need to any additional rehabilitation.
- Water quality monitoring will be established.
- Monitoring results will be maintained, trended and reported on each year as part of the requirement to report on Condition 10.1 of the IPC Licence on Bog Rehabilitation in the Annual Environmental Report, which will be available in April each year at www.epa.ie.
- The parameters to be included (as per condition 6.2 of the IPC Licence) include monthly monitoring for pH, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, DOC 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.
- The water quality monitoring demonstrates that water quality of discharge is stabilising or improving.
- The site has been environmentally stabilised.

APPENDIX II: BOG GROUP CONTEXT

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

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

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

The bogs in The Boora Bog Group have been used in the past to supply milled peat for the horticultural market, local power stations (Ferbane, Shannonbridge and West Offaly Power) and Derrinlough Briquette factory. Industrial peat extraction has now ceased in the Boora Bog Group. Remaining peat stocks are being transported to Derrinlough Briquette Factory and other customers.

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

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

Bog	Area (Ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Killaun	359.5	Cutover Bog Industrial peat production commenced at Killaun Bog in 1996 and ceased in 2020. Only the upper most layers of peat have been harvested. Deep peat reserves remain on site. Killaun is considered a deep peat cutover bog.	Killaun Bog formerly supplied a range of commercial customers including; horticultural peat and fuel peat. Most of the former production area is bare peat.	2020	Draft 2017
Boora	1,842.4	Cutaway Harvested since the 1950's resulting in the exhaustion of the commercially viable peat resource at the bog. The majority of Boora Bog is considered a shallow peat cutaway bog. Some areas of deep peat persist at this site.	The majority of Boora bog has already been rehabilitated. A significant area of cutaway bog has been re-wetted, developed as conifer forestry (Coillte) and developed as farmland (1980s). This site now forms the core of Lough Boora Discovery Park.	2020	Finalised 2021 Rehab beginning 2021

Pollagh/ Cornalaur	280.8	Cutaway At Pollagh Bog, industrial peat production began in 2004 and ceased in 2020. Peat reserves of variable depth remain on site. Some deep peat areas remain. Pollagh is considered a cutover bog with variable peat depths.	Pioneer emergent peatland vegetation communities are developing throughout the bog. The adjacent Cornalaur Bog was never developed for peat production.	2020	Finalised 2021 Rehab beginning 2021
Noggusboy	917.4	Cutaway Bog Industrial peat production commenced at Noggusboy during the 1950's and ceased in 2020. Long-term peat extraction has exhausted commercially viable peat reserves on this bog. Noggusboy is considered a shallow peat cutaway bog.	Part of the site was developed for conifer forestry by Coillte. Part of the site was developed as Cloghan Lake, as part of Lough Boora Discovery Park, in 1999. There is some emerging naturally colonising cutaway.	2020	To be finalised in 2021
Drinagh	1,339.1	Cutaway Bog Industrial peat production commenced at Drinagh during the 1950's and ceased in 2020. Some small pockets of deep peat reserves remain in parts of Drinagh Bog but most of the commercially viable peat reserves have been exhausted. Drinagh is considered a shallow peat, cutaway bog.	Drinagh East is cutaway and has been extensively rehabilitated as wetland. This part of the site has extensive development of naturally functioning peatland habitats. Some Coillte conifer forestry is also present. There is some emerging naturally colonising cutaway in Drinagh West.	2020	Draft 2017
Killaranny	242.8	Cutover Bog Industrial peat production commenced at Kilaranny during the 1980's. Deep peat reserves remain on much of the bog. Kilaranny is considered a deep peat cutover bog.	Kilaranny Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat. A portion of the site is leased by NPWS since 2011 as a re-location area for turf cutters from nearby Clara Bog SAC.	2020	Finalised 2021
Oughter	352.9	Cutaway Development of Oughter Bog commenced in the 1960's. Industrial peat production ceased in 2012. Shallow peat depths remain over much of the former production bog area. Oughter is considered a shallow peat cutaway bog.	The site has naturally been re-wetting and there is already significant natural colonisation. Part of the site has been developed as the Midlands National Shooting Centre of Ireland.	2012	Finalised 2021 Rehab beginning 2021
Galros	191.5	Cutover Bog Industrial peat production commenced at Galros during the 1980's and ceased in 2020. Some areas of deep peat remain on the former production area. Galros is considered a cutover bog of variable peat depth.	Galros Bog formerly supplied a range of commercial customers including; horticultural peat and fuel peat. Some naturally emerging cutaway habitats are developing in part of the site.	2020	Draft 2017
Clongawny More	987.2	Industrial peat production commenced at Clongawny More during the 1950's and ceased in 2020. Some pockets of deep peat persist, particularly in the south-	Part of the site rehabilitated, as part of Lough Boora Discovery Park, in 1999.	2020	Draft 2017

		western portion of the former production area. Clongawny More is considered a cutover bog with variable peat depths throughout the site.	Some Coillte conifer forestry is also present. The site has naturally been re-wetting and there is already significant natural colonisation. BnM currently have submitted an application for renewable energy development on this bog.		
Derrinboy	305.7	Cutover Bog Derrinboy was first developed by BnM in the 1980's. Peat production ceased at Derrinboy in 2020. This bog was used to supply horticultural peat. Only the upper layers of peat have been harvested. Derrinboy is considered a deep peat cutover bog.	Derrinboy Bog formerly supplied a range of commercial customers including; horticultural peat and fuel peat.	2020	To be finalised in 2021
Moneitta	707.5	Cutover Bog Moneitta was first developed by BnM in the 1970's. Peat production ceased at Monietta in 2020. This bog was used to supply horticultural peat. Only the upper layers of peat were harvested. Moneitta is considered a deep peat cutover bog.	Moneitta Bog formerly supplied a range of commercial customers including; horticultural peat and fuel peat.	2020	Draft 2017
Boora Lemanaghan Rail_Link	6.9	N/A	Not applicable	N/A	N/A
Derries	368.2	Cutaway Bog Development of The Derries Bog commenced in the 1960's. Industrial peat production ceased in 2005. Shallow peat depths remain over much of the former production bog area. The Derries Bog is considered a shallow peat cutaway bog.	Wetland rehabilitation carried out over part of site in 1999. Amenity trackway development in 2015. Part of the Lough Boora Discovery Park. The site has now been extensively naturally colonised and is a mosaic of wetland and Birch woodland habitats.	2005	Finalised 2021 Rehab beginning 2021
Turraun	534.5	Cutaway Bog Development of Turraun Bog commenced in the 1950's. Industrial peat production ceased in 2018. Turraun is considered a shallow peat cutaway bog.	Wetland rehabilitation carried out over part of area in 1999 as part of the Lough Boora Discovery Park. This section of the site has now been extensively naturally colonised and is a mosaic of wetland and Birch woodland habitats.	2018	Finalised 2021 Rehab beginning 2021
Derryclure	327.6	Cutover Bog Derryclure was first developed by BnM in the 1980's. Peat production ceased at Derryclure in 2020. This bog was used to supply horticultural peat. Only the upper layers of peat were harvested. Derryclure is considered a deep peat cutover bog.	Derryclure Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat.	2020	Draft 2021
Lemanaghan	1,253.7	Cutover Bog Industrial peat production commenced at Lemanaghan during the 1950's and ceased in 2019. Varied peat depths across the site. Deep peat reserves remain on	Lemanaghan Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat.	2020	Draft 2017

		much of the former production area of Lemanaghan Bog. It is considered a cutover bog.	There are some naturally emerging cutaway habitats.		
Belair North	565.7	Cutover Bog Belair North was first developed by BnM in the 1960's. TPeat production ceased at Belair North in 2020. This bog was used to supply horticultural peat. Only the upper layers of peat were harvested. Belair North is considered a deep peat cutover bog.	Belair North Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat.	2020	Draft 2017
Derrybrat	171.6	Cutaway Bog Industrial peat production commenced at Derrybrat during the 1950's and ceased in 2016. Derrybrat has shallow peat depths across the site. It is considered a shallow peat cutaway bog.	The site has been partially rehabilitated and there is already significant natural colonisation. Some conifer forestry has been developed by Coilte on the site.	2016	Finalised 2021
Belair South	228.8	Cutover Bog Belair South was first developed by BnM in the 1970's. Peat production ceased at Belair South in 2020. This bog was used to supply horticultural peat. As a result, only the upper layers of peat were harvested. Belair South is considered a deep peat cutover bog.	Belair South Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat.	2020	Draft 2017
Boora Bog Group Total	**10,983.7**				

See Drawing number BNM-DR-23-22-24 titled **Boora Bog Group**, included in the accompanying Mapbook which illustrates the location of Derrinboy Bog and the Boora Bog Group in context to the surrounding area.

APPENDIX III: ECOLOGICAL SURVEY REPORT

Ecological Survey Report

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

Bog Name:	**Derrinboy**	**Area (ha):**	308.3 ha (761.7 acres)
Works Name:	Hort Bog	**County:**	Offaly
Recorder(s):	MMC & DF	**Survey Date(s):**	14/02/2011

Habitats present (in order of dominance)

The most common habitats present at this site include:

- Bare peat (BP) (Codes refer BnM classification of pioneer habitats of production bog. See Appendix II).
- Birch scrub (eBir, oBir) (in and around silt pond areas)
- Silt ponds (Silt) with Gorse/Birch scrub and Purple Moorgrass-dominated grassland (gMol)
- Riparian zones (Rip) (with drains and associated habitats such as scrub)
- Access zones (Acc) with Purple Moorgrass-dominated grassland (gMol)

The most common habitats found around the margins of the production area include:

- Cutover Bog (PB4) (Codes refer to Heritage Council habitat classification, Fossitt 2000), See Appendix II.)
- Scrub (WS1)
- Raised bog (PB1) (minor remnants)
- Birch woodland (WN7)
- Conifer plantation (WD4)
- Hedgerows (WL1)
- Improved grassland (GA1) around the boundary where the GIS boundary extends into adjacent fields
- Wet grassland (GS4) (old cutover)

Description of site

Derrinboy bog is located in south Co. Offaly, close to Cadamstown Village and 3.5 km south of Kilcormac Town. It is somewhat isolated from the rest of the adjacent Boora complex and is currently being milled for horticultural peat. There is no rail link from the bog to the Boora complex. The local landscape is relatively flat in the local area and the surrounding land is dominated by farmland. The foothills of the Slieve Bloom mountains are relatively close with the ground beginning to rise in height to the south of the bog. Most of the surrounding land is improved grassland Some of the poorer soils contain wet grassland or are planted with conifer plantation and there is conifer plantation planted along the east side of the site. There are some small pockets of other peatland. A local road passes through the centre of Derrinboy bog and divides it into two main sections. There is a small works area to the north of the site along the local road. Harvested peat is stored in large piles along the road.

Derrinboy bog is a relatively young production bog and horticultural peat is currently being harvested from it. The peat is red/brown acidic *Sphagnum* peat. One noticeable feature of this bog is that the bog is still relatively high compared to other older production bogs. Nearly all the production bog is available for production and is bare peat. There was virtually no recolonisation of production bog on the east side and the only examples of typical pioneer

cutaway habitats are in and around the silt pond areas. Wildlife usage of the bog is relatively poor but there were still signs of foraging mammals such as Fox and Badger around the margins.

The east side has some small patches of remnant high bog along the southern boundary. These areas of high bog are quite disturbed from adjacent domestic sod peat cutting and are quite dry with Heather being the dominant vegetation feature. There is still some remnant hummocks of *S. capillifolium* and S. *papillosum* on the high bog surface but these are degrading and there are frequent other indicators of degradation and disturbance. There is intensive domestic sod peat cutting in this area. Some of the older cutover bog has now developed Birch-dominated woodland (WN7) and scrub (WS1). Conifer plantation (WD4) has been developed along the eastern boundary. A drain separates the conifer plantation from the BnM property. Some of the drainage along the headland is poor in this area and the headland is quite wet.

There are several silt ponds along the northern boundary of the east side. These have typical Birch and Gorse colonisation in the unused areas. Spoil heaps contain marl. Purple Moorgrass, Soft Rush and Bog Cotton dominate the vegetation around the ponds. The recolonised areas also contain some regenerating *Sphagnum* where there has been no disturbance and there is some surface water flow. Otter tracks were noted along one of the silt ponds. There is a channelised deep drain/stream (Pigeon Drain/Block River) along the boundary of this section.

The west side of the site has a similar suite of habitats. All of the production bog is available for production and is bare peat. There are small sections of intact raised bog around the margins. The majority of this raised bog is relatively dry. Some of it along the southern boundary is being cut for domestic sod peat from the opposite side while there is also a significant amount of older inactive cutover bog that is regenerating somewhat. There is also a band of well-established Birch woodland along the southern boundary. The western boundary generally has intact high bog with a band of Birch-dominated scrub/Birch woodland along the boundary. There is some inactive cutover bog in places. Some small sections of remnant high bog along the northern boundary are being actively cut for sod peat.

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

None

Adjacent habitats and land-use

Surrounding habitats include minor remnant sections of raised bog (PB1), old and active cutover bog (PB4), conifer plantation (WD4), wet grassland (GS4), improved agricultural grassland (GA1), Birch woodland (WN7) and scrub (WS1).

Watercourses (major water features on/off site)

- There are no major water-courses on the site
- However several large drains or channelised streams flow along some of the site borders including Pigeon Drain or Block River. These streams flow into the Silver River.
- This area is part of the mid Shannon catchment.

Peat type and sub-soils

Derrinboy is a relatively young production bog and red/brown acidic *Sphagnum* peat is mainly exposed at present. Gravel and marl have been exposed in some of the silt ponds to the north.

Fauna biodiversity

Birds

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

- Raven (2)
- Snipe (4)
- Common birds recorded on this site included Coal Tit, Robin, Starling (20), Hooded Crow, Blackbird and Reed Bunting

Mammals

Several signs of mammals were recorded around the site

- Otter (footprints to north)
- Badger
- Fox
- Hare

Fungal biodiversity

N/A

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APPENDIX IV: ENVIRONMENTAL CONTROL MEASURES TO BE APPLIED TO BOG REHABILITATION

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

APPENDIX V: BIOSECURITY

No invasive flora species have been recorded at Derrinboy Bog.

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

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

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

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

In addition to the above, Best Practise measures around the prevention and spread of Crayfish plague[6] and Zebra Mussel will be adhered with throughout all rehabilitation measures and activities.

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

APPENDIX VI: POLICY AND REGULATORY FRAMEWORK

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

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

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

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

1 EPA IPC Licence

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Boora bog group (Ref. PO-500-01). 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 Boora group. This regulatory requirement is the main driver of the development of this rehabilitation plan.

2 The Peatlands Climate Action Scheme (PCAS)

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

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

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

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

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

3 National Climate Policy

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

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

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

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

4 National Peatlands Strategy

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

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

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

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

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

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

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

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

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

The NRBMP 2018-2021 outlined how peat extraction can be a potentially significant pressure on various water quality parameters. Peatland rehabilitation of Bord na Móna cutaway (in addition to other measures) was part

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

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

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

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

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

6 National Biodiversity Action Plan 2016-2021

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

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

7 National conservation designations

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

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

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

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

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

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

9 All-Ireland Pollinator Plan 2021-2025

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

10 Land-use planning policies

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

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

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

11 National Archaeology Code of Practise

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

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

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

12 Bord na Móna Biodiversity Action Plan 2016-2021

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

One example of a key CBD target is:

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

The EUs headline target for progress by 2020 is to:

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

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

13 Bord na Móna commitments

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

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

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

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

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

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

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

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

APPENDIX VII. DECOMMISSIONING

1. Condition 10 Decommissioning

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

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

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

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

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

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

Item	Description	Derrinboy 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	Not Applicable
4	Decommissioning or Removal of Buildings and Compounds	Not Applicable
5	Decommissioning Fuel Tanks and associated facilities	Where required
6	Decommissioning and Removal of Bog Pump Sites	Removal of pump
7	Decommissioning or Removal of Septic Tanks	Where required

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

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

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

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

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

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

waste.

7.3.3 The ultimate destination of the waste.

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

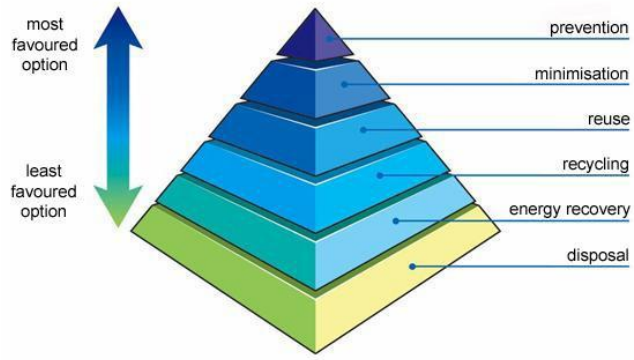
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

7.3.6 Details of any rejected consignments.

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

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

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



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

2. Enhanced Decommissioning.

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

Item	Enhanced Decommissioning Type	Derrinboy Decommissioning Plan
1	Removal of Railway Lines	n/a
2	Decommissioning Bridges and Underpasses	n/a
3	Decommissioning Railway Level Crossing	n/a
4	Restricting Access (bogs and silt ponds)	Restricting Access to Bog.
5	Removal of High Voltage Power Lines	Removal of power lines

APPENDIX VIII. GLOSSARY

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

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

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

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

Enhanced rehabilitation: This is defined as rehabilitation carried out under the 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 stabilisiation: 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 Lisence. 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 stabilisiation.

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

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

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

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

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

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

APPENDIX IX. EXTRACTIVE WASTE MANAGEMENT PLAN

(Minimisation, treatment, recovery and disposal)

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

Scope:
This plan covers IPPC Licence's Ref. P0500-01, Boora Bog Group in County Offaly.

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

1.1 Silt Pond excavations and maintenance.
All peat extraction activities in Boora 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 ores levelled out. As required by condition 6.6, these silt lagoons are cleaned twice per annum or more often if inspections dictate. These silt cleanings are also deposited on the same location, adjacent to the silt pond, where they may be levelled periodically to allow room for subsequent cleanings. These mounds of silt pond excavation material and cleanings are generally no higher that 2-3 metres.

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

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

2.0 P0500-01 IPPC Licence Extractive Waste Conditions

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

7.0 Extractive Waste Management Plan

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

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

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

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

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

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

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

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

Classification in accordance Annex II.

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

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

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

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

10.2 Cutaway Bog Rehabilitation Plan:

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

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

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

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

Review.
This plan will be reviewed every five years, the first review to take place in September 2017. This review will entail an inspection of these waste facilities to ensure their placing, management, maintenance and stability comply with the requirements of the Extractive Waste Management requirements and condition 7.5, 7.6 and 7.7 of the Boora IPPC Licence Ref. PO500-01.

APPENDIX X. MITIGATION MEASURES FOR THE APPLICATION OF FERTILISER

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

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

APPENDIX XI. CONSULTATION SUMMARIES

Table APXI -1 Consultees contacted

Bog Name	Contact Organisation	Contact Name	Date of Issue	Communication Format	Date Response Received	Response format

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

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Code of Practice

5. To arrange for the delivery or collection of the stray find, as directed by the Duty Officer of the National Museum of Ireland.

6. To complete the Report of Discovery of Archaeological Object(s) in Bogs (Appendix V), as directed by the Duty Officer of the National Museum of Ireland.

7. To maintain a file of all stray finds and associated documentation and provide copies to the Project Archaeologist.

8. To provide assistance, where required, to the Department during archaeological surveys.

9. To provide assistance, where required, to Bord na Móna's Consultant Archaeologists, during investigation and mitigation of monuments.

10. To report to the Bord na Móna members on the Archaeology Management Liaison Committee any planned developments or new activities on cutaway peatland areas within his/her group of bogs.

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

1) Purpose

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

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

2) Procedure

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

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

Your Archaeological Liaison Officer is ……

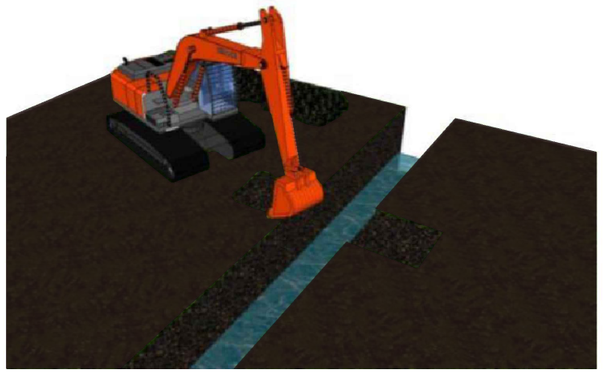
3) Records

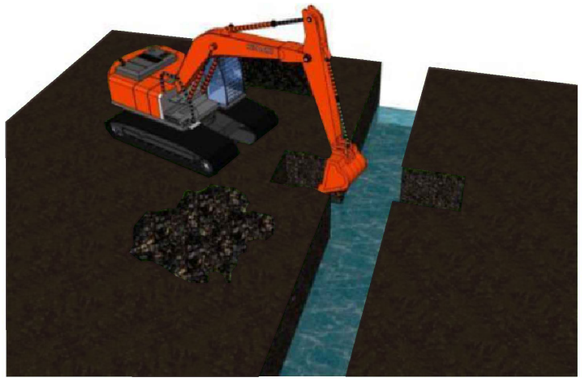
Revision Index			
Revision	Date	Description of change	Approved
1	13/10/2020	First release	EMcD

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

APPENDIX B
Rehabilitation Methodology Drawings

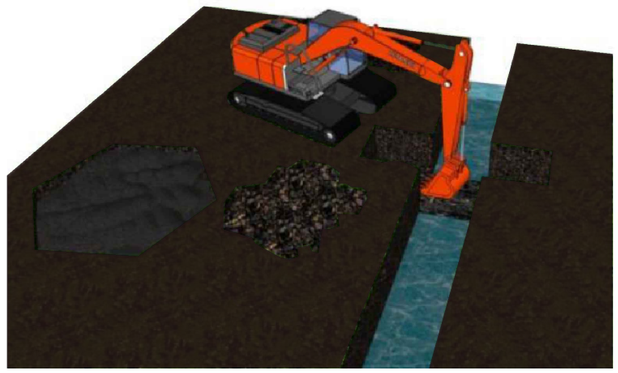
1. Before building drain block, the sides and bottom of the ditch is cleaned using the excavator to remove dry degraded peat, to ensure a good peat-to-peat contact.
(If any vegetation present, it should be carefully removed and left aside for replacement at the end of the process.)

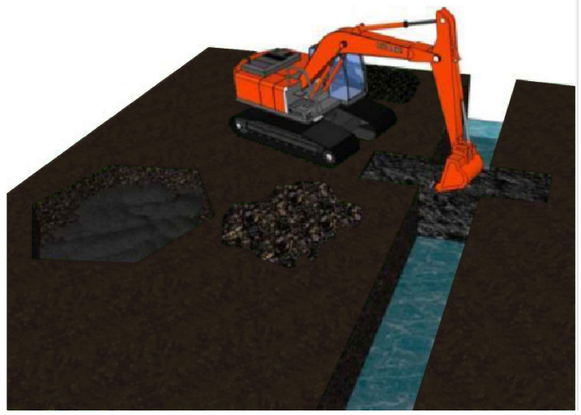




2. Cut key in either side of the drain approximately 500mm deep, and ensure that it is wider than the actual drain.
Remove 500mm of peat from bottom of the drain also and place behind the machine for replacement later.

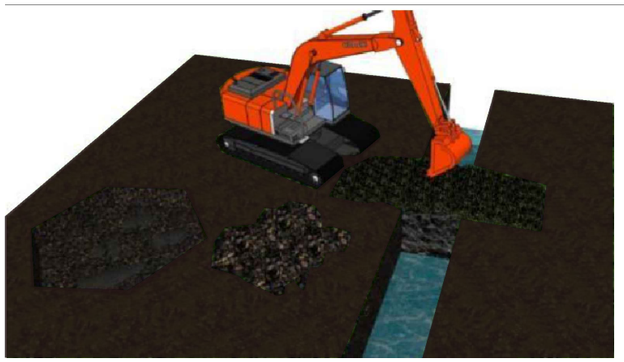
3. Open an area behind machine to be used as a borrow pit. Avoid using the surface layer of peat (top 100-200mm) which is likely to be very permeable. Only use the deeper, more compacted peat to build the drain block.
(If any vegetation present, it should be carefully removed and left aside for replacement at the end of the process.)

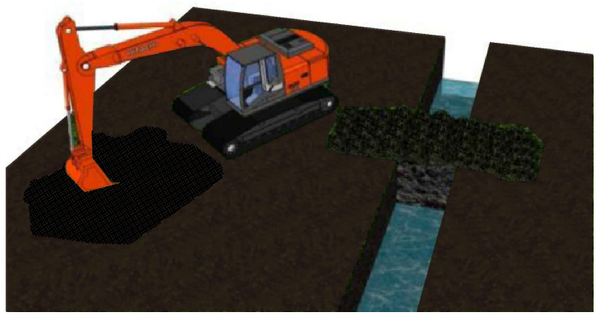




4. Dig out peat from the borrow pit and place into the drain compacting in 300mm layers. Compact the peat firmly using the excavator bucket before laying more peat from the borrow pit.

5. Build the drain block up at least 300mm-500mm above the ground level of the bog to allow for subsequent shrinkage of the peat as it dries.
(Take any vegetation removed in step 1 and step 3 and place on the top of the dam, to help bind and stabilise the drain block.)





6. Backfill the borrow pit with the peat extracted from the bottom of the drain in step 2. Press down on the sides of the peat borrow hole with the excavator bucket to grade the sides of the borrow pit.

This enhanced measure's main objective is to block drains with peat drain blocks to raise water levels, re-wetting peat and slowing water movements through the bog.

NOTES:

1. FIGURED DIMS ONLY TO BE TAKEN FROM THIS DRAWING.
2. REFER TO RELEVANT SITE PLAN TO ENSURE SPECIFIC DRAIN BLOCKS HAVE BEEN INSTALLED DOWNSTREAM PRIOR TO COMMENCING ANY RE-PROFILING WORKS, TO RETAIN ANY SILT THAT MAY ENTER THE DRAINS.
3. REFER TO RELEVANT SITE PLAN FOR No. OF DRAIN BLOCKS SPECIFIED PER 100M DRAIN LENGTH.
4. REFER TO RELEVANT SITE PLAN FOR SPECIFIC FINISHED GROUND LEVELS TO BE ACHIEVED.
5. ALL DETAILS TO BE AGREED WITH BORD NA MONA OPERATIONS PRIOR TO CONSTRUCTION.
6. OPERATORS TO CONFORM WITH ALL STANDARD OPERATING PROCEDURES.
7. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH THE SPECIFICATION FOR THE PARTICULAR BOG AND WITH THE REQUIREMENTS OF THE REHABILITATION PLAN, ANY NATURA IMPACT STATEMENT RECOMMENDED MEASURES IF APPLICABLE, ARCHAEOLOGY REPORTS AND ANY OTHER SPECIFIC ECOLOGICAL MEASURES OR ENVIRONMENTAL REPORTS FOR THIS BOG.

BORD NA MÓNA
Naturally Driven
Bord Na Móna Engineering Department
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STATUS

Rev	Description	Issued By	Date
b	For Approval	P.K.	03/03/21
a	Issued for Information	P.K.	18/12/20

PROJECT:
Peatland Climate Action Scheme
PCAS

TITLE:
Rehabilitation Method DPT 2
Peat Drain Blocking

Drawn By:		Checked By:		Approved:
CAD	Designer	Discip. Lead	Design Lead	Design Manager
P.K.		D.K.	P.N.	P.N.

Date: 18/12/20 Scale : N.T.S. A3 Stage: For Approval

Drawing No.: PCAS-0100-002 Rev: b

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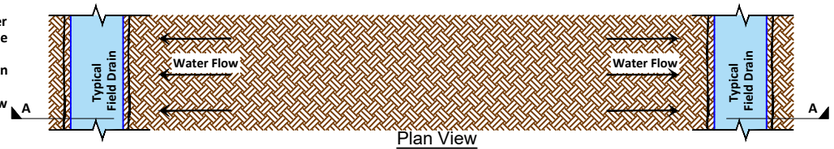
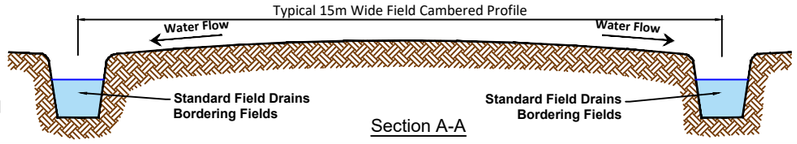
Existing Layout:

Typical existing bare peat fields are cambered (higher) in the centre and lower towards the drains, helping drainage of the fields but limiting the re-wetting of the central area.
The concept of field re-profiling is to level the surface of the individual peat production fields to retain surface water at the required depth.
On peatlands with increased slopes it will be more advantageous to create shallow depressions.



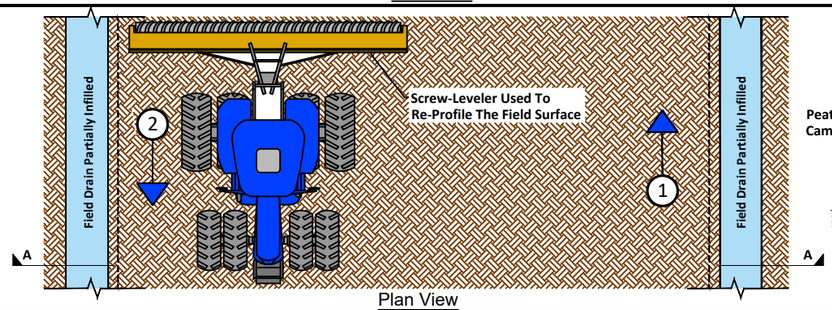
Plan View



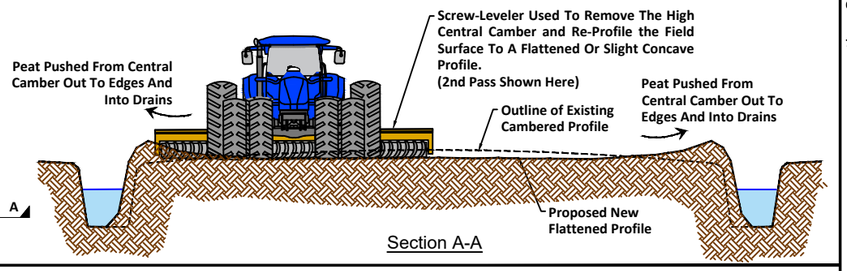
Section A-A

Phase 1
Re-Profiling of Field Surface

The first operation in the re-profiling process begins with using a Screw-Leveler to remove the high central camber from individual production fields and deposit the peat on the lower-lying edges of the same production field.
The Screw-Leveler, with a level axis, will run up the first side ① of the production field and down the other side ② close to the edge of the drain, resulting in some of the peat being tipped into the drain.



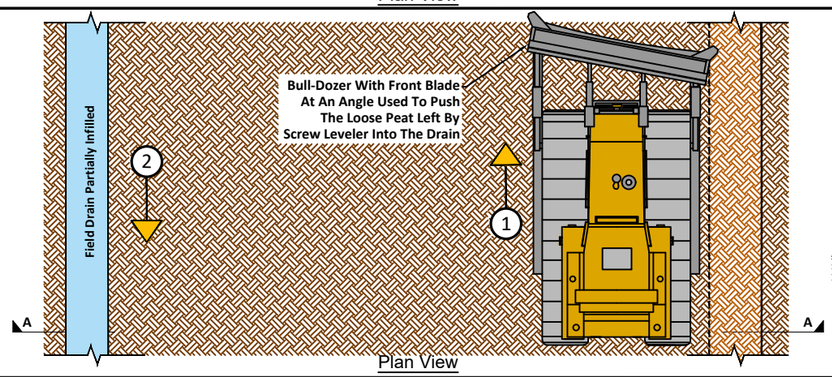
Plan View



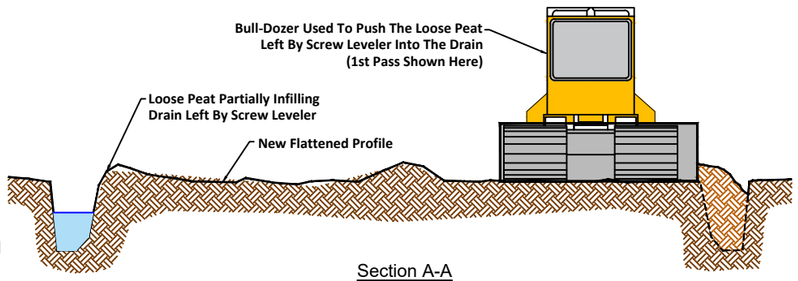
Section A-A

Phase 2
Infilling Of Drains

Next the Bull-dozer will run up the first side ① of the production field and down the other side ② with the front blade at an angle placing the peat in the drain.



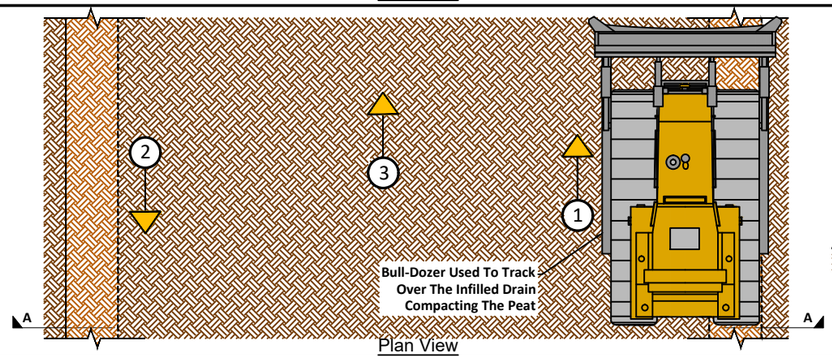
Plan View



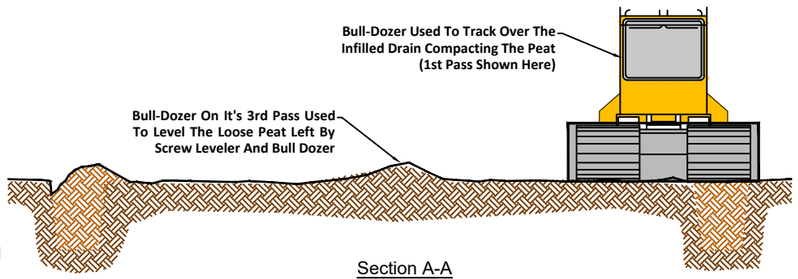
Section A-A

Phase 3
Final Leveling Of Drains & Field

Next the Bull-dozer will track over the first of the infilled drains ① and then back down the other drain ② compacting and leveling the peat.
It will also make a pass down the middle of field ③ flattening peat mounds left between Screw Leveler and Bull dozer runs.



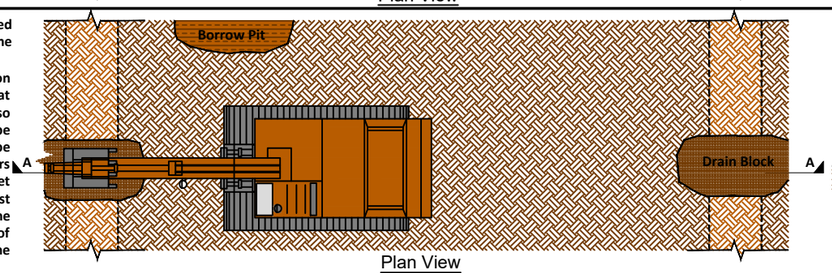
Plan View



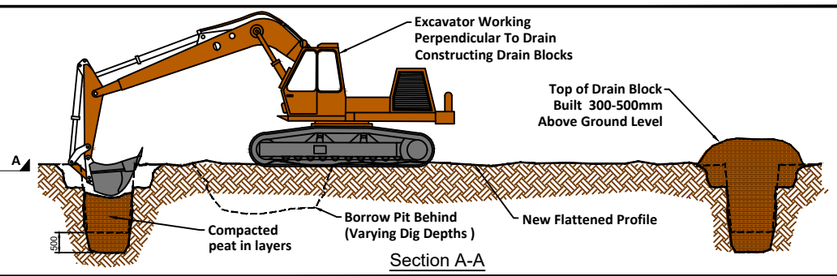
Section A-A

Phase 4
Drain Blocking

(NOTE: If any vegetation present, it should be carefully removed at the start and left aside for replacement at the end of the process, to help bind and stabilise the top of the drain block.)
Drain blocks are constructed using an Excavator operating at a perpendicular direction to the field drains. Key is cut in the drain approximately 500mm deep, and ensuring that it is wider than the actual drain. 500mm of peat is removed from bottom of drain also and placed behind the machine for replacement later. Area behind the machine is to be used as a borrow pit. Remove turf and degraded peat. Place this material close by to be used as cover later. 'Clay' like peat is extracted from pit and compacted in 300mm layers using the excavator bucket. The peat is firmly compacted using the machine bucket before laying more peat from the borrow pit. The drain block is built up at least 300-500mm above the ground level of the bog to allow for subsequent shrinkage of the peat as it dries. The borrow pit is back filled with the peat extracted from the bottom of drain. The sides of the borrow pit are to be pressed down and graded with the excavator bucket.



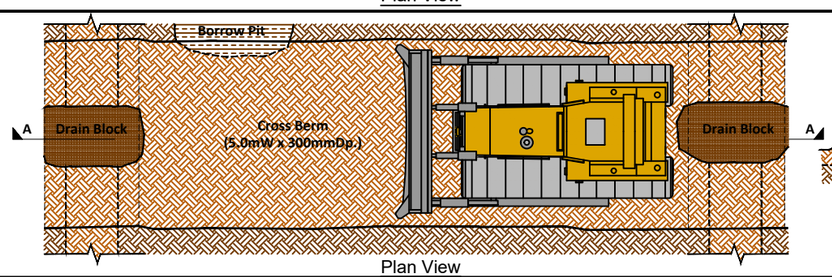
Plan View



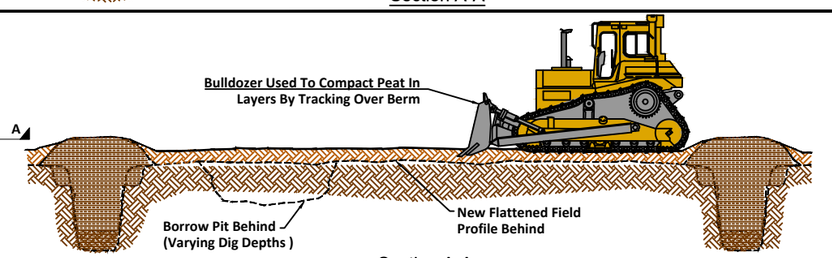
Section A-A

Phase 5
Cross Berm

An Excavator is used to form a key(5m long) in the drain's edges where the berm crosses.
A strip of peat(5m wide) is taken from the central camber of the field, pushed into the drain and compacted by the bull-dozer tracking over the drain block.
Next the bull-dozer is used to complete the central cross section of Berm by taking peat from the centre of the field and pushing it in line with the field to form an approximately 5m Wide x 300mm High Cross Berm.
The peat material in the berm is compacted by the dozer tracking over it in layers.
Berm edge profile is shaped by using the bucket of the excavator.



Plan View



Section A-A

NOTES:

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
2. REFER TO RELEVANT SITE PLAN TO ENSURE SPECIFIC DRAIN BLOCKS HAVE BEEN INSTALLED DOWNSTREAM PRIOR TO COMMENCING ANY RE-PROFILING WORKS, TO RETAIN ANY SILT THAT MAY ENTER THE DRAINS.
3. REFER TO RELEVANT SITE PLAN FOR No. OF DRAIN BLOCKS SPECIFIED PER 100M DRAIN LENGTH.
4. REFER TO RELEVANT SITE PLAN FOR SPECIFIC FINISHED GROUND LEVELS TO BE ACHIEVED.
5. ALL DETAILS TO BE AGREED WITH BORD NA MONA OPERATIONS PRIOR TO CONSTRUCTION.
6. OPERATORS TO CONFORM WITH ALL STANDARD OPERATING PROCEDURES.
7. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH THE SPECIFICATION FOR THE PARTICULAR BOG AND WITH THE REQUIREMENTS OF THE REHABILITATION PLAN, ANY NATURA IMPACT STATEMENT RECOMMENDED MEASURES IF APPLICABLE, ARCHAEOLOGY REPORTS AND ANY OTHER SPECIFIC ECOLOGICAL MEASURES OR ENVIRONMENTAL REPORTS FOR THIS BOG.

STATUS

Rev	Description	Issued By	Date
.		.	.
.		.	.
c	For Approval	P.K.	25/01/21
b	Methodology Type Changed To 4A And Cross Berm Added	P.K.	29/01/21
a	Issued For Information	P.K.	07/01/21

BORD NA MÓNA
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LEABEG, TULLAMORE CO. OFFALY
Tel. 057 9345900
Fax. 057 9345160

PROJECT:
Peatland Climate Action Scheme
PCAS

TITLE:
Rehabilitaion Method DPT 4A
Field Re-profiling

Drawn By:		Checked By:		Approved:
CAD	Designer	Discip. Lead	Design Lead	Design Manager
P.K.	-	D.K.	P.N.	P.N.

Date: 18/12/20 Scale : Not to Scale A3 Stage: For Approval
Drawing No.: PCAS-0100-005 Rev: c

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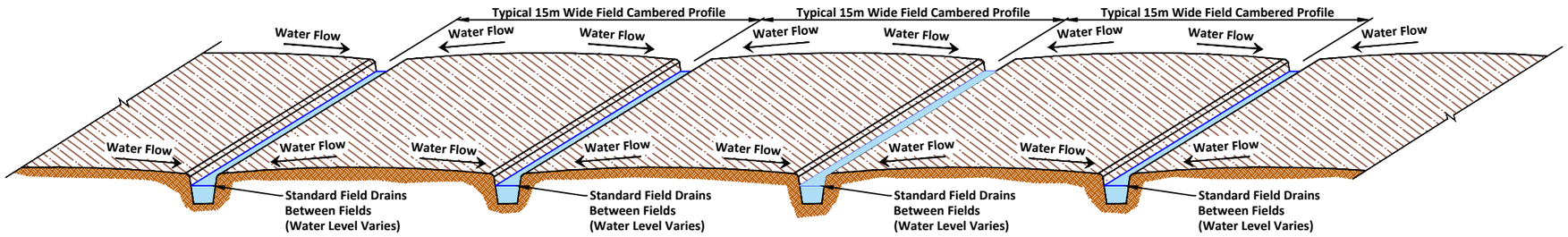
Existing Layout:

Typical existing bare peat fields are cambered (higher) in the centre and lower towards the drains, helping drainage of the fields but limiting the re-wetting of the central area.



NOTES:

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4. REFER TO RELEVANT SITE PLAN FOR SPECIFIC FINISHED GROUND LEVELS TO BE ACHIEVED.
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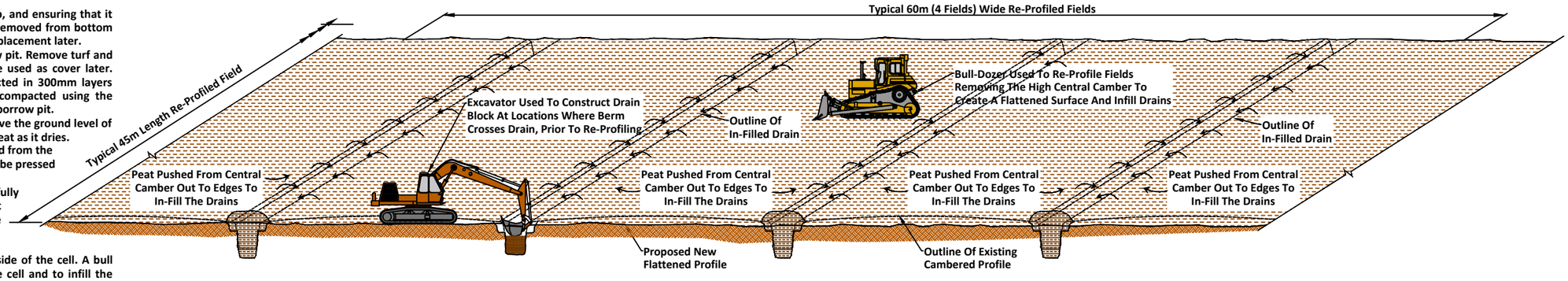
Phase 1
Drain Blocking And Re-Profiling of Fields Surface

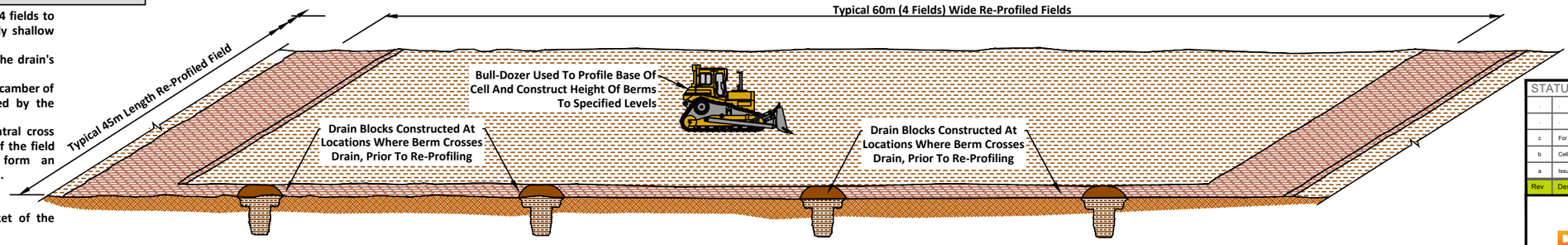
Drain blocks are constructed using an Excavator operating at a perpendicular direction to the field drains.
Key is cut in the drain approximately 500mm deep, and ensuring that it is wider than the actual drain. 500mm of peat is removed from bottom of drain also and placed behind the machine for replacement later.
Area behind the machine is to be used as a borrow pit. Remove turf and degraded peat. Place this material close by to be used as cover later. 'Clay' like peat is extracted from pit and compacted in 300mm layers using the excavator bucket. The peat is firmly compacted using the machine bucket before laying more peat from the borrow pit.
The drain block is built up at least 300-500mm above the ground level of the bog to allow for subsequent shrinkage of the peat as it dries.
The borrow pit is back filled with the peat extracted from the bottom of drain. The sides of the borrow pit are to be pressed down and graded with the excavator bucket.
(NOTE: If any vegetation present, it should be carefully removed at the start and left aside for replacement at the end of the process, to help bind and stabilise the top of the drain block.)

The centre of the cambered field is used as one side of the cell. A bull dozer is used to level and flatten the base of the cell and to infill the drains by removing the camber from the fields. Laser levels are mounted on bull-dozers to allow the machine drivers to move peat and create flat surfaces to the appropriate levels.



Phase 2
Formation of Surface Berms And Levelling Base of Cells

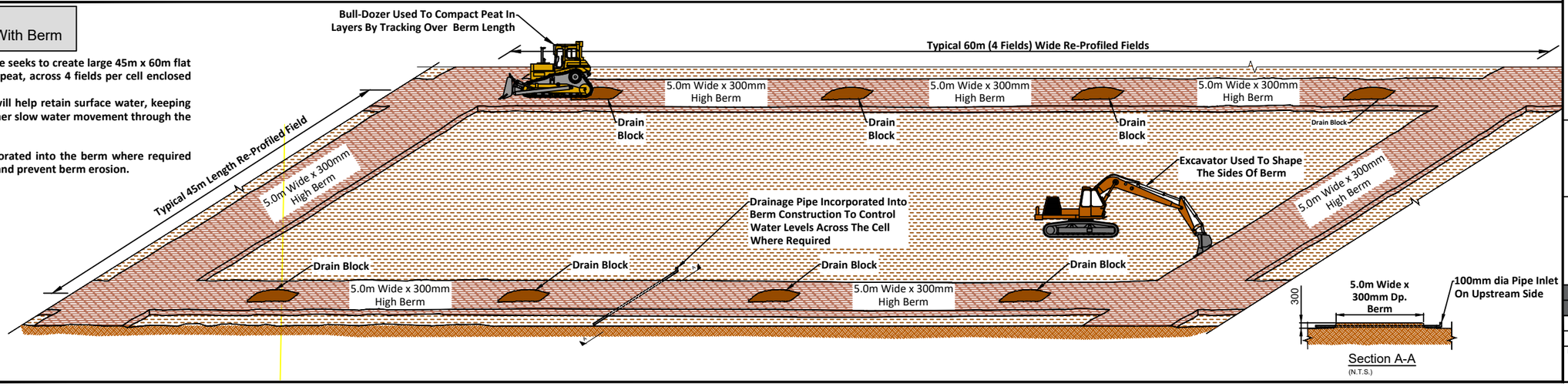
Berms are formed 45m in length and 60m across 4 fields to create an enclosed cell. The berms are relatively shallow (300mm high) and are 5.0 m wide.
An Excavator is used to form a key(5m long) in the drain's edges where the berm crosses.
A strip of peat(5m wide) is taken from the central camber of the field, pushed into the drain and compacted by the bull-dozer tracking over the drain block.
Next the bull-dozer is used to complete the central cross section of Berm by taking peat from the centre of the field and pushing it in line with the field to form an approximately 5m Wide x 300mm High Cross Berm.
The peat material in the berm is compacted in layers by the dozer tracking over it.
Berm edge profile is shaped by using the bucket of the excavator.



Final Profile:
45m x 60m Cell With Berm

This enhanced measure seeks to create large 45m x 60m flat areas or cells on bare peat, across 4 fields per cell enclosed by shallow berms.
The creation of cells will help retain surface water, keeping peat wet and will further slow water movement through the bog.

Drainage pipes incorporated into the berm where required to manage overflows and prevent berm erosion.



STATUS			
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.		.	.
c	For Approval	P.K.	24/02/21
b	Cell Size Text Amended	P.K.	28/01/21
a	Issued For Information	P.K.	07/01/21
Rev	Description	Issued By	Date

BORD NA MÓNA
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Fax. 057 9345160

PROJECT:
Peatland Climate Action Scheme (PCAS)

TITLE:
Rehabilitation Method DPT 4
45m x 60m Cell With Berms

Drawn By:		Checked By:		Approved:
CAD	Designer	Discip. Lead	Design Lead	Design Manager
P.K.	-	D.K.	P.N.	P.N.
Date: 22/12/20		Scale : Not to Scale	A3	Stage: For Approval
Drawing No.: PCAS-0100-006				Rev: c

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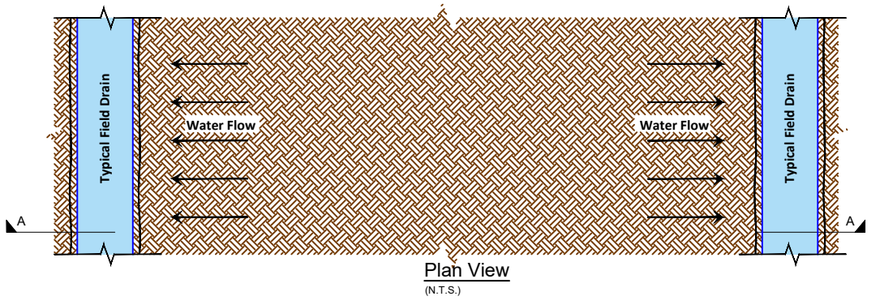
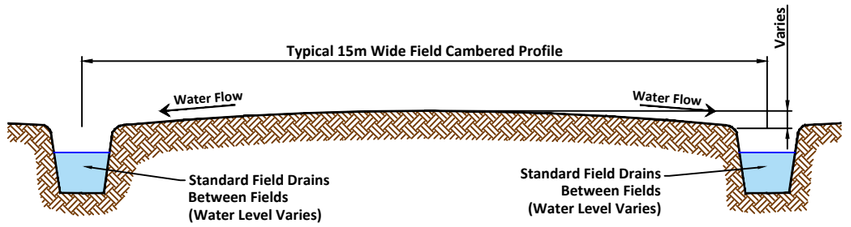
Existing Layout:

Typical existing bare peat fields are cambered (higher) in the centre and lower towards the drains, helping drainage of the fields but limiting the re-wetting of the central area.
The concept of drain blocking is to raise the water levels in the drains to re-wet the cutaway and slow the water movement through the bog.



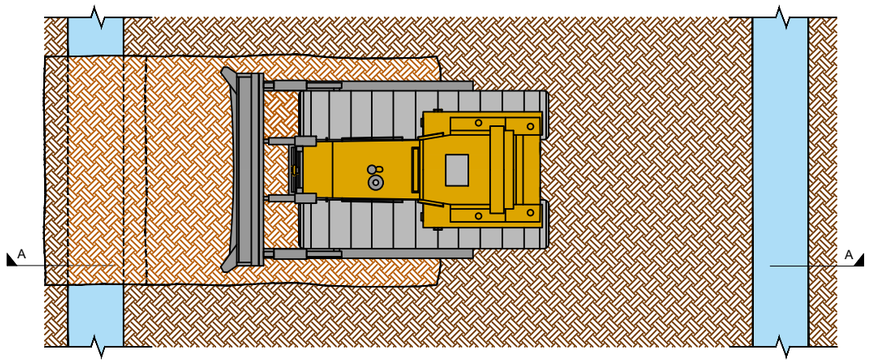
Plan View
(N.T.S.)



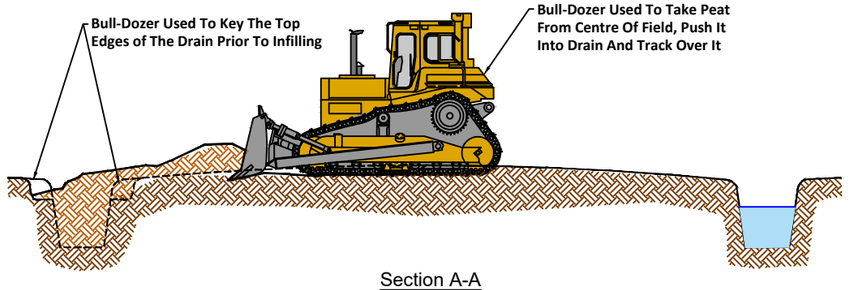
Section A-A
(N.T.S.)

Phase 1
Forming 'Speed Bump'

The Bull-dozer is used to create a 5m Length key along both edges of the drain, approximately 500mm Wide x 500mm Deep.
Next a strip of peat is taken from the central camber of the field, pushed into the drain and compacted by the bull-dozer tracking over the drain block, to form an approximately 5m Wide 'Speed Bump'.



Plan View

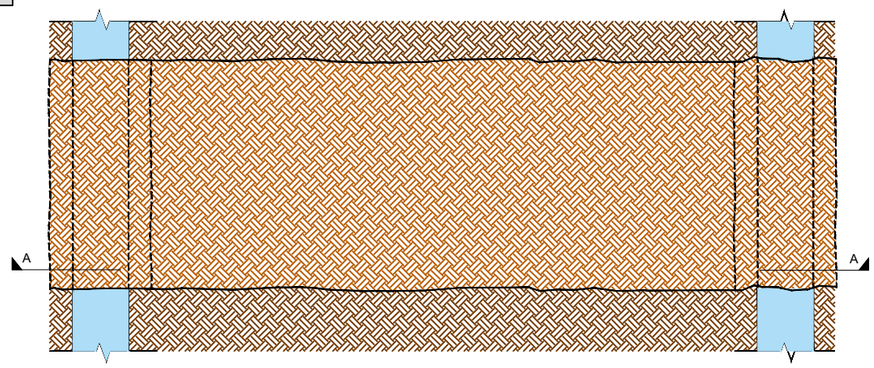


Section A-A
(N.T.S.)

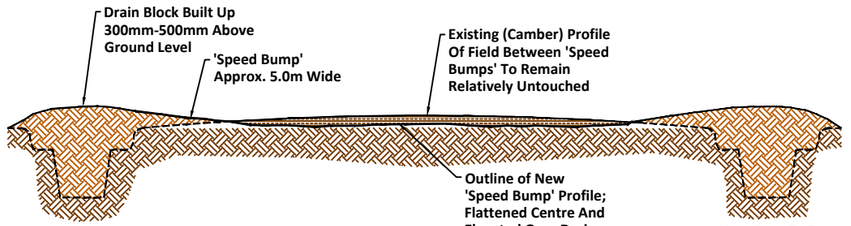
Plan View
(N.T.S.)

Complete Fields With Speed Bump (3 Per 100m)

Drain Blocks are built up at least 300mm-500mm above the existing ground level to allow for peat subsidence and to prevent water from flowing over the drain block and eroding it before it becomes stabilised.



Plan View
(N.T.S.)



Section A-A
(N.T.S.)

Section B-B
(N.T.S.)

NOTES:

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
2. REFER TO RELEVANT SITE PLAN TO ENSURE SPECIFIC DRAIN BLOCKS HAVE BEEN INSTALLED DOWNSTREAM PRIOR TO COMMENCING ANY RE-PROFILING WORKS, TO RETAIN ANY SILT THAT MAY ENTER THE DRAINS.
3. REFER TO RELEVANT SITE PLAN FOR No. OF DRAIN BLOCKS SPECIFIED PER 100M DRAIN LENGTH.
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STATUS

Rev	Description	Issued By	Date
.		.	.
.		.	.
c	For Approval	P.K.	03/03/21
b	'Key' Added To Top Edges Of Drain at Drain Block Locations	P.K.	09/02/21
a	Issued For Information	P.K.	29/01/21

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Fax. 057 9345160

PROJECT:
Peatland Climate Action Scheme
PCAS

TITLE:
Rehabilitation Method DCT 2
'Speed Bump' Peat Drain Block

Drawn By:		Checked By:		Approved:
CAD	Designer	Discip. Lead	Design Lead	Design Manager
P.K.	-	D.K.	P.N.	P.N.
Date: 13/01/21		Scale : Not to Scale	A3	Stage: For Approval
Drawing No.: PCAS-0100-008				Rev: c

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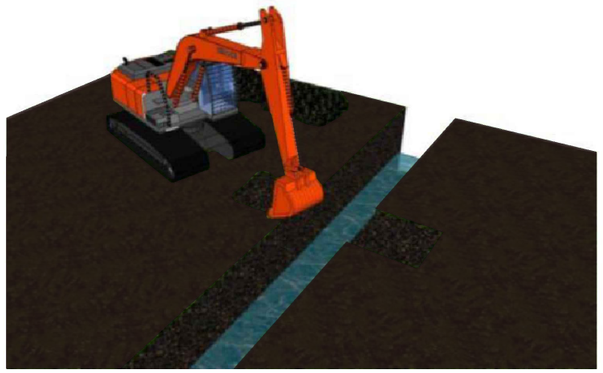
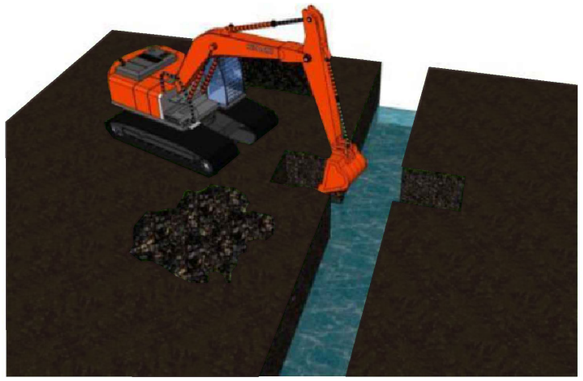
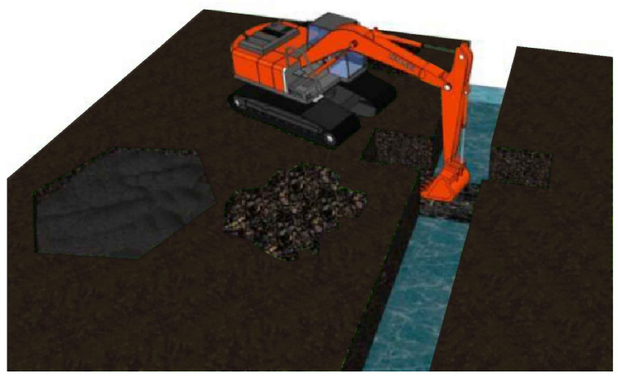
1. Before building of drain blocks, the sides and bottom of the ditch is cleaned using the excavator to remove dry degraded peat, to ensure a good peat-to-peat contact.
(If any vegetation present, it should be carefully removed and left aside for replacement at the end of the process.)

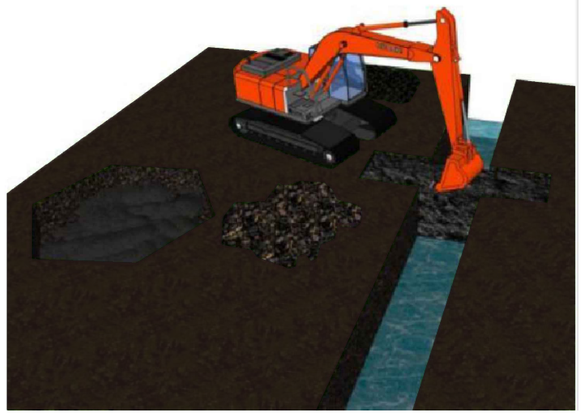




2. Cut key in either side of the drain approximately 500mm deep, and ensure that it is wider than the actual drain.
Remove 500mm of peat from bottom of the drain also and place behind the machine for replacement later.

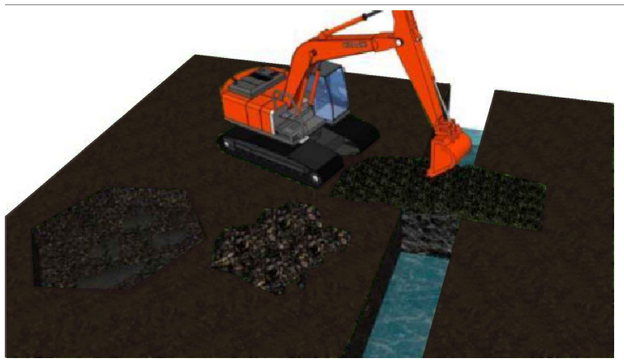
3. Open an area behind machine to be used as a borrow pit. Avoid using the surface layer of peat (top 100-200mm) which is likely to be very permeable. Only use the deeper, more compacted peat to build the drain block.
(If any vegetation present, it should be carefully removed and left aside for replacement at the end of the process.)

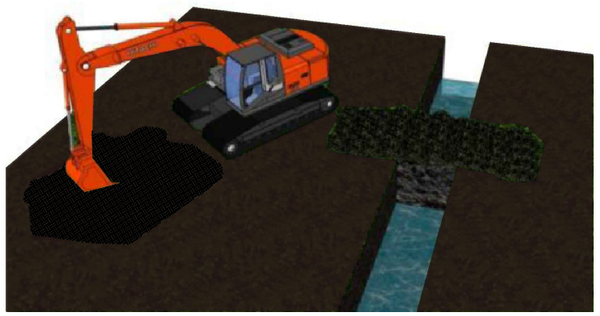




4. Dig out peat from the borrow pit and place into the drain compacting in 300mm layers. Compact the peat firmly using the excavator bucket before laying more peat from the borrow pit.

5. Build the drain block up at least 300mm-500mm above the ground level of the bog to allow for subsequent shrinkage of the peat as it dries.
(Take any vegetation removed in step 1 and step 3 and place on the top of the drain block, to help bind and stabilise the drain block.)





6. Backfill the borrow pit with the peat extracted from the bottom of the drain in step 2. Press down on the sides of the peat borrow hole with the excavator bucket to grade the sides of the borrow pit.

This enhanced measure's main objective is to block drains with peat drain blocks to raise water levels, re-wetting peat and slowing water movements through the bog.

NOTES:

1. FIGURED DIMS ONLY TO BE TAKEN FROM THIS DRAWING.
2. REFER TO RELEVANT SITE PLAN TO ENSURE SPECIFIC DRAIN BLOCKS HAVE BEEN INSTALLED DOWNSTREAM PRIOR TO COMMENCING ANY RE-PROFILING WORKS, TO RETAIN ANY SILT THAT MAY ENTER THE DRAINS.
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4. REFER TO RELEVANT SITE PLAN FOR SPECIFIC FINISHED GROUND LEVELS TO BE ACHIEVED.
5. ALL DETAILS TO BE AGREED WITH BORD NA MONA OPERATIONS PRIOR TO CONSTRUCTION.
6. OPERATORS TO CONFORM WITH ALL STANDARD OPERATING PROCEDURES.
7. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH THE SPECIFICATION FOR THE PARTICULAR BOG AND WITH THE REQUIREMENTS OF THE REHABILITATION PLAN, ANY NATURA IMPACT STATEMENT RECOMMENDED MEASURES IF APPLICABLE, ARCHAEOLOGY REPORTS AND ANY OTHER SPECIFIC ECOLOGICAL MEASURES OR ENVIRONMENTAL REPORTS FOR THIS BOG.

BORD NA MÓNA
Naturally Driven
Bord Na Móna Engineering Department
LEABEG, TULLAMORE CO. OFFALY
Tel. 057 9345900
Fax. 057 9345160

STATUS

Rev	Description	Issued By	Date
b	For Approval	P.K.	25/02/21
a	Issued for Information	P.K.	29/01/21

PROJECT:
Peatland Climate Action Scheme
PCAS

TITLE:
Rehabilitation Method WLT 4
Peat Drain Blocking

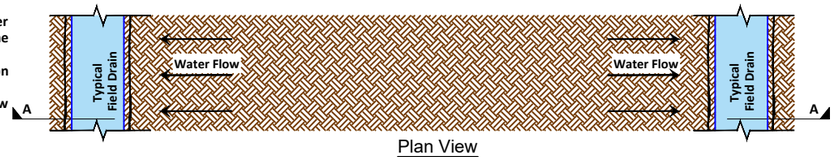
Drawn By:		Checked By:		Approved:
CAD	Designer	Discip. Lead	Design Lead	Design Manager
P.K.		D.K.	P.N.	P.N.

Date: 13/01/21 Scale : N.T.S. A3 Stage: For Approval

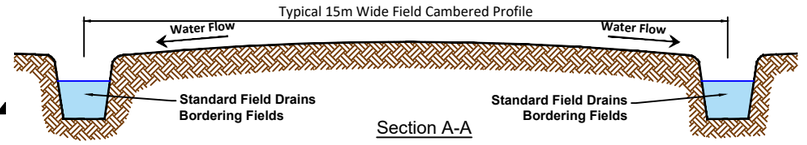
Drawing No.: PCAS-0100-011 Rev: b

Existing Layout:

Typical existing bare peat fields are cambered (higher) in the centre and lower towards the drains, helping drainage of the fields but limiting the re-wetting of the central area.
The concept of field re-profiling is to level the surface of the individual peat production fields to retain surface water at the required depth.
On peatlands with increased slopes it will be more advantageous to create shallow depressions.



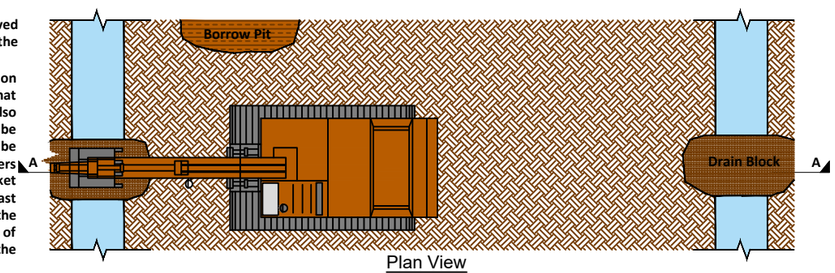
Plan View



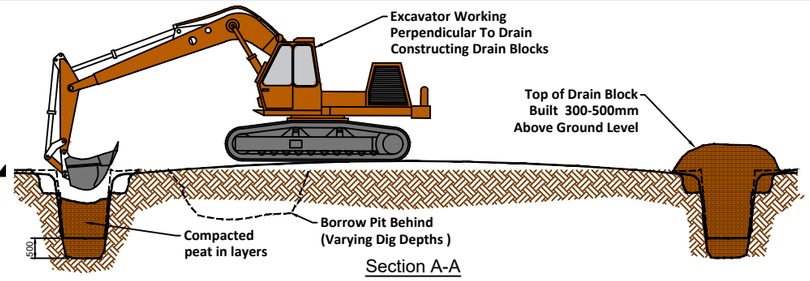
Section A-A

Phase 1
Drain Blocking

(NOTE: If any vegetation present, it should be carefully removed at the start and left aside for replacement at the end of the process, to help bind and stabilise the top of the drain block.)
Drain blocks are constructed using an Excavator operating at a perpendicular direction to the field drains. Key is cut in the drain approximately 500mm deep, and ensuring that it is wider than the actual drain. 500mm of peat is removed from bottom of drain also and placed behind the machine for replacement later. Area behind the machine is to be used as a borrow pit. Remove turf and degraded peat. Place this material close by to be used as cover later. 'Clay' like peat is extracted from pit and compacted in 300mm layers using the excavator bucket. The peat is firmly compacted using the machine bucket before laying more peat from the borrow pit. The drain block is built up at least 300-500mm above the ground level of the bog to allow for subsequent shrinkage of the peat as it dries. The borrow pit is back filled with the peat extracted from the bottom of drain. The sides of the borrow pit are to be pressed down and graded with the excavator bucket.



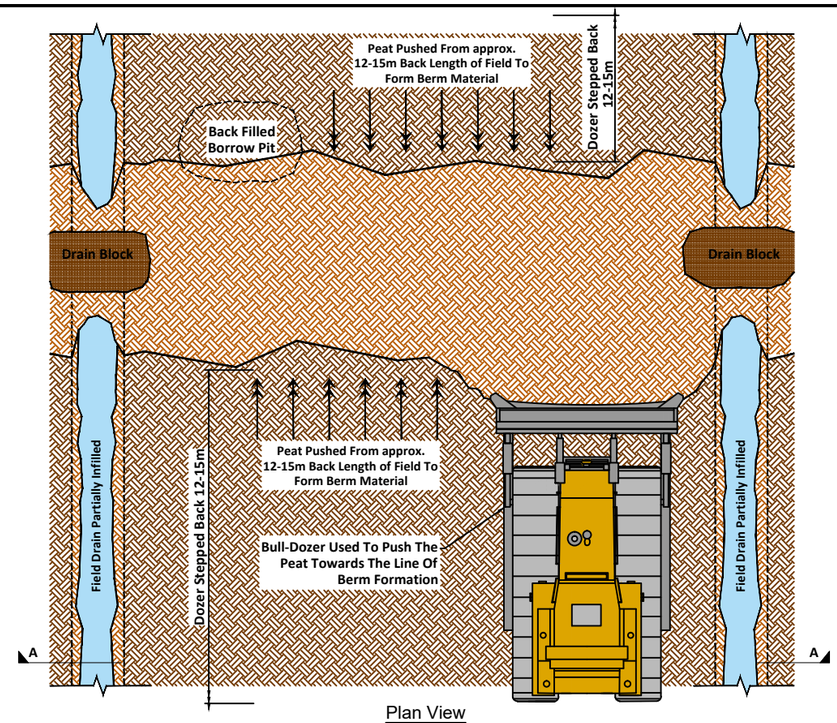
Plan View



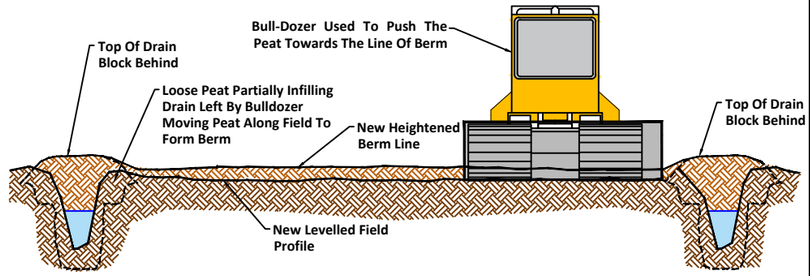
Section A-A

Phase 2
Field Re-profiling And Levelling

Next a Bull-dozer is stepped back 12 - 15m from the line of cross berm and used to take peat and move it towards the line of berm. The peat is pushed using the front bucket in line with the field to the berm location, levelling the profile of the field and removing the camber.



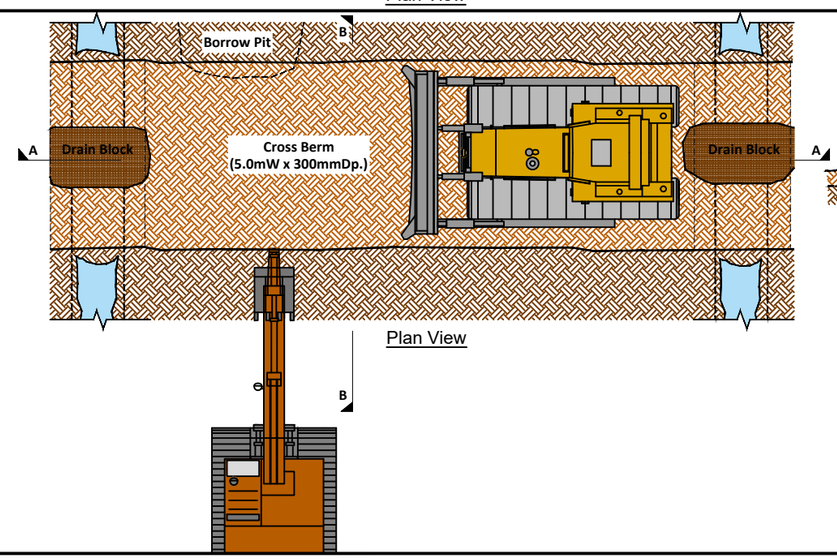
Plan View



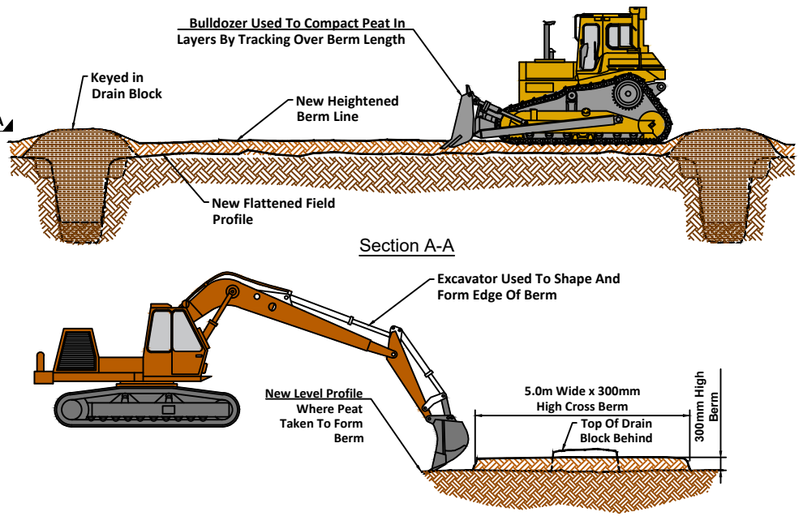
Section A-A

Phase 3
Cross Berm

An Excavator is used to form a key(5m long) in the drain's edges where the berm crosses.
Using a Bull-dozer a strip of peat(5m wide) is taken from the central gathered peat pile, pushed into the drain and compacted by the bull-dozer tracking over the drain block.
The peat material in the berm is compacted by the dozer tracking over it in layers forming an approximately 5m Wide x 300mm High Cross Berm.
Berm edge profile is formed and shaped using the bucket of the excavator.



Plan View



Section A-A

NOTES:

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2. REFER TO RELEVANT SITE PLAN TO ENSURE SPECIFIC DRAIN BLOCKS HAVE BEEN INSTALLED DOWNSTREAM PRIOR TO COMMENCING ANY RE-PROFILING WORKS, TO RETAIN ANY SILT THAT MAY ENTER THE DRAINS.
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STATUS

Rev	Description	Issued By	Date
00	Issued For Information	P.K.	7?/04/21

BORD NA MÓNA
Naturally Driven
Bord Na Móna Engineering Department
LEABEG, TULLAMORE CO. OFFALY
Tel. 057 9345900
Fax. 057 9345160

PROJECT:
Peatland Climate Action Scheme
PCAS

TITLE:
Rehabilitaion Method DPT 4B
Field Re-profiling

Drawn By:		Checked By:		Approved:
CAD	Designer	Discip. Lead	Design Lead	Design Manager
P.K.	-	D.K.	P.N.	P.N.

Date: 24/03/21 | Scale : Not to Scale A3 | Stage: For Approval

Drawing No.: PCAS-0100-016 | Rev: 00

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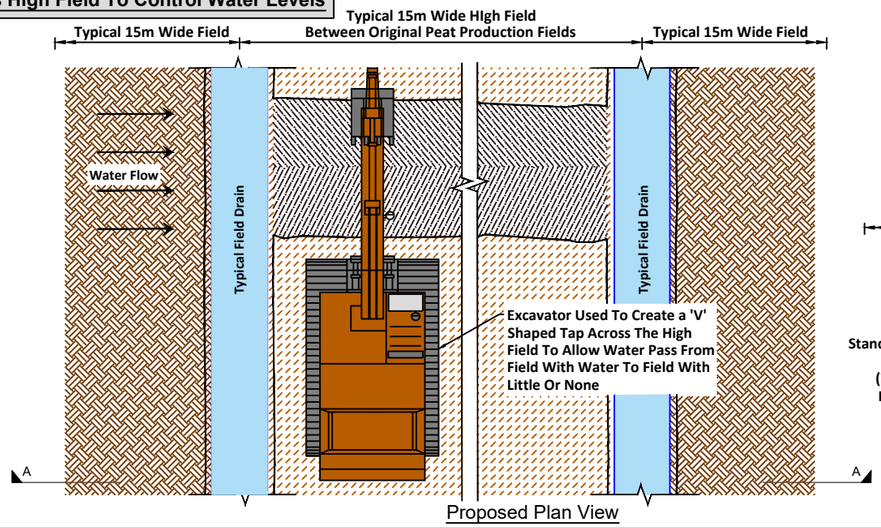
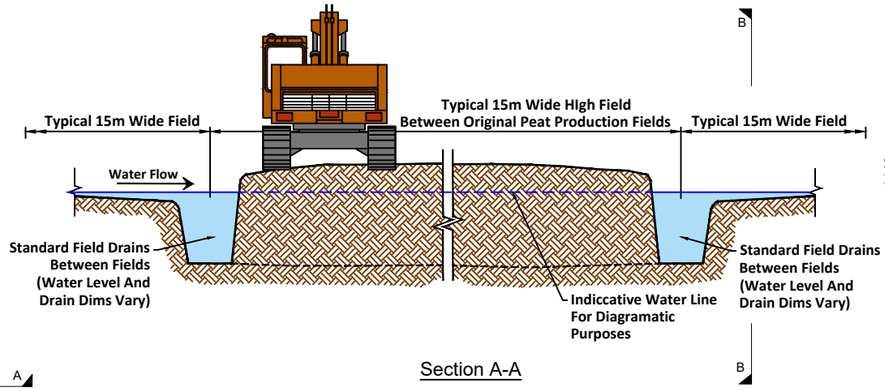
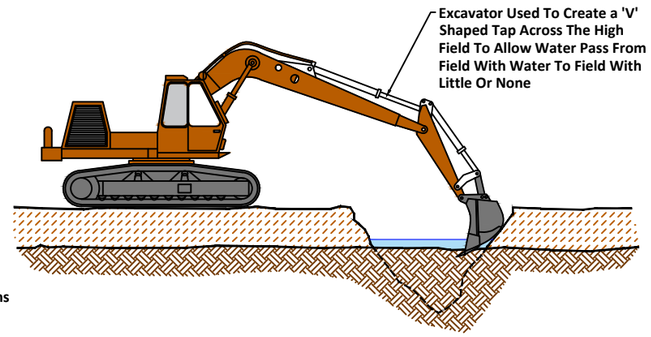
'V' Tap Across High Field To Control Water Levels



Proposed Plan View



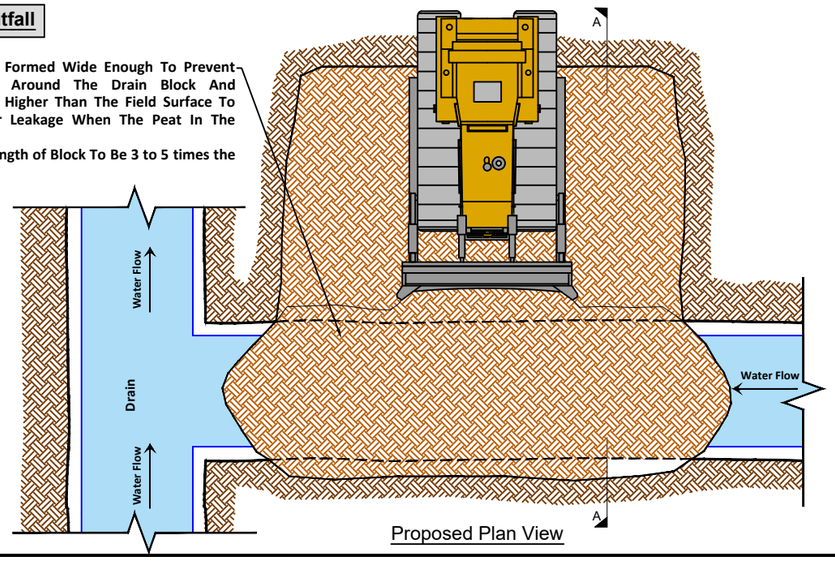
Section A-A



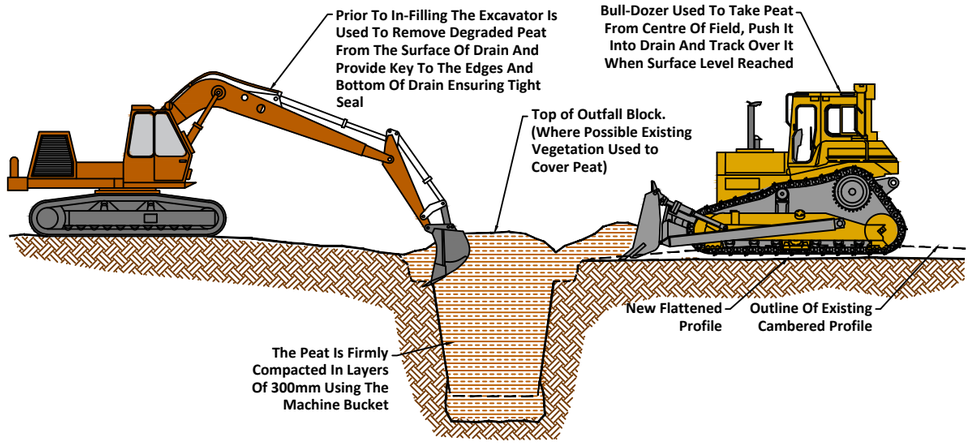
Section B-B

Blocking Of Outfall

The Blocks Are Formed Wide Enough To Prevent Water Moving Around The Drain Block And 300mm-500mm Higher Than The Field Surface To Prevent Further Leakage When The Peat In The Blocks Subsides.
Approximate Length of Block To Be 3 to 5 times the Width Of Drain

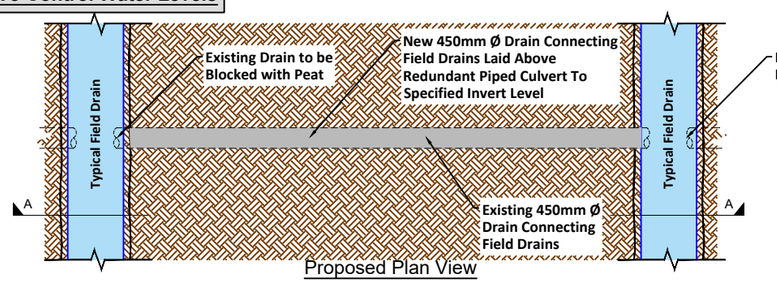


Proposed Plan View

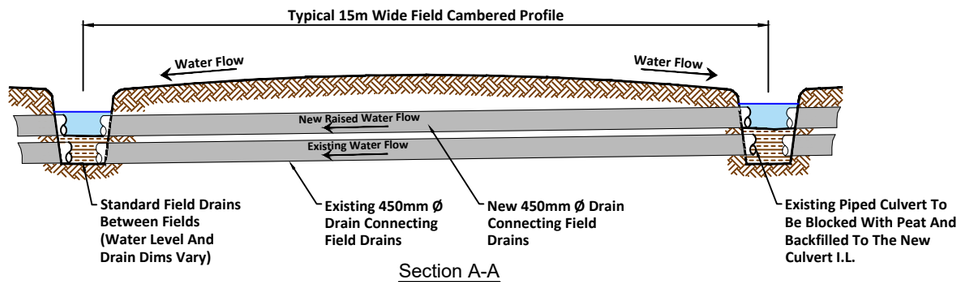


Section A-A

Raise Piped Culverts To Control Water Levels

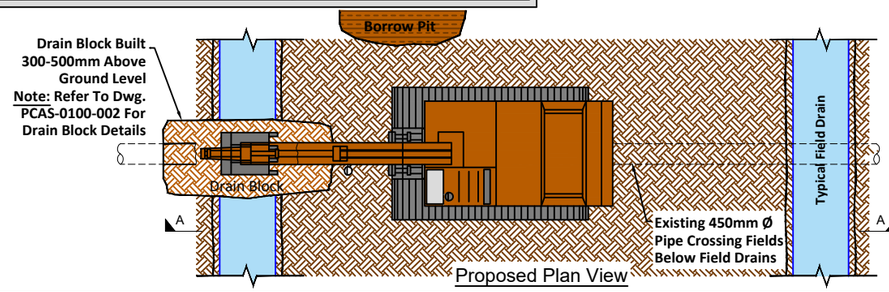


Proposed Plan View

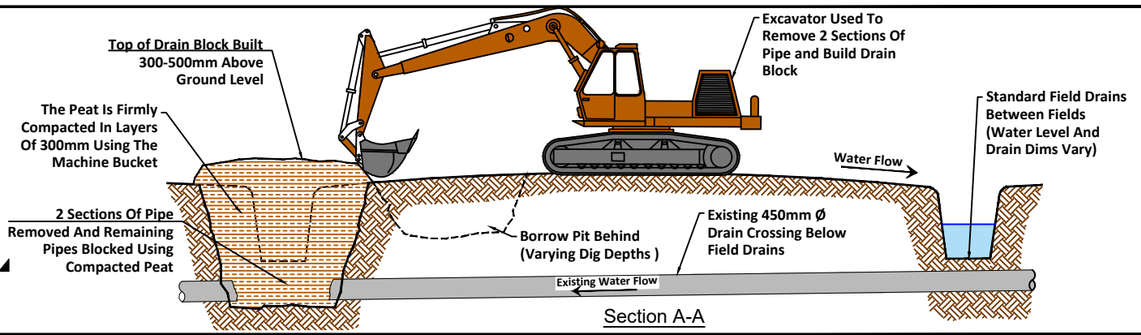


Section A-A

Blocking Of Piped Field Drain Running Below Open Field Drains



Proposed Plan View



Section A-A

NOTES:

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STATUS

Rev	Description	Issued By	Date
.		.	.
d	Piped Field Drain Block Detail Added	P.K.	12/07/21
c	'Key' Added to Base Of Drain For Blocking Of Outfall Control Measure	P.K.	03/03/21
b	For Approval	P.K.	25/02/21
a	Issued For Information	P.K.	29/01/21

BORD NA MÓNA
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LEABEG, TULLAMORE CO. OFFALY
Tel. 057 9345900
Fax. 057 9345160

PROJECT:
Peatland Climate Action Scheme
PCAS

TITLE:
Modifying of Outfalls
& Managing Water Levels

Drawn By:		Checked By:		Approved:
CAD	Designer	Discip. Lead	Design Lead	Design Manager
P.K.	-	D.K.	P.N.	P.N.
Date: 20/01/21		Scale : Not to Scale	A3	Stage: For Approval
Drawing No.: PCAS-0100-014				Rev: d

C:\Users\KiernanP\Desktop\Castlegar\DR\PCAS-0100-014d_ModifyingOutfalls.dwg

Existing Layout:

Typical existing bare peat fields are cambered (higher) in the centre and lower towards the drains, helping drainage of the fields but limiting the re-wetting of the central area.
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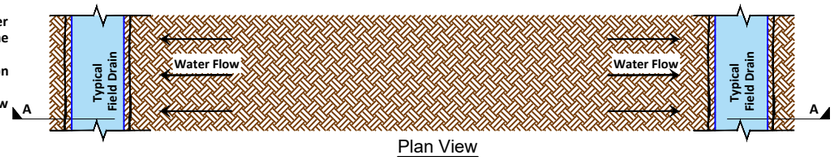
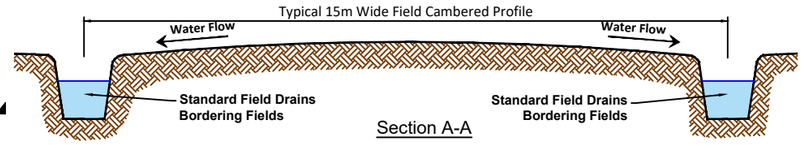
On peatlands with increased slopes it will be more advantageous to create shallow depressions.



Plan View



Section A-A

Phase 1
Drain Blocking

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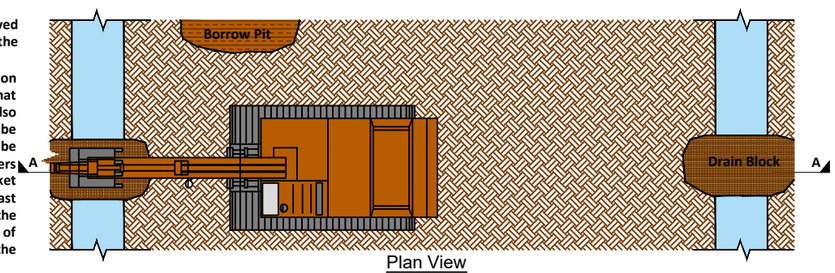
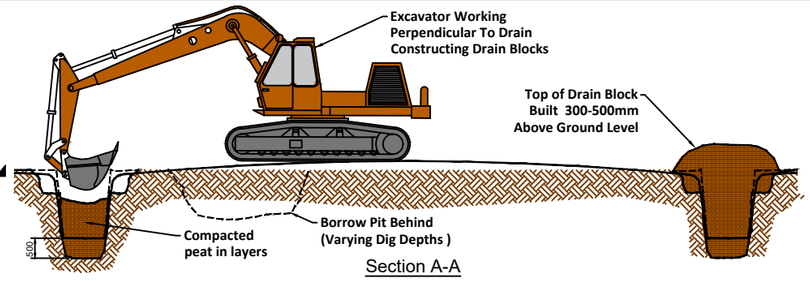


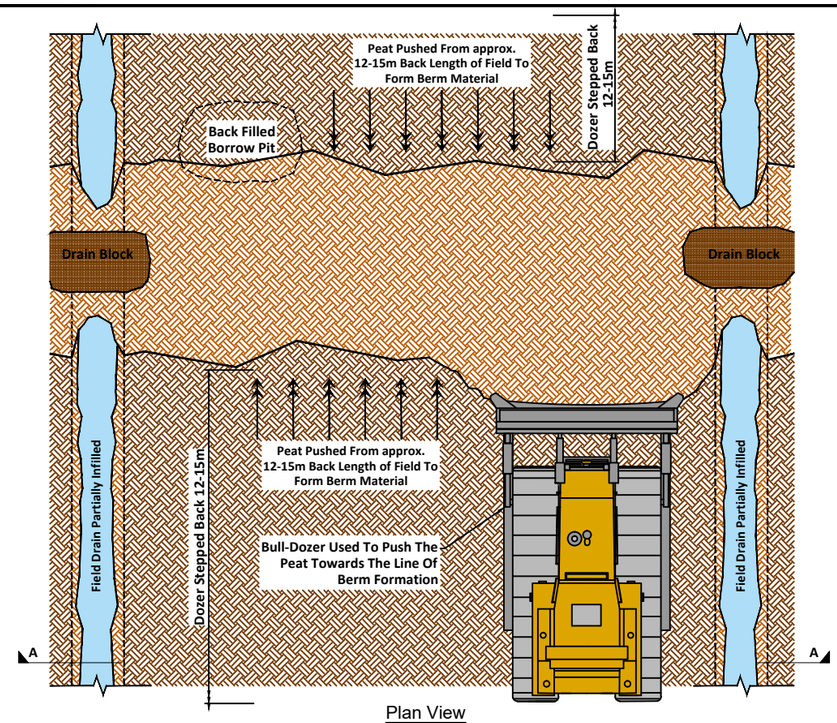
Plan View



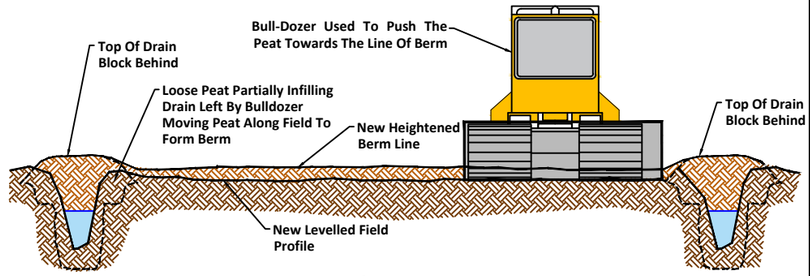
Section A-A

Phase 2
Field Re-profiling And Levelling

Next a Bull-dozer is stepped back 12 - 15m from the line of cross berm and used to take peat and move it towards the line of berm. The peat is pushed using the front bucket in line with the field to the berm location, levelling the profile of the field and removing the camber.



Plan View



Section A-A

Phase 3
Cross Berm

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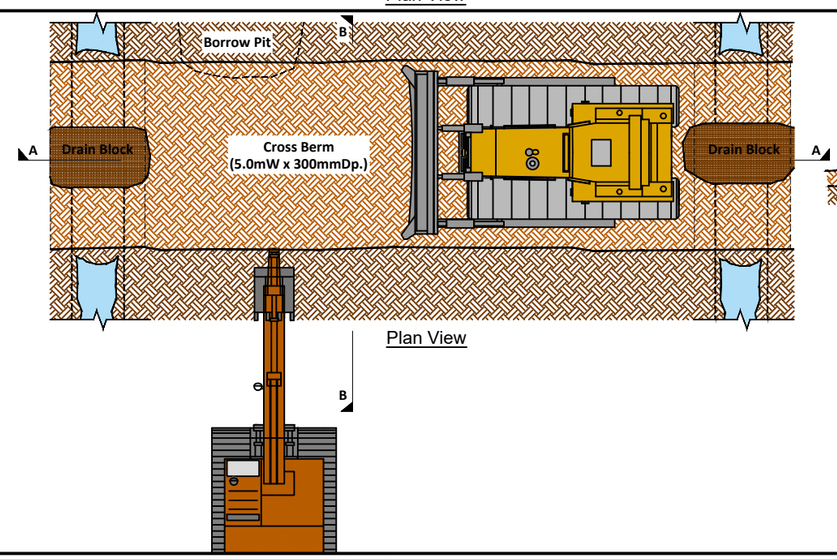
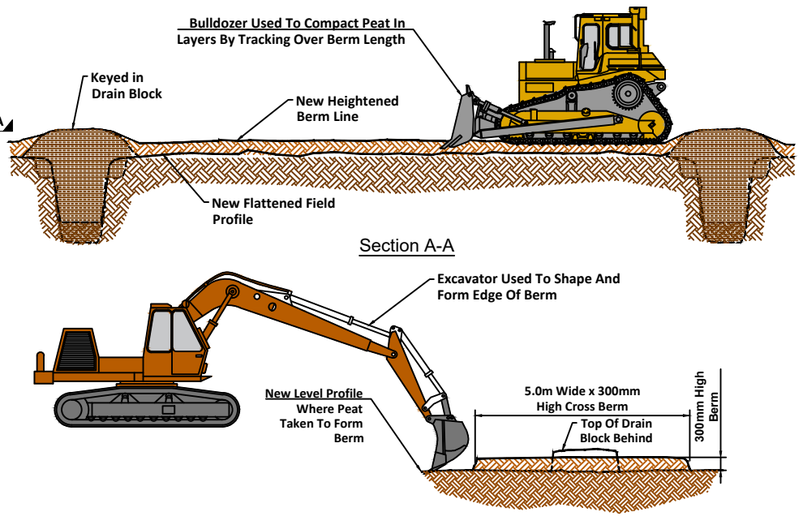


Plan View



Section A-A

NOTES:

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STATUS

Rev	Description	Issued By	Date
00	Issued For Information	P.K.	7?/04/21

BORD NA MÓNA
Naturally Driven
Bord Na Móna Engineering Department
LEABEG, TULLAMORE CO. OFFALY
Tel. 057 9345900
Fax. 057 9345160

PROJECT:
Peatland Climate Action Scheme
PCAS

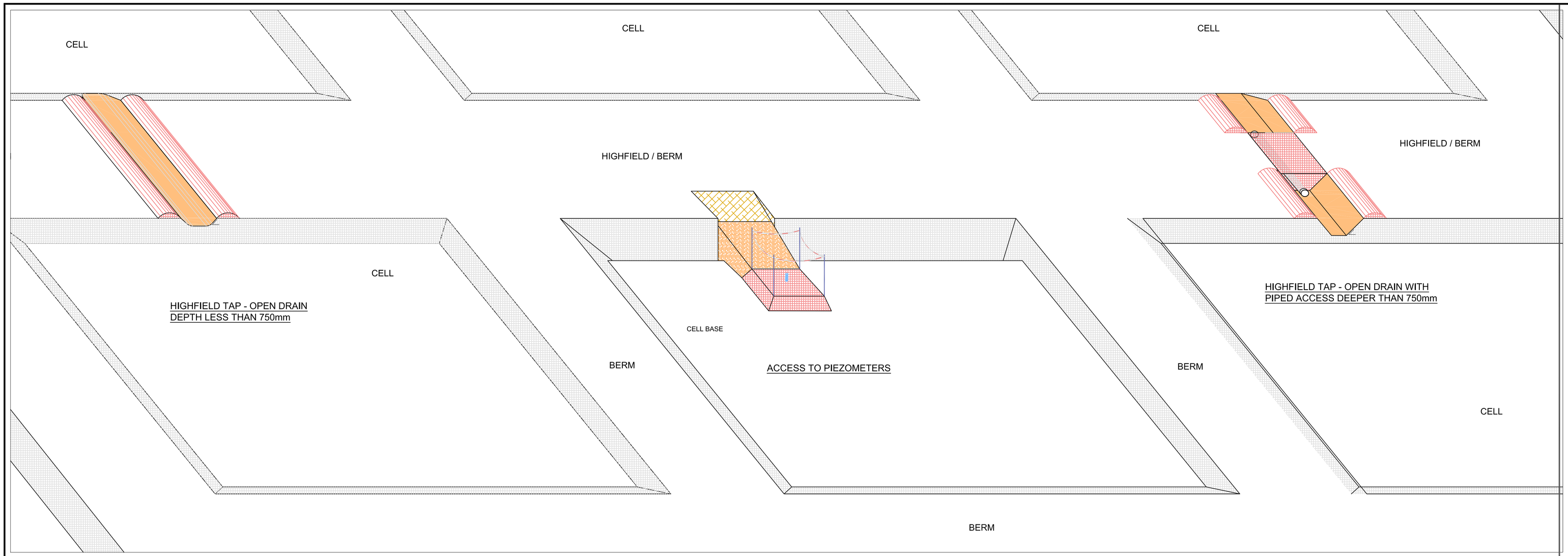
TITLE:
Rehabilitaion Method DPT 4B
Field Re-profiling

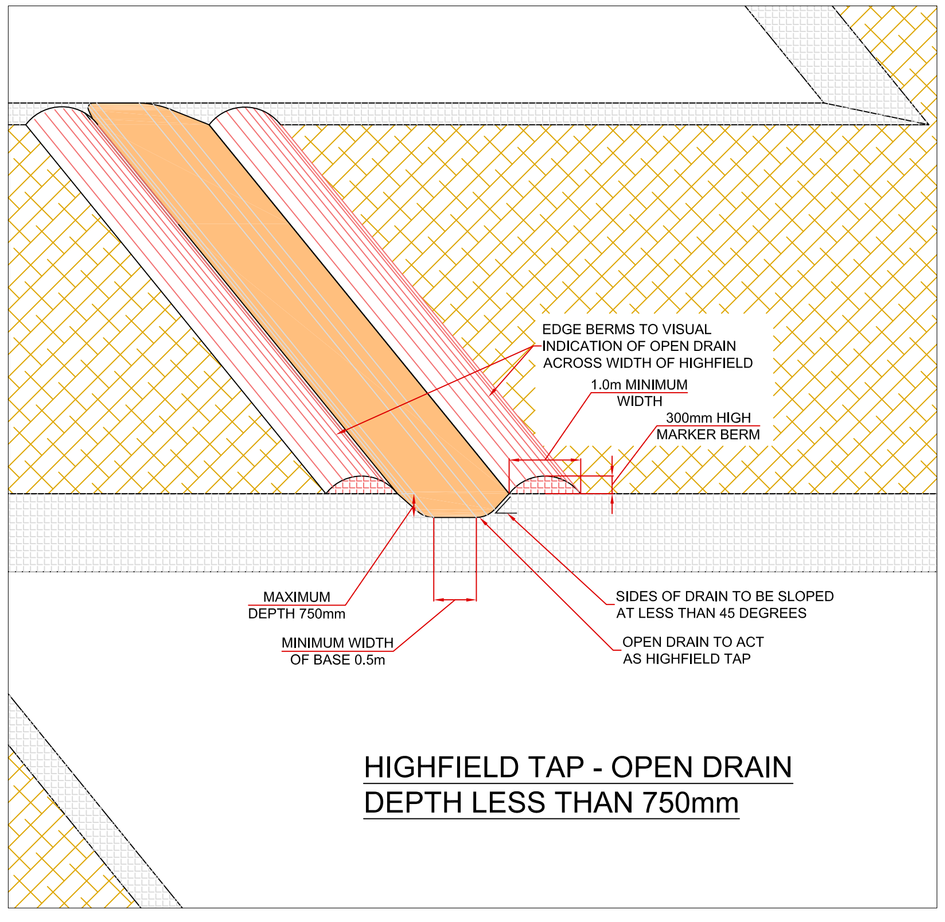
Drawn By:		Checked By:		Approved:
CAD	Designer	Discip. Lead	Design Lead	Design Manager
P.K.	-	D.K.	P.N.	P.N.

Date: 24/03/21 | Scale : Not to Scale A3 | Stage: For Approval

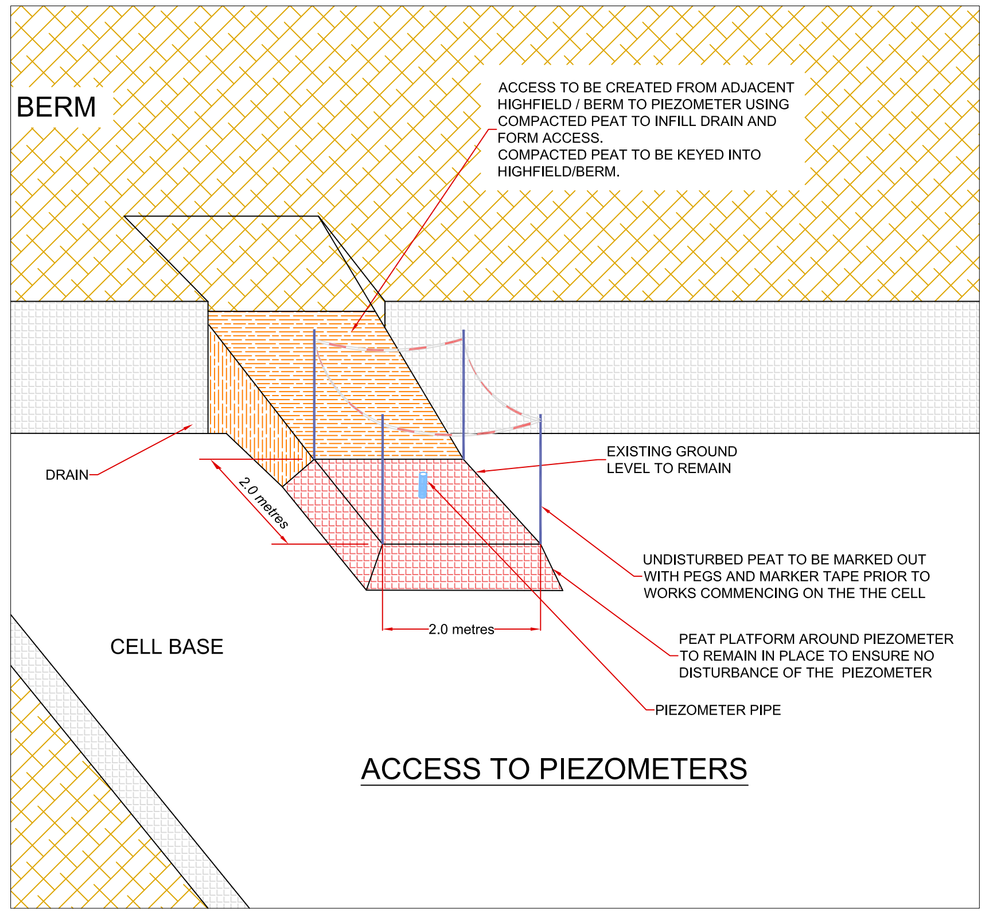
Drawing No.: PCAS-0100-016 | Rev: 00

C:\Users\KiernanP\Desktop\Castlegar\DR\PCAS-0100-016a_DPT_4B_ProfilingInsideBerm.dwg

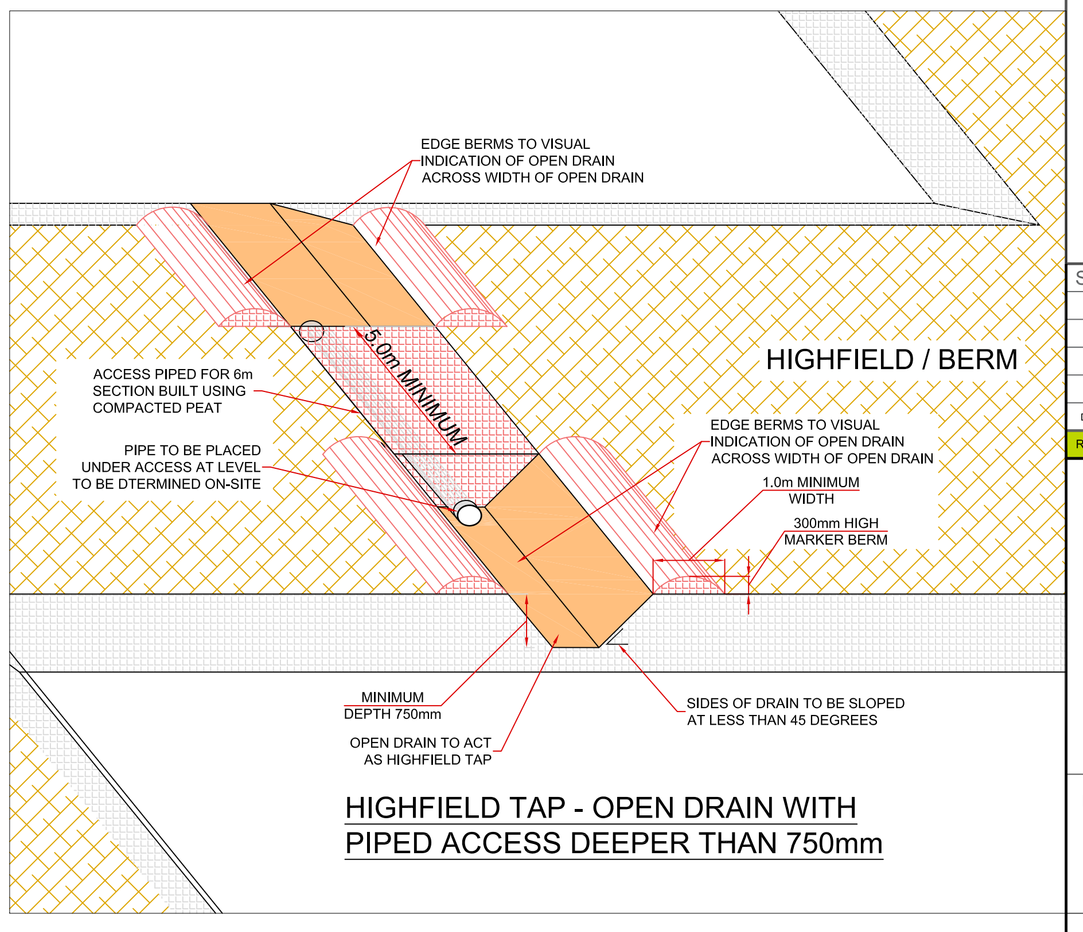




HIGHFIELD TAP - OPEN DRAIN
DEPTH LESS THAN 750mm



ACCESS TO PIEZOMETERS



HIGHFIELD TAP - OPEN DRAIN WITH
PIPED ACCESS DEEPER THAN 750mm

NOTES:

STATUS

.	.	.	.
D02	TRENCHES REVISED	FB	18/10/2021
Rev	Description	Issued By	Date

BORD NA MÓNA
Naturally Driven
Bord Na Móna Eng Department
LEABEG, TULLAMORE CO. OFFALY
Tel. 057 9345900
Fax. 057 9345160

PROJECT:

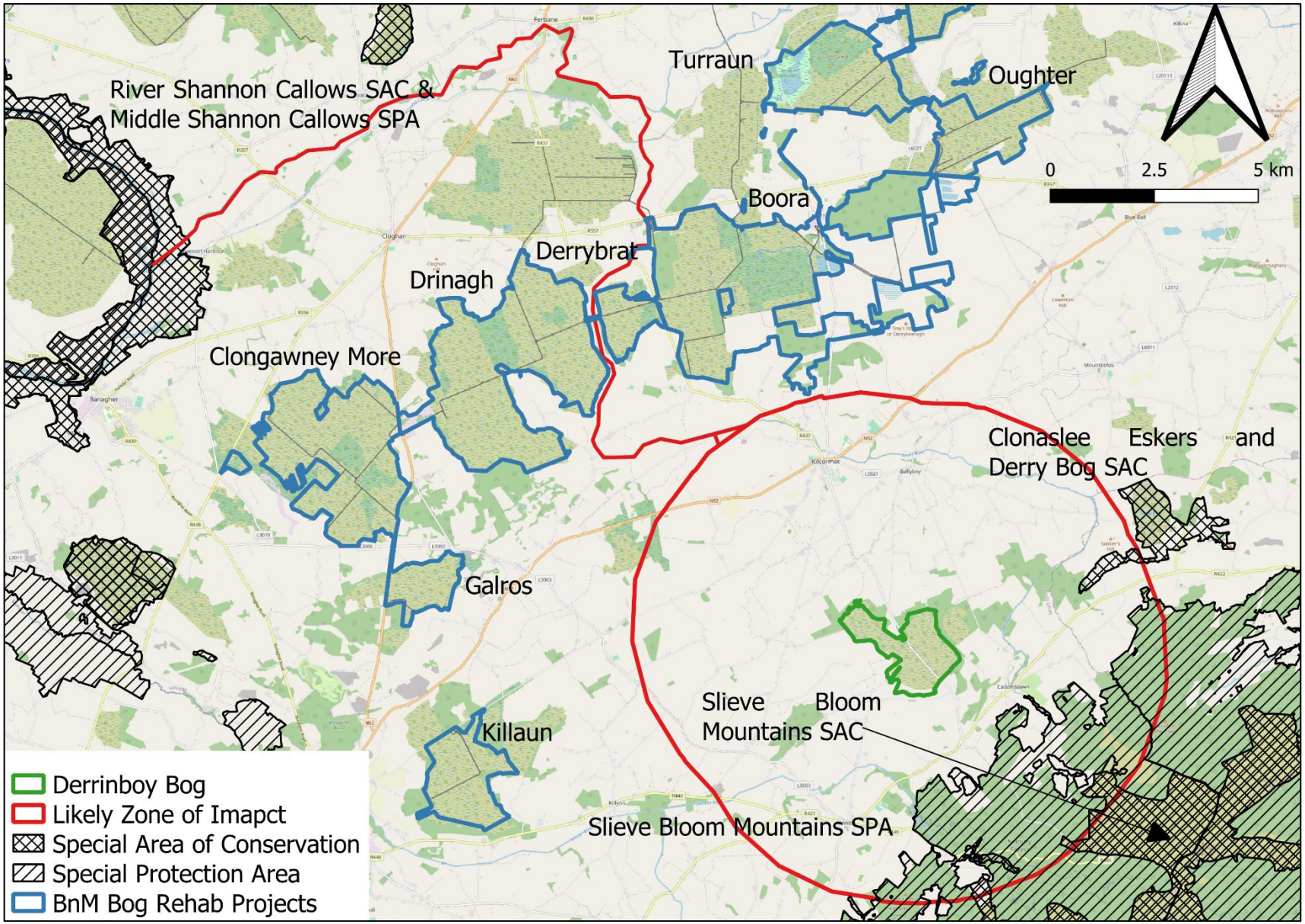
Peatland Climate Action Scheme
PCAS

TITLE:

REHAB MEASURE
HIGH FIELD TAPS

Drawn By:		Checked By:		Approved:
CAD	Designer	Disclp. Lead	Design Lead	Design Manager
FB	FB	L.H.	D.K.	P.N.
Date: APRIL '21		Scale : Not to Scale	A1	Stage: For Approval
Drawing No.: PCAS_0100_018				Rev: D01

APPENDIX C
Location and Likely Zone of Impact


River Shannon Callows SAC &
Middle Shannon Callows SPA
Turraun
Oughter
Boora
Derrybrat
Drinagh
Clongawney More
Clonaslee Eskers and
Derry Bog SAC
Galros
Killaun
Slieve Bloom
Mountains SAC
Slieve Bloom Mountains SPA
0
2.5
5 km
Derrinboy Bog
Likely Zone of Imapct
Special Area of Conservation
Special Protection Area
BnM Bog Rehab Projects

ROD
ROUGHAN & O'DONOVAN

CONTACT

ROUGHAN & O'DONOVAN
CONSULTING ENGINEERS

Arena House
Arena Road
Sandyford
Dublin 18
D18 V8P6
Ireland

Phone +353 1 294 0800
Email info@rod.ie