Delichon Ecology

Cutaway Bog Decommissioning and Rehabilitation Plan

Natura Impact Statement

Derrycolumb Bog, Co. Longford

Prepared For:

BORD NA MÓNA
Naturally Driven

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1 INTRODUCTION

Bord na Móna have in recent years permanently ceased industrial peat production on a significant area of bog. In line with Bord na Móna's accelerated decarbonization strategy, the company has also committed to ambitious enhanced peatland decommissioning and rehabilitation improvements.

This strategy has been developed to optimise benefits of peatland rehabilitation and restoration for climate action. In addition, it will also have benefits for biodiversity, water (catchment management) and other ecosystem services. These improvements are in line with the Government Climate Action agenda and will bring with it significant natural capital benefits. It will also create a stable natural landscape for the benefit of neighbours and local communities in former peat production areas.

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Mount Dillon bog group (Ref. PO504-01). As part of the condition 10.2 of the IPC license, decommissioning and rehabilitation of cutaway boglands is required.

It is proposed by Government that Bord na Móna carry out a Peatlands Enhanced Decommissioning, Rehabilitation and Restoration Scheme (PCAS) on peatlands previously used for energy production. Note this proposal is also known colloquially as the 'Peatlands Climate Action Scheme'. The additional costs of the proposed Scheme will be supported by Government through the Climate Action Fund. Bord na Móna have identified a footprint of 33,000 ha (a subset of the BnM estate that has been used for energy production) as peatlands suitable for enhanced rehabilitation. This proposed Scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations (Appendix VII) 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.

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

It is envisaged that the 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 drain-blocking, outfall blocking and use of overflow pipes;
- drain blocking on extant remnant bog;
- re-profiling that will deliver suitable conditions for development of wetlands, fens and bog habitats;
- targeted fertiliser applications,
- seeding of targeted vegetation; and
- proactive inoculation of suitable peatland areas with Sphagnum.

These are collectively designed to optimise hydrological conditions (ideally and where possible water-levels <10 cm) for climate action benefits and to accelerate the trajectory of the site towards a naturally functioning ecosystem, and eventually a reduced carbon source/carbon sink again. In some areas of dry cutaway this trajectory will be significantly longer, and it is not feasible in the short-term to re-wet some areas, which will

develop other habitats. Other areas will naturally have deeper water). 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.

This Screening for Appropriate Assessment Report / Natura Impact Statement Report has been prepared by Delichon Ecology on behalf of Bord na Mona and contains sufficient objective scientific information to facilitate Bord na Mona to determine whether the decommissioning and rehabilitation outlined in the plan referenced above requires Appropriate Assessment, or whether the potential for significant effects on any designated European Site can be excluded.

The preparation of this Appropriate Assessment Reporting has had regard to;

- EU Habitats Directive (92/43/EEC)**,**
- EU Birds Directive (Council Directive (2009/147/EC)
- European Communities (Birds and Natural Habitats) Regulations 2011,
- Assessment of Plans and Projects significantly affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC, European Commission 2001,
- Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities. Department of the Environment, Heritage and Local Government (2010).
- Managing Natura 2000 Sites: The Provisions of Article 6 of the 'Habitats Directive' 92/43/EEC, European Commission, 2018.
- *Derrycolumb Bog Cutaway Bog Decommissioning and Rehabilitation Plan 2021* (2021) as prepared by BnM – see Appendix B of this document.

For the avoidance of doubt, within this appraisal, no reliance is made on existing mitigation measures which form part of current or previous industrial peat production. The scope of this appraisal refers to the proposed decommissioning and rehabilitation only, as described in the Plan included as Appendix B.

1.1 Appropriate Assessment Process

Under Article 6(3) of the Habitats Directive, an Appropriate Assessment of the implications of any plan or project on a European Site is required before a project is approved/adopted. This must include all the aspects of the plan or project which can, either individually or in combination with other plans or projects, affect the conservation objectives of that European Site, in the light of the best scientific knowledge in the field. The competent national authorities are to authorise a plan, project or activity only if they have made certain that it will not adversely affect the integrity of any European Site.

This current document comprises a Screening for Appropriate Assessment to determine whether Appropriate Assessment is required, in addition to a Stage 2 Appropriate Assessment Report. The Screening must identify whether the project, alone or in combination with other plans and projects, is likely to have significant effects on any European Site in view of the qualifying interests and conservation objectives of these sites; or whether the potential for such significant effects can be excluded. This test is completed with cognisance of emerging case law.

In the current context, where significant effects are considered likely, in view of the qualifying interests or special conservation interests and the respective conservation objectives of any European site, the Screening identifies that Appropriate Assessment is required. Therefore, this NIS report provides mitigation to avoid

adverse effects on European site integrity. This report is conducted in line with the requirements of Article 6(3) of the EU Habitats Directive (92/43/EEC) and the National Parks and Wildlife Service (NPWS) Guidance for Planning Authorities (2010), and it is intended that the information contained within this document will form the basis for the Article 6(3) Appropriate Assessment process completed by the Competent Authority.

1.1.1 Stages of the Appropriate Assessment Process

Appropriate Assessment involves a number of steps and tests that are applied using a stage-by-stage approach. Each step or stage in the assessment process precedes and provides a basis for other steps. The four stages in an Appropriate Assessment (AA), are further described below.

Guidance on the Appropriate Assessment (AA) process was produced by the European Commission in 2002, which was subsequently developed into guidance specifically for Ireland by the Department of Environment, Heritage and Local Government (DEHLG) (2009). These guidance documents identify a staged approach to conducting an AA, as shown in **Image 1**.

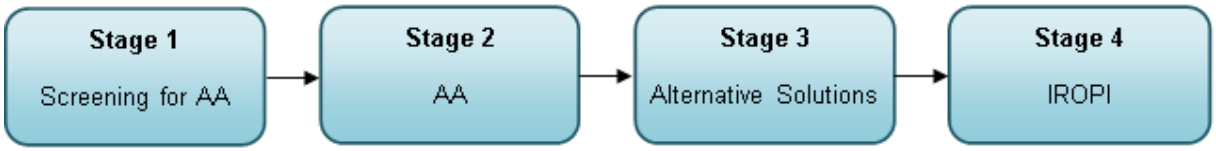


Image 1: The Appropriate Assessment Process (from: Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities, DEHLG, 2009).

Stage 1 - Screening for AA

This stage examines the likely effects of a project either alone or in combination with other projects upon a European site and considers whether it can be objectively concluded that these effects will not be significant.

Stage 2 – Appropriate Assessment

In this stage, the impact of the project on the integrity of the European site is considered with respect to the conservation objectives of the site and to its structure and function. Mitigation measures should be applied to the point where no adverse impacts on the site(s) remain.

Stage 3 - Alternative Solutions

Should the Appropriate Assessment determine that adverse impacts are likely upon a European site, this stage examines alternative ways of implementing the project that, where possible, avoid these adverse impacts. For the avoidance of doubt, no reliance is placed on Stage 3.

Stage 4 - IROPI

Assessment where no alternative solutions exist and where adverse impacts remain: Where imperative reasons of overriding public interest (IROPI) exist, an assessment to consider whether compensatory measures will or will not effectively offset the damage to the European site will be necessary. European case law highlights that consideration must be given to alternatives outside the project area in carrying out the IROPI test. It is a rigorous test which projects are generally considered unlikely to pass. In any event, the proponent does not purport to place any reliance on Stage 4.

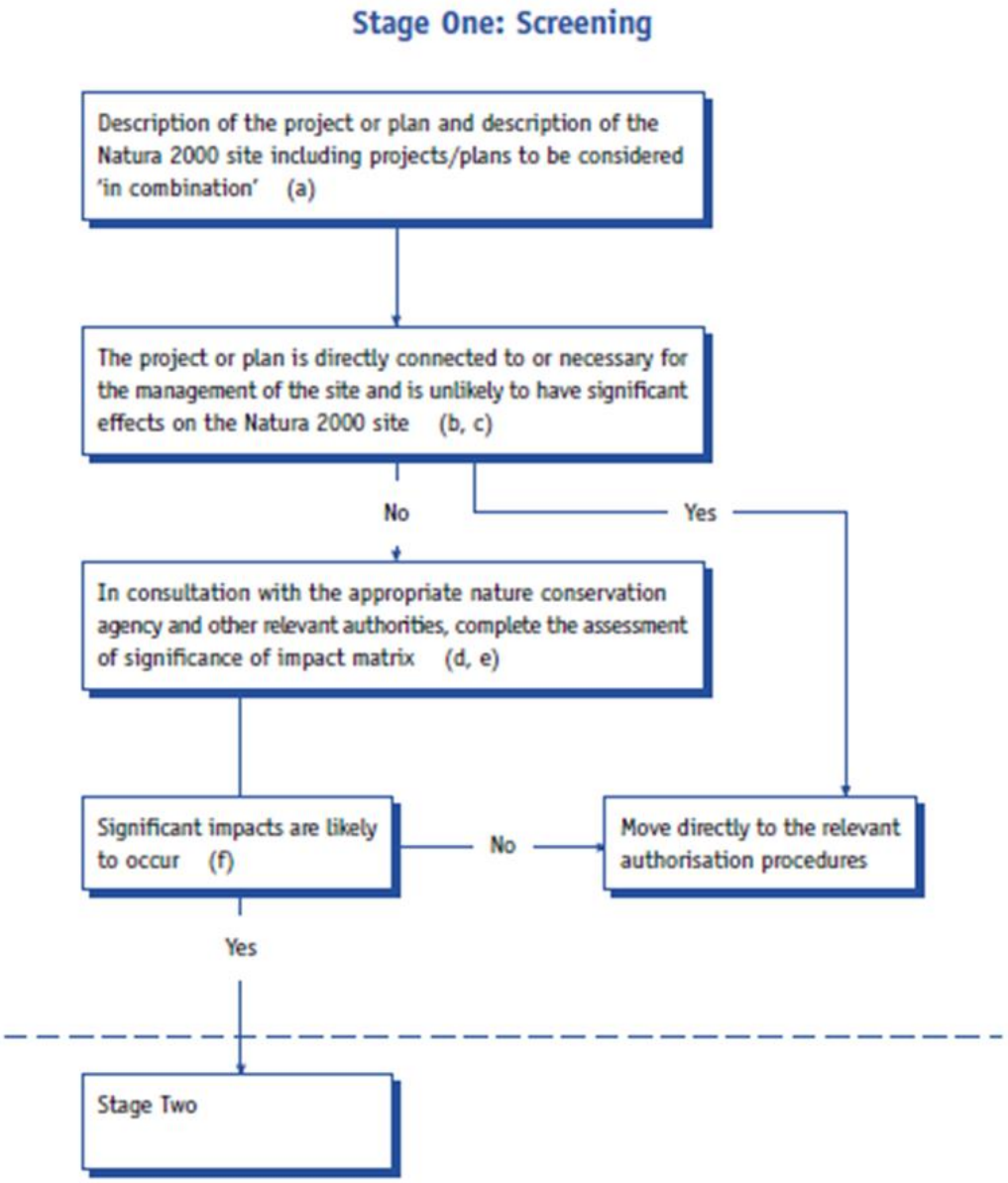
1.1.2 Statement of Authority

Eamonn Delaney BSc, MSc, MCIEEM, CECOL prepared this Natura Impact Statement. Eamonn has fourteen years consultancy experience and has prepared Screening for Appropriate Assessment and Natura Impact Statements for various projects, including residential, amenity, renewable energy and transport developments in addition to strategic policy and planning proposals. Eamonn conducted field visits to the Derrycolumb site in December 2020 and March 2021.

2 Stage 1: Screening

2.1 Screening Evaluation Process

The Screening process examines the likely effects of the described Derrycolumb Bog decommissioning and rehabilitation, as described in the appended 'plan' (Appendix B), either alone or in combination with other projects or plans, upon any European Site and considers whether it can be objectively concluded that these effects will not be significant. The Screening evaluation comprises four steps, as outlined in the diagram below:



2.1.1 Application of Protective Measures in the Screening Evaluation

The Screening evaluation to inform the AA process, presented in Section 2.10 below, has been carried out in the absence of any best practice measures, protective measures or mitigation measures considered to avoid harmful effects on European Sites.

2.2 Overview of Derrycolumb Bog Decommissioning and Rehabilitation

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Derrycolumb bog group (Ref. PO504-01). As part of Conditions 10.1 and 10.2 of this license, respectively, decommissioning and rehabilitation must be undertaken to ensure the permanent rehabilitation of the cutaway bog lands within the licensed area. Derrycolumb bog is part of the Mount Dillon bog group. Derrycolumb Bog is located in Co. Longford.

A document titled '*Derrycolumb Bog Cutaway Bog Decommissioning and Rehabilitation 2021'* has been prepared specifically to describe the proposed decommissioning and rehabilitation measures at Derrycolumb Bog and is appended to this document as Appendix B.

It is proposed by Government that Bord na Móna carry out a Peatlands Enhanced Decommissioning, Rehabilitation and Restoration Scheme (PCAS) on peatlands previously used for energy production. The additional costs of the proposed Scheme will be supported by Government through the Climate Action Fund. Bord na Móna have identified a footprint of 33,000 ha (a subset of the BnM estate that has been used for energy production) as peatlands suitable for enhanced rehabilitation – including Derrycolumb Bog. This proposed Scheme will significantly go beyond what is required to meet rehabilitation obligations under existing EPA IPC licence conditions.

Decommissioning seeks to address condition 10.1 of license Ref. PO504-01, which 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.

Decommissioning must take place at each bog prior to or concurrent with rehabilitation – the scale of decommissioning per bog varies dependant on the items/ infrastructure previously in place to facilitate prior peat extraction.

Enhanced decommissioning as part of the PCAS will enhance the future after use of the bog for amenity value, security against access for illegal and unsocial activities and general State and community benefit.

Rehabilitation seeks to address the requirements of Condition 10.2 of IPC License Ref. PO504-01 and is based on a reference document prepared by BNM per Bog for which the IPC license is applicable. See the following extract from IPC License Ref. PO504-01:

"*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."*

Derrycolumb Bog has been in active peat production since the mid 1980s. Industrial peat production ceased in 2019. The primary rehabilitation goal and outcome for Derrycolumb Bog is **environmental stabilisation** of the bog.

Enhanced Rehabilitation interventions supported by the above referenced 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.

2.3 Screening Evaluation: Is the Project Directly Connected to or Necessary for Management of a European Site?

For a project or plan to be 'directly connected with or necessary to the management of the site', the 'management' component must refer to management measures that are for conservation purposes, and the 'directly' element refers to measures that are solely conceived for the conservation management of a site and not direct or indirect consequences of other activities.

Finding: **No, the proposed Derrycolumb Bog Decommissioning and Rehabilitation is not directly connected to or necessary for the management of a European Site.**

2.4 Description of the proposed Decommissioning and Rehabilitation

2.4.1 Location, Size, Scale, Landcover

2.4.1.1 Location

Derrycolumb Bog (hereafter Derrycolumb) is located approximately 9.5km to the west of Ballymahon in County Longford. This bog comprises three main sections that are divided by minor public roads. Derraghan Bog (also a Bord na Móna bog) is located immediately adjacent to two sections of Derrycolumb and is connected via a rail link to Derrycolumb. To the south east, the next adjacent Bord na Móna Bog (Edera Bog) is also connected to Derrycolumb via a rail line. The overall majority of Derrycolumb has now ceased active industrial peat production. There are travel paths and drainage channels maintained around the bog formerly used for access and drainage of industrial peat production areas. The aforementioned rail line also runs through Derrycolumb.

Derrycolumb is one of a cluster of bogs that has developed along the floodplains of the River Shannon. It is one of a group with the Mount Dillon bog group that frequently is inundated with surface water during winter periods. In each of these bogs, a significant portion of the industrial peat production areas lie below the winter flood level of the Shannon. Derrycolumb has a pumped drainage regime to facilitate peat extraction.

Derrycolumb Bog is divided in three main sections – south-eastern, mid and north-western sections. These sections are separated by minor public roads.

See **Figure 1: Site Location of Derrycolumb Bog** (over)**.**

Figure 2: Aerial Imagery of Derrycolumb Bog (over).

Figure 3: **Extent of modelled degraded raised bog near the south-eastern boundary of Derrycolumb Bog.**

Figure 4: Current habitats at Derrycolumb Bog (over).

2.4.1.2 Size, Scale, Landcover

Size and Scale: Derrycolumb Bog comprises 455.8Ha in total.

Derrycolumb Bog (production area) is mainly composed of bare peat as the entire bog was in active peat production until 2019 (See Appendix B). There are some remnant, localised sections of raised bog still present, but these are generally small.

The Bilberry River flows along the north-eastern boundary of part of Derrycolumb. One area of remnant marginal raised bog present includes a small number of 'active' raised bog habitat. The site is located in proximity to but does not overlap Lough Ree SPA / SAC. Part of Derrycolumb Bog adjoins Derry Lough proposed Natural Heritage Area. The underlying geology at Derrycolumb Bog comprises Visean Limestones (undifferentiated)[1]. Subsoils at Derrycolumb comprise Silty clays, silty clay loams overlain by deposits of organic mud or marl deposits. The peat is underlain by glacial deposits interbedded with glacio-fluvial deposits made up of mixed gravels and till.

Industrial peat production at Derrycolumb Bog ceased in 2019. The peat harvested from this site was used for fuel peat for Lough Ree Power Station in Lanesborough.

In terms of size and scale, **decommissioning** at Derrycolumb includes the following:

- Clean-up of remaining or unconsolidated waste or materials located in Bogs, Yards, Buildings and Offices,
- Decommissioning Peat Stockpiles,

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

- Decommissioning Fuel Tanks and associated facilities,
- Decommissioning and Removal of Bog Pump Sites,
- Decommissioning or Removal of Septic Tanks, and
- Cleaning Silt Ponds.

Silt ponds will be retained and maintained during the rehabilitation phase. During the monitoring and verification phase silt ponds will be continually inspected and maintained, where appropriate. When it is deemed that silt ponds are not required, as the bog has been successfully stabilised and there is no silt run-off, the condition of the silt ponds will be reviewed. Silt ponds will either be de-watered (water levels lowered to a level where the silt pond will naturally develop as a small wetland feature), left in situ, or infilled (where discharges do not require silt control). It is proposed to decommission silt ponds in 2024, as necessary.

It should be noted, that the silt pond network at Derrycolumb Bog will not be the sole surface water attenuation during the project construction and operational phases. The design of the PCAS scheme requires the creation of internal drain blocking measures, which will in itself reduce the possibility of surface run-off to the receiving environment during the rehabilitation works.

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

The total area of Derrycolumb Bog is 455.8Ha of which 360.6Ha or 79.11% of the present Landcover (2021) will be subject to enhanced **rehabilitation** measures/activities (deep peat, dry cutaway and wetland).

Landcover

Existing:

The proposed rehabilitation site is dominated by cutover bare peat (PB4). Cutover areas support little plant species cover. The cutover bog areas support a network of field drains support that wetland plants such as Common Reed (*Phragmites australis*). Marginal habitats include Birch woodland (WN7)[2], remnant sections of raised bog (PB1), scrub (WS1) and cutaway bog (PB4). The remnant sections are generally small and are dry with a dominance of Ling Heather (*Calluna vulgaris*).

The streams that flow through the site have been canalised and support a small number of aquatic plant species. Riparian vegetation was mainly composed of Willow (*Salix* sp.), Common Reed and Reed Canary Grass (*Phalaris arundinacea*). A number of silt ponds, some of which were recently constructed, are located adjacent to and are incorporated into the streams. A map showing existing habitats at Derrycolumb Bog is presented in Figure 3.

Extent of Landcover requiring Decommissioning: Decommissioning will be applicable across all of Derrycolumb Bog.

Extent of Landcover requiring Rehabilitation: The total area of Derrycolumb Bog is 455.8Ha of which 360.6Ha or 79.11% of the present Landcover (2021) will be subject to **rehabilitation** measures/activities.

Future Landcover: Following decommissioning and rehab, future landcover of habitats currently evaluated as not requiring Rehab (i.e. Access Tracks and rights of way, marginal lands such as agricultural land, and marginal areas (e.g. high bog) around the edges of Derrycolumb Bog) will remain in line with existing baseline trends for these habitats, albeit without any waste or materials which would have been left in situ in the absence of decommissioning.

For habitats where rehabilitation is undertaken, landcover is expected to eventually comprise Embryonic Raised Bog, Scrub, Bog Woodland (or various mosaics of Birch Woodland, such as with Willow, or Pine); Regenerating Degraded Raised bog communities; Wetland habitats and communities of varying depths and extent; Wetlands Mosaic, Reed and large sedge swamp. The development of these habitats will reflect the

[2] Alphanumeric codes follow the classification presented in '*A Guide to Habitats in Ireland*' Fossitt (2000)

varying underlying environmental conditions and in part will develop as a mosaic of habitats. Rehabilitation will also modify the local environmental conditions (e.g. hydrology and topography).

The proposed rehabilitation will mean that environmental stabilisation is achieved (meaning IPC obligations are met) and, in addition, significant other positive quality effects particularly for climate action will be accrued.

In general, the key rehabilitation objective is to optimise the area of suitable hydrological conditions for climate action benefits This is defined as:

- Carrying out enhanced rehabilitation with the application of enhanced rehabilitation measures in selected areas to re-wet peat and slow water movement across the site. The north-westernmost sections of the Derrycolumb bog has, in parts, already developed a mosaic of pioneer cutaway habitats. 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 wetland and cutaway peatland habitats.
- Optimising hydrological conditions for the development of wetlands, fen, Reed Swamp and wet woodland on shallow cutaway peat, and eventually naturally functioning wetland/peatland habitats.
- Optimising hydrological conditions for the development of embryonic *Sphagnum*-rich vegetation communities in suitable deep residual peat areas.
- Stabilisation or improvement in water quality parameters (e.g. suspended solids).
- Environmental stabilisation.
- Rehabilitation will support the National Policies on Climate Action and GHG mitigation by maintaining and enhancing the current peat storage capacity of the bog (locking the carbon into the ground). It is expected that the bog will have reduced emissions (reduced source) and in time develop its carbon sink function, in part, as some peat-forming habitats develop on site. It will also support Ireland's commitments towards Water Framework Directive and the National River Basin Management Plan 2018-2021.

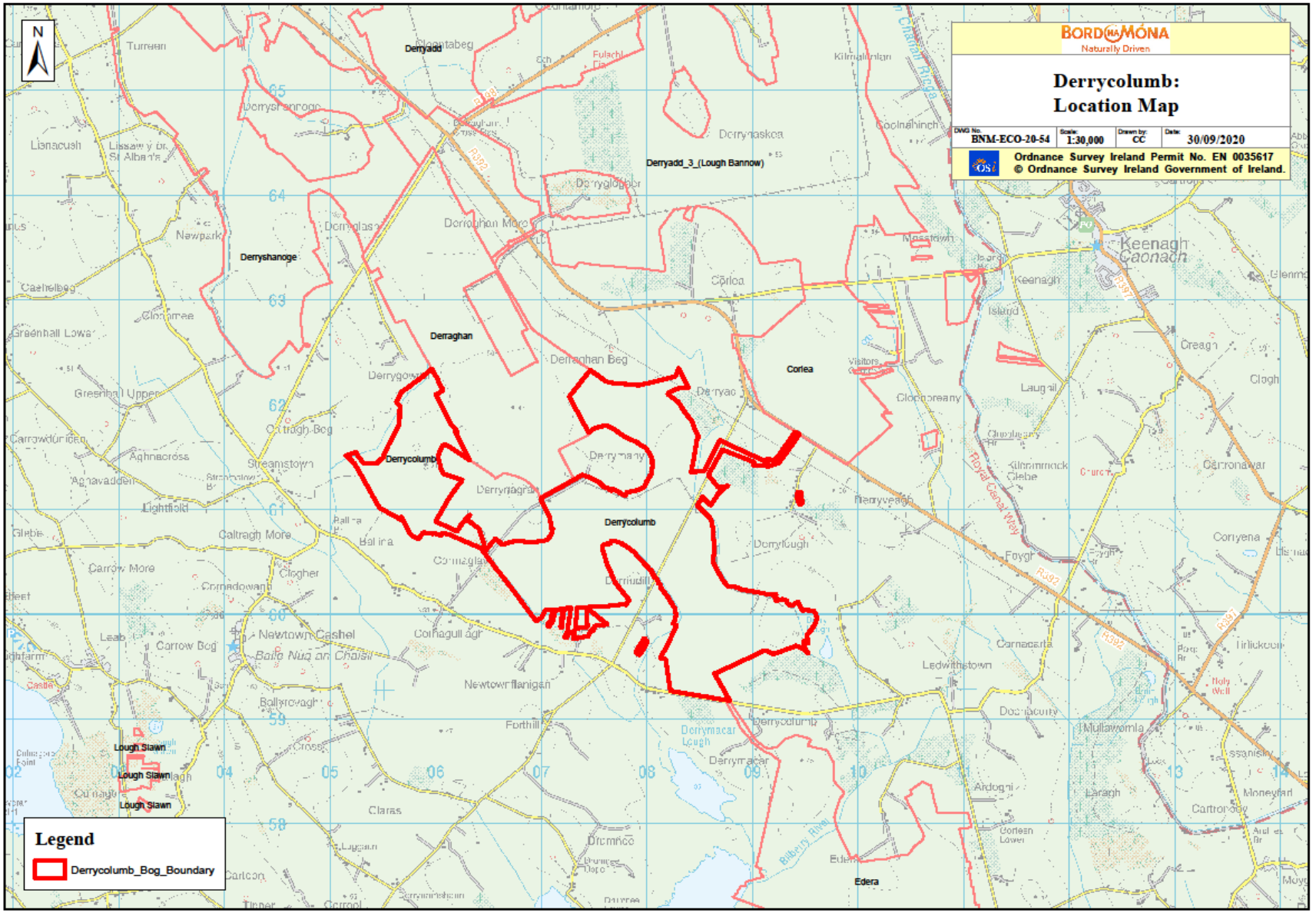


Figure 1: Site Location of Derrycolumb Bog

Figure 2: Aerial photo of Derrycolumb Bog

2.5 Description of the Receiving Environment

The majority of Derrycolumb Bog within the Bord na Móna boundary is bare peat as this site was in production until 2019 (see Image 1). The site is drained by three tributaries of the Ledwithstown_010 watercourse and one tributary of the Drumnee_010 watercourse, all of which provide connectivity to Lough Ree located south of Derrycolumb Bog.

2.5.1 Desk Based Assessments

2.5.1.1 National Biodiversity Data Centre

A search was undertaken on the National Biodiversity Data Centre[3] for Protected and Invasive Species presence in the vicinity of the proposed development. Derrycolumb Bog is located within hectads N05 and N06[4]. The protected and invasive species records available for these hectads are shown in **Table 1**.

Table 1: NBDC records of protected and invasive species in N05 and N06 10km grid squares

Common Name	Species Name	Date of Record	Designation	Hectad	Feature of Qualifying Interest for European Sites within the project ZoI
Common Frog	*Rana temporaria*	26/05/2020 02/07/2020	EU Habitats Directive Annex V; Protected Species: Wildlife Acts	N05 & N06	No
Smooth Newt	*Lissotriton vulgaris*	22/04/2019	Protected Species: Wildlife Acts	N05	No
Barn Owl	*Tyto alba*	15/07/2017 31/12/2011	Irish Wildlife Acts Birds of Conservation Concern in Ireland - Red List	N05 & N06	No
Barn Swallow	*Hirundo rustica*	31/12/2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds	N06	No

[3] Available at https://www.biodiversityireland.ie/. Accessed in June 2020

[4] 10x10km Irish Grid Square

Common Name	Species Name	Date of Record	Designation	Hectad	Feature of Qualifying Interest for European Sites within the project ZoI
			of Conservation Concern in Ireland - Amber List		
Barnacle Goose	*Branta leucopsis*	31/12/2001	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	N06	No
Bewick's Swan	*Cygnus columbianus subsp. bewickii*	31/12/2001	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List	N05 & N06	No
Black-headed Gull	*Larus ridibundus*	08/05/2016 & 31/12/2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation	N05 & N06	No

Common Name	Species Name	Date of Record	Designation	Hectad	Feature of Qualifying Interest for European Sites within the project ZoI
			Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List		
Black-tailed Godwit	*Limosa limosa*	29/02/1984 & 31/12/2001	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	N05 & N06	No
Canada Goose	*Branta canadensis*	31/12/2001	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland) || Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species	N05	No
Common Coot	*Fulica atra*	22/04/2016	Protected Species: Wildlife	N05 & N06	Yes

Common Name	Species Name	Date of Record	Designation	Hectad	Feature of Qualifying Interest for European Sites within the project ZoI
		31/12/2011	Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List		
Common Goldeneye	*Bucephala clangula*	31/12/2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	N05 & N06	Yes

Common Name	Species Name	Date of Record	Designation	Hectad	Feature of Qualifying Interest for European Sites within the project ZoI
Common Grasshopper Warbler	*Locustella naevi*	22/04/2016 & 31/12/2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	N05 & N06	No
Common Kestrel	*Falco tinnunculus*	18/06/2017 31/12/2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	N05 & N06	No
Common Kingfisher	*Alcedo atthis*	18/06/2017		N05	No
Common Linnet	*Carduelis cannabina*	31/12/2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	N06	No

Common Name	Species Name	Date of Record	Designation	Hectad	Feature of Qualifying Interest for European Sites within the project ZoI
Common Pheasant	*Phasianus colchicus*	12/05/2016 & 31/12/2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species	N05 & N06	No
Common Pochard	*Aythya ferina*	31/12/2011 & 31/12/2001	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	N05& N06	No
Common Redshank	*Tringa totanus*	31/12/2011	Protected Species: Wildlife Acts || Threatened	N05 & N06	No

Common Name	Species Name	Date of Record	Designation	Hectad	Feature of Qualifying Interest for European Sites within the project ZoI
			Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List		
Common Sandpiper	*Actitis hypoleucos*	31/12/2011 & 31/07/1972	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	N05 & N06	No
Common Scoter	*Melanitta nigra*	31/12/2011		N05	Yes
Common Snipe	*Gallinago gallinago*	18/06/2017 & 31/12/2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern ||	N05 & N06	No

Common Name	Species Name	Date of Record	Designation	Hectad	Feature of Qualifying Interest for European Sites within the project ZoI
			Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List		
Common Starling	*Sturnus vulgaris*	31/12/2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	N05 & N06	No
Common Swift	*Apus apus*	31/12/2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	N5 & N06	No
Common Tern	*Sterna hirundo*	15/07/2017 & 31/07/1991	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species ||	N05 & N06	Yes

Common Name	Species Name	Date of Record	Designation	Hectad	Feature of Qualifying Interest for European Sites within the project ZoI
			Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List		
Common Wood Pigeon	*Columba palumbus*	15/07/2017 & 31/12/2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species	N05 & N06	No
Corncrake	*Crex crex*	31/07/1972 & 31/07/1991	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation	N05 & N06	No

Common Name	Species Name	Date of Record	Designation	Hectad	Feature of Qualifying Interest for European Sites within the project ZoI
			Concern - Red List		
Dunlin	*Calidris alpina*	31/12/2001	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	N05 & N06	No
Eurasian Curlew	*Numenius arquata*	31/12/2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List	N05 & N06	No

Common Name	Species Name	Date of Record	Designation	Hectad	Feature of Qualifying Interest for European Sites within the project ZoI
Eurasian Marsh Harrier	*Circus aeruginosus*	12/05/2016	Protected Species: Wildlife Acts	N05	No
Eurasian Oystercatcher	*Haematopus ostralegus*	31/12/2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	N05	No
Eurasian Teal	*Anas crecca*	31/12/2011& 22/08/2016	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	N05 & N06	Yes

Common Name	Species Name	Date of Record	Designation	Hectad	Feature of Qualifying Interest for European Sites within the project ZoI
Eurasian Wigeon	*Anas penelope*	31/12/2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	N05 & N06	Yes
Eurasian Woodcock	*Scolopax rusticola*	31/07/1972 & 29/02/1984	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened	N05 & N06	No

Common Name	Species Name	Date of Record	Designation	Hectad	Feature of Qualifying Interest for European Sites within the project ZoI
			Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List		
European Golden Plover	*Pluvialis apricaria*	31/12/2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List	N05 & N06	Yes
Gadwall	*(Anas strepera)*	31/12/2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I	N06	No

Common Name	Species Name	Date of Record	Designation	Hectad	Feature of Qualifying Interest for European Sites within the project ZoI
			Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List		
Great Black-backed Gull	*Larus marinus*	15/07/2017	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	N05	No
Great Cormorant	*Phalacrocorax carbo*	08/05/2016 & 27/08/2016	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	N06	No
Great Crested Grebe	*Podiceps cristatus*	22/04/2016 & 31/12/2011	Protected Species: Wildlife Acts || Threatened Species: Birds of	N05 & N06	No

Common Name	Species Name	Date of Record	Designation	Hectad	Feature of Qualifying Interest for European Sites within the project ZoI
			Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List		
Greater White-fronted Goose	*Anser albifrons*	31/12/2001	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	N05	No
Grey Partridge	*Perdix perdix*	31/07/1972	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected	N05	No

Common Name	Species Name	Date of Record	Designation	Hectad	Feature of Qualifying Interest for European Sites within the project ZoI
			Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List		
Greylag Goose	*Anser anser*	31/12/2001	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland) || Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened	N05	No

Common Name	Species Name	Date of Record	Designation	Hectad	Feature of Qualifying Interest for European Sites within the project ZoI
			Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List		
Hen Harrier	*Circus cyaneus*	22/04/2016 & 15/12/2017	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	N05 & N06	No
Herring Gull	*Larus argentatus*	31/12/2001	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List	N05 & N06	No
House Martin	*Delichon urbicum*	15/07/2017 & 31/12/2011	Protected Species: Wildlife Acts || Threatened	N05 & N06	No

Common Name	Species Name	Date of Record	Designation	Hectad	Feature of Qualifying Interest for European Sites within the project ZoI
			Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List		
House Sparrow	*Passer domesticus*	31/12/2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	N05 & N06	No
Lesser Black-backed Gull	*Larus fuscus*	31/12/2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	N05 & N06	No
Little Egret	*Egretta garzetta*	15/07/2017 & 31/12/2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds	N05 & N06	No

Common Name	Species Name	Date of Record	Designation	Hectad	Feature of Qualifying Interest for European Sites within the project ZoI
			Directive >> Annex I Bird Species		
Little Grebe	*Tachybaptus ruficollis*	22/04/2016 & 31/12/2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	N05 & N06	No
Mallard	*Anas platyrhynchos*	12/05/2016 & 31/12/2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species	N05 & N06	Yes
Merlin	*Falco columbarius*	08/05/2016	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation	N05	No

Common Name	Species Name	Date of Record	Designation	Hectad	Feature of Qualifying Interest for European Sites within the project ZoI
			Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List		
Mew Gull	*Larus canus*	31/12/2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	N05 & N06	No
Mute Swan	*Cygnus olor*	31/12/2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	N06	No
Northern Lapwing	*Vanellus vanellus*	08/05/2016 & 31/12/2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section	N05 & N06	Yes

Common Name	Species Name	Date of Record	Designation	Hectad	Feature of Qualifying Interest for European Sites within the project ZoI
			II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List		
Northern Pintail	*Anas acuta*	31/12/2001	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List	N05 & N06	No
Northern Shoveler	*Anas clypeata*	31/12/2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >>	N06	Yes

Common Name	Species Name	Date of Record	Designation	Hectad	Feature of Qualifying Interest for European Sites within the project ZoI
			Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List		
Northern Wheatear	*Oenanthe oenanthe*	31/07/1991	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	N05	No
Pink-footed Goose	*Anser brachyrhynchus*	31/12/2001	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species	N05	No
Red Grouse	*Lagopus lagopus*	31/07/1972	Protected Species: Wildlife Acts || Protected	N05 & N06	No

Common Name	Species Name	Date of Record	Designation	Hectad	Feature of Qualifying Interest for European Sites within the project ZoI
			Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List		
Red-breasted Merganser	*Mergus serrator*	31/12/2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species	N05	No
Ringed Plover	*Charadrius hiaticula*	31/12/2001	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation	N05 & N06	No

Common Name	Species Name	Date of Record	Designation	Hectad	Feature of Qualifying Interest for European Sites within the project ZoI
			Concern - Amber List		
Sand Martin	*Riparia riparia*	31/12/2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	N05 & N06	No
Skylark	*Alauda arvensis*	12/05/2016 & 27/06/2016	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	N05& N06	No
Spotted Flycatcher	*Muscicapa striata*	31/12/2011 & 31/07/1991	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	N05 & N06	No

Common Name	Species Name	Date of Record	Designation	Hectad	Feature of Qualifying Interest for European Sites within the project ZoI
Stock Pigeon	*Columba oenas*	31/07/1991	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	N06	No
Tufted Duck	*Aythya fuligula*	22/04/2016 & 31/12/2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	N05 & N06	Yes
Water Rail	*Rallus aquaticus*	31/07/1972	Protected Species: Wildlife Acts || Threatened Species: Birds of	N05	No

Common Name	Species Name	Date of Record	Designation	Hectad	Feature of Qualifying Interest for European Sites within the project ZoI
			Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List		
Whinchat	*Saxicola rubetra*	31/12/2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List	N05	No
Whooper Swan	*Cygnus cygnus*	31/12/2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of	N05 & N06	Yes

Common Name	Species Name	Date of Record	Designation	Hectad	Feature of Qualifying Interest for European Sites within the project ZoI
			Conservation Concern >> Birds of Conservation Concern - Amber List		
Yellowhammer	*Emberiza citrinella*	31/07/1991 & 31/12/2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List	N05 & N06	No
Blue Fleabane	*Erigeron acer*	13/09/2018	Threatened Species: Endangered	N06	No
Canadian Waterweed	*Elodea canadensis*	21/06/2018 & 31/12/1999	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)	N05 & N06	No
Cherry Laurel	*Prunus laurocerasus*	22/06/2012	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species	N05	No
Japanese Knotweed	*Fallopia japonica*	06/05/2017	Invasive Species: Invasive Species || Invasive	N06	No

Common Name	Species Name	Date of Record	Designation	Hectad	Feature of Qualifying Interest for European Sites within the project ZoI
			Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)		
Rhododendron	*Rhododendron ponticum*	09/02/2018 & 15/03/2011	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)	N05 & N06	No
Sycamore	*Acer pseudoplatanus*	13/04/2005 & 18/07/2005	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species	N05 & N06	No
Berosus (Berosus) *signaticollis*	*Berosus (Berosus) signaticollis*	10/07/2002	Threatened Species: Endangered	N06	No
Haliplus (Liaphlus) variegatus	*Haliplus (Liaphlus) variegatus*	14/06/1989	Threatened Species: Vulnerable	N06	No
Limnebius nitidus	*Limnebius nitidus*	13/06/1951	Threatened Species: Endangered	N06	No
Large Heath	*Coenonympha tullia*	19/06/2012	Threatened Species: Vulnerable	N06	No
Barbut's Cuckoo Bee	*Bombus (Psithyrus) barbutellus*	18/09/1972	Threatened Species: Endangered	N06	No

Common Name	Species Name	Date of Record	Designation	Hectad	Feature of Qualifying Interest for European Sites within the project ZoI
Common Garden Snail	*Cornu aspersum*	01/06/2013	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species	N06	No
Corbicula fluminea	*Corbicula fluminea*	09/09/2014	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)	N06	No
English Chrysalis Snail	*Leiostyla (Leiostyla) anglica*	13/04/1968	Threatened Species: Vulnerable	N06	No
Glutinous Snail	*Myxas glutinosa*	13/04/1968	Threatened Species: Endangered	N06	No
Marsh Fritillary	*Euphydryas aurinia*	01/07/2019	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Threatened Species: Vulnerable	N05	No
Point Snail	*Acicula fusca*	13/04/1968	Threatened Species: Vulnerable	N06	No

Common Name	Species Name	Date of Record	Designation	Hectad	Feature of Qualifying Interest for European Sites within the project ZoI
Tree Snail	*Balea (Balea) perversa*	13/04/1968	Threatened Species: Vulnerable	N06	No
Whirlpool Ramshorn	*Anisus (Disculifer) vortex*	13/04/1968	Threatened Species: Vulnerable	N06	No
Clustered Earth-moss	*Ephemerum cohaerens*	04/09/2007	Protected Species: Flora Protection Order || Protected Species: Flora Protection Order >> Flora Protection Order 2015 Schedule B (Mosses) || Threatened Species: Vulnerable	N06	No
Fontinalis antipyretica var. cymbifolia	*Fontinalis antipyretica var. cymbifolia*	03/09/2007	Threatened Species: Data deficient	N05 & N06	No
Large Hook-moss	*Drepanocladus lycopodioides*	31/12/1979 & 04/09/2007	Threatened Species: Vulnerable	N05 & N06	No
Polytrichum commune var. perigoniale	*Polytrichum commune var. perigoniale*	26/08/2016	Threatened Species: Data deficient	N06	No
Roach	*Rutilus rutilus*	31/12/1996	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)	N05	No

Common Name	Species Name	Date of Record	Designation	Hectad	Feature of Qualifying Interest for European Sites within the project ZoI
Common Lizard	*Zootoca vivipara*	26/05/2020 & 27/06/2019	Protected Species: Wildlife Acts	N05 & N06	No
American Mink	*Mustela vison*	12/10/2012 & 24/06/2017	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)	N05 & N06	No
Brown Long-eared Bat	*Plecotus auriitus*	08/08/2012	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts	N06	No
Eastern Grey Squirrel	*Sciurus carolinensis*	31/12/2012	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> EU Regulation No. 1143/2014 || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)	N05 & N06	No

Common Name	Species Name	Date of Record	Designation	Hectad	Feature of Qualifying Interest for European Sites within the project ZoI
Eurasian Badger	*Meles meles*	31/12/2012 & 09/12/2018	Protected Species: Wildlife Acts	N05 & N06	No
Eurasian Red Squirrel	*Sciurus vulgaris*	02/09/2015 & 31/07/2015	Protected Species: Wildlife Acts	N05 & N06	No
European Otter	*Lutra lutra*	28/10/2015 & 12/08/2012	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts	N05 & N06	Yes
European Rabbit	*Oryctolagus cuniculus*	29/09/1992 17/06/2010	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species	N05 & N06	No
Lesser Noctule	*Nyctalus leisleri*	26/10/2009 & 08/08/2012	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts	N05 & N06	No

Common Name	Species Name	Date of Record	Designation	Hectad	Feature of Qualifying Interest for European Sites within the project ZoI
Natterer's Bat	*Myotis nattereri*	12/09/2012	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts	N06	No
Pine Marten	*Martes martes*	26/08/2018 & 31/12/2012	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts	N05 & N06	No
Pipistrelle	*Pipistrellus pipistrellus sensu lato*	26/10/2009 & 12/09/2012	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts	N05 & N06	No
Soprano Pipistrelle	*Pipistrellus pygmaeus*	26/10/2009 & 08/08/2012	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >>	N05 & N06	No

Common Name	Species Name	Date of Record	Designation	Hectad	Feature of Qualifying Interest for European Sites within the project ZoI
			Annex IV || Protected Species: Wildlife Acts		
West European Hedgehog	*Erinaceus europaeus*	01/10/2018 & 31/12/1979	Protected Species: Wildlife Acts	N05 & N06	No

2.5.1.2 National Parks and Wildlife Service Data Request

Table 2 presents protected species records held for hectad N05 and N06 by the National Parks and Wildlife Service.

Table 2: NPWS records of protected and invasive species in N05 and N06 10km grid squares

Common Name	Species	Record Date	Location(s)
Common Sandpiper	*Actitis hypoleucos*	2004	Red Island, Lough Ree Pollagh, Lough Ree
Constricted Feather-moss	*Amblystegium humile*	2004	
Willow Feather-moss	*Amblystegium varium*	2004	Lanesborough
Shoveler	*Anas clypeata*	2004	Saints Island, Lough Ree, Co. Longford
Teal	*Anas crecca*	2005	Saints Island, Lough Ree, Co. Longford
Wigeon	*Anas penelope*	2007	Saints Island, Lough Ree, Co. Longford
Mallard	*Anas platyrhynchos*	2007	Red Island, Lough Ree, Co. Longford
Swift	*Apus apus*	2007	Red Island, Lough Ree, Co. Longford
Grey Heron	*Ardea cinerea*	2007	Lough Ree
Pochard	*Aythya ferina*	2007	Saints Island, Lough Ree, Co. Longford
Tufted Duck	*Aythya fuligula*	2007	Lanesborough Lough Ree
Narrow-leaved Helleborine	*Cephalanthera longifolia*	1899 & 1972	Cleraun, Lough Ree Portanure, Lough Ree, Co. Longford
Spiny Threadwort	*Cephaloziella spinigera*	1899	S. of Doonis Lough
Black-headed Gull	*Chroicocephalus ridibundus*	1986 & 1991	Lough Ree
Cladonia ciliata	*Cladonia ciliata*	1991	
Reindeer Moss	*Cladonia portentosa*	1992	
Whooper Swan	*Cygnus cygnus*	2003	Saints Island, Lough Ree, Co. Longford

Common Name	Species	Record Date	Location(s)
Blue Fleabane	*Erigeron acer*	1899, 2010 & 2011	Lanesborough, old quarry Elfeet Bay
Hedgehog	*Erinaceus europaeus*	1991 & 1993	East Goats Island, Lough Ree, Co. Longford SE Lanesborough, Co. Longford
Showy Feather-moss	*Eurhynchium speciosum*	1993 & 2016	Lanesborough
Fontinalis antipyretica var. cymbifolia	*Fontinalis antipyretica var. cymbifolia*	2005 & 2006	E. edge of L. Ree at Cow Island (W. of Loughfarm)
Coot	*Fulica atra*	2006 & 2007	Lough Ree
Moorhen	*Gallinula chloropus*	2007	Lough Ree
Barn Swallow	*Hirundo rustica*	2007	Red Island, Lough Ree, Co. Longford
Fir Clubmoss	*Huperzia selago*	2007	
Common Gull	*Larus canus*	2007	Pollagh, Lough Ree, Co. Longford
Lesser Black-backed Gull	*Larus fuscus*	2007	Lough Ree
Wood White	*Leptidea sinapis*	2007	Red Island, Lough Ree, Co. Longford
Irish Hare	*Lepus timidus subsp. hibernicus*	1887, 1900, 1991, 1992, 2007	Cashel, Caranagh Saints Island, Lough Ree
Otter	*Lutra lutra*	1991, 1992, 1999 and 2010	Cashel, Carabagh
Pine Marten	*Martes martes*	1900, 2005, 2011, 2012	
Common Scoter	*Melanitta nigra*	1885, 1899 and 1960	
Badger	*Meles meles*	2002, 2005, 2010	Cashel
Green winged orchid	*Orchis morio*	2002	
Rough Poppy	*Papaver hybridum*	1972, 1979, 2007	Lough Ree, Efleet Bay
Golden Plover	*Pluvialis apricaria*	2007	Saints Island, Lough Ree

Common Name	Species	Record Date	Location(s)
Great Crested Grebe	*Podiceps cristatus*	2007	Lough Ree
Common Frog	*Rana temporaria*	1992, 2002, 2006, 2008 and 2011	Various locations
Sand Martin	*Riparia riparia*	1899	Pollagh Lough Ree
Shepherd's Needle	*Scandix pecten-veneris*	1900	
Betony	*Stachys officinalis*	1986, 1988, 1991, 1992, 1998, 2004, 2006	Lough Ree, Saint's Island, West of Bethlehem House
Little Grebe	*Tachybaptus ruficollis*	2006	Red Island, Lough Ree
Shelduck	*Tadorna tadorna*	2010	Pollagh, Lough Ree
Redshank	*Tringa totanus*	1887	Pollagh, Lough Ree
Smooth Newt	*Triturus vulgaris*	1900	
Lapwing	*Vanellus vanellus*	1898, 1994	Pollagh, Lough Ree

2.5.1.3 Baseline Water Quality Data for Derrycolumb Bog

Table 3 below provides baseline water quality data captured by Bord na Mona following sampling and monitoring efforts between August 2020 and April 2021. The results of these sampling events displays that suspended solids levels are in compliance with IPC licence targets. Suspended solid parameters are not provided in Site Specific Conservation Objectives (SSCO) supporting document for the water dependent or nutrient sensitive habitats and species of Lough Ree SAC. Results for ammonia indicate that two of the sampling points (SW88A and SW90) are in compliance with IPC licence parameters and Lough Ree SAC SSCO target parameters (with the exception of the sampling period 01.04.2021 at emission point SW90). Emission point SW91 were in compliance with IPC licence parameters but exceeded the Lough Ree SSCI target parameters for ammonia. Total phosphorus and pH levels were in compliance with Lough Ree SSCI target parameters.

Table 3: Baseline water quality information for Derrycolumb Bog

Emission Point	IPC Licence SS ELV	Lough Ree SAC Target SSCO parameter	01/08/2020	01/09/2020	01/10/2020	01/11/2020	01/12/2020	01/01/2021	01/02/2021	01/03/2021	01/04/2021
Suspended Solids (mg/l)											
SW88A	35	n/a	1	2	2	2	-	4	-	-	7
SW90	35	n/a	5	2	5	2	-	4	-	-	2
SW91	35	n/a	4	3	4	2	-	2	-	-	2
Ammonia (mg/l)											
SW88A	1.420	0.065(mg/l)	0.049	0.045	0.049	0.199	-	0.124	-	-	0.335
SW90	1.420	0.065(mg/l)	0.239	0.2	0.239	0.148	-	0.121	-	-	1.06
SW91	1.420	0.065(mg/l)	1.39	0.4	1.39	1.27	-	1.05	-	-	0.096
Total Phosphorus (mg/l)											
SW88A	NA	0.020 (ug/l)	0.05	0.05	0.05	0.05	-	0.05	-	-	0.05
SW90	NA	0.020 (ug/l)	0.05	0.11	0.05	0.05	-	0.05	-	-	0.05
SW91	NA	0.020 (ug/l)	0.05	0.09	0.05	0.05	-	0.05	-	-	0.05
pH (pH units)											
SW88A	NA	Maximum pH 9	7.7	7.7	7.7	7.7	-		-	-	7.8

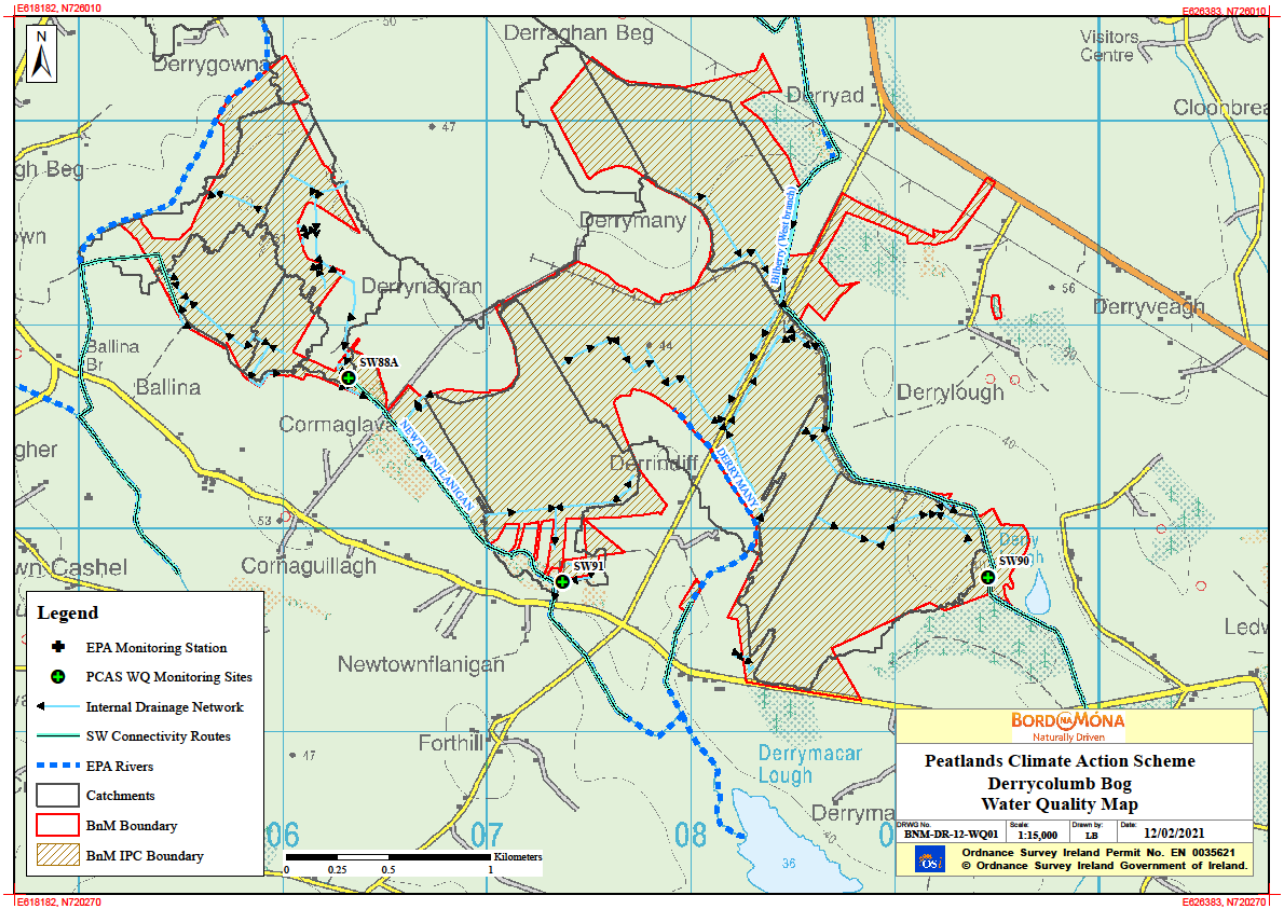
Emission Point	IPC Licence SS ELV	Lough Ree SAC Target SSCO parameter	01/08/2020	01/09/2020	01/10/2020	01/11/2020	01/12/2020	01/01/2021	01/02/2021	01/03/2021	01/04/2021
SW90	NA	Maximum pH 9	7.5	7.8	7.5	7.6	-	7.6	-	-	7.4
SW91	NA	Maximum pH 9	7.3	7.6	7.3	7.1	-	7	-	-	7.9

Derrycolumb Bog Water Quality Management

In accordance with the existing Integrated Pollution Control licence for Derrycolumb Bog, drainage water is discharged via an appropriately designed silt pond treatment arrangement as required in Condition 6.6. of the licence.

Derrycolumb bog has silt ponds that discharge surface water to the Ledwithstown IE_SH_26L840850 and Drumnee IE_SH_26D080850 rivers and eventually the Shannon Upper IE_SH_25SO21660. Peat extraction is identified as pressure in the second cycle of the river basin management plan it is not indicated as remaining so in the third cycle, currently under preparation.

Details of silt ponds, associated surface water emission points and those being monitored and sampled as part of the PCAS scheme are detailed in the below water quality map[5]. 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 1.42mg/l and COD 100mg/l.

[5] Figure 3.7 of the accompanying Derrycolumb Bog Cutaway Bog Decommissioning and Rehabilitation Plan 2021

From an analysis of any monitoring over the past 5 yrs. of the IPC licence environmental monitoring programme, indicate that results were under the ELV for SS and the majority of the trigger levels for ammonia and COD. See below table[6] extracted from the accompanying rehabilitation plan.

Bog	SW	Monitoring	Sampled	pH	SS	TS	Ammonia	TP	COD	Colour
Derrycolumb	SW-88	Q4 19	07/11/2019	7.6	9	260	1.7	0.05	45	249
Derrycolumb	SW-88A	Q4 19	07/11/2019	7.7	12	185	0.163	0.05	43	310
Derrycolumb	SW-89	Q4 19	07/11/2019	7	5	85	0.409	0.05	37	216
Derrycolumb	SW-90	Q4 19	07/11/2019	7.9	7	264	0.255	0.05	53	257
Derrycolumb	SW-91	Q4 19	07/11/2019	7.8	7	309	0.107	0.05	65	251
Derrycolumb	SW91-A	Q4 19	07/11/2019	7.3	6	213	0.094	0.05	82	396
Derrycolumb	SW-92	Q4 19	13/11/2019	7.8	3	360	0.107	0.05	72	232
Derrycolumb	SW-93	Q4 19	13/11/2019	7.4	2	233	0.112	0.05	85	339
Derrycolumb	SW-93A	Q4 19	13/11/2019	7.40	2	257	0.315	0.05	51	128
Derrycolumb	SW-88	Q2 17	29/05/2017	7.9	6	632	0.2	0.05	40	114
Derrycolumb	SW-88A	Q2 17	29/05/2017	7.7	5	320	0.37	0.05	39	124
Derrycolumb	SW-89	Q2 17	29/05/2017	7.7	5	374	0.17	0.05	50	144
Derrycolumb	SW-90	Q2 17	31/05/2017	7.7	6	280	0.46	0.05	42	110
Derrycolumb	SW-91	Q2 17	31/05/2017	7.8	5	408	0.26	0.05	42	116
Derrycolumb	SW91-A	Q2 17	31/05/2017	7.9	7	368	0.32	0.05	57	108
Derrycolumb	SW-92	Q2 17	31/05/2017	7.5	5	219	3.9	0.05	48	144
Derrycolumb	SW-93	Q2 17	31/05/2017	7.8	6	628	0.53	0.05	51	111
Derrycolumb	SW-93A	Q2 17	31/05/2017	7.6	10	308	0.05	0.05	42	125
Derrycolumb	SW-91	Q2 16	09/06/2016	7.3	19	302	0.85	0.33	112	267
Derrycolumb	SW-92	Q3 16	12/09/2016	7.2	12	176	0.16	0.12	89	225

is noted that the ELV and trigger levels assigned under the IPC licence are higher than the limits assigned in the Site Specific Conservation Objectives (SSCO) for Lough Ree SAC. This document has assigned the following annual average concentrations for Total Phosphorus (TP) (<20ug/l) and ammonia (<0.065mg/l N) for the Annex I habitat of qualifying interest Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation (3150), which occurs approximately 366m downstream of Derrycolumb Bog at its closest point. No limit has been assigned in the SSCO by the NPWS for SS.

IPC water quality monitoring at Derrycolumb Bog has recorded ammonia above the SSCO parameters set for natural eutrophic lake habitat.

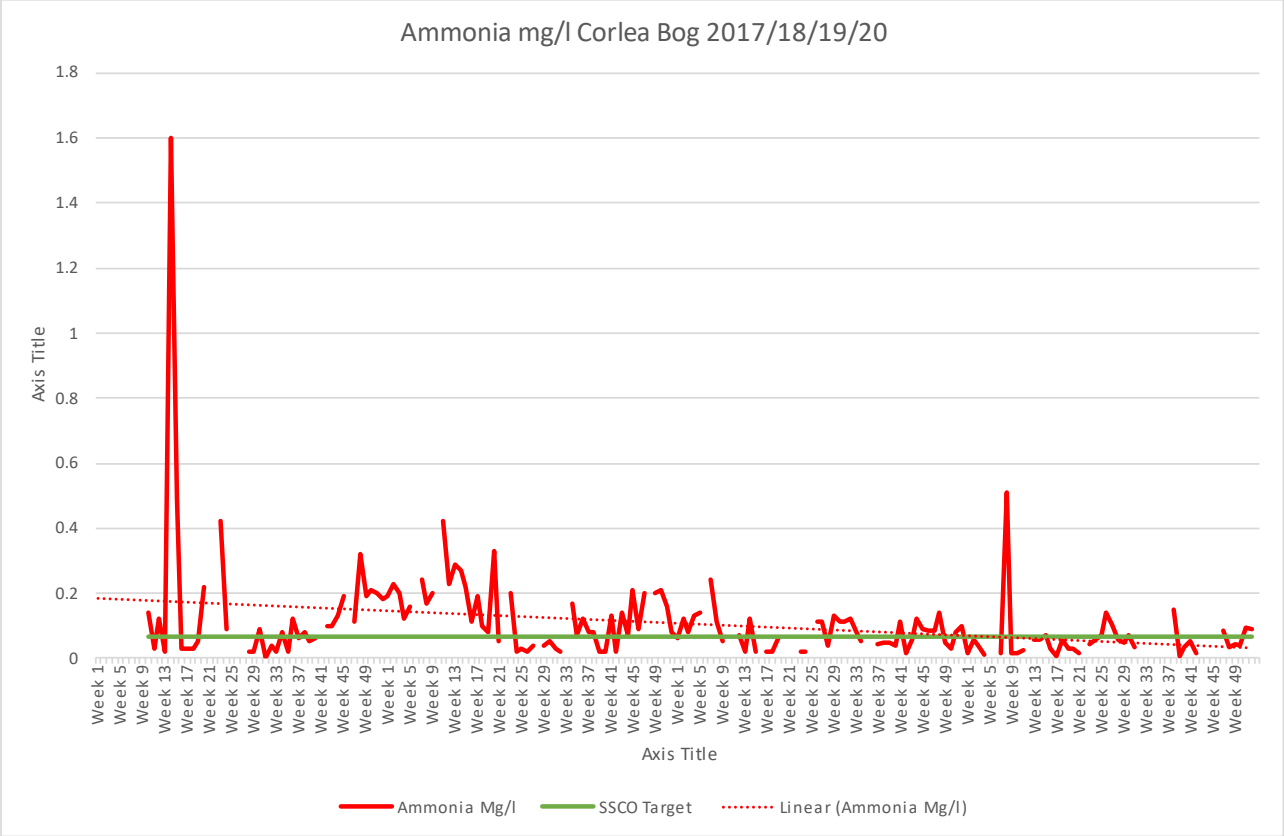
It is expected that following the implementation of the PCAS at Derrycolumb Bog the concentration of TP, ammonia, as well as Suspended Solids (SS) will follow a downward trend and will within the short-term (i.e. within a 3-year period) reduce concentrations of these parameters to below the NPWS limits.

This projection is supported by water quality monitoring of 2 other similar raised bogs (Longfordpass Bog and Corlea Bog) that were previously subject to industrial peat extraction and that have since been subject to peatland rehabilitation. Graph 1 below shows the downward trend for ammonia at Corlea Bog, which is also located within Bilberry _SC_010 sub-catchment. Corlea Bog is located immediately north of Derrycolumb Bog at its closest point. Graph 2 shows a consistent low level of TP recorded for Corlea Bog. The laboratory detection limit for TP is 0.05mg/l and Graph 2 shows that concentrations for TP are below the laboratory limits of detection, indicating very low levels. Similarly, the laboratory detection limits for SS was 5ml/l up until July 2019. The laboratory was changed in July 2019 and a new detection limit for SS of 2mg/l was applied. The SS concentrations were consistently below the 5mg/l and the 2mg/l at both laboratories, indicating very low SS concentrations in silt pond outfalls. Rehabilitation measures continue to establish at Corlea Bog and it has yet to stabilise, but the downward trend for ammonia found during the stabilisation of rehabilitation measures shows that once stabilised, the re-wetted bog will reduce ammonia emissions to meet the SSCO

[6] **EPA monitoring data for the previous three years in relation to Derrycolumb Bog**

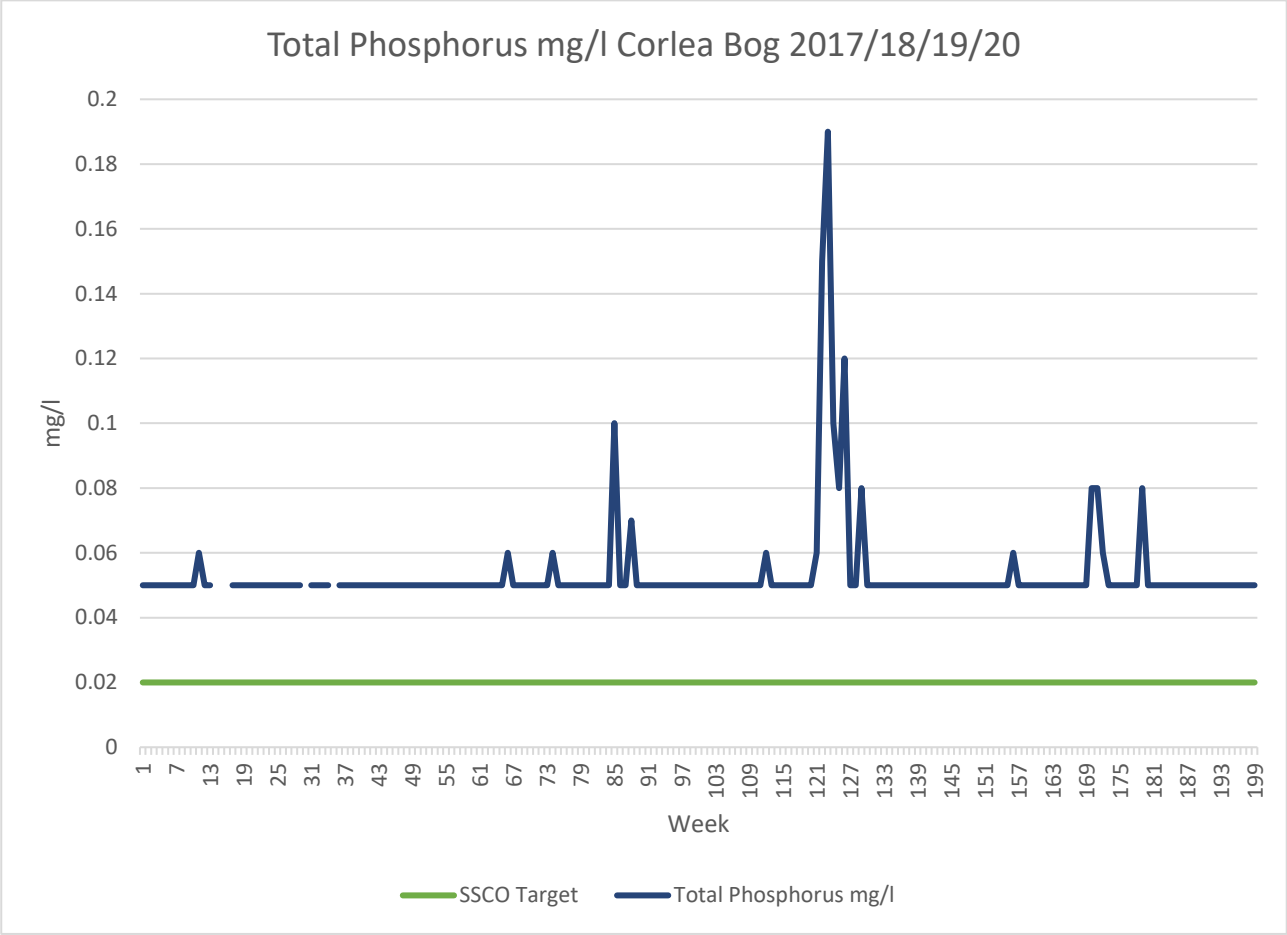
parameters / limits. It is also reasonable to predict a downward trend for SS and TP as the rehabilitation measures become established.

It is further noted that the concentrations of TP, SS and ammonia reported in the above table are from onsite silt ponds. The silt pond network at Derrycolumb discharges to the Ledwithstown_010 watercourse catchment. Water quality in the receiving Ledwithstown watercourse is given unassigned status on the EPA mapviewer[7]. Nonetheless, the waters discharging from silt ponds at Derrycolumb are diluted within the receiving Ledwithstown_010 watercourses, their downstream sections and in turn are further diluted and assimilated within Lough Ree.



Graph 1: Ammonia Concentrations and Trend at Corlea Bog

[7] https://gis.epa.ie/EPAMaps/



Graph 2: TP Concentrations at Corlea Bog, showing the limit of detection at 0.05mg/l

2.5.2 Field Assessments

2.5.2.1 Current habitats

Habitats within the Derrycolumb Bog site were identified and classified based on surveys completed on 19th & 23rd July 2012, September 2012 and March 2013. These habitats were further validated in the timeframe between 2013 and the present day, with the last visit taking place in October of 2019 (08th October 2019). Site visits undertaken by Delichon Ecology in the winter period 2020/21 were also used to ground truth available BNM habitat classifications - see Section 2.5.5.

The most common habitats present at the Derrycolumb site include:

- Bare peat (BP) (Codes refer BnM classification of pioneer habitats of production bog. See Appendix II).
- Pioneer dry heath communities (dHeath)
- Silt Ponds (Silt) with associated habitats such as scrub, Bracken, rank grassland (GS2), dry calcareous
- grassland (gCal) and typical pioneer communities of disturbed areas (disTuss).
- The most common habitats present around the margins at this site include:
- Birch woodland (WN7) (Codes refer to Heritage Council habitat classification, Fossitt 2000), See Appendix II)
- Scrub (WS1) (Gorse scrub and Birch scrub developing of dry high bog around margins)
- Raised bog (PB1)
- Cutover bog (PB4) (several small fragments)
- Wet grassland (GS4).

Although the majority of the site is classified as bare peat, many of the field drains support wetland plants such as Common Reed (*Phragmites australis*) as the dominant vegetation type. Marginal and adjacent habitats include Birch woodland (WN7), remnant sections of raised bog (PB1), recolonising scrub (WS1), recolonising bog supporting acid grassland (GS3) and heath (HH) and cutaway bog (PB4). The remnant sections of raised bog are generally small and are dry with a dominance of Ling Heather. The north-western section of the bog has been out of peat production for a longer period and has already developed pioneer cutaway vegetation comprising bog cotton and rushes. The south-easternmost section of the bog is comparably low lying and supports ephemeral / seasonal occurrences of ponding water that may provide suitable habitats for avifaunal species.

The watercourses draining the bog have been canalised and deepened and support a small number of aquatic plant species. Riparian vegetation was mainly composed of treelines comprising Willow (*Salix* sp.), Ash (*Fraxinus excelsior*) and Common Birch (*Betula pubescens*) in addition to Gorse (*Ulex europaeus*) and Willow scrub. In stream of emergent vegetation included localised occurrences of Common Reed and Reed Canary Grass (*Phalaris arundinacea*), floating sweet grass (*Glyceria fluitans*) and water starwort (*Callitriche* sp.). A number of silt ponds, are located adjacent or incorporated into these streams.

A small area in the south-eastern corner of the site is within the area that is designated as the Derry Lough proposed Natural Heritage Area (Site Code 001444, hereafter pNHA). The pNHA where it overlaps consists of Wet Grassland (Fossitt Code GS4), Poor Fen (PF1), Bog Woodland (WN7) and open water/wetland habitats. There is no production bog within the pNHA. The Bilberry (Ledwithstown_010) River flows along the north-eastern boundary of this part of Derrycolumb and a berm was constructed along a section of the river in 2010 in order to prevent flooding to the former production bog area.

South of the Bilberry River, the boundary of this section of Derrycolumb encloses some Raised or high bog (PB1) that includes a small number of 'active' raised bog. This habitat contains Heather (*Calluna vulgaris*), Purple Moor Grass (*Molinia caerulea*), Bog Asphodel (*Narthecium ossifragum*), Bog Cotton (*Eriophorum spp*.), Sundew species and Deer Grass (*Trichophorum cespitosum*) along with Sphagnum mosses (*Sphagnum magnellanicum, S. subnitens* and *S. papillosum*). A silt pond and a section of Birch (*Betula spp.)* woodland (WN7) is also located in this area. The southern boundary of this section has a small area of remnant raised bog (PB1) that is used for domestic turf cutting and some scrub (WS1) and Wet Grassland (GS4) is further present.

The mid-section of Derrycolumb is the largest portion of the bog and this area curves around farmland (primarily improved agricultural grassland GA1) that is located to the north. The majority of the mid-section was until recently in active industrial peat production however some cutaway bog (PB4) has emerged in recent years. These areas of cutaway are becoming vegetated by a mix of emergent Soft Rush (*Juncus effusus*) along with Birch and Willow (*Salix spp.)* This area is bounded to the south west by the Newtownflanagan Stream (Ledwithstown_010 River tributary).

The north/western section of Derrycolumb was in industrial peat production for a number of years and the centre of this section has been cutaway and is becoming vegetated with Soft Rush and Marsh Arrow Grass (*Triglochin palustris*) (pioneering Poor Fen PF1 habitat). A relatively large section of Birch woodland (WN7) is located in the southern section of this part of Derrycolumb and is made up of Birch and Willow.

Other habitats along the margins of Derrycolumb overall include further Birch woodland, wet grassland, dry heath (HH1) and cutover bog (PB4) or mosaics of same. A habitat map of the site is shown in **Figure 4**.

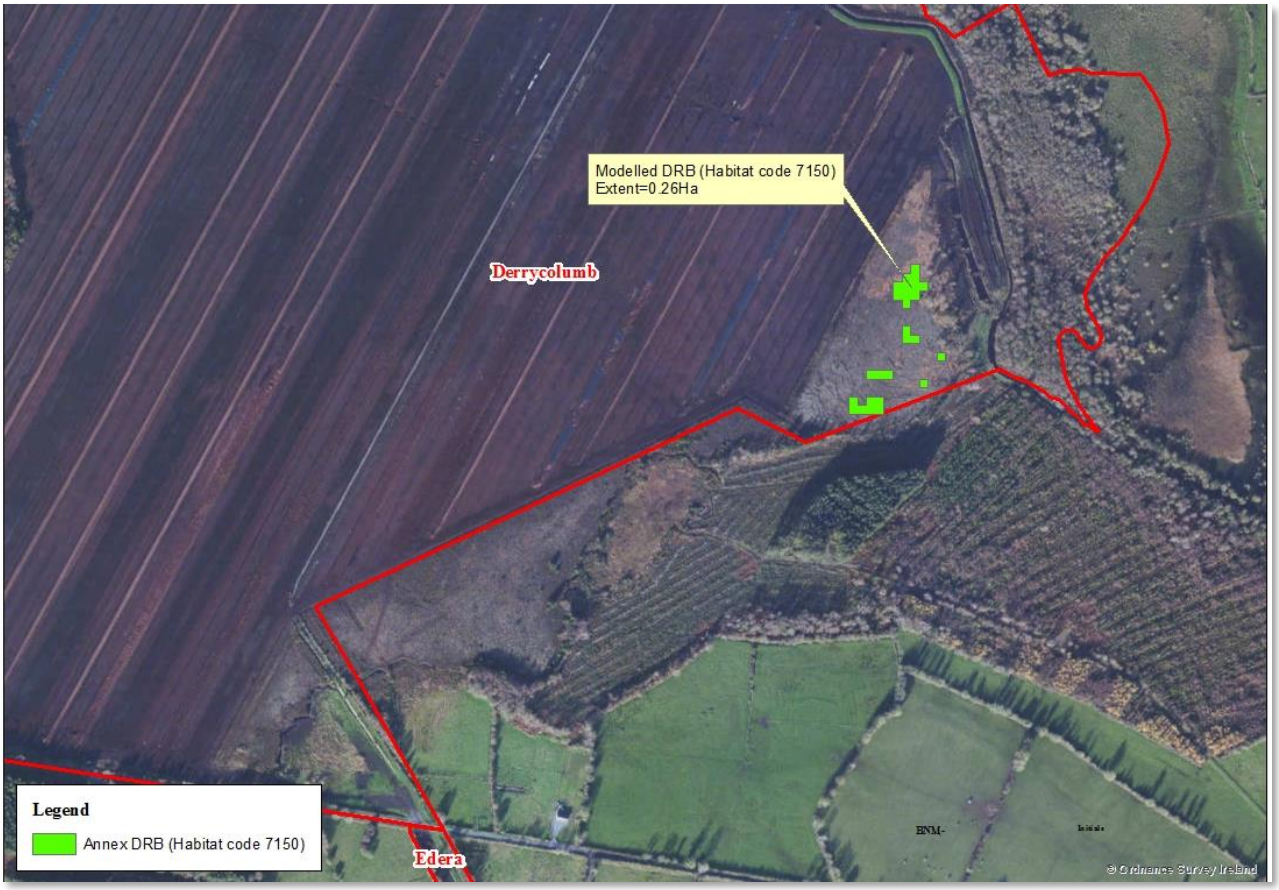


Figure 3: **Extent of modelled degraded raised bog near the south-eastern boundary of Derrycolumb Bog.**

2.5.2.2 Bird Surveys

The Derrycolumb Bog site was visited on three occasions over the 2020/2021 wintering season; i.e. October 08th 2020, December 09th 2020 and March 04th 2021.

The south-eastern corner of the Derrycolumb bog site supports ephemeral/ seasonal standing water that could support suitable habitat for foraging and roosting waders and wildfowl. However, the site walkover surveys completed in Derrycolumb Bog during the winter of 2020 and 2021 did not identify large numbers of waterbirds or wildfowl using this area for roosting or foraging purposes.

Bird species identified during the October and December 2020 and March 2021 walkover surveys are presented in **Table 4** below.

Table 4: Bird Species identified during the site walkover surveys in winter 2020/2021

Common Name	Species Name	Activity within the site
Starling	*Sturnus vulgaris*	Small flocks flying over and through the site and its environs.
Fieldfare	*Turdus pilaris*	Small mixed flocks flying over and through the site and its environs.
Redwing	*Turdus iliacus*	
Song Thrush	*Turdus philomelos*	Calling from treeline habitat near the margins of the Derrycolumb site.
Mistle Thrush	*Turdus viscivorus*	Identified on treeline habitat near the margins of the Derrycolumb site.
Woodcock	*Scolopax rusticola*	Flushed from scrub habitat adjoining expansive area of cutover bog
Goldfinch	*Carduelis carduelis*	Foraging along scrub and treelines at the site margins.
Hooded Crow	*Corvus cornix*	Individual birds flying through or within Derrycolumb Bog.
Rook	*Corvus frugilegus*	Individual birds flying through or within Derrycolumb Bog.
Raven	*Corvus corax*	Two Raven overflying the Derrycolumb Bog site.
Jackdaw	*Corvus monedula*	Individual birds flying through or within Derrycolumb Bog.
Magpie	*Pica pica*	Individual birds flying through or within Derrycolumb Bog.
Buzzard	*Buteo buteo*	Flying north-east of Derrycolumb Bog within the Derrylough townland.
Pheasant	*Phasianus colchicus*	Calling from woodland cover near the south-eastern corner of the site.
Wood Pigeon	*Columba palumbus*	Flushed from treeline habitat adjoining expansive area of cutover bog.
Long-tailed Tit	*Aegithalos caudatus*	Flushed from scrub habitat adjoining expansive area of cutover bog.
Chaffinch	*Fringilla coelebs*	Calling from treeline habitat near the site boundary.
Blackbird	*Turdus merula*	Foraging within scrub habitat adjoining expansive area of cutover bog.
Reed Bunting	*Emberiza schoeniclus*	Foraging near silt ponds and scrub
Whooper Swan	*Cygnus cygnus*	Five Whooper Swan (*Cygnus cygnus*) flying over the site on December 09th in a south-east to north-west direction at 08.40am.
Golden Plover	*Pluvialis apricaria*	Small flock of 24 birds seen in flight over central lobe of bog.

Common Name	Species Name	Activity within the site
Grey Heron	*Ardea cinerea*	Perched on the margins of the ephemeral wetland near the south-eastern corner of Derrycolumb Bog.
Mallard	*Anas platyrhynchos*	Using ephemeral wetland near the south-eastern corner of Derrycolumb Bog.
Pied Wagtail	*Motacilla alba*	Using hard standing areas and access tracks for foraging purposes.
Meadow Pipit	*Anthus pratensis*	Foraging within marginal peatland habitat.
Dunnock	*Prunella modularis*	Foraging along scrub and treelines at the site margins.
Grey Wagtail	*Motacilla cinerea*	Identified near watercourse and silt ponds near the Cormaglava townlands.
Goldcrest	*Regulus regulus*	Foraging along scrub and treelines at the site margins.
Wren	*Troglodytes troglodytes*	Foraging along scrub and treelines at the site margins.
Robin	*Erithacus rubecula*	Foraging along scrub and treelines at the site margins.
Coal Tit	*Periparus ater*	Foraging along scrub and treelines at the site margins.
Great Tit	*Parus major*	Foraging along scrub and treelines at the site margins.
Blue Tit	*Cyanistes caeruleus*	Foraging along scrub and treelines at the site margins.

2.5.2.3 Mammal Surveys

A mammal survey of the Derrycolumb site was undertaken on March 04th 2021. This provided further information to the baseline walkover surveys completed in late 2020. An otter survey was completed along the Ledwithstown River in addition to all silt ponds and drainage channels within and adjoining the Derrycolumb site. In addition, the Derrycolumb site and its environs were also surveyed for the presence and usage of non-volant mammal species including badger, fox, Irish Hare, mink etc.

The otter survey methodology followed those methods employed in the 'Otter Survey of Ireland 2004/2005' (Bailey & Rochford, 2006) comprising a modification of the Standard Otter Survey Method developed by Jefferies (1980).

In addition, the mammal survey incorporated badger surveys that were completed in accordance with the *Guidelines for the treatment of badgers prior to the construction of National Road Schemes* (TII, 2006) *and The Badger and Habitat Survey of Ireland* (Smal, 1995).

The mammal survey undertaken on March 04th 2021 at the Derrycolumb Bog site identified the signs of badger, mink, otter and fox. Irish Hare was identified on an expansive area of cutover bog located near the south-eastern corner of the Derrycolumb Bog. The findings of the survey are presented in **Table 5** below and illustrated in **Figure 5**.

Table 5: Findings of the March 2021 mammal survey

Common Name	Species Name	Grid Co-ordinates (in ITM)		Description
		X	Y	
Badger	*Meles meles*	608525	760975	Badger Prints
Badger	*Meles meles*	608562	760925	Badger Prints
Badger	*Meles meles*	608573	760935	Badger Prints
Mink	*Neovison vison*	608629	760704	Couch
Mammal	-	608615	760590	Mammal trail
Mink	*Neovison vison*	608628	760514	Mink scat
Fox	*Vulpes vulpes*	609027	760211	Fox scat and track
Mink	*Neovison vison*	609219	760119	Mink prints
Otter	*Lutra lutra*	609354	760026	Otter prints
Otter	*Lutra lutra*	609367	759969	Otter prints
Badger	*Meles meles*	609369	759904	Badger Prints
Badger	*Meles meles*	609359	759869	Badger Prints
Mammal	-	608453	761558	Mammal trail
Badger	*Meles meles*	608476	761680	Badger Prints
Mammal	-	606673	760400	Mammal trail
Fox	*Vulpes vulpes*	606631	760362	Mammal trail and fox guard hair
Badger	*Meles meles*	606664	760316	Badger guard hair and track
Badger	*Meles meles*	605883	760801	Badger Prints
Badger	*Meles meles*	605705	760811	Badger Prints
Badger	*Meles meles*	605678	760844	Badger sett
Badger	*Meles meles*	605690	760821	Badger sett
Badger	*Meles meles*	605718	760803	Outlier badger sett

The margins of the Ledwithstown River straddling the eastern and south-eastern corner of Derrycolumb Bog, support signs of badger (prints) travelling north and south along the banks of the river and its nearby surrounds. The Ledwithstown River supported mammal tracks / trails leading into and from the riverbank margins. The Ledwithstown River supported mink scat and signs of a layup / couch. The margins of the silt

ponds near the site's south-eastern corner supported otter prints, mink prints and badger prints. No otter holts were identified during the site survey.

The Ledwithstown River in this area is a small channelised, modified watercourse that supports little suitability for foraging otter. The stream does not support suitable habitat for suitable prey items for otter such as fish, crayfish etc. In addition, the silt pond margins and lower stretches of the Ledwithstown River comprise vertical bank margins comprising peat, a substrate unsuitable to support otter holts and breeding sites. The Ledwithstown River may provide a suitable corridor or commuting route for otter and mink to the downstream sections of the Ledwithstown River and Lough Ree.

The western and north-western section of the Derrycolumb Bog study is adjoined by a drainage channels and upper sections of watercourses which support connectivity with the Ledwithstown River and the Drumnee_010 Stream. There were no signs of otter using these watercourses / channels or the silt ponds in these locations. These channels and their adjoining habitats supported signs of badger (sett, guard hair, prints and tracks) and fox (hair and mammal tracks). The boundary of the Derrycolumb Bog site at the Cormaglava townland supported a three entrance badger sett, a badger outlier sett and associated badger tracks and prints within the adjacent peatland areas.

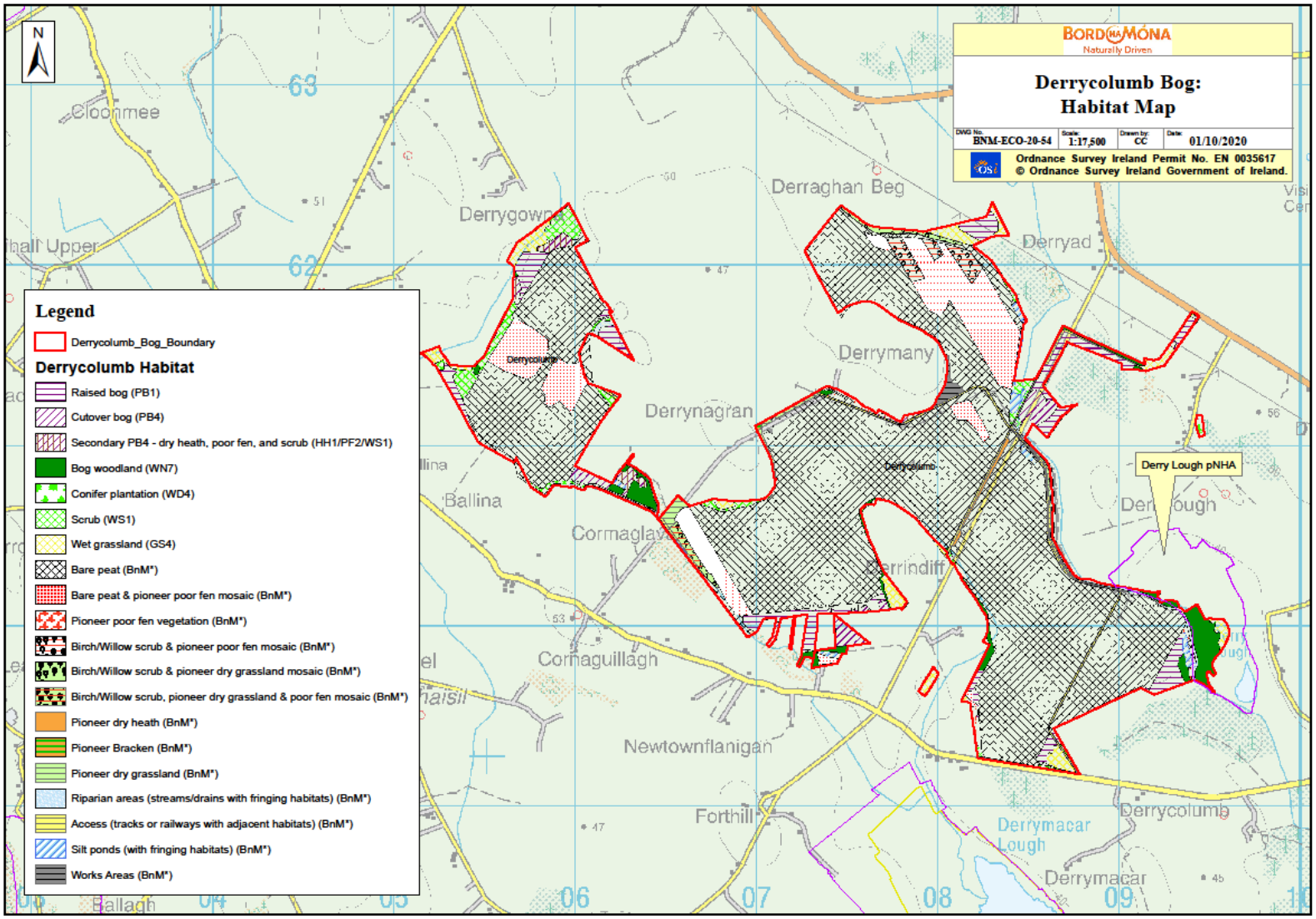


Figure 4: Current Habitats at Derrycolumb Bog

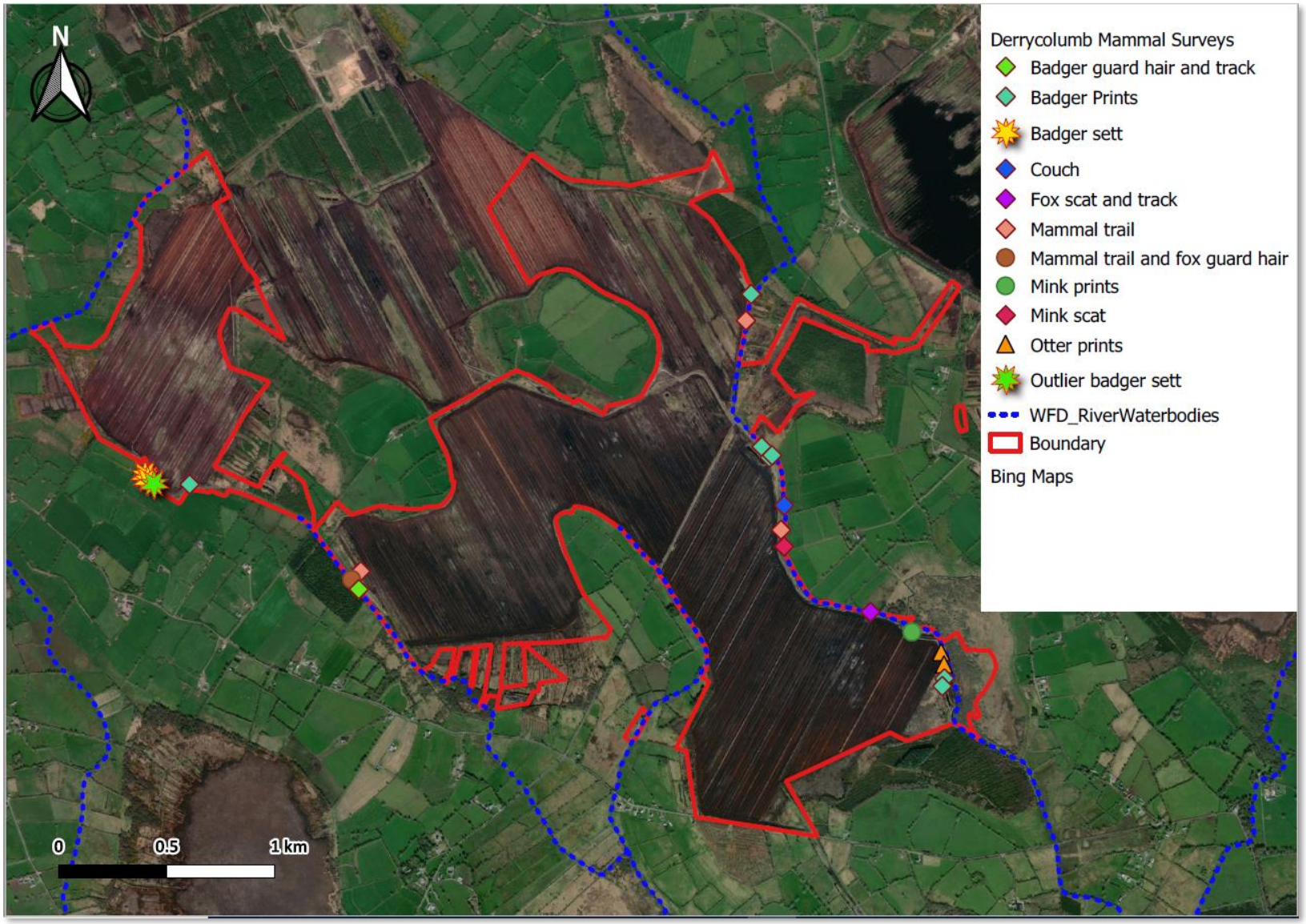


Figure 5: Mammal Signs and Features within the Derrycolumb Site

	
Image 1 – Central and southern sections of Derrycolumb Bog comprising bare cutover bog	Image 2 – Railway line and recolonising bare peat near the centre of Derrycolumb Bog
	
Image 3 – Ledwithstown River located near the south-eastern boundary of the site	Image 4 – Areas of cutover bog near the northern boundary of the site recolonising with rushes

	
Image 5 – Tributary of the Ledwithstown_010 River draining the south-western section of the site	Image 6 – Large sections of cutover bog located within the centre of the Derrycolumb Bog site

2.5.3 Species of Conservation Interest

There is the potential for otter to use the streams and silt ponds on-site. It is likely that an Otter "couch" is situated within the site environs. Signs of several mammal species have been noted by Bord na Móna ecologists during surveys of Derrycolumb including Red Fox (*Vulpes vulpes*), Badger (Meles meles), Pine Marten (*Martes martes*) and Otter (*Lutra lutra*). Irish Hare (*Lepus timidus subsp. hibernicus*), West European Hedgehog (*Erinaceus europaeus*) and American Mink (*Mustela vison*) are likely to occur in suitable habitat based on records from the NBDC website.

A review of available Biodiversity records from the National Biodiversity Data Centre (hereafter NBDC) of bird records from the recent 2007-2011 Bird Atlas, found 92 species of birds have been recorded at or near Derrycolumb Bog.

Common species observed at Derrycolumb by Bord na Móna ecologists include Grey Heron (*Ardea cinerea*), Hooded Crow (*Corvus cornix*), European Robin (*Erithacus rubecula*), Common Blackbird (*Turdus merula*) and Raven (*Corvus corax*).

Studies to inform the nearby Derryadd Wind Farm planning application[8] recorded flight activity proximal to Derrycolumb of (Amber listed- Colhoun & Cummins 2013[9]) Lesser Black-backed Gull (*Larus fuscus*) during Spring passage; and evidence of breeding (Amber listed) Common Snipe (*Gallinago gallinago*) in suitable habitat. A Common Buzzard (*Buteo buteo*) breeding territory was confirmed at Derrygowna, immediately NW of Derrycolumb.

Wintering (Amber listed) Whooper Swan (*Cygnus cygnus*) are known to occur at a number of wetlands in the hinterland of Derrycolumb, such as Fort William Turlough, Cordora Turlough and at Carrowmore[10].

The site walkover survey completed by Delichon Ecology in December 2020 identified five Whooper Swan (*Cygnus cygnus*) flying over the site in a south-east to north-west direction at 08.40am. Other bird species

[8]McCarthy Keville O'Sullivan Ltd. (2017). Bord na Móna Breeding Surveys 2017 Derryadd Co. Longford Survey Report.

[9] Colhoun, K. & Cummins, S. (2013). Birds of Conservation Concern in Ireland 2014-2019. Irish Birds 9: 523-544.

[10] MWP (2017). Ornithology Report. Bord na Móna Winter Bird Survey 2016/17.

identified during the December 2020 site visit included Pied Wagtail (*Motacilla alba*), Redwing (*Turdus iliacus*), Fieldfare (*Turdus pilaris*), Starling (*Sturnus vulgaris*), Goldfinch (*Carduelis carduelis*), Hooded Crow (*Corvus cornix*), Rook (*Corvus frugilegus*), Long-tailed Tit (*Aegithalos caudatus*), Blackbird (*Turdus merula*), Meadow Pipit (*Anthus pratensis*), Dunnock (*Prunella modularis*), Grey Wagtail (*Motacilla cinerea*), Robin (*Erithacus rubecula*), Great Tit (*Parus major*) and Blue Tit (*Cyanistes caeruleus*). The expansive cutover bog areas did not support waders or wildfowl species during the site walkover survey. The south-easternmost section of the site is the most low-lying section and supported ephemeral water during the site walkover survey. This area provided the greatest potential to support over-wintering wildfowl or waders within the Derrycolumb site.

2.5.4 Invasive species

Invasive alien species known to occur at the subject bog (or desktop review suggests presence is likely), and for which reasonably foreseeable source impact pathways for dispersal may result from the proposed PCAS are described here. There are no IAS in this context recorded from Derrycolumb Bog. Invasive plant species were not identified within the Derrycolumb bog site or its environs during the December 2020 site visit.

A broad range of common garden escapes are occasionally present around the margins of Bord na Móna bogs, and although spatial overlap with the PCAS is expected to be limited.

2.5.5 Certainty and Sufficiency of Data

The Biodiversity baseline information presented in this Appropriate Assessment reporting was collated from site investigations and field surveys, along with publicly available online resources including from the National Biodiversity Data Centre (NBDC) and the National Parks and Wildlife Service (NPWS) online webpage, which are regularly updated.

All field survey work was carried out by qualified and experienced ecologists.

In addition, where required, or possible, specific data requests have been made to NPWS via the online data request facility, specifically with regards to records of sensitive species; and, to BirdWatch Ireland in respect of the results of IWeBS surveys, which are available upon request.

Further sources of data used to supplement the current appraisal, included current, up to date, Bord na Móna held habitat mapping datasets, as well as previously commissioned baseline reporting of Bord na Móna Bog Groups, reporting to inform Bord na Móna wind farm proposals, and any available Bord na Mona wind farm monitoring reports where it was deemed there was overlap with the current scope of PCAS activities. Citations are provided at the end of this report for any reports which have been referenced.

For the avoidance of doubt although some of this supplementary baseline data was 3+ years old, due regard has been given to the passage of time & any changes to the baseline environment at Derrycolumb in the interim period were considered by a suitably qualified ecologist; visits to inform the current appraisal were used as ground-truthing exercises to confirm the relevance or not of any previously defined baseline information.

In the most part, due the continuation of industrial Peat Extraction by Bord na Mona up to and including the year 2019 at Derrycolumb, it was considered that habitats at the bog remained relatively unchanged from the point at which many prior baseline surveys were undertaken, and therefore, it is considered that data presented in prior baseline reporting was of relevance, with exceptions noted. Nonetheless reliance is focussed primarily on the most recently available or collected data.

2.6 Decommissioning and Rehabilitation Stage

The proposed **decommissioning** at Derrycolumb Bog includes the following:

- Clean-up of remaining or unconsolidated waste or materials located in Bogs, Yards, Buildings and Offices,
- Cleaning Silt Ponds,
- Decommissioning Peat Stockpiles,
- Decommissioning Fuel Tanks and associated facilities,
- Decommissioning and Removal of Bog Pump Sites, and
- Decommissioning or Removal of Septic Tanks.

Further measures include the lifting of the existing rail line, decommissioning of existing level crossings and measures to restrict access to the bog.

Rail line lifting may occur concurrently or after rehabilitation activities. In some instances, outer spurs are to be left in place to facilitate rehabilitation access, meaning these lines won't be lifted until rehabilitation is complete.

The proposed Derrycolumb Bog **rehabilitation** comprises a series of bespoke (to Derrycolumb Bog) interventions designed to stabilise the existing baseline and meet compliance with the requirements of the existing EPA, IPC License and the proposed PCAS. Prescriptive measures are unique to the existing baseline habitats and comprise 3 no. broad categories,

1) those associated with (exposed) Deep Peat; drain blocking (different intensities), drain infilling, and berms and field reprofiling ;

2) those associated with Dry cutaway; i.e. drain blocking, managing water levels and overflows; and

3) measures associated with Wetland Cutaway, including restricting and reducing pumping regimes and associated drain blocking, along with outfall blocking and management of overflows.

4) those associated with remnant high bog namely drain blocking

The aim of Rehabilitation is as much as possible to place existing peatlands on a **trajectory** towards a naturally functioning peatland system (Renou-Wilson 2012).

2.6.1.1 Decommissioning and Rehabilitation Access

Access will be through the existing local road networks at the Derrynagran and Derrinduff townlands, in addition to existing internal access tracks which facilitated the previous peat extraction. No change to baseline conditions to facilitate access for either decommissioning or rehabilitation is required.

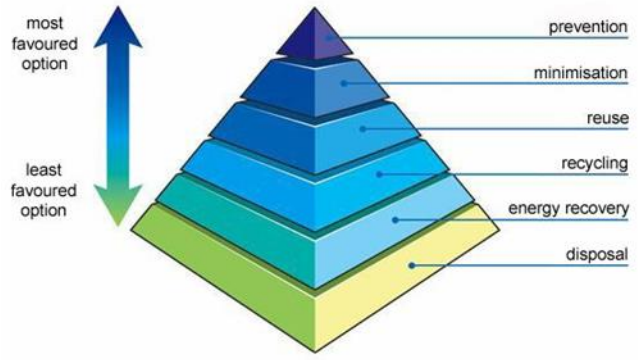
2.6.1.2 Standard Methodology for Decommissioning

Decommissioning at Derrycolumb Bog will involve the deployment of a work crew to collect and oversee the removal of any remaining plant or potentially contaminating waste left *in situ* in line with Condition 7 of License Ref. P0-504-01. This condition specifically requires that BnM's procedures for the 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 the IPC license 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 EPA. Waste sent off-site for recovery or disposal shall only be conveyed to a waste contractor, as agreed by the EPA, and only transported from the site of the activity to the site of recovery/disposal in a manner which will not adversely affect the environment.

A full record, which shall be open to inspection by authorized persons of the EPA at all times, shall be kept by the licensee (BnM) on matters relating to the waste management operations and practices at Derrycolumb Bog. This record shall as a minimum contain details of the following:

- The names of the agent and transporter of the waste;
- The name of the persons responsible for the ultimate disposal/recovery of the Waste;
- The ultimate destination of the waste;
- Written confirmation of the acceptance and disposal/recovery of any hazardous waste consignments sent off-site;
- The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery;
- Details of any rejected consignments.

A copy of this Waste Management record shall be submitted to the Agency as part of the AER for Derrycolumb Bog. As required by the license, these waste items will be removed for recycling or disposal, using external contractors with the required waste collection permits, with waste records maintained as required. Where possible, Bord na Mona 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 license.

Decommissioning may also include measures to restrict access to the bog or silt ponds.

Regarding the lifting of rail lines this will be facilitated by a manual work crew either a) loading rail line components onto a trailer and removing a) direct to contractor, b) to a consolidation area via tractor, prior to disposal, or c) utilizing the rail line itself to remove the components in reverse order onto a locomotive trailer, with again, the parts being delivered up the rail line to be stored and/or disposed of, in line with IPC license conditions.

Peat stockpiles: Any existing and unsalable peat stockpiles which are required to be 'decommissioned' will have protective polythene removed. This will involve the stripping of the polythene cover as per standard procedure where the polythene is rolled/baled by a polywrapper for transport to the area hardstand for removal off-site. Any peat stockpiles that are unsalable will be required to be decommissioned and rehabilitated into the adjoining fields ('levelling'), from where it was originally harvested. This process first involves the associated silt pond being cleaned if necessary, the stockpile field drains blocked to capture any run-off, with blockages every 100m. The peat is then deposited by dozer onto the adjoining field and blocked

drain, where it is cambered and compacted. The locations and extent of peat stockpiles are presented in **Figure 6** below.

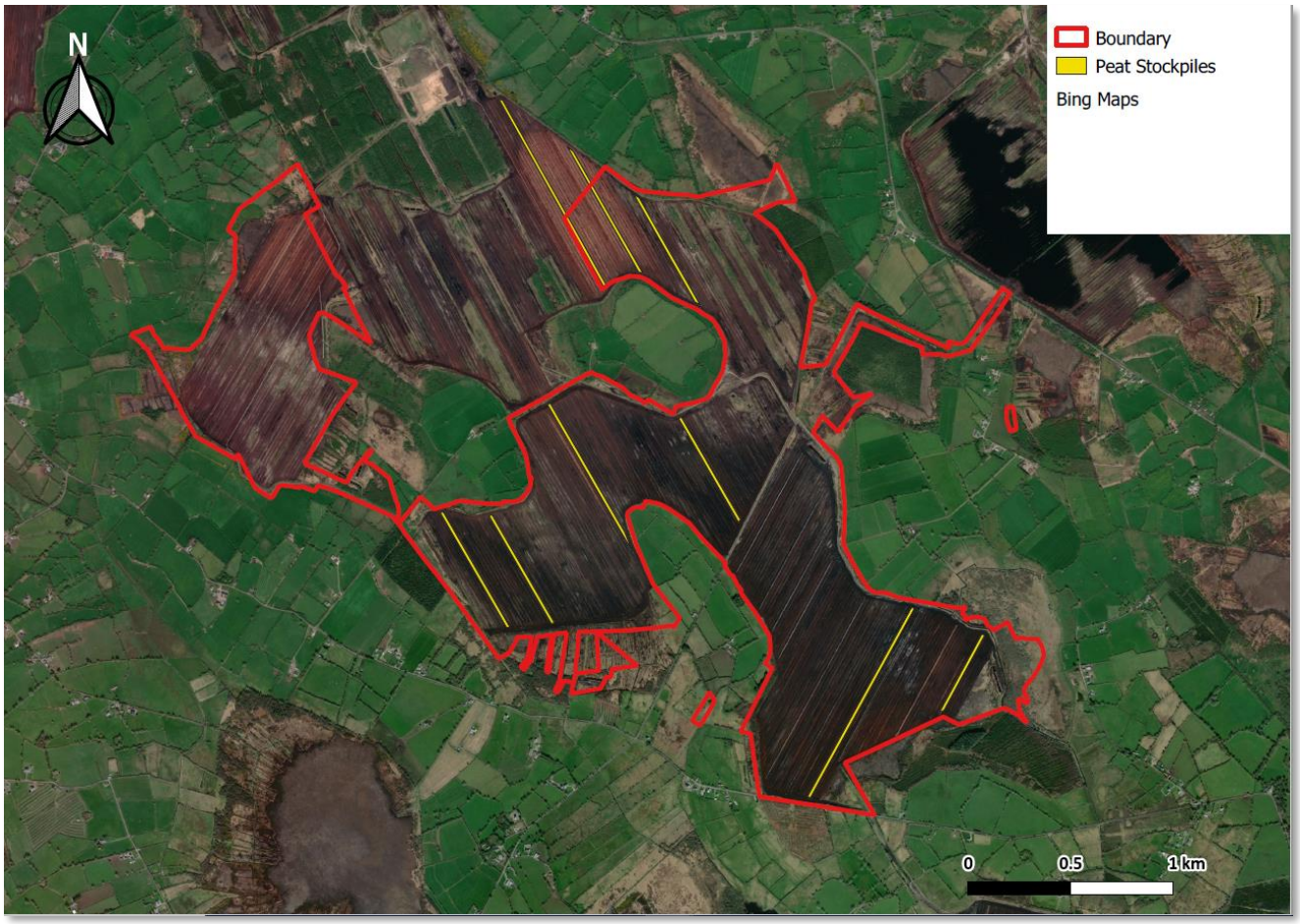


Figure 6: Locations and extent of peat stockpiles at Derrycolumb Bog

Decommissioning and De-Gassing Mobile Fuel Tanks: These tanks are first emptied of any usable fuel and then degassed using a suitable hazardous waste contractor, with appropriate certification provided. The tank is then either removed for reuse or recycling or retained within the bund as a site asset. In addition, the concrete bund is cleaned, and any hazardous wastes generated are removed by hazardous waste contractor. Any remaining concrete bunds, once cleaned and deemed as an infrastructural asset to the site will be retained.

Bog area clean up: These bog areas include the parking spaces for production plant and equipment, locations for storing rail line, drainage pipes and stockpile covering. All remaining or unconsolidated old and unused polythene will be collected for recycling or disposal, depending on condition. Any remaining older and immobile plant will be brought in from bog and removed off site. Any remaining hazardous waste oils, fluids and batteries will be removed off site by qualified appropriate hazardous waste contractors. All remaining unused drainage pipes will be gathered up for reuse, recycling or disposal. All remaining, unconsolidated unused rail line sections will be collected from the bog and stored at the main access location for dismantling.

2.6.1.3 Standard Methodology for Rehabilitation Activities

The proposed Derrycolumb **Rehabilitation** will be undertaken using standard Best Practices in peatland restoration. These are based on published information in the Irish context, Methodologies developed through Rehabilitation trials, Best Practices employed elsewhere in Europe on peatland rehabilitation and restoration but also the 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), including examples such as the BnM Raised Bog Restoration Project[11] -see also Section 2.8.2 Sources of Information.

In terms of rehabilitation the ecological and site information collected during Bord na Móna ecological baseline surveys, additional site visits, stakeholder input, and monitoring and desktop analysis forms the basis for the planning of peatland rehabilitation at Derrycolumb Bog, along with:

- Significant international engagement during this period with other countries in relation to best-practise regarding peatland rehabilitation and after-use through the International Peatland Society and the Society for Ecological Restoration (Joosten & Clarke, 2002; Clarke & Rieley, 2010; Gann et al., 2019); and
- Consultation and engagement with internal and external stakeholders.
- GIS Mapping
- BnM drainage surveys
- Bog topography
- Hydrological modelling

Bog Rehabilitation Techniques or Methods

The key interventions to be applied to deep peat cutover bog restoration/rehabilitation is re-wetting peat to encourage natural colonisation of typical vegetation and the development of *Sphagnum*-rich peat-forming vegetation communities. The key interventions to be applied to areas of shallow residual peat prone to flooding, and areas of exposed marl or underlying substrate are effectively those to target the production of wetlands, or fen forming habitats. Some areas of residual peat, due to modelled water levels will effectively only be subject to water level management. Areas of marginal and higher elevated ground within the former production area, such as headlands will also be subject to drain blocking and fertiliser application. Certain prescriptions will require management to ensure water-levels remain close to the surface of the peat for most of the year (100mm ± 50mm).

Several different approaches can be taken to this type of restoration/rehabilitation, and the rehabilitation packages with different rehabilitation/restoration intensities to managing suitable hydrological conditions are proposed (see **Table 6**) with detailed drawings presented in Appendix D.

Note the table below excludes constrained areas and rehabilitation categories with no intervention.

Table 6: Rehabilitation Categories

Cutover Bog	
DPT2	More intensive drain blocking (7/100 m) & blocking outfalls & managing overflows
DPT3	More intensive drain blocking (7/100 m) & field reprofiling & blocking outfalls and managing overflows
DCT1	Blocking outfalls and managing water levels with overflow pipes
DCT2	Regular drain blocking (max 3/100m) +blocking outfalls and managing water levels with overflow pipes+ targeted fertiliser treatment
WLT 1	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

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

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 (max 7/100 m), + blocking outfalls and managing overflows + transplanting Reeds and other rhizomes
DPT4	Berms and field re-profiling (45m x 60m cell) & blocking outfalls and managing overflows with drainage channels for excess water & Sphagnum inoculation
DPT5	Cut and Fill cell bunding (30m x 30m cell) & blocking outfalls and managing overflows with drainage channels for excess water & Sphagnum inoculation

The constituent prescriptions which combine to form each respective rehabilitation package are further described below, namely;

1. Regular Drain Blocking (3/100m)
2. Intensive Drain Blocking (7/100m)
3. Blocking Outfalls
4. Managing Water levels with overflow pipes
5. Field Reprofiling
6. Berms and field reprofiling (45m x 60m cell)
7. Drainage channels for excess water
8. Cut and fill cell bunding (30m x 30m cell)
9. Sphagnum Innoculation
10. Retention of Hydraulic Breaks

A full set of Detailed Drawings for the Proposed Rehabilitation Works Methodologies are included in Appendix D.

1.Regular Drain Blocking (3/100m)

This measure can be applied to cutover bog, cutaway bog and drained raised bog with different environmental characteristics. It can be applied to residual peat of various depths including deep cutover peat. The main objective is to place peat blockages in drains to raise water levels, re-wetting peat and slowing water movements through the site. Slowing water movement will have additional benefits of reducing fluvial carbon loss (via water) and also improving water quality leaving the site by reducing emissions of silt and ammonia.

The number of peat blockages per 100m is determined by the topography of the site, but an allowance has been estimated at on average 3 blocks per 100m of field drain. The methodology follows NPWS guidelines published by the National Parks and Wildlife Service (Mackin *et al.,* 2017[12]) and in line with methodologies originally developed by McDonagh (1997).

In all instances peat blockages will be installed using a specially adapted tracked machine. The process involves clearing the drain and creating a 'key' in the drain sides in order to ensure a tight seal is maintained. The drain is subsequently blocked with peat taken from a nearby 'borrow pit' and involves placing layer after layer of peat until it is built up to above the ground surface, after which it is covered with a 'scraw' of vegetation (where available). Each peat blockage takes approximately 5mins to complete.

[12] https://www.npws.ie/sites/default/files/publications/pdf/IWM99_RB_Restoration_Best%20Practice%20Guidance.pdf

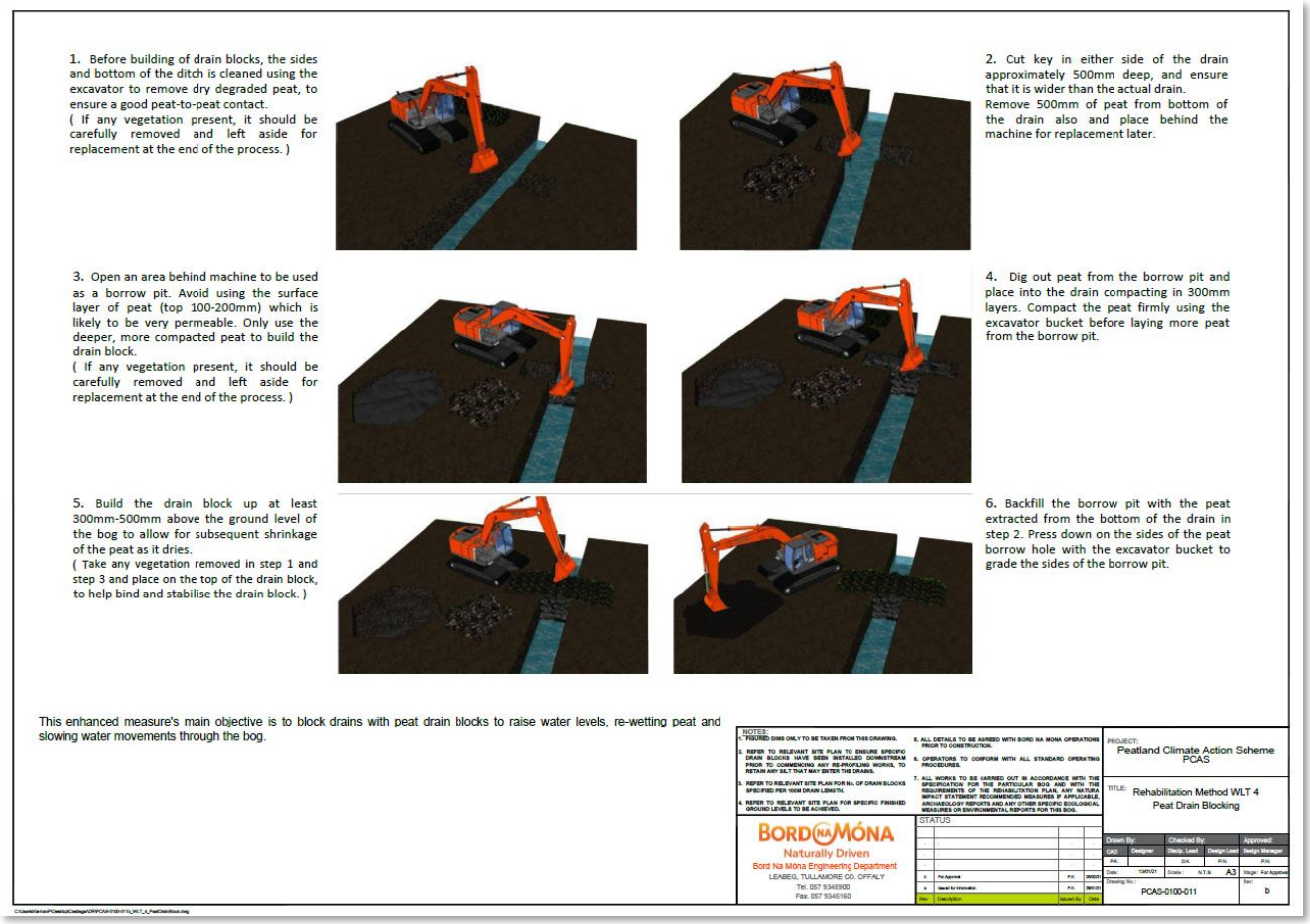


Figure 7: Completed Peat blockage (reproduced from Mackin *et al.*, 2017)

2. Intensive Drain Blocking (max 7/100m)

This measure can be applied to cutover bog, cutaway bog and drained raised bog with different environmental characteristics. It can be applied to residual peat of various depths including deep cutover peat. The main objective is to block drains with peat barriers to raise water levels, re-wetting peat and slowing water movements through the site. Slowing water movement will have additional benefits of reducing fluvial carbon loss (via water) and also improving water quality leaving the site by reducing emissions of silt and ammonia.

The number of peat blockages per 100m is determined by the topography of the site, but an allowance has been estimated at a maximum of 7 blocks per 100m of field drain. The methodology follows NPWS guidelines published by the National Parks and Wildlife Service (Mackin *et al.,* 2017) and in line with methodologies originally developed by McDonagh (1997).

The increased number of peat blockages (compared with the standard measures) will benefit re-wetting and trapping silt on cutaway with slightly greater slopes and will further slow the movement of water from these sites. Methods are as per 1 but blockages are at a higher frequency along the length of the drainage feature.

3.Blocking Outfalls

The key objective from targeted blocking of outfalls within a bog is to re-wet peat but to manage water-levels at an appropriate level for the development of wetland and peatland vegetation. This measure optimises re-wetting of cutaway. This measure also has additional benefits of reducing fluvial carbon loss (via water) and also improving water quality leaving the site by reducing emissions of silt and ammonia.

Targeted blocking of outfalls is suitable for bogs or portions of bogs that have already had a period of natural colonisation, minimising disturbance to pioneer habitats that are already developing. It is also appropriate for locations where there is establishing habitats and where former drainage infrastructure is already starting to break down. Hydrological modelling and an understanding of site drainage is required to identify appropriate locations for targeted drain-blocking to maximise re-wetting. Drains are blocked at these locations using an excavator by lifting pipes and filling holes with peat or local sub-soils.

Again, the key objective is to manage water-levels at 0-10 cm above the peat surface for as much of the year as possible. Some deeper water is inevitable due to heterogenous topography of the cutaway. This measure can be particularly effective as outfall pipes generally run perpendicular to field drains to catch and transport water off the bog. The outfalls have been piped through high fields. Blocking pipes at the high fields means that the high fields can be converted to natural berms or embankments, creating a compartmented wetland.

4. Managing water levels with overflow pipes

This prescription is associated strongly with the blocking of outfalls. Following the blocking of outfalls, some high fields may require overflow pipes to be installed to manage water levels at the required height above peat surface and/or in instances where a series of high fields have been flooded using the cascade effect, the lowermost field may require the outfall to be piped and managed to facilitate access for example. Overflow pipes will typically be new, 100mm plastic pipes.

Overflow pipes are installed using an excavator.

Figure 8: Examples of installed overflow pipes

5.Field Reprofiling

The concept of field re-profiling is to level the surface of the individual peat production fields to allow more uniform coverage of water at an ideal depth (c.100mm ± 50mm) for vegetation colonisation and in particular the development of mosses that will accelerate the trajectory towards naturally functioning peatland ecosystems. It can be applied to residual peat of various depths including deep cutover peat.

Peat production fields generally have a convex camber toward the edges and have a heterogeneous topography. It is usual for the drains and edges of the fields to become wet whilst the high centres of the fields remain dry. Small hollows within the peat fields will retain surface water for longer. This enhanced measure will target the development of a flat or concave topography that will help the retention of shallow surface water. This approach will be combined with other measures such as drain blocking to re-wet peat to increase the cover of shallow surface water and re-wetted peat on the former production fields. In general, peat production fields will still have a prevailing slope (they will be flatter or convex, but not level.

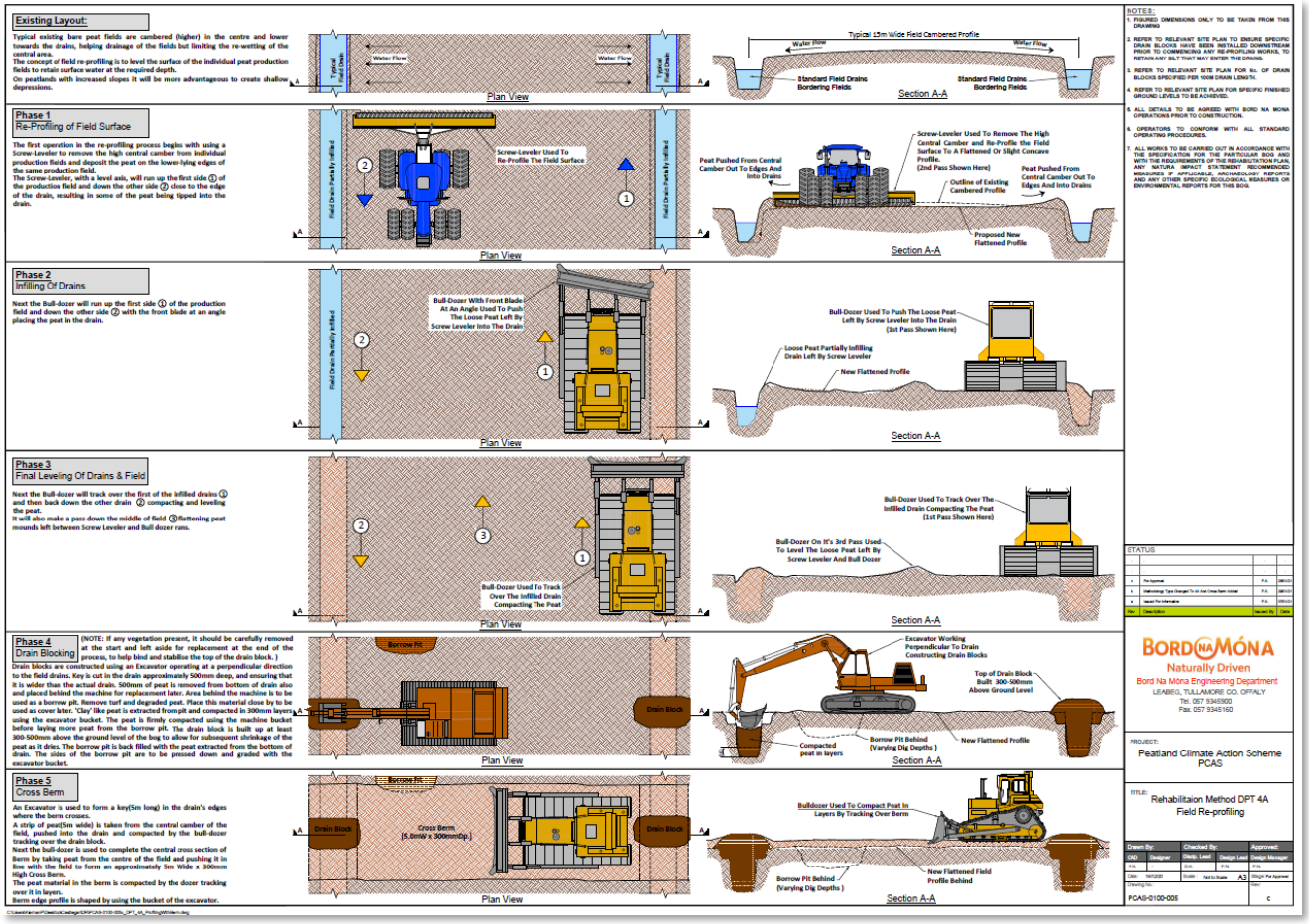


Figure 9: Indicative methodology for field profiling DPT4A

This method uses a bull dozer or 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 and partially in the drains (see **Figure 9**). It is not intended to completely infill the drains but the drains will be blocked with peat dams. It is planned to create a final profile with a largely flat or slightly concave surface. This will depend on the general topography and slope. On cutaway with increased slopes it will be more advantageous to create shallow depressions. Any depressions will be 10-20cm deep, and a maximum of 20m long (although natural topography may require flexibility in sizing). Depressions can be separated by a strip of undisturbed peat 1-2 m wide.

An alternative to using a dozer is to use a screw-leveller to create a 'clean cut' into a field of deep peat. Any peat which has been thrown to the side is then using to infill adjacent drains using a dozer. This is combined with drain blockages at set intervals, finger berms to prevent sheet flow of water, and cross berms, possibly keyed across the peat fields.

In general, water will still flow across the surface of the re-profiled peat field depending on the prevailing slope but will be retained for longer in the depressions, encouraging the development of wetland habitats. The increased depression will increase the area of optimal hydrological conditions. On more level ground, it will be more straightforward to re-wet larger areas with a more homogenous topography. Slowing water movement will have additional benefits of reducing fluvial carbon loss (via water) and also improving water quality leaving the site by reducing emissions of silt and ammonia.

6. Berms and field reprofiling (45m x 60m cell)

This measure seeks to create large flat areas or cells of shallow water on bare peat, across multiple fields that are enclosed by shallow berms to retain shallow surface water. The creation of cells will help retain surface water, keeping peat wet and will further slow water movement through the cutaway.

The width of each cell will typically be four fields wide. The centre of former cambered peat production field will be used one 'side' of the cell. Drains within the cell will be infilled. A bull dozer will be used to level and flatten the base of the cell and to infill the drains. The bull-dozer will be used to remove the camber from the former peat production fields and to create a flat and level surface. Laser levels will be mounted on bull-dozers to allow the machine drivers to move peat and create flat surfaces.

Alternatively, a similar process but utilising a screw leveller to remove the cambered surface may be undertaken.

Berms will be formed across or perpendicular to the fields using materials from the cell floor. These berms will be relatively shallow (30 cm high) and will be at least 4-5 m wide. These berms will act to enclose the cell and to retain shallow surface water. Pipes will be used to manage overflows and prevent bund erosion.

The berms will be constructed using an excavator and the trench-bunding technique may be used. The trench bunding technique involves digging a new trench as a 'foundation' or key for the bund. Material is then repacked into the trench and then built up to create a bund. Additional material for the bund will be supplied by the surrounding area. The trench bunding technique improves the overall strength of the bund by creating a foundation and also reduces sub-surface flows through the bunded area.

The exact dimensions of the cells will be dependent upon the topography of the site and the heights of the various peat fields. For example, it may be appropriate to have cells that are only two fields wide where two low fields have higher fields on either side. It may not be appropriate to equalise the levels of two adjacent fields where there is a significant height difference. The length of the cells may be shorter if the fields are on a steeper gradient to that the base of the cells is flat to retain water. Such flexibility is essential to maximise water retention on site and minimise machinery and peat movements. This enhanced measure requires more intensive planning to adapt it towards varying topography.

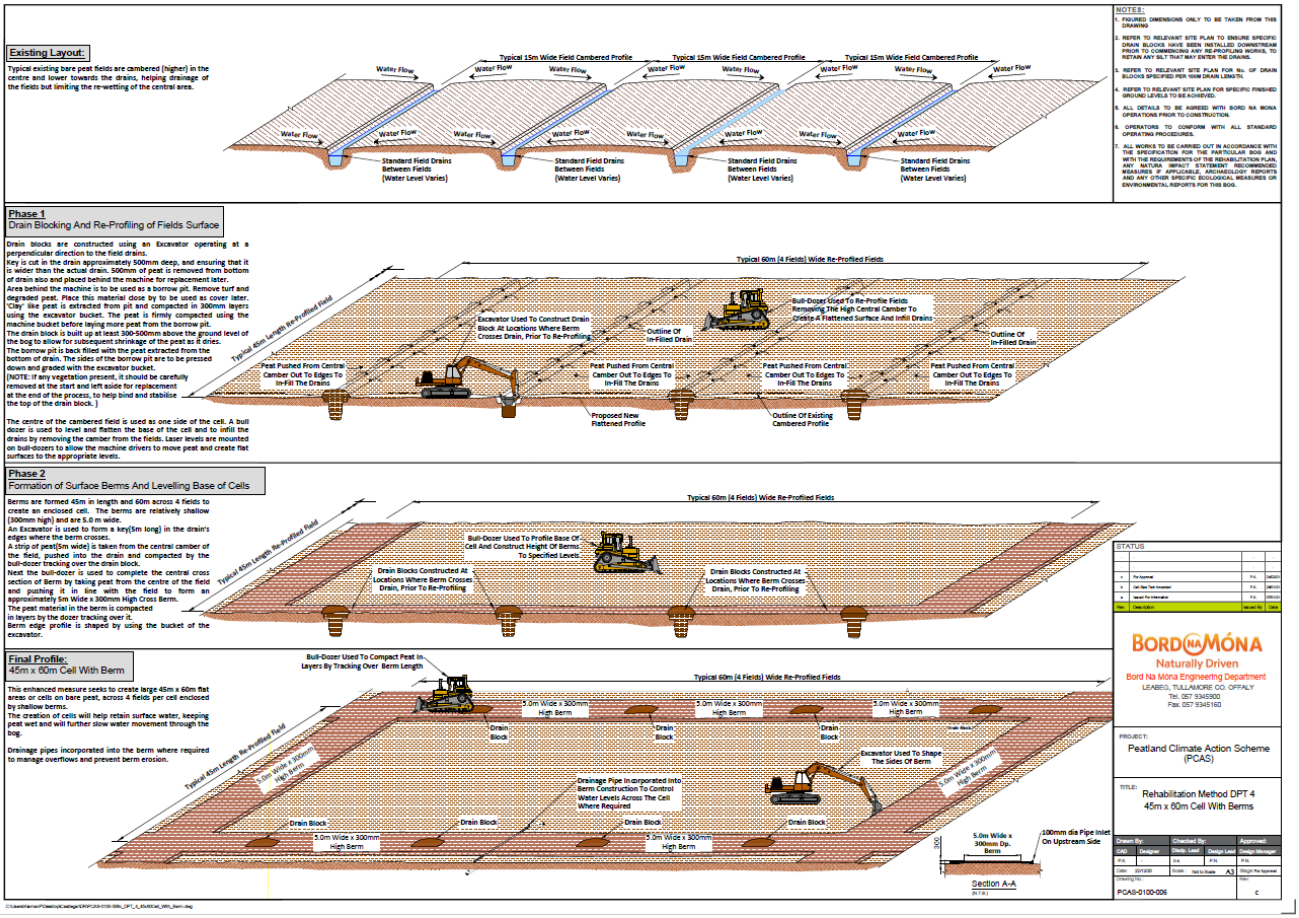


Figure 10: Indicative methodology for surface profiling with berm

7. Drainage channels for excess water

New drainage channels (swales) are appropriate to help manage larger volumes of water at large sites during high rainfall events. The main objective is not to drain any residual peat but to manage excess water and prevent significant flooding. Swales (shallow wide drainage channels) are a common measure used in the design and construction of constructed wetlands. They may only get occasional use during the year during periods of high rainfall.

At some Bord na Móna sites, once drains and pipes are blocked water can rise to inappropriate levels due to the localised topography (basins). Permanent deeper water can inhibit the development of wetland or peatland vegetation and large open bodies of water are not encouraged, where possible.

In some instances, 'taps' can be cut between peat fields to allow water flow/reduce volumes of water from one part of the bog to another.

This measure will allow greater management of water levels across the cutaway, the benefits of which are listed above and will help protect newly created infrastructure (cell bunds). Hydrological modelling will be key to design these new drainage channels.

8. Cut and fill cell bunding (30m x 30m cell)

This is an intensive engineering approach to peatland rehabilitation that looks to modify the topography substantially to optimise suitable hydrological conditions for the development of peat-forming communities. It will also have additional benefits of reducing fluvial carbon loss (via water) and also improving water quality leaving the site by reducing emissions of silt and ammonia.

The cut and fill cell bunding approach aims to create 'saucers' or flat bunded areas (cells) on peat with berms to hold shallow water at appropriate levels. Each cell is approximately 30 x 30 m and laser levels will be used

on excavators and bulldozers to aid the construction of flat cells surrounded by slightly convex berms. As cells are constructed production field drains will be infilled with peat. Cells will be sized relatively small to prevent wave erosion affecting the development of moss growth.

Bunds will be constructed using an excavator at a level approximately 30cm higher than the cell floor and will be about 4-5 m in width. Bunds may be constructed using the trench bunding approach described above. When the bund is constructed using this drier peat, it is compacted by the excavator's tracks to ensure that the bund retains shallow water in the cell. The top surface level of the bunds are constructed with a high level of accuracy (level along the extent of length bounding the cell). This is essential as surface water eventually overflows the bunds at later stages when drainage pipes become less functional.

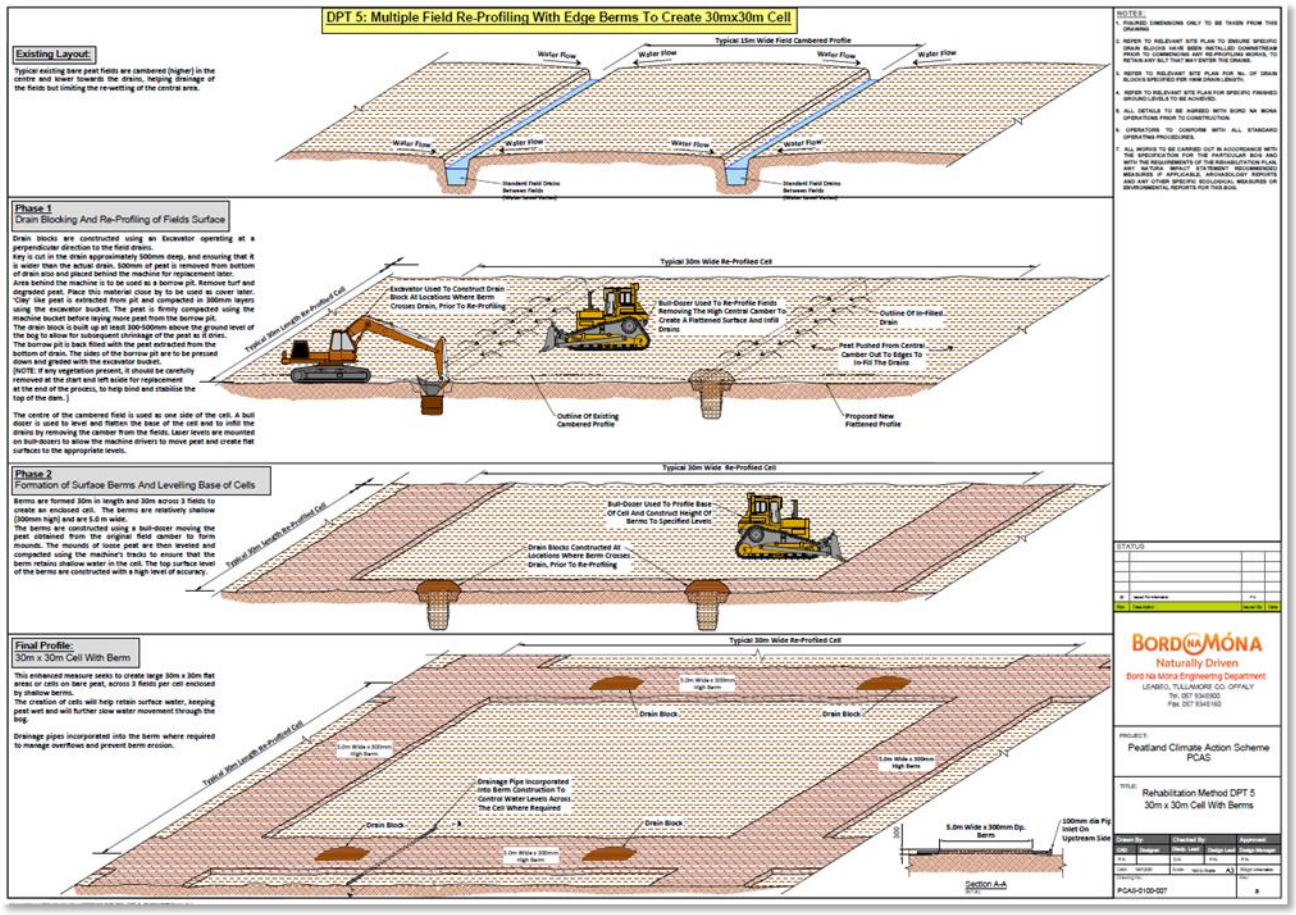


Figure 11: Indicative methodology for cut and fill cell bunding

When bunds are being constructed, drainage pipes are added (1 per cell) to channel flow from pond to pond down the site gradient. The drainage pipes include a 90-degree elbow and a section of straight pipe on the up-flow side to control the level of water in the cell at the desired level below the top level of the berm. Drainage pipes are important to prevent erosion of the bund during initial phases however, once the bunds are stabilised, the pipes became redundant as the vegetation within the pond establishes to a point where it hinders water flow to the pipe.

9. *Sphagnum* Inoculation

The main objective of this enhanced rehabilitation intervention is to accelerate the rate of natural colonisation of Sphagnum moss at suitable sites by introducing donor material. The presence of *Sphagnum*-rich vegetation on peatlands brings significant benefits as this is considered a potential carbon sink.

There is potential to use *Sphagnum* inoculation to establish and diversify selected small areas on target sites with *Sphagnum* species, which in turn, and in combination with natural colonisation, can then naturally

colonise the remaining deep peat cutover bog area. *Sphagnum* inoculation should only be used in appropriate environmental conditions (water-logged, deep peat with stable water levels and with more acidic water chemistry).

It is proposed to use locally sourced *Sphagnum* and procured donor material, sourced from older established Bord na Móna cutover bog sites where possible, to inoculate Bord na Móna deep peat cutover bogs. Small amounts (handfuls) will be distributed into the newly created cells on deep peat cutover bog. This material can be planted into the soft peat or scattered into shallow water. The use of significant volumes of *Sphagnum* donor material is constrained by the small amount of suitable donor material and donor sites. It is also proposed to use *Sphagnum* donor material developed in greenhouses (e.g. Beadaplugs), where suitable donor material can be made available, and where this is required.

There are significant benefits for climate action from establishing *Sphagnum*-rich peatland vegetation communities. These have been found to quickly develop as carbon sinks (> 10 year). This enhanced measure will be used in combination with some of the other enhanced re-wetting measures (cut and fill cell bunding) to accelerate and optimise the development of *Sphagnum*-rich vegetation on suitable deep peat cutaway sites.

10. Retention of Hydraulic Breaks

To sustain hydrological continuity through the margins of the proposed rehabilitation and decommissioning site and to avoid flooding of adjacent lands, it is proposed to retain certain key hydraulic breaks (drains) along the margins of the bog site and to regrade some drains along the boundaries of the site. These works will be completed to retain peripheral surface water drainage around the margins of the bog rehabilitation sites allowing hydrological flow from lands upstream of the site to areas downstream of the rehabilitation site. These works may require localised instream excavation, widening and regrading of existing drains with tracked excavators. **Figure 12** below provides an image from the Derrycolumb Bog Drainage Management Plan which shows the locations and extent of proposed drainage management features. This mostly includes the retention of existing drainage features, maintenance of silt ponds, the upgrade of a small stretch of the Bilberry River near the south-eastern boundary of Derrycolumb Bog and the creation of a new channel near the north-western boundary of the site.

Figure 12: Drainage Management Measures for Derrycolumb Bog (derived from the Drainage Management Plan for Derrycolumb Bog)

See Appendix D for the full suite of Methodology Drawings.

Hydrological functionality of the created wetlands

Once the rehabilitation measures have been implemented and are functional, the wetland measures as they approach the discharge points will be adapted to act as a silt control measure and thus performing the same functional requirement as the in-situ silt ponds. It also the case that the wetlands upstream of the outfalls will act as a large silt sinks between high fields and thus increased sediment/silt control will be introduced to the bog by default as part of the rehabilitation measures. The orientation of the taps through the Highfields is staggered to further promote a silt control function and slow down the escape of water from the bog.

A breakdown of the extent of deep peat rehabilitation packages is provided in **Table 7**, below.

Deep Peat Cutover Bog		**Extent (Ha)**
DPT2	More intensive drain blocking (7/100 m) & blocking outfalls & managing overflows	2.8
DPT3	More intensive drain blocking (7/100 m) & field reprofiling & blocking outfalls and managing overflows	75.2
DPT4	Berms and field re-profiling (45m x 60m cell) + blocking outfalls and managing overflows + drainage channels for excess water + *Sphagnum* inoculation	40.6
DPT5	Cut and Fill cell bunding (30m x 30m cell) + blocking outfalls and managing overflows + drainage channels for excess water + *Sphagnum* inoculation	4.4

Table 7 Extent of Deep Peat Rehabilitation proposed at Derrycolumb.

A breakdown of the extent of wetland, dry cutaway rehabilitation types and silt ponds is provided in **Table 8**, below.

Dry Cutaway and Wetland		**Extent (Ha)**
DCT2	Regular drain blocking (3/100 m) + blocking outfalls and managing water levels with overflow pipes + targeted fertiliser treatment	77.8
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	43.2
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	20.7
WLT4	More intensive drain blocking (max 7/100 m), + blocking outfalls and managing overflows + transplanting Reeds and other rhizomes	95.9
n/a	Silt ponds	1.0

Table 8 Extent of Dry Cutaway and Wetland proposed at Derrycolumb.

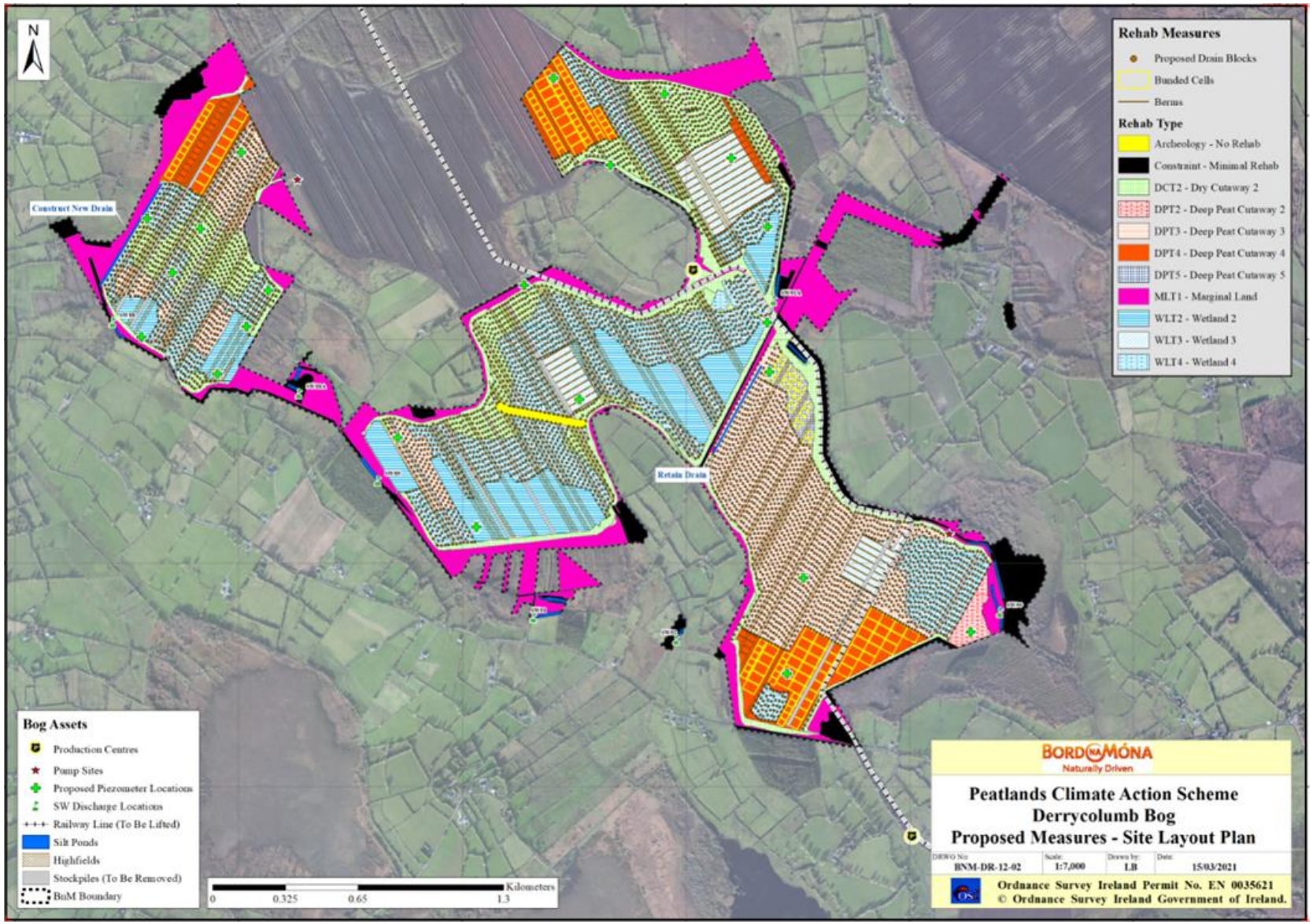


Figure 13: Proposed Enhanced (PCAS) Rehabilitation Plan

2.6.1.4 Decommissioning and Rehabilitation Timescale and Resource Requirements

Duration

Decommissioning activities will be completed within a period of 12 months and are scheduled to be completed before the end of April 2022.

Rehabilitation activities will be completed within a period of approximately 12 months. In general activities proposed for FY22 i.e. 2021 will be carried out between the months of April and October inclusive.

The duration of activities provided are approximate and may be slightly shorter or longer, depending on weather conditions and progress on rehabilitation prescriptions. Activities may cease for the winter months due to rainfall and poor ground conditions, in line with typical BNM work practice and H&S requirements. In any case, the rehabilitation period will not be longer than 1 year.

2.6.1.4.1 Hours of Work

Normal Decommissioning and Rehabilitation times will be daylight hours between 08.00 and 17.30hrs Monday to Friday.

2.6.1.5 Use of Natural Resources

Land Requirement: There is no land requirement in respect of **decommissioning**. The Derrycolumb bog area comprises 455.8 hectares of land, however not all of this area will require active rehabilitation works. As rehabilitation through stabilisation and land cover change is the primary objective, no 'negative quality' land take is associated with Rehabilitation. No land take is required for e.g. the storage of vehicles – vehicles are typically left in situ at points of work or on 'headlands'.

Water: No additional water is required for either decommissioning or rehabilitation.

Soils/Peat:

Regarding **decommissioning** some peat or topsoil material which is contaminated may be removed in line with Schedule 2 of the IPC license. This is considered negligible in magnitude.

During **rehabilitation**, minor quantities of existing peat will be excavated from drainage trenches and/or an immediately adjacent borrow pit at peat dam locations and immediately used to form peat blocks. Borrow pits are re-instated, as the final step in dam creation, by the excavator driver profiling the surrounding peat/scraw into place over the excavated borrow pit. In each instance the magnitude of extracted peat is negligible. Similarly, the installation of overflow pipes may require excavation of minor quantities of peat, and/or subsoil dependant on location (Insertion of peat blockages/overflow pipes may interact with underlying subsoils where peat depths are shallow). All material used will be from the immediate vicinity and no transport of material will be required.

Existing bare peat surfaces will be re-profiled in line with pre-defined 'levels' where required to 'rewet' areas of currently dry peat. This may be through use of a dozer or a screw leveller. Dozers will be used to create 'speed bumps' or dams across existing drainage channels adjacent to re-profiled areas, by 'dozing' peat displaced in re-profiling into place at pre-defined dam locations. Dozers may also be used to infill drains with peat displaced by screw levelling. For any prescriptions such as the creation of bunded 'cells', certain fields will be re-profiled into a succession of tiered cells with separating bunds or dams; in some instances, these may be 'keyed', to avoid sub-surface water flow, and ensure cells retain the target depth of water.

Peat will also be utilised to infill any blocked outfalls or raised drainage pipes.

Hydrocarbons will be used on-site during decommissioning and rehabilitation activities and will be limited to the diesel or petrol fuel and mechanical oils used by any onsite site machinery and equipment.

2.6.1.6 Emissions & Wastes during Rehabilitation

Dust, Noise, Vibration: Dust, noise and localised vibration along access routes arising from the arrival and departure of **decommissioning** vehicles or **rehabilitation** machinery will be localised to the access tracks or rail line, occur in low volumes and last for a negligible duration – it is common practice on BnM working bogs to leave vehicles *in situ* once on site, therefore daily trips into and out of the bog are not expected. Dust and noise limits are currently set on IPC licenses.

Regarding rehabilitation, the extent of dust, noise and localised vibration from individual machines creating peat dams to block drains or blocking outfalls is momentary in duration and localised and therefore considered negligible in magnitude. Reprofiling the surfaces of exposed peat using a 'dozer' or 'screw leveller' and creating 'speed bump' blockages or infilling drains produces a higher potential for the release of dust, however the duration of this is expected to be brief (i.e. with effects lasting less than a day). Enhanced measures where bunded cells are created may take longer duration.

Durations overall are expected over a 12-month period at Derrycolumb Bog or until rehabilitation is complete.

Fuel and some pipes may require to be delivered. No blasting or piling is required.

Wastes: General waste will arise from the presence of staff. Very small quantities of chemical waste will be generated, this waste is limited to solid waste oil, such as oily rags.

Welfare Facilities: Welfare facilities are available at Derrycolumb Bog. Where required, Portaloos and additional welfare facilities may be added to the Derrycolumb site. This may be required to accommodate guests or additional workers during the summer months and to assist with social distancing requirements during the ongoing Covid-19 pandemic.

2.6.2 Operational Stage

Duration: Once constructed and commissioned, the proposed Decommissioning and Rehabilitation will remain permanently in place.

Operational Activities: Operational activities will mainly comprise non-intrusive environmental & ecological monitoring (including surface water monitoring, vegetation monitoring but also the use of drones to provide catalogues of aerial photography),and may also include minimal works such as repairs to existing peat blockages, adjustment of overflow pipes (where required) and or fertilisation to increase successional rates. Maintenance of existing silt ponds to reduce emissions to local water bodies, as conditioned by the existing IPC license, will still be required. Activities to retain the function of drainage channels operating as hydraulic breaks along the site boundary, to include drainage channel cleaning, removal of trees, debris etc.

Operational Access: Operational access will be through the existing local road networks at the Derrynagran and Derrinduff townlands, in addition to existing internal access tracks which facilitated the previous peat extraction.

Timing of Operational Activities: It is expected that scheduled inspection and maintenance activities will be carried out by a 2-4 person team, typically for 1 day per month, for the foreseeable future.

Use of Natural Resources: During the Operational Stage, there is limited requirement for the use of natural resources – negligible quantities of peat or subsoil may be used to repair existing or create additional drain blocks.

Emissions & Wastes: During the Operation Stage of Rehabilitation there will be negligible exhaust fumes, dust and noise emitted by maintenance vehicles and or other equipment such as drones during occasional maintenance works, such as to outflows.

Fugitive emissions to air

Collectively, ceasing industrial peat production, re-wetting and re-vegetating will minimise any risk of emission to air from dust. During the operational stage of Peatland Rehabilitation, typical emission of dust from exposed peat to air is expected to cease.

Carbon Emissions

Following rehabilitation and into the early operational stage Derrycolumb Bog may continue to be a carbon source, however as habitats stabilise following intervention, the bog is expected to, over time, become a carbon sink in part.

2.6.3 Other Projects and Plans with Potential to Cause In-Combination Effects

The location of the proposed Derrycolumb Bog decommissioning and rehabilitation will partially overlap (temporally) with the removal of existing stockpiles from the Derrycolumb Bog site. The removal of these stockpiles are anticipated to be completed before the end of summer 2021. Longford County Council are proposing a future amenity trackway through Derrycolumb Bog, the project is currently in the Part VIII process and will comprise: the construction of a trackway approximately 3.9km in length through the townlands of Derrycolumb, Derrylough and Derryad (Rathcline By.). This project does not overlap temporally with the proposed decommissioning and rehabilitation of Derrycolumb Bog.

Other bogs within the larger Bog Group will also be subject to both decommissioning and rehabilitation to meet IPC license conditions. This has the potential to result in in-combination effects from the release of hydrocarbons, emissions to air and water.

Peat extraction through turbary occurs around the margins of Derrycolumb Bog and at other locations within 15km. This has the potential to result in in-combination effects from the release of hydrocarbons, emissions to air and water, and through modification to drainage regimes.

A planning search of the National Planning Database found a number of proposed or consented developments within the vicinity of Derrycolumb Bog, including private dwellings or amendments to private dwellings, and a number of agricultural led planning applications such has for slatted sheds/ amendments to existing farm infrastructure etc.

There are 3 no. local authority jurisdictions within 15km of Derrycolumb Bog (Longford County Council, Westmeath County Council and Roscommon County Council). All local authorities have County Development Plans and/or plans relating to Heritage and Biodiversity.

There is a current ongoing NPWS Raised Bog Restoration Project which may include at some date some raised bogs within 15km of Derrycolumb Bog. Restoration activities at these bogs may have the potential for in combination effects with decommissioning and rehabilitation at Derrycolumb Bog, however there is no currently known temporal or spatial overlap between any planned restoration activities and the decommissioning and rehabilitation of Derrycolumb Bog.

The threats and pressures for Lough Ree SAC (**Table 14**) identify 'J02.11.02 - Other siltation rate changes' as a high ranking negative threat and pressure for this European Site. Therefore, the proposed project in addition to other plans and projects within the Zone of Influence that could contribute siltation effects to the receiving environment and the downstream sections of Lough Ree SAC are considered further below.

2.6.3.1 Other BnM Bog Group Decommissioning and Rehabilitation

Other BnM bogs within the larger Mount Dillon group will also be subject to decommissioning and rehabilitation to meet the various, pertinent, IPC license conditions, however, currently, the only known temporal overlap between these proposed activities elsewhere in the Mount Dillon group is at the following bogs:

- Edera Bog – Adjoins the southern boundary of Derrycolumb Bog. Edera Bog supports connectivity to the downstream sections of Lough Ree SPA and Lough Ree SAC via the Ledwithstown_010 watercourses. The proximity and interconnectivity between these sites and their co-location within the Ledwithstown_010 watercourse catchment area means there is potential for in-combination effects.
- Derrycashel Bog – Located 13.1km north-west and upstream of Derrycolumb Bog. Derrycashel Bog is located within the Upper River Shannon catchment and supports potential hydrological connectivity to downstream areas of Lough Ree SPA and Lough Ree SAC via the River Shannon.

The construction phase of decommissioning and rehabilitation at these bogs may overlap those proposed for Derrycolumb Bog. All of the above bog sites within the Mount Dillon Group support potential connectivity with the downstream areas of Lough Ree SAC and Lough Ree SPA.

The Operational stage of Derrycolumb Bog Decommissioning and Rehabilitation will overlap the Rehabilitation stage of other bogs within the Mount Dillon Bog group however the expected magnitude of any effects from Derrycolumb Bog at this lifecycle stage are evaluated as insufficient to result in in-combination effects. The possibility of likely significant in combination effects can reasonably be excluded on this basis.

As outlined, bog sites within the Mount Dillon Group proposed for decommissioning and rehabilitation in 2021, support potential connectivity with the downstream areas of Lough Ree SPA and Lough Ree SAC. The decommissioning and rehabilitation of any other bogs within the greater Mount Dillon Group will be subject to Appropriate Assessment and it is considered the requisite mitigation will be in place should the potential for any adverse effects on European site integrity be identified as part of the Appropriate Assessment process. This should also identify the potential for any sequential in-combination pathways, in particular should temporal overlap exist.

2.6.3.2 Decommissioning existing stockpiles at Derrycolumb Bog

Remaining peat stockpiles (See Figure 6 for locations of peat stockpiles on site) will be removed from the Derrycolumb Bog site in 2020 and 2021. The removal of these stockpiles could contribute to baseline water quality impacts to receiving watercourses and the downstream European Sites through the release or spread of particulate matter into the Ledwithstown River. Such effects are possible in the absence of best practice measures and Standard Operating Procedures being implemented. Bord na Mona have developed a SOP for loading and removal of peat stockpiles from site to ensure targeted transfer of milled peat material to transport vehicles with no spread or release of this material to the receiving and surrounding environment.

2.6.3.3 Turbary

Analysis of aerial photography displays private turbary at the north and south western margins of Derrycolumb Bog, with further areas at Newtownflanagan and Drumnee (south-west and south of Derrycolumb Bog) in addition to further evidence of unauthorised turbary occurs at various locations within 15km of Derrycolumb Bog. Hydrological linkages between these turbary sites and the receiving environment at Derrycolumb Bog may exist, primarily via drainage to EPA blue line watercourses. These linkages provide potential to contribute to in-combination or cumulative effects to Lough Ree SPA / SAC.

2.6.3.4 NPWS Raised Bog Restoration Lough Forbes Complex SAC (001818) Aghnamona Bog NHA (000422)

Lough Forbes Complex SAC and Aghnamona Bog NHA are located 13km and 22km north of the proposed Derrycolumb bog rehabilitation area respectively and may possibly be subject to restoration and rehabilitation works in the short-term.

An Appropriate Assessment (of the National Raised Bog SAC Management Plan 2017-2022) has been carried out in accordance with Regulation 42(11) and 42(12) of the European Communities (Birds and Natural Habitat) Regulations 2011-2015 and has had regard to the findings of the Natura Impact Statement, the conservation and management measures set out in the National Raised Bog SAC Management Plan 2017-2022 and which constitute plan-level mitigation measures, and the submissions and observations received on the (draft) National Raised Bog SAC Management Plan[13]. One of the primary mitigation elements proposed

[13] https://www.npws.ie/sites/default/files/general/AA%20Determination%20NRBMP%202017_2022_0.pdf

is that screening for appropriate assessment and if necessary appropriate assessment will be carried out in relation to any site specific/project level measures including restoration measures and turf-cutting. If AA of a project at site level determines that adverse effects are likely, or cannot be ruled out, the project will either not be pursued or, where considered appropriate, the derogation steps of Article 6(4) will apply, but only in a case in which there are imperative reasons of overriding public interest (IROPI) requiring a project to proceed, there are no less damaging alternative solutions, and compensatory measures have been identified that can be put in place.

On this basis, it is assumed that the appropriate level of Appropriate Assessment has or will be carried out in respect of any future proposed restoration activities at the above bog, and that any required mitigation to avoid adverse effects on European Site integrity will be in place.

2.6.3.5 Agricultural Activity

Given the proximity of Derrycolumb Bog to Lough Ree and the Upper Shannon Catchment, there is potential for agricultural activities and their respective emissions to air (noise as a source of disturbance) and water (sediment, runoff, deleterious materials) to combine with source effects from decommissioning and rehabilitation at Derrycolumb Bog. Most of these activities are not subject to Appropriate Assessment, and form part of the existing baseline environment.

2.6.3.6 Mid-Shannon Wilderness Park

Longford County Council proposed the development of amenity facilities (such as walkways and cycleways) within cutover bog areas at and near Lanesboro, Killashee and Keenagh boglands. Co. Longford. The development of these walkways and cycleways will not temporally overlap with the proposed rehabilitation works at Derrycolumb Bog.

2.6.3.7 Local Authority Development Plans

The following development plans have been identified:

- Roscommon County Development Plan 2014-2020
- Roscommon County Development Plan 2021 – 2027
- County Roscommon Heritage Plan 2017-2021
- Longford County Development Plan 2021-2027
- County Longford Heritage Plan 2019-2024
- Draft County Development Plan 2021-2027
- County Westmeath Heritage Plan 2018-2023

It is assumed that the above, or any other plans including those currently at draft status, will be subject to the requirement for Appropriate Assessment which can reasonably be assumed to provide mitigation to avoid adverse effects on European Sites.

2.6.3.8 Proposed Solar Farms at Middleton, Ballycore, Treanboy and Newtown near Kilashee, Co. Longford (18135), Fisherstown, Clondra, Co. Longford (18146) and Ballykenny Co. Longford (19222)

Three proposed solar farms located in upstream catchment of Derrycolumb Bog, all of which support connectivity with the Lough Ree catchment and its associated European Sites.

Solar Farm (18135)

Ten year permission for a solar farm on a site of approximately 51.38 hectares consisting of the following: up to 216,000 m^2 of solar photo-voltaic panels on ground mounted steel frames to generate between 35MW to

50MW of electrical energy; substation and control room and associated hard standing; 14 no. inverter/transformer stations; underground power and communication cables & ducts; boundary security fence; CCTV cameras; upgraded internal access tracks; new internal access tracks and associated drainage infrastructure; provision of passing areas on lands adjacent to the L-11261 local road; access will be via the L-11261 local road through the upgrade of an existing agricultural entrance and at the existing entrance to Middleton House; and temporary construction compounds and all associated site services & works

Solar Farm (18146)

Proposed development at a site comprising lands within the property of the former Atlantic Mills factory. The development will comprise the construction of a solar farm with an export capacity of approximately 4MW comprising photovoltaic panels on ground mounted frames, with associated infrastructure including a switch gear control room (to be developed at 1 of 2 location options on site. No additional works proposed to the existing substation on site as part of this application), ducting and electrical cabling, internal access roads, fencing and all associated site development works.

Solar Farm (19222)

Planning application for a 25 year permission for a solar farm up to 19 Ha with an export capacity of approximately 9MW comprising of photovoltaic panels on ground mounted steel frames, a single storey DNO building, customer room, control building, storage container, HV kiosk, switch gear housing and 6 no. inverter transformer enclosures, ducting and electrical cabling, perimeter fencing, mounted CCTV cameras, new internal access tracks and associated drainage infrastructure and all associated site works at Ballkenny, Co Longford.

All of these proposed solar farm sites have been granted conditional planning permission. All solar farm sites support connectivity to the River Shannon catchment and the Lough Ree catchment and by extension Lough Ree SPA / SAC.

2.6.3.9 Derryadd Windfarm ABP-303592-19

In 2019, Bord na Mona Powergren Ltd submitted a planning application to An Bord Pleanala for a 10-year planning permission for the construction of a wind farm comprising 24 no. wind turbines, 1 no. 110kV substation and all related works. An Bord Pleanala granted planning for this windfarm with 19 conditions. This windfarm is located ca. 900m north-east of Derrycolumb Bog and extends between Keenagh and Lanesborough. Derryadd Windfarm supports connectivity with the Lough Ree catchment and could contribute to cumulative impacts to constituent European Sites; i.e. Lough Ree SPA and SAC.

It should be noted that when rehabilitated, Derrycolumb Bog may become more suitable to support wetland waterbird species, including some SCI species of Lough Ree SPA. Should SCI species utilise the Derrycolumb site during the project's operational phase, they will not be subject to significant adverse effects (as a result of disturbance, displacement or collision) from site maintenance works and monitoring, both of which will be intermittent and temporary. To this end, SCI species that may utilise the Derrycolumb site once operational will not be subjected to baseline impacts upon which Derryadd Windfarm could further contribute. The construction and operational phases of Derryadd Windfarm will be subject to their own mitigation measures to safeguard avifaunal species, including potential ex-situ impacts to SCI species utilising the Derryadd Windfarm and its environs.

2.6.3.10 Amenity Trackway through Derrycolumb Bog

Longford County Council are proposing a future amenity trackway through Derrycolumb Bog, the project is currently in the Part VIII process and will comprise: the construction of a trackway approximately 3.9km in length through the townlands of Derrycolumb, Derrylough and Derryad (Rathcline By.). The works will consist

of a walkway, a number of activity areas at various locations and associated site works. The proposed development will require the layering on the surface of the bog to develop the final layer of the walkway. It is envisaged the majority of the area around the trackway will be allowed to re-nature back to its original wetland character.

This project does not overlap temporally with the proposed decommissioning and rehabilitation of Derrycolumb Bog.

2.6.3.11 Other Projects or Activities

The likelihood of cumulative interaction with other plans or projects is considered low, due to limited temporal or spatial overlap; the absence of hydrological connectivity or shared hydrological catchment with many of the other plans or projects described, the separation distance or setback buffers between the described plans or projects and European Sites, and the requirement for Appropriate Assessment for other plans or projects, such as private dwellings, forestry entrances, slatted sheds, masts and amendments to existing planning consents, which can reasonably be assumed to provide mitigation to avoid adverse effects on European Sites. Nonetheless the possibility of secondary effects from activities forming part of decommissioning or rehabilitation at Derrycolumb Bog cannot be excluded – a precautionary approach is taken.

Figure 14 below illustrates the locations of the above mentioned projects relative to the proposed rehabilitation works at Derrycolumb Bog.

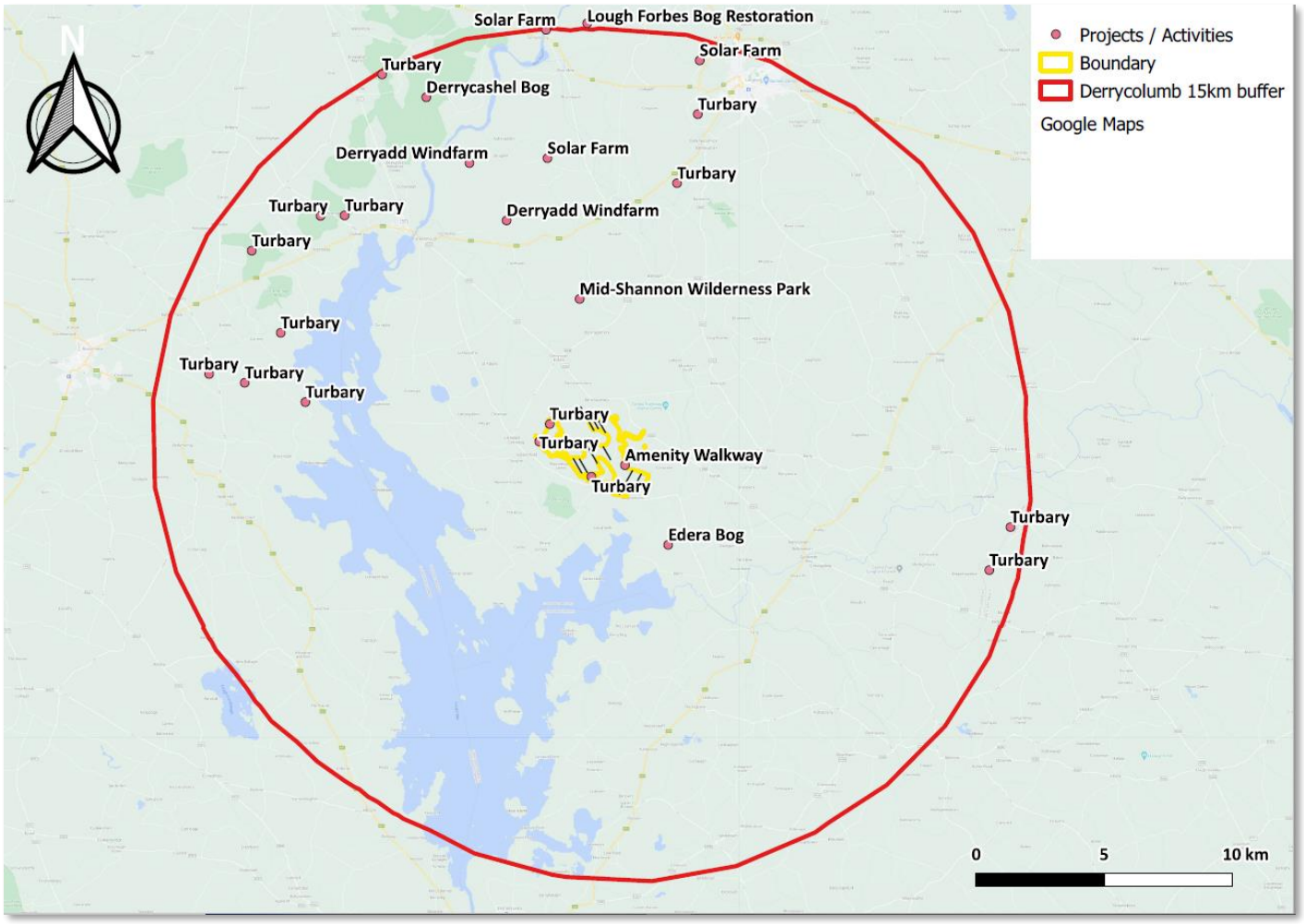


Figure 14: **Other projects and activities within 15km of the proposed bog rehabilitation works at Derrycolumb**

2.7 European Sites under consideration

2.7.1 Distance of the Project to European Sites

For the proposed Derrycolumb Bog decommissioning and rehabilitation, a limited zone of potential impact is predicted, due to the relatively small scale, duration and localised nature of the activities proposed.

Nevertheless, a precautionary 15km distance was chosen to evaluate the potential for effects (alone and in-combination) on European Sites.

There are **9 European Sites** - **7** Special Area's of Conservation (SAC) and **2** Special Protection Area (SPA) - **within 15km of Derrycolumb Bog.** The locations of these European Sites are illustrated in **Figure 15: European Sites within 15km of Derrycolumb Bog** and **Figure 16: Proximal, adjacent or overlapping European Sites**, with the distances from the bog rehabilitation site and comment on hydrological connectivity provided in **Table 9**.

Table 9: European Sites within 15km of Derrycolumb Bog

European Site (SAC or SPA)	Site Code	Distance from the Development*	Hydrological Connectivity (Y/N: If Yes Downstream or Upstream connectivity relative to Derrycolumb Bog)
Lough Ree SAC	000440	290 m south-west of Derrycolumb and 366m downstream at its closest point.	Y:Downstream via the Ledwithstown_010 and Drumnee_010 watercourses.
Lough Ree SPA	004064	350m south-west of Derrycolumb and 520m downstream at its closest point.	Y:Downstream via the Ledwithstown_010 and Drumnee_010 watercourses.
Corbo Bog SAC	002349	12km north-west	N: No, located upstream of the proposed works. No hydrological connectivity between the proposed bog rehabilitation site and this European Site.
Fortwilliam Turlough SAC	000448	3.7km north-west	N: No, located upstream of the proposed works. No hydrological or hydrogeological connectivity between the proposed bog rehabilitation site and this European Site.
Mount Jessop Bog SAC	002202	7.9km north-east	N: No, located upstream of the proposed works. No hydrological connectivity between the proposed bog rehabilitation site and this European Site.
Brown Bog SAC	002346	12.9km north/north-east	N: No, located upstream of the proposed works. No hydrological connectivity between the proposed bog rehabilitation site and this European Site.
Lough Funshinagh SAC	000611	14.6km south-west	N: No, located upstream of the proposed works. No hydrological connectivity between the proposed bog rehabilitation site and this European Site.
Ballykenny / Fisherstown Bog SPA	004101	12.9km north	N: No, located upstream of the proposed works. No hydrological connectivity between the proposed bog rehabilitation site and this European Site.
Lough Forbes Complex SAC	001818	12.9km north	N: No, located upstream of the proposed works. No hydrological connectivity between the proposed bog rehabilitation site and this European Site.

*All distances cited are the closest straight line distance as measured using GIS.

The Qualifying Interests/Special Conservation Interests and locational context for each of the thirteen European Sites examined in this Screening Report are provided in **Table 10.**

The Site Synopsis and Conservation Objectives for each site are available in full on the National Parks & Wildlife Service website at https://www.npws.ie/protected-sites. Conservation Objectives were reviewed to inform the current appraisal – in particular to identify any possible sensitivities and resultant pathways for likely significant effects.

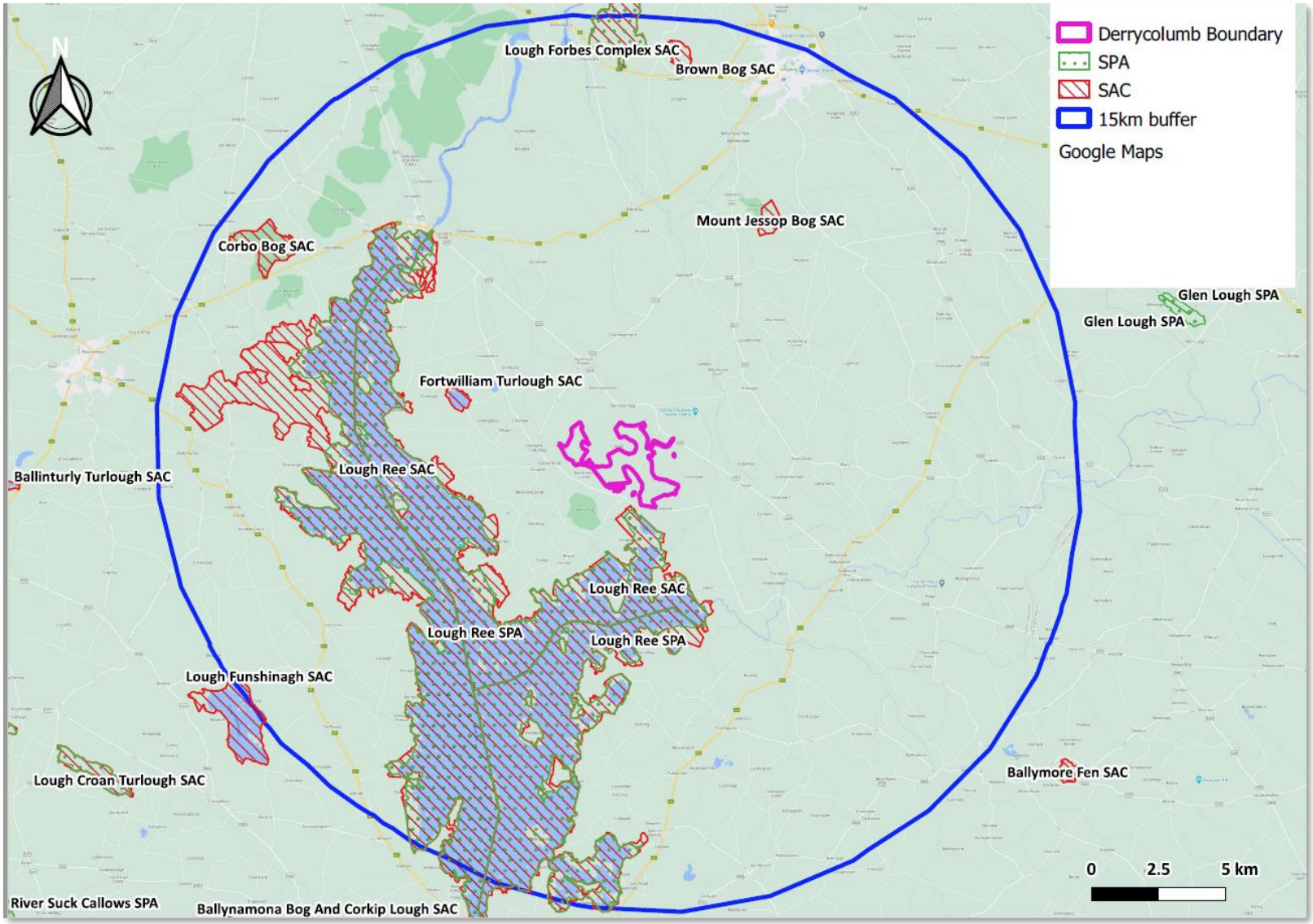


Figure 15: European Sites within 15km of Derrycolumb Bog

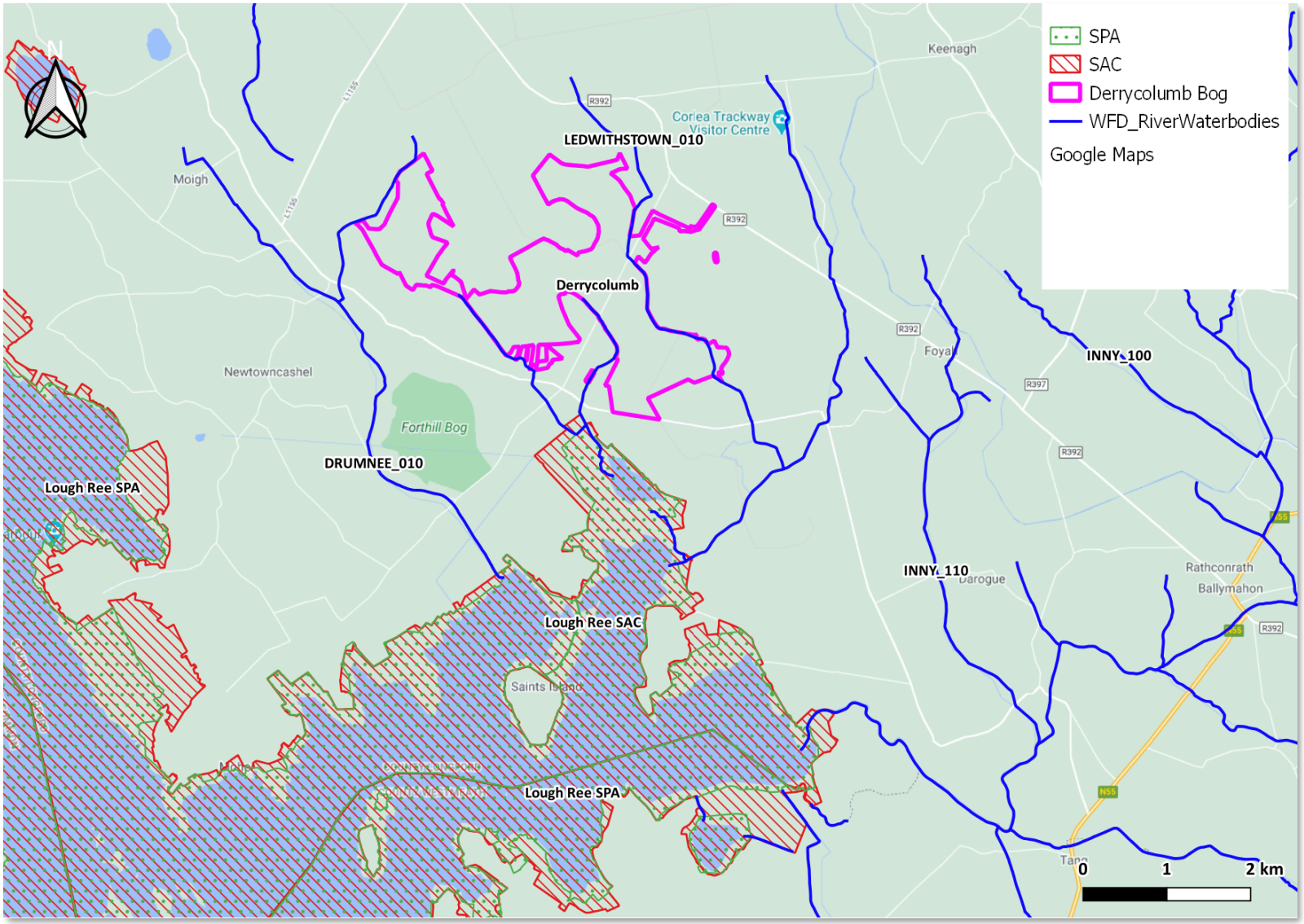


Figure 16: Proximal, adjacent or overlapping European Sites

Table 10: Description of European Sites within a 15km radius of Derrycolumb Bog

	European Site Name and Code	Qualifying Interest / Special Conservation Interest and Code *denotes a priority habitat	Summary Description (from Site Synopsis)	Data Source
1	Lough Ree SAC (000440)	[1355] Otter *Lutra lutra* [3150] Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation [6210] Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [7120] Degraded raised bogs still capable of natural regeneration [7230] Alkaline fens [8240] Limestone pavements [91A0] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91D0] Bog woodland*	Lough Ree is the third largest lake in Ireland and is situated in an ice-deepened depression in Carboniferous limestone on the River Shannon system between Lanesborough and Athlone. The site spans Counties Longford, Roscommon and Westmeath. Some of its features (including the islands) are based on glacial drift. It has a very long, indented shoreline and hence has many sheltered bays. Although the main habitat, by area, is the lake itself, interesting shoreline, terrestrial and semi- aquatic habitats also occur. Lough Ree and its adjacent habitats are of major ecological significance. Some of the woodlands around the lake are of excellent. St John's Wood is particularly important; it is one of the very few remaining ancient woodlands in Ireland. The lake itself is an excellent example of a mesotrophic to moderate-eutrophic system, supporting a rare fish species and a good diversity of breeding and wintering birds.	NPWS (2013) Lough Ree SAC 000440. Version date: 23.08.2019. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Accessed online 26.11.2020
2	Corbo Bog SAC (002349)	[7110] Active raised bogs [7120] Degraded raised bogs still capable of natural regeneration [7150] Depressions on peat substrates of the Rhynchosporion	Corbo Bog is located 7 km west of Lanesborough, mainly in the townlands Corbo, Cloonageeragh, Clooncashel Beg and Coolshagtena, in Co. Roscommon. The site comprises a raised bog that includes both areas of high bog and cutover bog. The site is bounded on the south by the Lanesborough to Roscommon road, and a road from this one to Kilroosky forms part of the western boundary. Corbo Bog is a site of considerable conservation significance as it consists of a raised bog, a rare habitat in the E.U. and one that is becoming increasingly scarce and under threat in Ireland. This site supports a good diversity of raised bog	NPWS (2015) Conservation Objectives: Corbo Bog SAC 002349. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Accessed online 28.12.2020

	European Site Name and Code	Qualifying Interest / Special Conservation Interest and Code *denotes a priority habitat	Summary Description (from Site Synopsis)	Data Source
			microhabitats, including hummock/hollow complexes, pools and flushes. Active raised bog is listed as a priority habitat on Annex I of the E.U. Habitats Directive. Priority status is given to habitats and species that are threatened throughout the E.U. Ireland has a high proportion of the total E.U. resource of this habitat type (over 60%) and so has a special responsibility for its conservation at an international level.	
3	Fortwilliam Turlough SAC (000448)	[3180] Turloughs	Fortwilliam Turlough is situated close to the eastern shore of Lough Ree, 6 km south of Lanesborough, in Co. Longford. The surrounding countryside is flat, with a thin cover of drift. The floor of the basin is at two levels, a lower central area with several lakes and ponds, and a higher surrounding area of till with scattered rocks, extending north-westwards into flat fields and woodland. There is a little surface flow into the basin and floodwater appears to be strongly calcareous. Fortwilliam is the only extant large turlough in Longford and one of only two east of the River Shannon. It has a high diversity caused by a semi-permanent waterbody, abundant marl precipitation, a relative lack of grazing and small outcrops of limestone, so it is a very representative example of the habitat. The turlough basin seems intact, its basin and hydrology largely unmodified. Its oligotrophic status is valuable, as this feature is becoming rarer in the context of modern agriculture. Due to these factors, Fortwilliam Turlough is a site of considerable ecological value.	NPWS (2018) Conservation Objectives: Fortwilliam Turlough SAC 000448. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht. Accessed online 28.12.2020
4	Mount Jessop Bog SAC (002202)	[7120] Degraded raised bogs still capable of natural regeneration [91D0] Bog woodland*	Mount Jessop Bog SAC occurs within the larger raised bog system that is designated as Mount Jessop Bog NHA (001450). It is situated 5	NPWS (2020) Conservation objectives for Mount Jessop Bog SAC

	European Site Name and Code	Qualifying Interest / Special Conservation Interest and Code *denotes a priority habitat	Summary Description (from Site Synopsis)	Data Source
			km south-west of Longford Town in the townland of Mount Jessop, Co. Longford. The site is part of a basin raised bog that includes both areas of high bog and cutover bog. The site is bordered by open high bog on its northern and western sides and by agricultural land on its eastern side and southern side. The underlying geology is carboniferous limestone. he SAC is located within the raised bog Mount Jessop Bog NHA, the conservation management of which should support the redevelopment of Active Raised Bog and Bog Woodland in the SAC. In addition, it is estimated that restoration works carried out on the SAC will benefit the conservation of 2 ha of Active Raised Bog and 0.25 ha of Degraded raised bog in the adjacent area of Mount Jessop Bog NHA (001450).	[002202]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht. Accessed online 28.12.2020
5	Brown Bog SAC (002346)	[7110] Active raised bogs [7120] Degraded raised bogs still capable of natural regeneration [7150] Depressions on peat substrates of the Rhynchosporion	Brown Bog NHA is located 5 km north-west of Longford town, mainly in the townlands of Tully, Lissanurlan and Cartronlebagh. The site comprises a raised bog that includes both areas of high bog and cutover bot. The bog margins are mainly surrounded by scrub/woodland. This site is situated in a drumlin-filled valley and consists of a small raised bog characterised by a central wet depression with quaking mats of bog mosses and tear pools colonised by algae. Water flows through the pools and it is possible that there is a spring located in the bog centre. A flush area occurs in the north. Abandoned cutover is found around the northern, western and north-eastern bog margins. Remnant old deciduous woodland occurs to the north-west.	NPWS (2016) Conservation Objectives: Brown Bog SAC 002346. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.
6	Lough Funshinagh SAC (000611)	[3180] Turloughs	Lough Funshinagh is located approximately 12 km north-west	NPWS (2018) Conservation

	European Site Name and Code	Qualifying Interest / Special Conservation Interest and Code *denotes a priority habitat	Summary Description (from Site Synopsis)	Data Source
		[3270] Rivers with muddy banks with Chenopodion rubri p.p. and Bidention p.p. vegetation	of Athlone, in Co. Roscommon. The lake, which is underlain by Carboniferous limestone, is classified as a turlough because it fluctuates to a significant extent every year and occasionally dries out entirely (approximately two to three times every ten years). In most years, however, an extensive area of water persists. This is filled with vegetation, providing excellent breeding habitat for wildfowl, and the site is designated a Wildfowl Sanctuary. The lake is fed by springs and a small catchment to the west. It is mesotrophic in quality, with some marl (calcium carbonate) deposition, and is surrounded by pastures. Lough Funshinagh is of major ecological importance, both from a vegetation and ornithological viewpoint. Turloughs are listed as priority habitat on Annex I of the E.U. Habitats Directive. Lough Funshinagh is a unique and atypical example of this habitat, and has a particular value in being relatively unmodified by grazing and modern agriculture.	Objectives: Lough Funshinagh SAC 000611. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.
7	Lough Forbes Complex SAC (001818)	3150 Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation 7110 Active raised bogs 7120 Degraded raised bogs still capable of natural regeneration 7150 Depressions on peat substrates of the Rhynchosporion 91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae)	This site consists of a number of different habitats, and is centred around Lough Forbes, a lake formed by a broadening of the River Shannon. As well as the lake itself, there is also a series of raised bogs, callow grasslands and a variety of other aquatic and terrestrial habitats to the west of Newtown Forbes on the Longford/Roscommon boundary. The importance of the Lough Forbes site lies in its excellent diversity of habitats, some of which, for example the raised bogs, are rare and threatened. The site is also of ornithological importance for its wintering waterfowl, breeding Merlin and Red Grouse. The presence of Whooper Swan and Merlin is of particular note as these species are	NPWS (201c) Conservation Objectives: Lough Forbes Complex SAC 001818. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

	European Site Name and Code	Qualifying Interest / Special Conservation Interest and Code *denotes a priority habitat	Summary Description (from Site Synopsis)	Data Source
			listed on Annex I of the E.U. Birds Directive.	
8	Lough Ree SPA (004064)	[A004] Little Grebe *Tachybaptus ruficollis* [A038] Whooper Swan *Cygnus cygnus* [A050] Wigeon *Anas penelope* [A052] Teal *Anas crecca* [A053] Mallard *Anas platyrhynchos* [A056] Shoveler *Anas clypeata* [A061] Tufted Duck *Aythya fuligula* [A065] Common Scoter *Melanitta nigra* [A067] Goldeneye *Bucephala clangula* [A125] Coot *Fulica atra* [A140] Golden Plover *Pluvialis apricaria* [A142] Lapwing *Vanellus vanellus* [A193] Common Tern *Sterna hirundo* [A999] Wetland and Waterbirds	Situated on the River Shannon between Lanesborough and Athlone, Lough Ree is the third largest lake in the Republic of Ireland. It lies in an ice-deepened depression in Carboniferous Limestone. Some of its features (including the islands) are based on glacial drift. The main inflowing rivers are the Shannon, Inny and Hind, and the main outflowing river is the Shannon. The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Whooper Swan, Wigeon, Teal, Mallard, Shoveler, Tufted Duck, Common Scoter, Goldeneye, Little Grebe, Coot, Golden Plover, Lapwing and Common Tern.	NPWS (2014) Lough Ree SPA 004064. Version date: 30.5.2015. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Accessed online 26.11.2020
9	Ballykenny/Fisherstown Bog SPA (004101)	[A395] Greenland White-fronted Goose Anser albifrons flavirostris	Ballykenny-Fisherstown Bog SPA is located on the border between Counties Longford and Roscommon in the north-central midlands and is underlain by Carboniferous limestone. It is centered around Lough Forbes, a naturally eutrophic lake on the River Shannon system which is fed also from the north by the River Rinn. The lake has well-developed swamp vegetation and displays natural transitions to seasonally flooded grassland, marsh and raised bog. The raised bogs, known as the Ballykenny-Fishertown complex, are separated by the Camlin River, which has further areas of callow grassland. At the time this site was designated as a Special Protection Area (SPA) it was being used by part of the Loughs Kilglass and Forbes Greenland White-fronted Goose population. The geese appear to	NPWS (2020) Conservation objectives for Ballykenny-Fisherstown Bog SPA [004101]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.

	European Site Name and Code	Qualifying Interest / Special Conservation Interest and Code *denotes a priority habitat	Summary Description (from Site Synopsis)	Data Source
			have since abandoned the peatland sites in favour of grassland sites elsewhere. The site was regularly utilised during the 1980s and Greenland White-fronted Goose is regarded as a special conservation interest for this SPA.	

2.8 Sources of Information & Consultation

2.8.1 Consultation

Consultation seeks to engage an audience of relevant stakeholders at both a national and local level.

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

An advertisement about PCAS was also printed in the Longford Leader (January 2021) (a local newspaper that covers the Derrycolumb Bog area).

See Section 4 of the Rehabilitation Plan included as Appendix B for a full consultation report.

Formal consultation has been undertaken with NPWS regarding proposed Decommissioning and Rehabilitation Plans, including protected Sites. The findings and feedback from the consultation process have been fed into the final rehabilitation and decommissioning plans. Due cognisance was also given to information available on the NPWS website at:

https://www.npws.ie/development-consultations#.

2.8.2 Sources of Information

Other sources of Information, which were considered during this Screening evaluation, included both desktop studies and fieldwork:

- Review of the Conservation Objectives, Site Synopsis and Site boundary information for the European Sites within with study area;
- Review of OSI Discovery Mapping for the 15km study area around Derrycolumb Bog;
- Review of EPA online mapping for watercourse features (https://gis.epa.ie/EPAMaps/);
- Review of location and layout mapping for proposed Rehab;
- Review of the detailed description of proposed Decommissioning and Rehabilitation measures, including methodologies specific to the main categories of land types under consideration, which occur in cutaway bogs;
- Review of other plans and projects within 15km
- Review of the results of previous Ecological Surveys of Derrycolumb Bog, along with recent confirmatory site visits; and
- Review of Derryadd Windfarm Environmental Impact Assessment Report (EIAR) (Tobin Consulting Engineers, 2019)

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

- 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.
- Spatial data in respect of Article 12 reporting, available online at https://www.npws.ie/maps-and-data/habitat-and-species-data/article-12-data.
- Available data on Greenland White-fronted Geese such as annual reporting by the Greenland White-fronted Goose Study and National Parks and Wildlife Service.

Planning peatland rehabilitation 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 4):

- Bord na Móna Biodiversity Action Plan
- 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 2017-2022. Department of Arts, Heritage and the Gaeltacht.
- 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.

2.9 Potential Sources, Pathways and Timing of Impacts to European Sites (SACs & SPAs)

2.9.1 Potential Sources, Pathways and Timing of Impacts to SACs

2.9.1.1 Direct Impact to Habitats within the SAC *(no potential for this impact to occur)*

There is no spatial overlap between Derrycolumb Bog and any of the SAC's under consideration. It can therefore reasonably be concluded that there is no potential for direct impact/effects (such as habitat loss, or loss of habitat connectivity) on any SAC's from the proposed decommissioning and rehabilitation of Derrycolumb Bog. Possible pathways can only exist for indirect effects on SAC's either secondary, cross-factor or 'ex-situ'. Therefore, there is **no possibility of direct impacts to SAC** habitats, and this impact pathway is screened out from further evaluation. No potential for likely significant effects identified.

2.9.1.2 Indirect loss or degradation of terrestrial or aquatic habitats within SAC boundaries

Sources (all outside SAC boundaries): Movement of soil or peat, machinery; earthworks, excavations, failure of berms, installation or pipes/ temporary overburden storage, cleaning of silt ponds, removal of waste and/or raw material, lifting of rail; use of fuels, chemicals or fertiliser.

Working within watercourses and drainage channels along the site boundary / periphery to retain the function of hydraulic barriers between the site and the surrounding environment and to sustain the flow of surface water around the margins of the site. Such works may require localised instream works, mobilisation of particulate matter, local excavations within drainage channels, machinery works within and adjacent to watercourses.

Pathway: Surfacewater runoff flow paths to receiving drainage systems, downstream watercourses

Potential Derrycolumb Bog Decommissioning and Rehabilitation Impact/Pathway Connectivity:

The identified impact sources could possibly reduce water quality or aquatic habitat quality in the local context, where all works are located outside of and at a distance from any designated SAC. The closest SAC is the Lough Ree SAC, which is located in relative proximity (290m north-east) to and supports hydrological connectivity with the Derrycolumb Bog site. Derrycolumb Bog supports hydrological connectivity to this European Site through the Ledwithstown_010 and Drumnee_010 watercourses.

The current appraisal evaluates the possibility for any effects in downstream hydrologically connected SAC European Sites through sediment/contaminant/nutrient laden runoff, berm failure (and consequent siltation effects) or the spread of invasive species, with regard to any indirect habitat loss, reduction in habitat extent, or degradation effects (i.e. to habitat quality) in respect of Qualifying Interests.

Timing of Impacts: The potential for impact sources arising from the project only relates to the stage (i.e. Decommissioning and Rehabilitation), when groundworks and use of machinery will take place for a limited duration -in this instance expected to be up to 12 months. Once decommissioning and rehabilitation are complete, the decommissioned and rehabilitated Derrycolumb Bog will require some monitoring, generally involving visual inspections of habitat succession, sometimes using drones, and any ongoing scheduled maintenance such as of silt ponds, or collection of water samples. Due to the negligible (both in terms of source magnitude but also duration) and non-intrusive nature of operational activities, there is no potential for the operational phase of the proposed decommissioning and rehabilitation to cause effects to European Sites.

2.9.1.3 Indirect or ex-situ disturbance or displacement of Qualifying Interests

Sources (all outside SAC boundaries): Decommissioning and Rehabilitation activities; movement of construction machinery and vehicles including rail; presence of personnel; noise and vibration and/or visual intrusion from construction works and construction machinery.

Working within watercourses and drainage channels along the site boundary / periphery to retain the function of hydraulic barriers between the site and the surrounding environment and to sustain the flow of surface water around the margins of the site. Such works may require localised instream works, mobilisation of particulate matter, local excavations within drainage channels, machinery works within and adjacent to watercourses.

Pathway: contact (direct contact with BnM personnel during site works), air (through its ability to transmit noise effects), visibility (on site presence of BnM personnel)

Potential Derrycolumb Bog Decommissioning and Rehabilitation Impact/Pathway Connectivity: The impact sources identified above may result in possible localised impacts occurring within the local context of the decommissioning and rehabilitation area during the construction phase. Any such impacts resulting in disturbance or displacement effects on Annex II species listed as Qualifying Interests of SACs (e.g. Otter) would be *ex situ*. The Derrycolumb Bog site is drained via the Ledwithstown and Drumnee watercourses, which may provide foraging or commuting habitat for otter associated with Lough Ree SAC. Otters utilising these watercourses may experience ex-situ disturbance effects as a result of the proposed rehabilitation works.

Timing of Impacts: As outlined above, the potential for effects only relates to the construction stage of decommissioning and rehabilitation. The scale and duration of any operational phase sources of disturbance or displacement are considered insufficient to result in likely significant effects.

2.9.1.4 Indirect or ex-situ mortality of Qualifying Interests

Sources (all outside SAC boundaries): Decommissioning and Rehabilitation activities; movement of construction machinery and vehicles including rail; presence of personnel; noise and vibration, failure of berms and/or visual intrusion from construction works and construction machinery.

Working within watercourses and drainage channels along the site boundary / periphery to retain the function of hydraulic barriers between the site and the surrounding environment and to sustain the flow of surface water around the margins of the site. Such works may require localised instream works, mobilisation of particulate matter, local excavations within drainage channels, machinery works within and adjacent to watercourses.

Pathway: contact (direct contact with BnM personnel during site works),

Potential Derrycolumb Bog Decommissioning and Rehabilitation Impact/Pathway Connectivity: The impact sources identified above may result in possible localised impacts occurring within the local context of the decommissioning and rehabilitation area during the construction phase. Any such impacts resulting in mortality of Annex II species listed as Qualifying Interests of SACs (e.g. Otter) would be *ex situ* and separated from any European Site. Potential impacts associated with berm failure and the resultant mortality to otter using the berm as a holt, layup or refuge area is low, given the poor suitability of the berm structures to support such activities.

Timing of Impacts: As outlined above, the potential for effects only relates to the construction stage of decommissioning and rehabilitation. The scale and duration of any operational phase sources of mortality are considered insufficient to result in likely significant effects.

2.9.1.5 Other Projects with Potential to Cause Cumulative Impacts to SAC sites

Sources (all outside SAC boundaries): Decommissioning and Rehabilitation activities; movement of construction machinery and vehicles including rail; presence of personnel; noise and vibration and/or visual intrusion from construction works and construction machinery. Removal of milled peat stockpiles from Derrycolumb Bog are not part of the proposed rehabilitation works. However, these works will temporally overlap with the proposed rehabilitation works.

Working within watercourses and drainage channels along the site boundary / periphery to retain the function of hydraulic barriers between the site and the surrounding environment. Such works may require localised instream works, mobilisation of particulate matter, local excavations within drainage channels, machinery works within and adjacent to watercourses.

Pathway: contact (direct contact with BnM personnel during site works), air (through its ability to transmit noise effects), visibility (on site presence of BnM personnel)

Potential Derrycolumb Bog Decommissioning and Rehabilitation Impact/Pathway Connectivity: The identified impact sources could possibly reduce water quality or aquatic habitat quality in the local context, where all works are located outside of and at a distance from any designated SAC.

The current appraisal evaluates the possibility for any effects in downstream hydrologically connected SAC European Sites through sediment/contaminant/nutrient laden runoff, or the spread of invasive species, with regard to any indirect habitat loss, reduction in habitat extent, or degradation effects (i.e. to habitat quality) in respect of Qualifying Interests.

The disturbance related impact sources identified above may result in possible localised impacts occurring within the local context of the decommissioning and rehabilitation area during the works phase.

Timing of Impacts: It is considered that during the decommissioning and rehabilitation stages at Derrycolumb Bog, the possibility exists for any inadvertent release of silt or other degrading materials to possibly combine with downstream effects from other projects. Although expected to be localised and limited in magnitude, disturbance effects on Otter may combine with other localised sources such as related to Turbary and agriculture to result in increased effects on ex-situ populations. Significant effects during operation can be screened out.

2.9.2 Potential Sources, Pathways and Timing of Impacts SPAs

2.9.2.1 Direct Impacts to Habitats within SPAs

There is no spatial overlap between Derrycolumb Bog and any of the SPA's under consideration. It can therefore reasonably be concluded that there is no potential for direct impact/effects (such as habitat loss, or loss of habitat connectivity) on any SPA's from the proposed decommissioning and rehabilitation of Derrycolumb Bog. Possible pathways can only exist for indirect effects on SAC's either secondary, cross-factor or 'ex-situ'. Therefore, there is **no possibility of direct impacts to SPA** species or their associated habitats, and this impact pathway is screened out from further evaluation. No potential for likely significant effects identified.

2.9.2.2 Indirect loss, reduction or degradation of terrestrial or aquatic habitats within SPA sites

Sources (some but not all inside SPA boundaries): Movement of soil or peat, machinery; earthworks, excavations, failure of berms, temporary overburden storage, cleaning of silt ponds, installation or pipes, removal of waste and/or raw material, lifting of rail; use of fuels, chemicals or fertiliser.

Working within watercourses and drainage channels along the site boundary / periphery to retain the function of hydraulic barriers between the site and the surrounding environment. Such works may require

localised instream works, mobilisation of particulate matter, local excavations within drainage channels, machinery works within and adjacent to watercourses.

Pathway: Surfacewater runoff flow paths to receiving drainage systems, downstream watercourses

Potential Derrycolumb Bog Decommissioning and Rehabilitation Impact/Pathway Connectivity: The identified impact sources could reduce water quality or aquatic habitat quality in the local context – with some of this potentially occurring within at least 1 no. SPA boundary; i.e. Lough Ree SPA. The current appraisal evaluates the possibility of any effects to downstream hydrologically connected SPAs through sediment/contaminant/nutrient laden runoff, changes to hydrological regimes or morphology of supporting watercourses, or through the spread of invasive species, regarding any indirect (effective) habitat loss or degradation effects to Special Conservation Interests.

The proposed Decommissioning and Rehabilitation at Derrycolumb is located in relative proximity to one SPA boundary. Effects on this SPA are evaluated to determine the potential (or not) for significant effects.

Timing of Impacts: The potential for impact sources arising from the project only relates to the Decommissioning and Rehabilitation Stage, when groundworks and use of machinery will take place for a limited duration - in this instance expected to be up to 12 months. Once decommissioning and rehabilitation are complete, the decommissioned and rehabilitated Derrycolumb Bog will require minimal monitoring, generally involving visual inspections of habitat succession, sometimes using drones, and any ongoing scheduled maintenance such as of silt ponds. Due to the negligible (both in terms of source magnitude but also duration) and non-intrusive nature of operational activities, there is no potential for the operational phase of the proposed decommissioning and rehabilitation to cause significant effects to European Sites.

2.9.2.3 Indirect or ex-situ disturbance/displacement of bird species of Special Conservation Interest

Sources (some but not all inside SPA boundaries): Decommissioning and Rehabilitation activities; movement of construction machinery and vehicles including rail; installation or pipes; presence of personnel; noise and vibration and/or visual intrusion from construction works and machinery.

Working within watercourses and drainage channels along the site boundary / periphery to retain the function of hydraulic barriers between the site and the surrounding environment. Such works may require localised instream works, mobilisation of particulate matter, local excavations within drainage channels, machinery works within and adjacent to watercourses.

Pathway: contact (direct contact with BnM personnel during site works), air (through its ability to transmit noise effects), visibility (on site presence of BnM personnel)

Potential Derrycolumb Bog Decommissioning and Rehabilitation Impact/Pathway Connectivity: The impact sources identified above, in addition to the impact pathways are evaluated with regard to potential in-situ or ex-situ disturbance or displacement effects on bird species listed as Special Conservation Interests of the SPA sites.

Derrycolumb Bog supports potential hydrological connectivity (520m downstream) and relative proximity (350m south-west) to Lough Ree SPA via the Ledwithstown_010 and Drumnee_010 watercourses. Given this relative proximity, SCI species associated with Lough Ree SPA may utilise Derrycolumb Bog or its environs for feeding, foraging or commuting purposes.

Therefore, SCI species associated with these European Sites may experience ex-situ disturbance/displacement as a result of the proposed decommissioning and rehabilitation works.

Timing of Impacts: As outlined above, the potential for effects only relates to the decommissioning and rehabilitation Stage as source magnitude during any operational phase activities can be screened out. In terms of Timing of Effects, this is limited to the migratory (September to November for Autumn and March

to mid-May for Spring) and winter period (October to March) when most of the SCI species for which these sites are designated are present[14].

2.9.2.4 Other Projects with Potential to Cause Cumulative Impacts to SPA sites

The potential for the construction phase of the proposed Derrycolumb bog decommissioning and rehabilitation to cause cumulative effects with other plans or projects is evaluated with regard to impact pathways which may be connected to SPA sites within the zone of influence.

Sources (all outside SPA boundaries): Decommissioning and Rehabilitation activities; movement of construction machinery and vehicles including rail; presence of personnel; noise and vibration and/or visual intrusion from works and machinery. Removal of milled peat stockpiles from Derrycolumb Bog are not part of the proposed rehabilitation works. However, these works will temporally overlap with the proposed rehabilitation works. Stockpile removal could contribute towards additional disturbance to those associated with the proposed rehabilitation works.

Working within watercourses and drainage channels along the site boundary / periphery to retain the function of hydraulic barriers between the site and the surrounding environment. Such works may require localised instream works, mobilisation of particulate matter, local excavations within drainage channels, machinery works within and adjacent to watercourses.

Pathway: contact (direct contact with BnM personnel during site works), air (through its ability to transmit noise effects), visibility (on site presence of BnM personnel)

Potential Derrycolumb Bog Decommissioning and Rehabilitation Impact/Pathway Connectivity:

The identified impact sources could reduce water quality or aquatic habitat quality in the local context, where some works are located within an SPA, or in locations where pathways exist to downstream SPA's. The current assessment evaluates the possibility of any effects in adjacent or overlapping or downstream hydrologically connected SPAs through sediment/contaminant/nutrient laden runoff or through the spread of invasive species, regarding any indirect habitat loss or degradation effects to Special Conservation Interests, in combination with other plans or projects. Disturbance related impact sources identified above, in addition to the impact pathways are evaluated with regard to potential ex-situ disturbance or displacement effects on bird species listed as Special Conservation Interests of the SPA sites, specifically in terms of plans or projects which may act as sources of similar sources of effects and where similar pathways exist.

Timing of Impacts: The potential for in combination impact sources arising from the project only relates to the works stage (i.e. Decommissioning and Rehabilitation), when groundworks and use of machinery will take place for a limited duration - in this instance expected to be up to 12 months. For disturbance to SCI species, the potential for effects only relates to the works stage of decommissioning and rehabilitation as source magnitude during any operational phase activities can be screened out. In terms of Timing of Effects, this is limited to the migratory (September to November for Autumn and March to mid-May for Spring) and winter period (October to March) or breeding period, as applicable, when most of the SCI species for which these sites are designated are present.

[14] Periods are as defined in the SNH document '*Survey Methods for use in assessing the impacts of onshore windfarms on bird communities'*. (2005). SNH, Battleby, Scotland.

2.10 Screening Evaluation of the Potential for Effects on European Sites (SACs & SPAs)

The Screening evaluation is based on a conceptual site model which identifies potential impact source-pathways between the described Derrycolumb Bog decommissioning and rehabilitation and each European Site. This allows for an assessment of any potential for significant effects on the Qualifying Interests / Special Conservation Interests and their respective Conservation Objectives.

The following impact source-pathways for the seven SAC sites are evaluated in relation to any potential for significant effects (**Table 11** below):

- Indirect loss or degradation of terrestrial or aquatic habitats within SAC sites, alone and in combination;
- Indirect or ex-situ disturbance, displacement or mortality of species of Qualifying Interest, alone and in combination.

The following impact source-pathways for the two SPA sites are evaluated in relation to any potential for significant effects (**Table 12** below):

- Indirect loss, reduction or degradation of terrestrial or aquatic habitats within SPA sites, alone and in combination;
- Indirect or ex-situ disturbance/ displacement of bird species listed as Special Conservation Interests, alone and in combination.

The evaluation of potential for in-combination effects with regard to Other Plans or Projects includes the plans or projects described in Section 2.6.3.

Table 11: Evaluation of Possibly Significant Effects to the seven SAC sites

	European Site	Separation Distance from Derrycolumb Bog	Hydrological Connection – Yes/No	Evaluation of the potential for Derrycolumb Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the seven SAC Sites: **1**. Direct effects to Qualifying Interest habitats or species of an SAC Site (i.e. species mortality, habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC **2**. Indirect loss or degradation of terrestrial or aquatic habitats within the SAC site; **3**. Indirect/ex-situ disturbance or displacement of species of Qualifying Interest. **4.** Indirect or ex-situ mortality of Qualifying Interests
1	Lough Ree SAC (000440)	290 m south-west of Derrycolumb and 366m downstream at its closest point.	Y:Downstream via the Ledwithstown_010 and Drumnee_010 watercourses.	**1: Screened Out – No likelihood for direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC** The proposed works are not located within or in immediate proximity to this European Site. Therefore there will be no direct impacts to this European Site. **2: Screened In - Possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SPA** Due to proximity and the presence of hydrological connectivity between proposed activities and this European Site possible pathways for effects are identified. **3: Screened In - Possibility for indirect or ex-situ disturbance or displacement of species of Qualifying Interests** Due to the presence of hydrological connectivity between proposed activities and this European Site, possible pathways for localised effects on (ex-situ) Otter (a species of Qualifying Interest for this European Site) are identified, which cannot be screened out in the absence of measures to avoid harmful effects. **4: Screened In – Possibility for indirect or ex-situ mortality to species of Qualifying Interests** Due to the presence of hydrological connectivity between proposed activities and this European Site, possible pathways for localised effects on (ex-situ) Otter (a species of Qualifying Interest for this European Site) are identified, which cannot be ponds. screened out in the absence of measures to avoid harmful effects such as accidental or inadvertent mortality when carrying out certain works e.g. cleaning of silt
2	Corbo Bog SAC (002349)	12km north-west	N: No, located upstream of the proposed works. No hydrological connectivity between the proposed bog	**1: Screened Out – No likelihood for direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC** The proposed works are not located within or in proximity to this European Site. Therefore there will be no direct impacts to this European Site.

	European Site	Separation Distance from Derrycolumb Bog	Hydrological Connection – Yes/No	Evaluation of the potential for Derrycolumb Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the seven SAC Sites: **1**. Direct effects to Qualifying Interest habitats or species of an SAC Site (i.e. species mortality, habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC **2**. Indirect loss or degradation of terrestrial or aquatic habitats within the SAC site; **3**. Indirect/ex-situ disturbance or displacement of species of Qualifying Interest. **4.** Indirect or ex-situ mortality of Qualifying Interests
			rehabilitation site and this European Site.	**2: Screened Out - Possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SAC** Due to the separation distance to this SAC and the lack of hydrological connectivity, possible pathways for indirect loss, reduction or degradation of terrestrial / aquatic habitats within or in close proximity to Derrycolumb Bog can be excluded. **3: Screened Out - No potential for indirect or ex-situ disturbance or displacement of species of Qualifying Interests** The proposed works located 12km from this European Site. There are no species of Qualifying Interest listed for this European Site. Therefore there will be no indirect of ex-situ disturbance effects in this regard. **4: Screened Out - No potential for indirect or ex-situ mortality to species of Qualifying Interests** The proposed works located 12km from this European Site. There are no species of Qualifying Interest listed for this European Site. Therefore there will be no indirect of ex-situ effects in this regard.
3	Fortwilliam Turlough SAC (000448)	3.7km north-west	N: No, located upstream of the proposed works. No hydrological connectivity between the proposed bog rehabilitation site and this European Site. This European Site is located within the same groundwater body as Derrycolumb Bog; i.e. the Funshinagh groundwater body (IE_SH_G_091).	**1: Screened Out – No likelihood for direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC** The proposed works are not located within or in proximity to this European Site. Therefore there will be no direct impacts to this European Site. **2: Screened Out - Possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SAC** Due to the separation distance to this SAC and the lack of hydrological connectivity, possible pathways for indirect loss, reduction or degradation of terrestrial / aquatic habitats within or in close proximity to Derrycolumb Bog can be excluded. **3: Screened Out - No potential for indirect or ex-situ disturbance or displacement of species of Qualifying Interests**

	European Site	Separation Distance from Derrycolumb Bog	Hydrological Connection – Yes/No	Evaluation of the potential for Derrycolumb Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the seven SAC Sites: **1**. Direct effects to Qualifying Interest habitats or species of an SAC Site (i.e. species mortality, habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC **2**. Indirect loss or degradation of terrestrial or aquatic habitats within the SAC site; **3**. Indirect/ex-situ disturbance or displacement of species of Qualifying Interest. **4.** Indirect or ex-situ mortality of Qualifying Interests
			While Derrycolumb and Fortwilliam are both situated within the same karstified limestone bedrock, it is extremely unlikely that there is hydrogeological connectivity given they are separated by a locally important aquifer. In addition, it is highly unlikely that there is groundwater flow from Derrycolumb towards Fortwilliam Turlough. There are several mounds of higher ground between the bog and the SAC which would be zones of recharge and would have a recharge mound between the two areas and therefore limit the risk of any changes to the	The proposed works located 3.7km from this European Site. There are no species of Qualifying Interest listed for this European Site. Therefore there will be no indirect of ex-situ disturbance effects in this regard. **4: Screened Out - No potential for indirect or ex-situ mortality to species of Qualifying Interests** The proposed works located 3.7km from this European Site. There are no species of Qualifying Interest listed for this European Site. Therefore there will be no indirect of ex-situ effects in this regard.

	European Site	Separation Distance from Derrycolumb Bog	Hydrological Connection – Yes/No	Evaluation of the potential for Derrycolumb Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the seven SAC Sites: **1**. Direct effects to Qualifying Interest habitats or species of an SAC Site (i.e. species mortality, habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC **2**. Indirect loss or degradation of terrestrial or aquatic habitats within the SAC site; **3**. Indirect/ex-situ disturbance or displacement of species of Qualifying Interest. **4.** Indirect or ex-situ mortality of Qualifying Interests
			hydrogeological regime within the vicinity of FortWilliam Turlough SAC. A review of the topography of the area indicates that groundwater flow from Derrycolumb is most likely to be in a southerly direction (away from FortWilliam Turlough SAC), as a result it is highly unlikely that any changes to the regional groundwater level within the bog would have any impact on FortWilliam Turlough SAC.	
4	Mount Jessop Bog SAC (002202)	7.9km north-east	N: No, located upstream of the proposed works. No hydrological connectivity between the proposed bog	**1: Screened Out – No likelihood for direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC** The proposed works are not located within or in proximity to this European Site. Therefore there will be no direct impacts to this European Site. **2: Screened Out - Possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SAC**

	European Site	Separation Distance from Derrycolumb Bog	Hydrological Connection – Yes/No	Evaluation of the potential for Derrycolumb Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the seven SAC Sites: **1**. Direct effects to Qualifying Interest habitats or species of an SAC Site (i.e. species mortality, habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC **2**. Indirect loss or degradation of terrestrial or aquatic habitats within the SAC site; **3**. Indirect/ex-situ disturbance or displacement of species of Qualifying Interest. **4.** Indirect or ex-situ mortality of Qualifying Interests
			rehabilitation site and this European Site.	Due to the separation distance to this SAC and the lack of hydrological connectivity, possible pathways for indirect loss, reduction or degradation of terrestrial / aquatic habitats within or in close proximity to Derrycolumb Bog can be excluded. **3: Screened Out - No potential for indirect or ex-situ disturbance or displacement of species of Qualifying Interests** The proposed works located 7.9km from this European Site. There are no species of Qualifying Interest listed for this European Site. Therefore there will be no indirect of ex-situ disturbance effects in this regard. **4: Screened Out - No potential for indirect or ex-situ mortality to species of Qualifying Interests** The proposed works located 7.9km from this European Site. There are no species of Qualifying Interest listed for this European Site. Therefore there will be no indirect of ex-situ effects in this regard.
5	Brown Bog SAC (002346)	12.9km north/north-east	N: No, located upstream of the proposed works. No hydrological connectivity between the proposed bog rehabilitation site and this European Site.	**1: Screened Out – No likelihood for direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC** The proposed works are not located within or in proximity to this European Site. Therefore there will be no direct impacts to this European Site. **2: Screened Out - Possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SAC** Due to the separation distance to this SAC and the lack of hydrological connectivity, possible pathways for indirect loss, reduction or degradation of terrestrial / aquatic habitats within or in close proximity to Derrycolumb Bog can be excluded. **3: Screened Out - No potential for indirect or ex-situ disturbance or displacement of species of Qualifying Interests** The proposed works located 12.9km from this European Site. There are no species of Qualifying Interest listed for this European Site. Therefore there will be no indirect of ex-situ disturbance effects in this regard. **4: Screened Out - No potential for indirect or ex-situ mortality to species of Qualifying Interests**

	European Site	Separation Distance from Derrycolumb Bog	Hydrological Connection – Yes/No	Evaluation of the potential for Derrycolumb Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the seven SAC Sites: **1**. Direct effects to Qualifying Interest habitats or species of an SAC Site (i.e. species mortality, habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC **2**. Indirect loss or degradation of terrestrial or aquatic habitats within the SAC site; **3**. Indirect/ex-situ disturbance or displacement of species of Qualifying Interest. **4.** Indirect or ex-situ mortality of Qualifying Interests
				The proposed works located 12.9km from this European Site. There are no species of Qualifying Interest listed for this European Site. Therefore there will be no indirect of ex-situ effects in this regard.
6	Lough Funshinagh SAC (000611)	14.6km south-west	N: No, located upstream of the proposed works. No hydrological connectivity between the proposed bog rehabilitation site and this European Site.	**1: Screened Out – No likelihood for direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC** The proposed works are not located within or in proximity to this European Site. Therefore there will be no direct impacts to this European Site. **2: Screened Out - Possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SAC** Due to the separation distance to this SAC and the lack of hydrological connectivity, possible pathways for indirect loss, reduction or degradation of terrestrial / aquatic habitats within or in close proximity to Derrycolumb Bog can be excluded. **3: Screened Out - No potential for indirect or ex-situ disturbance or displacement of species of Qualifying Interests** The proposed works located 14.6km from this European Site. There are no species of Qualifying Interest listed for this European Site. Therefore there will be no indirect of ex-situ disturbance effects in this regard. **4: Screened Out - No potential for indirect or ex-situ mortality to species of Qualifying Interests** The proposed works located 14.6km from this European Site. There are no species of Qualifying Interest listed for this European Site. Therefore there will be no indirect of ex-situ effects in this regard.
7	Lough Forbes Complex SAC (001818)	12.9km north	N: No, located upstream of the proposed works. No hydrological connectivity between the proposed bog	**1: Screened Out – No likelihood for direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC** The proposed works are not located within or in proximity to this European Site. Therefore there will be no direct impacts to this European Site.

	European Site	Separation Distance from Derrycolumb Bog	Hydrological Connection – Yes/No	Evaluation of the potential for Derrycolumb Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the seven SAC Sites: **1**. Direct effects to Qualifying Interest habitats or species of an SAC Site (i.e. species mortality, habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC **2**. Indirect loss or degradation of terrestrial or aquatic habitats within the SAC site; **3**. Indirect/ex-situ disturbance or displacement of species of Qualifying Interest. **4.** Indirect or ex-situ mortality of Qualifying Interests
			rehabilitation site and this European Site.	**2: Screened Out - Possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SAC** Due to the separation distance to this SAC and the lack of hydrological connectivity, possible pathways for indirect loss, reduction or degradation of terrestrial / aquatic habitats within or in close proximity to Derrycolumb Bog can be excluded. **3: Screened Out - No potential for indirect or ex-situ disturbance or displacement of species of Qualifying Interests** The proposed works located 12.9km from this European Site. There are no species of Qualifying Interest listed for this European Site. Therefore there will be no indirect of ex-situ disturbance effects in this regard. **4: Screened Out - No potential for indirect or ex-situ mortality to species of Qualifying Interests** The proposed works located 12.9km from this European Site. There are no species of Qualifying Interest listed for this European Site. Therefore there will be no indirect of ex-situ effects in this regard.

Table 12: Evaluation of Possibly Significant Effects to the two SPA sites

	European Site	Separation Distance from Derrycolumb Bog	Hydrological Connection – Yes/No	Evaluation of the potential for Derrycolumb Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the three SPA Sites: 1. Direct Impacts to Habitats within SPAs (i.e. disturbance, displacement, mortality) 2. Indirect loss, reduction or degradation of terrestrial or aquatic habitats within or in close proximity to the SPA site; (i.e. through habitat loss, degradation, fragmentation or reduction/loss of connectivity of suitable habitat, or through a reduction in prey item species) 3. Indirect or Ex-Situ disturbance or displacement of bird species of Special Conservation Interest (i.e. through disturbance, displacement or mortality of SCI species).
1	Lough Ree SPA (004064)	350m south-west of Derrycolumb and 520m downstream at its closest point.	Yes: Downstream via the Ledwithstown_010 and Drumnee_010 watercourses.	**1: Screened Out - Possibility for direct loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SPA** Due to the separation distance to this SPA, possible pathways for direct effects can be excluded. **2: Screened In - Possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SPA** Due to proximity and the presence of hydrological connectivity between proposed activities and this European Site possible pathways for effects are identified. **3: Screened In - Possibility for indirect or ex-situ disturbance or displacement effects of bird species of Special Conservation Interest** Bird species of Special Conservation Interests for this SPA include (wintering): [A004] Little Grebe (*Tachybaptus ruficollis*); [A038] Whooper Swan (*Cygnus cygnus*); [A050] Wigeon (*Anas penelope*); [A052] Teal (*Anas crecca*); [A053] Mallard (*Anas platyrhynchos*); [A056] Shoveler (*Anas clypeata*); [A061] Tufted Duck (*Aythya fuligula*); [A067] Goldeneye (*Bucephala clangula*); [A125] Coot (*Fulica atra*); [A140] Golden Plover (*Pluvialis apricaria*); [A142] Lapwing (*Vanellus vanellus*); Breeding: [A065] Common Scoter (*Melanitta nigra*); [A193] Common Tern (*Sterna hirundo*); and Wetland and Waterbirds [A999]. Due to proximity, it is considered that it cannot be ruled out that at least some migratory (in transit) or wintering individuals of the SCI Species may be attracted to Derrycolumb Bog and its environs, and hence be subject to possible disturbance events, dependant on timing, habitat requirements, tolerable disturbance and likelihood of occurrence of individual SCI species. Effects on Lough Ree SPA as a whole are screened in, and further analysis on individual SCI species is provided in Table 13, over.

	European Site	Separation Distance from Derrycolumb Bog	Hydrological Connection – Yes/No	Evaluation of the potential for Derrycolumb Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the three SPA Sites: 1. Direct Impacts to Habitats within SPAs (i.e. disturbance, displacement, mortality) 2. Indirect loss, reduction or degradation of terrestrial or aquatic habitats within or in close proximity to the SPA site; (i.e. through habitat loss, degradation, fragmentation or reduction/loss of connectivity of suitable habitat, or through a reduction in prey item species) 3. Indirect or Ex-Situ disturbance or displacement of bird species of Special Conservation Interest (i.e. through disturbance, displacement or mortality of SCI species).
2	Ballykenny / Fisherstown Bog SPA (004097)	12.9km north	No, located upstream of the proposed works. No hydrological connectivity between the proposed bog rehabilitation site and this European Site.	**1. Screened Out - Possibility for direct loss, reduction or degradation of terrestrial or aquatic habitats within the SPA** Due to the separation distance to this SPA, possible pathways for direct effects can be excluded. **2: Screened Out - Possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SPA** Due to the separation distance to this SPA, possible pathways for indirect loss, reduction or degradation of terrestrial habitats within or in close proximity to Derrycolumb can be excluded. **3: Screened Out - Possibility for indirect or ex-situ disturbance or displacement effects of bird species of Special Conservation Interest** Due to the separation distance to this SPA, possible pathways for disturbance or displacement effects to SCI species of Ballykenny/Fisherstown Bog SPA can be excluded. Ballykenny / Fisherstown Bog SPA is located 12.9km north of Derrycolumb Bog. The SCI species for which this European Site is designated is Greenland White-fronted Goose. In accordance with Scottish Natural Heritage (SNH) Guidance[15] on assessing connectivity with SPA sites, Greenland White-fronted Goose is considered to have a core winter foraging range of 5km-8km. Therefore, there is no risk of the Greenland White-fronted Goose flocks at Ballykenny / Fisherstown Bog SPA utilising Derrycolumb Bog as a core foraging area. Therefore, there will be no risk of significant ex-situ disturbance or displacement effects of SCI species to Ballykenny / Fisherstown Bog SPA as a result of the proposed bog rehabilitation works.

[15] Scottish Natural Heritage (2016) Assessing Connectivity with Special Protection Areas (SPAs) Guidance/

2.11 Screening for Appropriate Assessment: Conclusion Statement

The Screening Evaluation provided herein has examined the potential for any effects arising via source pathway linkages with regard to connectivity to designated European Sites (SACs and SPAs) within the zone of influence of all predicted Project impacts. An extended buffer zone of 15km was further considered, in line with NPWS guidance (DoEHLG, 2009), for evaluation of effects on any European Site which may arise associated with the proposed decommissioning and rehabilitation of Derrycolumb Bog, as required. There is a total of nine European sites located within the 15km zone of consideration:

1. Lough Ree SAC (000440)
2. Lough Ree SPA (004064)
3. Corbo Bog SAC (002349)
4. Fortwilliam Turlough SAC (000448)
5. Mount Jessop Bog SAC (002202)
6. Brown Bog SAC (002346)
7. Lough Funshinagh SAC (000611)
8. Lough Forbes Complex SAC (001818)
9. Ballykenny/Fisherstown Bog SPA (004101)

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

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

- Lough Ree SAC (000440)
- Lough Ree SPA (004064)

A Stage 2 Appropriate Assessment Report follows in respect of these European Sites.

3 STAGE 2: APPROPRIATE ASSESSMENT

3.1 Introduction to Stage 2

Following screening to inform the requirement for Appropriate Assessment, the potential for significant effects, could not be excluded, with regard to the following European Sites:

1. Lough Ree SAC (000440)
2. Lough Ree SPA (004064)

This section comprises a detailed appraisal of the impacts of the proposed Derrycolumb Bog Decommissioning and Rehabilitation (either directly or indirectly) or in-combination with other projects or plans, on the integrity of the above listed European Sites, and is considered with respect to their conservation objectives and to their structure and function.

An overview of Derrycolumb Bog proposed Decommissioning and Rehabilitation is provided in Section 2.2. See also the document included as Appendix B of this report.

3.1.1 Connectivity of Features of Qualifying Interest for Lough Ree SPA and Lough Ree SAC with Derrycolumb Bog

Table 13 below provides further analysis of Lough Ree SPA and the suitability of Derrycolumb Bog to support SCI species for this European Site. SCI species likely to occur within the Derrycolumb Bog site and surrounds or those species potentially connected to the proposed works are considered further in the NIS.

Table 13: Connectivity of SCI Species of Lough Ree SPA with the Derrycolumb Bog site

SCI Species Name and Code	Identified at Derrycolumb Bog during site surveys	Suitability of the Derrycolumb Bog to support Lough Ree SCI species	Requiring Further Appraisal in NIS?
A004 Little Grebe (*Tachybaptus ruficollis*)	No	No – Little Grebe were not identified within the Derrycolumb Bog site or its environs during the site walkover surveys. Little Grebe are typically associated with shallow freshwater rivers, streams, lakes or ponds. Little Grebe nest / breed on floating vegetation in shallow waterbodies, reedbeds with water fringing plants or other dense swamp vegetation. Therefore, suitable foraging, roosting or breeding habitat for Little Grebe are not present within	No

SCI Species Name and Code	Identified at Derrycolumb Bog during site surveys	Suitability of the Derrycolumb Bog to support Lough Ree SCI species	Requiring Further Appraisal in NIS?
		Derrycolumb Bog and environs.	
A038 Whooper Swan (Cygnus cygnus)	Yes – overflying the site, not identified using the bog site	Yes – the south-eastern corner of the Derrycolumb Bog site supports suitable habitat to support roosting Whooper Swan, with potentially suitable foraging habitat located adjacent to the bog site.	Yes
A050 Wigeon (*Anas penelope*)	No	No – Wigeon were not identified within the Derrycolumb Bog site or its environs. Wigeon require space and visibility when selecting suitable roosting and feeding habitat and tend to avoid closed landscapes. Standing water within the site is restricted to a localised area near the south-eastern boundary, in addition to silt ponds, the Ledwithstown and Drumnee watercourses and associated tributaries. These features are largely unsuitable to support routine feeding or foraging Wigeon, given their narrow channels, adjoining scrub and treeline vegetation	No

SCI Species Name and Code	Identified at Derrycolumb Bog during site surveys	Suitability of the Derrycolumb Bog to support Lough Ree SCI species	Requiring Further Appraisal in NIS?
		thereby restricting sightlines.	
A052 Teal (*Anas crecca*)	No	Yes – within drains and silt ponds and ephemeral wetland area near the site's south-eastern corner.	Yes
A053 Mallard (*Anas platyrhynchos*)	Yes – using wetland area near the south-eastern corner of the site	Yes – within drains and silt ponds and ephemeral wetland area near the site's south-eastern corner.	Yes
A056 Shoveler (*Anas clypeata*)	No	No	No
A061 Tufted Duck (*Aythya fuligula*)	No	No	No
A065 Common Scoter (*Melanitta nigra*)	No	Common Scoter utilise Lough Ree for breeding and feeding purposes. They are piscivorous species associated with coastal / estuarine habitats and some large inland lakes, such as Lough Ree. They are not likely to utilise the Derrycolumb bog site and its constituent and adjacent habitats due to the absence of viable feeding, foraging and breeding habitats. Therefore, it is not considered that the proposed rehabilitation works at Derrycolumb Bog support potential connectivity to this SCI species.	No

SCI Species Name and Code	Identified at Derrycolumb Bog during site surveys	Suitability of the Derrycolumb Bog to support Lough Ree SCI species	Requiring Further Appraisal in NIS?
A067 Goldeneye (*Bucephala clangula*)	No	Goldeneye are diving piscivorous and insectivorous ducks, over-wintering in Ireland on estuaries lakes. Suitable foraging and roosting habitat does not occur within the **Derrycolumb Bog** site, especially the extensive areas of cutover bog and any areas of shallow ephemeral water. Therefore, it is not considered that the proposed rehabilitation works at Derrycolumb Bog support potential connectivity to this SCI species.	No
A125 Coot (*Fulica atra*)	Yes	Yes – within drains and silt ponds and ephemeral wetland area near the site's south-eastern corner.	Yes
A140 Golden Plover (*Pluvialis apricaria*)	Yes – overflying the site, not identified using the bog site	May utilise the bog site on intermittently / occasionally	Yes
A142 Lapwing (*Vanellus vanellus*)	No	May utilise the bog site on intermittently / occasionally	Yes
A193 Common Tern (*Sterna hirundo*)	No	Common Tern not likely to utilise the Derrycolumb bog site and its constituent and adjacent habitats during the summer months due to the absence of viable feeding, foraging and	No

SCI Species Name and Code	Identified at Derrycolumb Bog during site surveys	Suitability of the Derrycolumb Bog to support Lough Ree SCI species	Requiring Further Appraisal in NIS?
		breeding habitats. Therefore, it is not considered that the proposed rehabilitation works at Derrycolumb Bog support potential connectivity to this SCI species.	
(A999) Wetlands	Yes	Derrycolumb Bog provides wetland areas and habitats that could provide some ecosystem service for Lough Ree SPA SCI species, albeit ex-situ to the SPA.	Yes

Table 14 below provides further analysis of Lough Ree SAC and the suitability of Derrycolumb Bog to support features of Qualifying Interest for this European Site. QI habitats and species likely to occur within the Derrycolumb Bog site and surrounds or those QI habitats and species potentially connected to the proposed works are considered further in the NIS.

Table 14: Connectivity and likely significant effects to habitats and species of Qualifying Interest for Lough Ree SAC

QI Name and Code	Identified at Derrycolumb Bog during site surveys	Potential connectivity between the proposed bog rehabilitation works and this Feature of Qualifying Interest	Requiring Further Appraisal in NIS?
1355 Otter (*Lutra lutra*)	No – but this species may utilise the watercourses such as the Ledwithstown River as a commuting route or temporary refuge.	Yes – watercourses link Derrycolumb Bog to Lough Ree, which in turn could support otter.	Yes
3150 Natural eutrophic lakes with Magnopotamion or	No – but watercourses on site provide	Yes - watercourses link Derrycolumb Bog to Lough Ree,	Yes

QI Name and Code	Identified at Derrycolumb Bog during site surveys	Potential connectivity between the proposed bog rehabilitation works and this Feature of Qualifying Interest	Requiring Further Appraisal in NIS?
Hydrocharition - type vegetation	suitable connectivity to the downstream sections of this habitat within Lough Ree SAC.	which in turn supports this Annex I habitat.	
6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	No – located in downstream sections of Lough Ree SAC.	No – this is a terrestrial habitat located on the margins of Lough Ree. There is no connectivity between the proposed rehabilitation works and this Annex I habitat.	No
7120 Degraded raised bogs still capable of natural regeneration	Degraded raised bog habitat identified on the southern margins of the Ledwithstown River. However, this habitat is located outside of the Lough Ree SAC boundary.	No – This is a terrestrial habitat located on the margins of Lough Ree. There is no hydrological connectivity between the proposed rehabilitation works and this Annex I habitat.	No
7230 Alkaline fens	No - located in downstream sections of Lough Ree SAC.	Yes – potential to occur on the margins of Lough Ree waterbody.	Yes
8240 Limestone pavements	No	No – there is no potential connectivity between the proposed rehabilitation works and this Annex I habitat. Potential source-pathway-receptor interaction is via hydrological conduits. Limestone pavement distribution in Lough Ree SAC is located on the eastern shores of Lough Ree at the Aughakeel townland. Limestone pavement is a terrestrial	No

QI Name and Code	Identified at Derrycolumb Bog during site surveys	Potential connectivity between the proposed bog rehabilitation works and this Feature of Qualifying Interest	Requiring Further Appraisal in NIS?
		habitat that is not nutrient sensitive or water dependent. Therefore, there will be no potential for the proposed rehabilitation works to contribute significant effects to this Annex I habitat.	
91A0 Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	No	No - there is no potential connectivity between the proposed rehabilitation works and this Annex I habitat. Potential source-pathway-receptor interaction between Derrycolumb Bog and Lough Ree SAC is via hydrological conduits. Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles distribution in Lough Ree SAC not provided in the Conservation Objectives supporting document. This Annex I habitat is a terrestrial habitat. Therefore, there will be no potential for the proposed rehabilitation works to contribute significant effects to this Annex I habitat.	No
91D0 Bog woodland	No	No – distribution analysis presented in the Conservation Objectives supporting document for Lough Ree SAC identify this Annex I habitat within the central part of Clooncraff Bog, which is located >10km north-west of Derrycolumb Bog on the western margins of Lough Ree. There is no hydrological connectivity between the Derrycolumb Bog and this portion of bog woodland.	No

3.1.2 Current Status of the Qualifying or Special Conservation Interest Species of the European Sites under consideration

3.1.2.1 Lough Ree SAC (Site Code 000216)

Otter *Lutra lutra*

The Qualifying interest under consideration is Otter *Lutra lutra.* This European site holds a population of Otter, a species listed on Annex II of the E.U. Habitats Directive. Suitable habitat (foraging and breeding) exists for this species at Derrycolumb Bog. No Otter holts or couches have been recorded at Derrycolumb Bog however their possible presence cannot be excluded.

The territories of Otters can stretch for several kilometres; the total length of the home range depends on the availability of food. The smallest territories are thought to occur at coastal sites, where territories may be as small as 2km. The longest territories occur in upland streams where an individual may have to range more than 20km to find sufficient food. Territorial marking typically occurs by means of sprainting or anal secretions. These marks are left mostly at features such as bridge footings, boulders, grass tussocks and stream confluences. Within their territories an individual otter may utilise a number of resting sites within its territory; these can be hidden refuges above ground (couches), or under-ground chambers (holts). Holts tend to be natural crevices, associated with the roots of trees growing along river and lake banks. These natural recesses provide the otter with a holt that has multiple entrances from which the otter can escape if disturbed. Couches occur frequently in dense vegetation and may be associated with frequently used runs and slides into the water. The rearing of cubs occurs within 'natal holts', which are not marked by spraint. Although capable of breeding at any time of the year, a peak in breeding occurs during the summer and early autumn.

Otters that live in rivers and lakes tend to not be completely nocturnal, described as being crepuscular – activity peaks at dusk and dawn. Otters are principally piscivorous (fish eating), relying predominantly on salmonids (salmon and trout), but also eel and small fish species such as stickleback. However, Otters are not limited to fish and feed opportunistically on a range of prey when available: frogs are frequently eaten by Otters, and the remains of invertebrates (crayfish), birds and small mammals have also been found in spraints.

Within the most recent Habitats Directive Article 17 Reporting: the conservation status of Otter is listed as 'Favourable' under *Range*, *Population*, *Habitat for the Species*, and *Future Prospects*- overall favourable. The current favourable reference range is considered to be large enough to allow the long-term survival of the species and is greater than the estimated range of the species when the habitats directive came into force in Ireland. Regarding habitat for the species, habitat availability and quality is not considered to be or to have been a limiting factor in the species range, based on its widespread occurrence. Hence the underlying trend in habitat is evaluated as having remained 'stable'. No conservation measures are reported as being needed.

Regarding future prospects Article 17 reporting describes Otter as a species whose range is extensive and stable, having recovered from a previous decline. The broad habitat niche is occupied and is generally considered to be in good condition. No significant threats or pressures were identified. The overall trend in conservation status is improving.

Regarding Natura 2000 sites specifically, the short-term trend in population size within the Natura network is 'increasing'. This is considered to be applicable to Lough Ree SAC where it occurs at Derrycolumb Bog.

3150 Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation

The site synopsis for Lough Ree SAC[16] describes this Annex I habitat as follows:

> *The greater part of Lough Ree is less than 10 m in depth, but there are six deep troughs running from north to south, reaching a maximum depth of about 36 m just west of Inchmore. The lake has been classified as mesotrophic in quality, but the size of the system means that a range of conditions prevail depending upon, for example, rock type. This gives rise to local variations in nutrient status and pH, which in turn results in variations in the phytoplankton and macrophyte flora. Therefore species indicative of oligotrophic, mesotrophic, eutrophic and base-rich situations occur. The water of Lough Ree tends to be strongly peat-stained, restricting macrophytes to depths of less than 2 m, and as a consequence, macrophytes are restricted to sheltered bays, where a typical Shannon flora occurs. Species present include Intermediate Bladderwort (Utricularia intermedia), pondweeds (Potamogeton spp.), Quillwort (Isoetes lacustris), Greater Duckweed (Spirodela polyrhiza), stoneworts (Chara spp., including C. pedunculata) and Arrowhead (Sagittaria sagittifolia). The latter is a scarce species which is almost confined in its occurrence to the Shannon Basin.*

Article 17 Reporting[17] for this Annex I habitat describes its plant species composition as follows:

> *This lake habitat is considered likely to occur in lowland, base-rich lakes in the midlands and north-east of Ireland, where it is characterised by high abundance and diversity of pondweeds (Potamogeton spp.), such as Potamogeton lucens, P. praelongus, P. perfoliatus, P. obtusifolius, P. berchtoldii and P. pectinatus. Other rooted, predominantly submerged higher plants frequently co-occur, including Myriophyllum spicatum, Hippuris vulgaris, Callitriche spp., Sagittaria sagittifolia and Ceratophyllum demersum, while free-floating species such Lemna trisulca are also common. The habitat is associated with large lakes in large catchments, such as those of the Shannon system, and with small, but naturally more productive lakes, such as those found in parts of the drumlin-belt of Cavan, Monaghan and Leitrim or the lowlands south-east of the Burren. It seems likely that the pondweed-rich variant found in Ireland requires mesotrophic waters. 3150 lakes typically have well-developed reed swamp, fen and/or marsh communities around much of their shoreline. Wet woodland would have surrounded much of the shoreline in the past and has survived or re-colonised patches of many 3150 lake shores. Lakes with habitat 3150 are associated with catchments dominated by mineral soil and, hence, some of the most intensive agricultural lands in Ireland. Consequently, the habitat has been under pressure from eutrophication since the 1970s or before.*

Article 17 Reporting for this Annex I habitat describes its distribution as follows:

> *The distribution of habitat 3150 in Ireland is based largely on the 2007-2012 Article 17 distribution map. However, for five of the nine SACs designated for the protection of habitat 3150 (i.e. SACs where 3150 is a Qualifying Interest), site-specific conservation objectives are published and the associated data (OSi 1:5,000) were used (NPWS, 2014, 2016, 2017, 2018). The distribution was, therefore, a hybrid dataset of lake polygons mapped at two scales: 1:50,000 and 1:5,000.*

Article 17 considers this Annex I habitat future prospects and trends as follows:

[16] https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY000440.pdf

[17] https://www.npws.ie/sites/default/files/publications/pdf/NPWS_2019_Vol2_Habitats_Article17.pdf

The short-term trend in Structure and functions was assessed as stable as status was stable or better at over 90% of 3150 sites monitored under the WFD. Given the ongoing stable trends, the predicted future trend is overall stable. 96- 98.5% of the monitored area of the habitat was assessed as in 'not good' condition. Although this is significantly more than 25%, Structures and functions were assessed as Unfavourable-Inadequate because the majority of the area was in Poor condition. As a result, the Future prospects of the Structure and functions were assessed as Poor. As the Future prospects of the Structure and functions were assessed as Poor, the Future prospects for habitat 3150 were assessed as Unfavourable-Inadequate.

6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)

The site synopsis for Lough Ree SAC describes this Annex I habitat as follows:

Dry calcareous grassland occurs scattered around the lake shore. This supports typical species such as Yellow-wort (Blackstonia perfoliata), Carline Thistle (Carlina vulgaris) and Quaking-grass (Briza media). Orchids also feature in this habitat e.g. Bee Orchid (Ophrys apifera) and Common Spotted-orchid (Dactylorhiza fuchsii).

Article 17 Reporting describes this Annex I habitat as follows:

The Annex I habitat 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) comprises species-rich plant communities found on shallow, well-drained calcareous substrates. It is considered a priority habitat only if it is an important orchid site. The Annex I habitat includes a mixture of grasses and herbs, with calcicole species typically frequent. It usually occurs on obvious geological features such as eskers, outcropping limestone rock and in association with limestone pavement.

Article 17 Reporting considers this Annex I habitat future prospects and trends as follows:

Short-term trend direction is Stable (for habitat that is in "good" condition). The Burren Programme and AranLIFE programmes are counterbalancing negative trends outside these areas. Conservation status of Structure and functions is therefore Unfavourable-Inadequate. Future prospects of Structure and functions are therefore Poor.

7120 Degraded raised bogs still capable of natural regeneration

The site synopsis for Lough Ree SAC describes this Annex I habitat as follows:

Small examples of raised bog occur, which are of interest in that they show a natural transition through wet woodland and/or swamp to lakeshore habitats. Active Raised Bog (ARB) habitat comprises areas of high bog that are wet and actively peat- forming, where the percentage cover of bog mosses (Sphagnum spp.) is high, and where some or all of the following features occur: hummocks, pools, wet flats, Sphagnum lawns, flushes and soaks. Results from surveys of the raised bog habitat in 2003 indicate the presence of 5.9 ha of Active Raised Bog (ARB). Also present are examples of Degraded Raised Bog (DRB) capable of regeneration. In general the vegetation of these degraded areas is dominated by typical raised bog species such as Cross-leaved Heath (Erica tetralix), Heather (Calluna vulgaris), Hare's-tail Cottongrass (Eriophorum vaginatum), Bog Asphodel (Narthecium ossifragum) and Deergrass (Scirpus cespitosus). Typically the degraded bog areas have a low cover of peat-forming bog mosses (Sphagnum spp.). The current extent of DRB as estimated using a recently developed hydrological modelling technique, based largely on Light Detection And Ranging (LiDAR) data, is 44.7 ha.

Article 17 reporting describes this Annex I habitat as follows:

DRB is characterised by the complete absence, or at best the presence of only a patchy thin cover, of an 'acrotelm' layer. The acrotelm is the living, actively growing upper layer of a raised bog. The acrotelm is vital to the maintenance and development of an active raised bog as this is the peat-forming layer and its presence strongly influences the rate of water runoff. Previously all the vegetated areas of high bog which were not delineated as Active Raised Bog (ARB) were classified as DRB, on the assumption that most of it could be restored to active peat-forming condition after implementation of comprehensive restoration works. The habitat was therefore considered to encompass sub-marginal, marginal and face bank ecotopes, (Kelly, 1993; Kelly and Schouten, 2002), as well as inactive flushes and dry woodland on the high bog. 751 7120 Degraded raised bog Based on the results of a comprehensive programme of research on Irish bogs by Irish and Dutch scientists in the 1990s, an ecohydrological model has recently been developed based on LiDAR (Light Detection and Ranging) data. The model predicts where there is potential to restore active conditions on the high bog (NPWS, 2017). As a result, only those areas with the right combination of physical conditions (including surface shape, slope and drainage patterns) ultimately capable of supporting ARB are now considered as DRB.

Article 17 Reporting considers this Annex I habitat future prospects and trends as follows:

Future prospects: Overall DRB is given Bad Future prospects. This is likely to significantly change in the next conservation status assessment report provided the actions proposed in the SAC Management Plan are implemented in the next reporting period.

7230 Alkaline fens

Article 17 reporting describes this Annex I habitat as follows:

Alkaline fens are groundwater-fed, generally peat-forming systems with extensive areas of species-rich small sedge and brown moss communities. They occur in areas where there is a high water table and a base-rich, often calcareous water supply. Alkaline fens can develop in areas where vertical water movement predominates (topogenous), such as poorly drained basins or hollows and open water transitions; or where horizontal water movement is also important (soligenous), such as flushes, valley fens and the laggs of raised bogs. However, this distinction is not always clear (such as in large floodplain fens which can include both elements). Fen systems are often a complex mosaic of habitats, with tall sedge beds, reedbeds, wet grasslands, springs and open-water co-occurring.

Article 17 Reporting considers this Annex I habitat future prospects and trends as follows:

The Future prospects for the Structure and functions of alkaline fen habitats in Ireland are assessed as bad. This is based on the assessment result in 2013, and the fact that little has happened in the interim in terms of putting in place conservation measures (either broadscale or site-specific) to counteract pressures and threats that have been identified as acting on the habitat. Thus, overall, the Future prospects for alkaline fen in Ireland have been assessed as Bad given that a significant proportion of the habitat is damaged (deemed to be >25% in a review in 2013, and based on expert judgement and a review of interim studies, it is thought to have increased), coupled with the fact that there are few to no conservation measures in place.

3.1.2.2 Lough Ree SPA (Site Code 004064)

SCI species considered for further assessment (Table 13) are as follows:

- Little Grebe (*Tachybaptus ruficollis ruficollis*) [A690]
- Whooper Swan (*Cygnus cygnus*) [A038]
- Teal (*Anas crecca*) [A052]

- Mallard (*Anas platyrhynchos*) [A053]
- Coot (*Fulica atra*) [A125]
- Golden Plover (*Pluvialis apricaria*) [A140]
- Lapwing (*Vanellus vanellus*) [A142]
- Wetland and Waterbirds [A999]

Further detailed assessments on each of the screened in SCI species are provided below.

Whooper Swan (*Cygnus cygnus*) [A038]

The latest Article 12 reporting data available from NPWS in respect of Whooper Swan relates to the period 2010. The wintering population size for this period, based on a best estimate of the number of individuals wintering was 10,520. Trends, both short term (2000-2010) and long-term (1986-2010) were all positive and increasing. The main pressures and threats comprise *Utility and service lines*, *renewable abiotic energy use, modification of cultivation practices*, *other agriculture activities*, *outdoor sports and leisure activities, recreational activities*, *and other forms of pollution* (sources relating to lead poisoning referenced only).

Results of the Irish Wetland Bird Survey (IWeBS[18]) for the winter period 2009/10 – 2015/16 report a population size (ROI) of 11,852 individuals (from Crowe *et al*., 2015), of which 4,052 were associated with the SPA network. No peak count data has been published for Lough Ree in the period 2011-2015.

Regarding connectivity to Derrycolumb Bog and potential linkage to Lough Ree SPA, Scottish Natural Heritage (SNH)[19] recommends a core range of 5km from nighttime roosts be assumed in respect of foraging Whooper Swan during the winter months when establishing connectivity between a proposed wind farm development and nearby SPA's. However, it is also accepted that the distribution of the Whooper Swan population wintering in Ireland may change over the winter months, possibly due to birds dispersing southwards (as the winter progresses) from their original arrival grounds[20].

Suitable habitat (improved grazing fields) for Whooper Swan does occur in the vicinity of the **Derrycolumb Bog**, subject to flood levels. Whooper Swan were identified overflying the Derrycolumb site during the December 2020 site walkover survey. Therefore, a precautionary approach is required as likely significant effects on Whooper Swan which may utilise adjacent areas and therefore cannot be reasonably excluded. As suitable Whooper Swan habitat does exist within the environs of **Derrycolumb Bog**, and birds were observed commuting over the bog in the winter of 2020/21, potential connectivity between Derrycolumb Bog and Lough Ree SPA in respect of this SCI is assumed.

Teal (*Anas crecca*) [A052]

Lough Ree supports nationally important populations of Teal (1,474 was the three year mean peak between 1997/98 and 1999/2000, as provided in the Site Synopsis for this European Site).

The latest Article 12 reporting data available from NPWS in respect of (wintering) Teal relates to the period 2006-2011. The wintering population size for this period, based on a five-year mean was 29,050 individuals of which 22,498 occurred within the SPA network. Trends in the short term (1999-2011) are considered to be Stable, and long-term (1987-2011) were unknown. The main pressures and threats are *Hunting and*

[18] Lewis et al. (2019). Irish Wetland Bird Survey: Waterbird Status and Distribution 2009/10-2015/16. Irish Wildlife Manuals, No. 106. National Parks and Wildlife Service, Department of culture, Heritage and the Gaeltacht, Ireland.

[19] https://www.nature.scot/sites/default/files/2018-08/Assessing%20connectivity%20with%20special%20protection%20areas.pdf

[20] Wernham, C.V., Toms, M.P., Marchant, J.H., Clark, J.A. Sitiwardens, G.M.&Baillie, S.R. (eds). 2002. *The Migration Atlas; movements of the birds of Britain and Ireland.* T. & A.D.Poyser, London.

collection of wild animals, pollution to surface waters, marine water pollution, other forms of pollution, human induced changes in hydraulic conditions, Outdoor Sports and Leisure activities and Renewable abiotic use.

Results of the Irish Wetland Bird Survey (IWeBS) for the winter period 2011/12 – 2015/16 report a population size (ROI) of 27,644 individuals of which 20,950 were associated with the SPA network. No peak count data has been published for Lough Ree in the period 2011-2015.

No Teal were recorded utilising Derrycolumb Bog on site visits in the winter period 2020/21.

Suitable foraging and roosting habitat occurs adjacent to and within **Derrycolumb Bog**, both within areas of ephemeral ponding water and drainage channels and watercourses. As suitable ephemeral wetland habitat does exist adjacent to and within **Derrycolumb Bog**, in line with a precautionary approach, potential connectivity between Derrycolumb Bog and Lough Ree SPA in respect of this SCI is assumed.

Mallard (*Anas platyrhynchos*) [A053]

Lough Ree SPA supports nationally important populations of Mallard (1,087 was the three year mean peak between 1997/98 and 1999/2000, as provided in the Site Synopsis for this European Site).

The latest Article 12 reporting data available from NPWS in respect of (wintering) Mallard relates to the period 2006-2011. The wintering population size for this period, based on a five-year mean was 20050 individuals of which 12,358 occurred within the SPA network. Trends in the short term (1999-2011) are considered to be fluctuating, and long-term (1987-2011) were unknown. The main pressures and threats are *Outdoor sports and leisure activities, recreational activities*, *hunting and collection of wild animals (terrestrial), Marine water pollution*, *pollution to surface waters (limnic & terrestrial, marine & brackish*), *renewable abiotic energy use*, and *other forms of pollution*.

Results of the Irish Wetland Bird Survey (IWeBS) for the winter period 2009/10 – 2015/16 report a population size (ROI) of 1,865 individuals of which 1,325 were associated with the SPA network, and describes ongoing decline in species numbers. Peak count data of Mallard has not been published for Lough Ree for the same period.

Mallard were recorded utilizing Derrycolumb Bog on site visits in the winter period 2020/21.

Mallard utilise a range of wetland habitats including shallow wetlands during the winter where they feed predominantly on zooplankton which are found mostly on ephemeral wetlands, (Crowe, 2005). No species-specific guidance is available with which to establish connectivity distances to wintering bird-based SPA's, however, they are known to undertake movements in response to cold weather as shallow waters are often the first to freeze (Crowe, 2005). As suitable ephemeral wetland habitat does exist adjacent to and within **Derrycolumb Bog**, and individuals were recorded at Derrycolumb in field surveys, potential connectivity between Derrycolumb Bog and Lough Ree SPA in respect of this SCI is assumed.

Coot (*Fulica atra*) [A125]

Lough Ree SPA supports nationally important populations of Goldeneye (338 was the three year mean peak between 1997/98 and 1999/2000, as provided in the Site Synopsis for this European Site).

The latest Article 12 reporting data available from NPWS in respect of Wigeon relates to the period 2006-2011. The wintering population size for this period, based on a five-year mean was 1,490 of which 1,007 occurred within the SPA network. Short term population trends (1999-2011) display and increase while long-term population trends (1987-2011) were unknown. The main pressures and threats comprise *pollution to surface waters*, *outdoor sports and leisure activities, marine water pollution and human induced changes in hydraulic conditions.*

Results of the Irish Wetland Bird Survey (IWeBS[21]) for the winter period 2009/10 – 2015/16 report a population size (ROI) of 13,303 individuals (from Crowe *et al*., 2015), of which 12,280 were associated with the SPA network. The peak (2011-2015) population associated with Lough Ree was 2,839 birds.

No Coot were recorded utilizing Derrycolumb Bog on site visits in the winter period 2020/21.

Suitable foraging and roosting habitat does not occur within the **Derrycolumb Bog** site, especially the extensive areas of cutover bog and any areas of shallow ephemeral water. However, features of deeper water such as siltation ponds, adjacent drainage channels and watercourses may provide suitable habitat for Coot. As suitable habitat does exist adjacent to **Derrycolumb Bog**, in line with a precautionary approach, potential connectivity between Derrycolumb Bog and Lough Ree SPA in respect of this SCI is assumed.

Golden Plover (*Pluvialis apricaria*) [A140]

The latest Article 12 reporting data available from NPWS in respect of Golden Plover relates to the period 2006-2011. The wintering population size for this period, based on a five-year mean was conservatively 99,870 individuals of which 81,907 occurred within the SPA network. Trends in the short term (1999-2011) were negative in quality and decreasing, however over the long-term (1987-2011) unknown. The main pressures and threats comprise *renewable abiotic energy use*, *modification of cultivation practices*, *marine and freshwater aquaculture*, *outdoor sports and leisure activities, recreational activities*, and *marine water pollution*.

Results of the Irish Wetland Bird Survey (IWeBS) for the winter period 2009/10 – 2015/16 report a population size (ROI) of 80,707 individuals of which 63,123 were associated with the SPA network, and describes long terms declines in the wintering population of Golden Plover in Ireland, possibly due to short-stopping. The peak count in the period 2011-15 for the Shannon Callows was 2050.

Golden Plover feed on a variety of soil and surface-living invertebrates, principally beetles and earthworms, but also plant material such as berries, seeds and grasses, and in winter are known to be attracted to mown grass or close-grazed pastures, stubbles, fallows, harvest-fields and other farmlands of open character, including flood lands (Cramp 1977-1993). Golden Plover will utilise cutaway bog for diurnal roosting.

Golden Plover were recorded flying over Derrycolumb Bog on one occasion during site visits completed during the winter period 2020/21.

No species-specific guidance is available with which to establish connectivity distances to wintering bird-based SPA's, however, a foraging range of up to 11km is cited in respect of breeding season foraging, and it is also known that cold weather can result in movements of Golden Plover during the winter. Based on observations during the winter period 2020/21, potential connectivity between Derrycolumb Bog and Lough Ree SPA in respect of this SCI is assumed.

Lapwing (*Vanellus vanellus*) [A142]

The latest Article 12 reporting data available from NPWS in respect of Lapwing relates to the period 2006-2011. The wintering population size for this period, based on a five-year mean was 88,580 individuals of which 69,488 occurred within the SPA network. Trends in the short term (1999-2011) and long-term (1987-2011) were negative in quality and decreasing. The main pressures and threats comprise *renewable abiotic*

[21] Lewis et al. (2019). Irish Wetland Bird Survey: Waterbird Status and Distribution 2009/10-2015/16. Irish Wildlife Manuals, No. 106. National Parks and Wildlife Service, Department of culture, Heritage and the Gaeltacht, Ireland.

energy use, *modification of cultivation practices*, *marine and freshwater aquaculture*, *outdoor sports and leisure activities, recreational activities*, and *marine water pollution*.

Results of the Irish Wetland Bird Survey (IWeBS) for the winter period 2009/10 – 2015/16 report a population size (ROI) of 69,823 individuals of which 48,232 were associated with the SPA network and describes long term declines in the wintering population of Lapwing in Ireland. The peak count in the period 2011-15 for Lough Ree was 1150.

No Lapwing were recorded utilizing Derrycolumb Bog on site visits in the winter period 2020/21.

Lapwing feed on chiefly small invertebrates, which live on or in the ground. During the winter, they utilise habitats such as arable fields and pastures in addition to coastal and estuarine habitats. Suitable habitat is available for this species within the pastoral fields adjacent to **Derrycolumb Bog**. No species-specific guidance is available with which to establish connectivity distances to wintering bird-based SPA's, however, it is also known that cold weather can result in movements of Lapwing during the winter. In line with a precautionary approach, potential connectivity between Derrycolumb Bog and Lough Ree SPA in respect of this SCI is assumed.

Wetland and Waterbirds [A999]

The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the wetland area contained in the SPA and the waterbirds that utilize this resource are of special conservation interest for 'Wetland & Waterbirds'. In addition to the Special Conservation Interests described above, the Site Synopsis for Lough Ree SPA describes a wide range of species as utilizing the site, including Tufted Duck, Black-headed Gull, Lesser Black-backed Gull and Common Gull. The various wetland habitats present in the SPA provide optimum feeding grounds for these various species of avifauna, while many of the birds also roost or rest within the (European) site.

Ephemeral wetland habitats do occur within the Derrycolumb Bog boundary as well as areas adjacent to the site. These habitats may provide suitable habitat for non-SCI and SCI species associated with Lough Ree SPA, notably the species recorded on field surveys and referenced above.

It is assumed that due to connectivity from the individual species described above, potential connectivity between Derrycolumb Bog and Lough Ree SPA exists in respect of the 'waterbirds' element of this SCI.

3.1.3 Pressures and Threats of European Sites

Threats and pressures published for Lough Ree SAC and Lough Ree SPA are presented in **Table 15** and **Table 16** below.

Table 15 – Threats and Pressures for Lough Ree SAC

Rank[22]	Threat Pressure[23]	Inside (i) / Outside (o) / Both (b)
H	K03.05 - antagonism arising from introduction of species	i

[22] Threat, pressure and impact ranking provided on Natura 2000 data form: H – High, M - Medium, L - Low

[23] Threat code sourced from Natura 2000 data form and follows reference list provided on threats, pressures and activities for European sites

Rank[22]	Threat Pressure[23]	Inside (i) / Outside (o) / Both (b)
M	H02.06 - diffuse groundwater pollution due to agricultural and forestry activities	b
L	J02.04 - Flooding modifications	b
L	H06.03 - Thermal heating of water bodies	o
L	G01.02 - Walking, horse-riding and non-motorised vehicles	i
L	L08 - Inundation (natural processes)	i
M	A04 - Grazing	i
M	A08 - Fertilisation	b
H	J02.11.02 - Other siltation rate changes	o
M	F03.01 - Hunting	i
M	G01.01 - Nautical sports	i
M	E01.03 - Dispersed habitation	o
L	D03.01.02 - Piers / tourist harbours or recreational piers	i
M	H01.08 - Diffuse pollution to surface waters due to household sewage and waste waters	b
M	B02 - Forest and Plantation management & use	b
M	F02.03 - Leisure fishing	i
H	I01 - Invasive non-native species	b
M	A03.03 - Abandonment / lack of mowing	i

Table 16 – Threats and Pressures for Lough Ree SPA

Rank	Threat / Pressure	Inside (i) / Outside (o) / Both (b)
M	A04 - Grazing	o
L	B - Sylviculture, forestry	o
M	I01 - Invasive non-native species	i
M	A08 - Fertilisation	o
H	G01.01 - Nautical sports	i

Rank	Threat / Pressure	Inside (i) / Outside (o) / Both (b)
M	G01.02 - Walking, horseriding and non-motorised vehicles	o
M	F03.01 - Hunting	i
M	F02.03 -Leisure fishing	i

3.1.4 Conservation Objectives for the relevant European Sites

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and;
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and;
- the conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

3.1.4.1 Lough Ree SAC (Site Code 000440)

The site-specific conservation objectives of Lough Ree SAC aim to define favourable conservation condition for the particular habitat or species at that site. These objectives and conditions are summarised in **Table 17** below in respect of the Qualifying Interests of Lough Ree SAC which were screened in for further evaluation.

The conservation objectives of Lough Ree SAC are available in full on the National Parks & Wildlife Service website at https://www.npws.ie/protected-sites. The conservation objectives reproduced in the table below were sourced from NPWS Conservation Objectives: NPWS (2016) Conservation Objectives: Lough Ree SAC 000440. Version 1 and should be read in conjunction with any other supporting documentation on the referenced website as provided above.

Table 17: Conservation Objectives of Lough Ree SAC (Site Code 000440)

Lough Ree SAC (Site Code 000440)	
Objective:	To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

Lough Ree SAC (Site Code 000440)		
Species Code	**Common Name**	**Scientific Name**
1355	Otter	*Lutra lutra*
Habitat Code	**Habitat Name**	
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates	
7120	Degraded raised bogs still capable of natural regeneration	
7230	Alkaline fens	
8240	Limestone pavements	
91A0	Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	
91D0	Bog woodland	

3.1.4.2 Site Specific Conservation Objectives of Lough Ree SAC

Table 18: Site specific conservation objectives for Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation (3150)

Attribute	Measure	Target	Potential Impact
Habitat area	Hectares	Area stable or increasing, subject to natural processes	The proposed works have the potential to impact these attributes in the event of major siltation events (resulting from the impact sources referenced in Section 2.9.1.2). Such an event could influence changes in habitat area, species composition, hydrological regime, water quality, water colour, acidification, turbidity, fringing habitat types and trophic levels.
Habitat distribution	Occurrence	No decline, subject to natural processes	
Typical species	Occurrence	Typical species present, in good condition, and demonstrating typical abundances and distribution	
Vegetation composition characteristic	Occurrence	All characteristic zones	
Vegetation distribution maximum depth	Metres	Maintain maximum depth of vegetation, subject to natural processes	
Hydrological regime – water level fluctuations	Metres	Maintain appropriate natural hydrological regime necessary to support the habitat	
Lake substratum quality	Various	Maintain appropriate substratum type, extent	

Attribute	Measure	Target	Potential Impact
		and chemistry to support the vegetation	
Water quality: transparency	Metres	Maintain/restore appropriate Secchi transparency. There should be no decline in Secchi depth/transparency	
Water quality: nutrients	Njg/l P; mg/l N	Maintain the concentration of nutrients in the water column to sufficiently low levels to support the habitat and its typical species	
Water quality: phytoplankton biomass	Njg/l Chlorophyll a	Maintain appropriate water quality to support the habitat, including good chlorophyll a status	
Water quality: phytoplankton composition	EPA phytoplankton composition metric	Maintain appropriate water quality to support the habitat, including good phytoplankton composition status	
Water quality: attached algal biomass	Algal cover and EPA phytobenthos metric	Algal cover and EPA phytobenthos metric Maintain trace/absent attached algal biomass (<5% cover) and good phytobenthos cover.	
Water quality: macrophyte status	EPA macrophyte metric	(The Free Index) Restore good macrophyte status	
Acidification status	pH units; mg/l	Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the habitat, subject to natural processes	
Water colour	mg/l PtCo	Maintain appropriate water colour to support the habitat	
Dissolved organic carbon (DOC)	mg/l	Maintain appropriate organic carbon levels to support the habitat	
Turbidity	Nephelometric turbidity units/ mg/l SS/ other appropriate units	Maintain appropriate turbidity to support the habitat	

Attribute	Measure	Target	Potential Impact
Fringing habitat: area	Hectares	Maintain the area and condition of fringing habitats necessary to support the natural structure and functioning of the lake habitat	

Table 19: Site specific conservation objectives for Alkaline Fens (7230)

Attribute	Measure	Target	Potential Impact
Habitat area	Hectares	Area stable or increasing, subject to natural processes	The proposed works have the potential to impact these attributes in the event of major siltation events (resulting from the impact sources referenced in Section 2.9.1.2). Such an event could influence changes in trophic levels of this habitat that in turn could effect attributes such as habitat area and distribution, hydrological regime, water quality, vegetation structure and composition.
Habitat distribution	Occurrence	No decline, subject to natural processes	
Hydrological regime	Metres	Appropriate natural hydrological regimes necessary to support the natural structure and functioning of the habitat	
Peat formation	Flood duration	Active peat formation, where appropriate	
Water quality: nutrients	Water chemistry measures	Appropriate water quality to support the natural structure and functioning of the habitat	
Vegetation structure: typical species	Percentage	Maintain vegetation cover of typical species including brown mosses and vascular plants	
Vegetation composition: trees and shrubs %	Percentage	Cover of scattered native trees and shrubs less than 10%	
Physical structure: disturbed bare ground	Percentage	Cover of disturbed bare ground less than 10%. Where tufa is present, disturbed bare ground less than 1%	
Physical structure: drainage	Percentage	Areas showing signs of drainage as a result of drainage ditches or heavy trampling less than 10%	

Table 20: Site Specific Conservation Measures for Otter (1355)

Attribute	Measure	Target	Potential Impact
Distribution	Percentage positive survey sites	No significant decline	The proposed works could effect the distribution of otter

Attribute	Measure	Target	Potential Impact
			through ex-situ disturbance of otter from the margins of Derrycolumb Bog and its associated watercourses. However, works near watercourses and silt ponds will be temporary and intermittent. The likelihood of such disturbance effects is considered to be low.
Extent of terrestrial habitat	Hectares	No significant decline. Area mapped and calculated as 330.6ha along river banks/lake shoreline/around pools	The proposed works will no contribute to the decline in extent of terrestrial, riverine or lacustrine habitat for otter within the Lough Ree SAC or those areas ex-situ of Lough Ree SAC, including the watercourses draining the Derrycolumb Bog site.
Extent of freshwater (river) habitat	Kilometres	No significant decline. Length mapped and calculated as 22.7km	
Extent of freshwater (lake) habitat	Hectares	Area mapped and calculated as 2097.4ha	
Couching sites and holts	Number	No significant decline	The findings of mammal surveys and site walkover surveys at Derrycolumb Bog did not identify otter holts within the site's silt ponds or streams. Works such as silt pond cleaning may contribute to temporary disturbance of otter using silt pond sites or the adjoining watercourses. The likelihood of such disturbance effects is considered to be low.
Fish biomass available	Kilograms	No significant decline	The proposed works have the potential to impact this attributes in the event of major siltation events (resulting from the impact sources referenced in Section 2.9.1.2). However, the likelihood of such

Attribute	Measure	Target	Potential Impact
			events is considered to be low.
Barriers to connectivity	Number	No significant increase. For guidance, see map 9	The proposed rehabilitation works will not provide permanent barriers to connectivity to commuting or foraging otter. Intermittent works at silt ponds and EPA blue line features may be required, but these are unlikely to present

3.1.4.3 Lough Ree SPA

The generic conservation objectives of Lough Ree SPA are available in full on the National Parks & Wildlife Service website at https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY004064.pdf. The Generic Conservation Objective for Lough Ree SPA is as follows: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

- A004 Little Grebe (Tachybaptus ruficollis)
- A038 Whooper Swan (*Cygnus cygnus*)
- A050 Wigeon (*Anas penelope*)
- A052 Teal (*Anas crecca*)
- A053 Mallard (Anas platyrhynchos)
- A056 Shoveler (*Anas clypeata*)
- A061 Tufted Duck (*Aythya fuligula*)
- A065 Common Scoter (*Melanitta nigra*)
- A067 Goldeneye (Bucephala clangula)
- A125 Coot (*Fulica atra*)
- A140 Golden Plover (*Pluvialis apricaria*)
- A142 Lapwing (Vanellus vanellus)
- A193 Common Tern (*Sterna hirundo*)

3.2 Summary of Impact Pathways screened in for examination at Stage 2

The impact pathways presented in **Table 21** to Qualifying Interests/Special Conservation Interests are examined in relation to each of the three European Sites under consideration, in order to evaluate the effect of Derrycolumb Bog Decommissioning and Rehabilitation, if any, on the integrity of each of the five European Sites.

Table 21: Qualifying Interests/Special Conservation Interests and Impact Pathways examined at Stage 2

European Site	Qualifying Interest/Special Conservation Interest for evaluation at Stage 2	Impact examined at Stage 2
Lough Ree SAC (Site Code 000440)	[1355] Otter *Lutra lutra* [3150] Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation [7230] Alkaline fens	a) Indirect/ex-situ disturbance or displacement of species of Qualifying Interest. b) Indirect loss, reduction or degradation of terrestrial or aquatic habitats within the SAC c) Indirect/ex-situ mortality to species of Qualifying Interest.
Lough Ree SPA (Site Code 004064)	[A038] Whooper Swan *Cygnus cygnus* [A052] Teal *Anas crecca* [A125] Coot *Fulica atra* [A140] Golden Plover *Pluvialis apricaria* [A142] Lapwing *Vanellus vanellus* [A999] Wetland and Waterbirds	a)Indirect loss, reduction or degradation of terrestrial or aquatic habitats within or in close proximity to the SPA site; b) Indirect or Ex-Situ disturbance or displacement of bird species of Special Conservation Interest.

3.3 Evaluation of potentially adverse impacts at Stage 2 (Alone & In Combination)

Evaluations are generally grouped between those which impact habitats (direct or indirect based on where secondary habitat degradation potentially occurs, i.e. within a European Site boundary or outside) and then species (disturbance/displacement or mortality). Mortality is only considered relevant in respect of Otter as bird species can evade contact with operating machinery. Disturbance or displacement to the key avian receptors which comprise SCI's and form part of the 'Wetland and Waterbirds' SCI is dealt with collectively. Potentially adverse impacts on wetlands as part of 'Wetlands and Waterbirds' are addressed under the treatment of indirect loss, reduction or degradation of terrestrial or aquatic habitats. Potentially adverse secondary effects on waterbirds as part of 'Wetlands and waterbirds' are evaluated under 'Indirect or Ex-Situ disturbance or displacement of bird species of Special Conservation Interest.'

The following evaluations are based on known sensitivities and best available scientific knowledge. Likely disturbance to wintering and passage wildfowl is based on flight initiation distances/Minimum Approach Distances (MADS) from peer reviewed publications.

In combination evaluations are based on the other plans or projects described in Section 2.6.3.

3.3.1 Indirect/ex-situ disturbance or displacement of species of Qualifying Interest (Otter)

3.3.1.1 Alone

Otter are rated as a very high sensitivity receptor (based on International importance ratings) and may be sensitive to mortality through inadvertent collision with moving vehicles or machinery, in particular during hours of darkness. However, such an occurrence is highly unlikely as the rehabilitation works will be completed during daylight hours only. Some travel to and from and within the site may be undertaken after daylight hours, however these events will be temporary and intermittent and of short duration.

There are no known Otter holts at Derrycolumb Bog or its environs, and the general unsuitability of areas subject to decommissioning and rehabilitation no doubt constrains usage, however Otter may utilise existing silt ponds or open areas of watercourses located upstream and downstream of the site and between the peatland basins.

Disturbance effects are more likely in respect of foraging or resting animals, ex-situ from the SAC, primarily within aquatic habitats but also within adjacent riparian corridors and /or whilst crossing the bog/ utilising drains in close proximity to proposed works. Many of the watercourses (including drainage for historic peat extraction) present whilst not within an SAC boundary, are ultimately hydrologically connected to a downstream SAC which includes Otter as a Qualifying Interest.

Were the impacts described above to occur within an SAC watercourse it may result in direct adverse effects on QI Species and Conservation objectives such as a decline in range and/or distribution and numbers of individuals within the SAC catchment - however this is not applicable in respect of Derrycolumb Bog Decommissioning and Rehabilitation i.e. there is no potential for the above described impacts within an SAC boundary.

In instances where this impact occurs outside or ex-situ the SAC it may, dependant on source magnitude, degree of hydrological connectivity and presence or absence of mitigating measures in line with tried and tested methods, have secondary adverse effects on connected or supporting populations for downstream but ecologically connected Qualifying Interest (QI) species, thus affecting Site Integrity/Conservation Objectives similarly.

Although there are no known otter were holts identified within Derrycolumb Bog site, a putative otter couch / slide was found along the margins of the Ledwithstown River near the south-eastern corner of the site. The suitability of the watercourse for otter is very low and the potential for otter to utilise this watercourse and its surrounds as a foraging or breeding habitat is also very low. Therefore, the likelihood of otter disturbance and displacement during the proposed works are considered to be low and highly unlikely. Should otter utilise the watercourses at the margins of the site (such as the Ledwithstown River) on an occasional or temporary basis, then disturbance effects as a result of the proposed works would be most likely to occur during daylight hours. Such disturbance effects are highly unlikely, however should they occur, they would be considered to be temporary and indirect. Such disturbance and displacement effects, should they occur, will not be adverse.

3.3.1.2 In Combination

There is potential for cumulative effects from other plans or projects which may result in similar source-impact-pathways to Otter within other tributaries or within the connected areas of the Upper Shannon catchment / Lough Ree.

The decommissioning and rehabilitation of Derrycolumb Bog by BnM, which is also within the River Shannon catchment, may result in likely significant/ potentially adverse effects on Otter; this project is known to temporally overlap works proposed for Derrycashel and Edera. Both of these proposed bog rehabilitation sites are located in relative proximity to the Derrycolumb site and support connectivity with Lough Ree and

the Shannon (Upper)_090 subcatchment. The Shannon (Upper)_090 subcatchment is located downstream of the Derrycolumb rehabilitation site.

In the absence of mitigation measures to avoid/reduce harmful effects, the order of cumulative effects is that of both projects combined, notwithstanding that it is assumed that Appropriate Assessment and mitigation measures, if required, will be undertaken and put in place.

Additional sources of disturbance such as baseline agricultural activities or existing turbary are considered unlikely to result in in combination adverse effects, due to habituation, described tolerance and occurrence during primarily daylight hours.

All other plans or projects identified are subject to Appropriate Assessment and it is assumed that in-combination effects are therefore unlikely, due to the requirement for mitigation if potentially adverse effects are identified.

3.3.1.3 Stage 2 Evaluation

In the absence of measures to avoid/reduce harmful effects, the magnitude of effects (alone and in combination) is evaluated as low, with no possibility of adverse effects on European Sites/Conservation Objectives evaluated.

3.3.2 Indirect/ex-situ mortality to species of Qualifying Interest (Otter)

3.3.2.1 Alone

Otter are rated as a very high sensitivity receptor (based on International importance ratings) and may be sensitive to mortality through inadvertent collision with moving vehicles or machinery, in particular during hours of darkness. However, such an occurrence is highly unlikely as the rehabilitation works will be completed during daylight hours only. Some travel to and from and within the site may be undertaken after daylight hours.

There are no known Otter holts at Derrycolumb Bog, and the general unsuitability of areas subject to decommissioning and rehabilitation no doubt constrains usage, however Otter may utilise existing silt ponds or open areas of watercourses located upstream and downstream of the site and between the peatland basins.

Indirect and ex-situ mortality of otter are more likely in respect of foraging or resting animals, primarily within aquatic habitats but also within adjacent riparian corridors and /or whilst crossing the bog/ utilising drains in close proximity to proposed works. Many of the watercourses (including drainage for historic peat extraction) present whilst not within an SAC boundary, are ultimately hydrologically connected to a downstream SAC which includes Otter as a Qualifying Interest.

Were the impacts described above to occur within an SAC watercourse it may result in direct adverse effects on QI Species and Conservation objectives such as a decline in range and/or distribution and numbers of individuals within an SAC - however this is not applicable in respect of Derrycolumb Bog Decommissioning and Rehabilitation.

Although there are no known otter were holts identified within Derrycolumb Bog site, a putative otter couch / slide was found along the margins of the Ledwithstown River near the south-eastern corner of the site. The suitability of the watercourse for otter is very low and the potential for otter to utilise this watercourse and its surrounds as a foraging or breeding habitat is also very low. Therefore, the likelihood of otter mortality during the proposed works are considered to be low and highly unlikely.

The likelihood of otter mortality from berm failure is also low and highly unlikely. Internal berms within the rehabilitation areas are unsuitable to support otter holts and couches and in most instances would be too far

removed from watercourses. Likewise peripheral berms are also highly unsuitable to support otter, due to their structure and poor cover capacity. In the unlikely event of peripheral berm failure, otter mortality is considered to be low and highly unlikely.

In instances where this impact occurs outside or *ex-situ* an SAC it may, dependant on source magnitude, degree of hydrological connectivity and presence or absence of mitigating measures in line with tried and tested methods, have secondary adverse effects on connected or supporting populations for downstream but ecologically connected Qualifying Interest (QI) species, thus affecting Site Integrity/Conservation Objectives similarly.

3.3.2.2 In combination

There is potential for cumulative effects from other plans or projects which may result in similar source-impact-pathways to Otter within other tributaries or within the downstream areas of Lough Ree SAC.

The decommissioning and rehabilitation of Derrycolumb Bog by BnM, which is also within the River Shannon / Lough Ree catchment, may result in likely significant/ potentially adverse effects on Otter; this project is known to temporally overlap works proposed for Derrycashel and Edera. Both of these proposed bog rehabilitation sites are located in relative proximity to the Derrycolumb site and support connectivity with Lough Ree and the Shannon (Upper)_090 subcatchment. The Shannon (Upper)_090 subcatchment is located downstream of the Derrycolumb rehabilitation site.

In the absence of mitigation measures to avoid/reduce harmful effects, the order of cumulative effects is that of both projects combined, notwithstanding that it is assumed that Appropriate Assessment and mitigation measures, if required, will be undertaken and put in place.

Additional sources of disturbance such as baseline agricultural activities are considered unlikely to result in in combination adverse effects.

All other plans or projects identified are subject to Appropriate Assessment and it is assumed that in-combination effects are therefore unlikely, due to the requirement for mitigation if potentially adverse effects are identified.

3.3.2.3 Stage 2 Evaluation

In the absence of measures to avoid/reduce harmful effects, the magnitude of effects (alone and in combination) is evaluated as low, with low possibility of adverse effects on European Sites/Conservation Objectives evaluated.

3.3.3 Indirect loss, reduction or degradation of aquatic habitats[24] within Lough Ree SAC and consequent effects to reliant aquatic species of Qualifying Interest

Aquatic habitats and species in this instance refers to the habitats and species of Qualifying Interest for Lough Ree SAC downstream of Derrycolumb Bog; i.e. otter (1355), Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation (3150) and alkaline fens (7230). Deterioration in water quality within Derrycolumb Bog and the downstream watercourses as a result of the proposed works, could result following the release of sediment or silt laden water from the site to the receiving watercourses; i.e. the Ledwithstown_010 watercourse and further downstream to Lough Ree. Siltation (and consequent nutrient enrichment) of the receiving watercourses could effect the in-situ and / or reliant QI species for Lough Ree

[24] Habitats requiring further

SAC such as Otter and the following aquatic / water dependent habitats Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation (3150) and alkaline fens (7230).

Decommissioning and Rehabilitation at Derrycolumb Bog will require direct excavation of the banks and bed of the existing drainage channels (peat production drains) to facilitate drain blocking, levelling of existing stock piles, reprofiling areas of cutover peat to remove preferential flowpaths to drainage channels, movement of peat to create various dams/speedbumps and cell bunds, regulate pumping to facilitate creation of wetlands. It will require the use of machinery and involve the removal of waste, including raw material, potentially contaminated soils or peat, railway infrastructure, and fuel.

Potential impacts to downstream connected aquatic ecology receptors could occur in the absence of best practice measures of mitigation being implemented during and following the proposed rehabilitation works.

3.3.3.1 Water quality effects due to sedimentation or the release of deleterious materials

Alone

Erosion and deposition are natural process in watercourses varying naturally throughout the year. However, additional sediment contributions entering the watercourse, such as from Decommissioning and Rehabilitation in, adjacent to or upstream of individual watercourses, could have negative implications for the receiving aquatic environment and could contribute to nutrient enrichment of the receiving watercourse and habitat degradation. These impacts may be mobilised downstream and affect river reaches at a distance from the physical works. Effects on these receptors may in turn affect downstream aquatic QI habitats and species for Lough Ree SAC. In addition, water quality effects due to contamination by fuels, oils or cementitious material has the potential to lead to direct toxicity events to QI species, or sub-lethal degradation and loss of aquatic habitat quality.

The release of large volumes of sediment and /or deleterious materials to aquatic habitats upstream of an SAC may reduce the quality of aquatic habitat resource for QI species, and/or result in effective habitat loss should QI species cease to utilise degraded habitats.

Overall effects may reduce the suitability of the receiving waters as a resource for QI species and the degrade water dependent and nutrient sensitive QI habitats, thus affecting Site Integrity and/or Conservation Objectives – particularly those which seek to maintain or restore the favourable conservation condition of the QI habitat / species at the Lough Ree SAC.

Loss of nutrient to Lough Ree and its supporting aquatic habitats will have the potential to contribute to an increase in the trophic status of the lake and result in further eutrophication. Lough Ree is a natural eutrophic lake and limits for TP and ammonia have been set in the accompanying SSCO document for Lough Ree SAC. These limits are an annual average concentration limit of <20ug/l for TP, <0.065mg/l N for ammonia and an annual average 95th percentile of <0.140mg/l N for total ammonia. Excessive nutrient inputs to the lake above these thresholds will have the potential to result in adverse effects to vegetation communities and fauna supported by the lake.

As noted in Section 2.5.2, water quality at silt ponds are monitored prior to discharge to the Ledwithstown River which subsequently drains to Lough Ree SAC. Currently the concentrations for TP and ammonia at silt ponds are above the limits set by the SSCOs for Lough Ree. It is noted that these monitoring results are from the silt ponds and are representative of TP and ammonia concentrations upstream of Lough Ree SAC. The concentrations of TP and ammonia draining to the above two watercourses will be diluted and attenuated and further diluted within the downstream areas of the Ledwithstown River and the lake waterbody.

The PCAS includes measures for the application of fertiliser to help accelerate natural colonisation within the areas targeted by active rehabilitation prescriptions. Slow-release Phosphorous-rich fertiliser (such as Rock Phosphate) will be used to accelerate natural colonisation and the development of pioneer vegetation cover. Low application rates will be used.

In the absence of suitable safeguards the use of these fertilisers, in-combination with the exist levels of TP and ammonia discharging from silt ponds, as well as discharges from existing and unprotected outfalls to the Ledwithstown will have the potential to combine with other existing sources of nutrient pressure to the lake to impact its trophic status.

In combination

There is potential for cumulative effects from other plans or projects which may result in similar source-impact-pathways to waterbodies upstream of or within the SAC's under consideration.

The decommissioning and rehabilitation of Derrycolumb Bog by BnM, may result in likely significant/potentially adverse effects on water quality.

Removal of remaining stockpiled milled peat within the Derrycolumb site will be undertaken in 2021 and may overlap with the proposed PCAS works. The overlap of both works processes could contribute to increased disturbance effects or release of potential pollutant to the receiving environment and potentially consequent impacts to European Sites. However, the removal of stockpiled peat material will be conducted in accordance with Bord na Mona's Peat Loading Standard Operating Procedures (See **Figure 20**), ensuring the release of potential pollutant sources during these works are avoided.

In the absence of mitigation measures to avoid/reduce harmful effects, the order of cumulative effects is that of both projects combined, notwithstanding that it is assumed that Appropriate Assessment and mitigation measures, if required, will be undertaken and put in place.

Various sources of water-quality related effects - with linkage to activities such as Agriculture or Turbary - within the SAC constitute activities requiring consent (ARC) of the minister and therefore are unlikely to result in in combination adverse effects.

Regarding the proposed amenity walkway at Derrycolumb and the proposed Shannon Wilderness Park, there is no temporal overlap with PCAS activities. It is assumed that Appropriate Assessment will be carried out of any potentially adverse effects on European Sites at the proposed time of construction and/or operation, and applicable mitigation put in place accordingly.

All other plans or projects identified are subject to Appropriate Assessment/and or consented mitigation measures and it is assumed that in-combination effects are therefore unlikely, due to the requirement for mitigation if potentially adverse effects are identified.

Stage 2 Evaluation

In the absence of measures to avoid/reduce harmful effects, the magnitude of effects (alone and in combination) is evaluated as high, with adverse effects on European Sites/Conservation Objectives evaluated as likely.

3.3.3.2 Alteration of flow regimes or changes to watercourse morphology

Alone

Watercourse morphology relates to the shape of a watercourse channel, its bed and banks and how erosion, transportation of water, sedimentation and the composition of riparian vegetation changes this shape over

time. In the absence of mitigation there is potential for sediment deposition at a scale which may alter tributary channel morphology within or ex-situ an SAC thus reducing the suitability of receiving (downstream) aquatic habitats and species of Qualifying Interest. Such occurrences could affect Site Integrity and/or Conservation Objectives for a European Site – particularly those which seek to maintain or restore the favourable conservation condition of aquatic habitats and species at the designated SAC.

The following Hydrological effects may occur to the local environment at Derrycolumb Bog as a result of the proposed works and may influence flow regimes to the receiving environment and receiving watercourses. These include:

- Increases in groundwater levels which may affect neighbouring lands across hydraulic gradients;
- Reductions in conveyance capacity around or through Derrycolumb Bog, or;
- Marginal alteration of topographical catchments, also resulting in flooding as a result of increased run-off.

Increased flooding and consequent run-off to lands adjacent to and surrounding Derrycolumb Bog could result in increased run-off of potential pollutants to the receiving watercourses; i.e. the Ledwithstown River, both of which provide remote connectivity between the site and Lough Ree SAC. Changes to the hydrological regime (reductions or increases in run-off) could result in consequent effects to ex-situ water dependent species using the downstream areas of the Ledwithstown River. Increased flow volumes / regimes to receiving watercourses may change localised watercourse morphology (as a result of localised erosion / scouring) which could contribute ex-situ effects to QI species using the downstream areas of the Ledwithstown River and Lough Ree, particularly otter.

In combination

There is potential for cumulative effects from other plans or projects which may result in similar source-impact-pathways to waterbodies upstream of or within the SAC under consideration.

The decommissioning and rehabilitation of Derrycolumb Bog by BnM, which is also within the Ledwithstown River catchment and supports connectivity to Lough Ree, may result in likely significant/potentially adverse effects on water quality.

Removal of remaining stockpiled milled peat within the Derrycolumb site will be undertaken in 2021 and may overlap with the proposed PCAS works. The overlap of both works processes could contribute to increased disturbance effects or release of potential pollutant to the receiving environment and potentially consequent impacts to European Sites. However, the removal of stockpiled peat material will be conducted in accordance with Bord na Mona's Peat Loading Standard Operating Procedures (See **Figure 20**), ensuring the release of potential pollutant sources during these works are avoided.

In the absence of mitigation measures to avoid/reduce harmful effects, the order of cumulative effects is that of both projects combined, notwithstanding that it is assumed that Appropriate Assessment and mitigation measures, if required, will be undertaken and put in place.

Various sources of flow regime or water morphology related effects, with linkage to activities such as Agriculture or Turbary, within the SAC constitute activities requiring consent (ARC) of the minister and therefore are unlikely to result in in combination adverse effects.

Regarding the proposed amenity walkway at Derrycolumb and the proposed Shannon Wilderness Park, there is no temporal overlap with PCAS activities. It is assumed that Appropriate Assessment will be carried out of any potentially adverse effects on European Sites at the proposed time of construction and/or operation, and applicable mitigation put in place accordingly.

All other plans or projects identified are subject to Appropriate Assessment/and or consented mitigation measures and it is assumed that in-combination effects are therefore unlikely, due to the requirement for mitigation if potentially adverse effects are identified.

Stage 2 Evaluation

In the absence of measures to avoid/reduce harmful effects, the magnitude of effects (alone and in combination) is evaluated as high, with adverse effects on European Sites/Conservation Objectives evaluated as likely.

3.3.4 Indirect loss, reduction or degradation of terrestrial or aquatic habitats within or in close proximity to the SPA site

Terrestrial habitat in this instance refers to the habitats within and adjoining Derrycolumb bog which may be utilised by SCI species as feeding resources, e.g. cutover bog and high bog areas used by feeding Swans and waterfowl, or habitats containing invertebrate prey items for which species such as Lapwing, Golden Plover or other waterbirds may forage – both within, in close proximity to, or upstream of the SPA's under consideration. Riparian habitats i.e. the interface between the aquatic habitat, the bankside vegetation and terrestrial environment are also considered here.

Aquatic habitat relates to instream features supporting aquatic biodiversity (bed substrate, morphology, water quality, etc.) both within and in close proximity to an SPA. Watercourses are highly sensitive to change, containing sensitive aquatic ecological receptors including fisheries, and a diverse macroinvertebrate community which provides feeding resources for various fauna.

Decommissioning and Rehabilitation at Derrycolumb Bog will require direct excavation of the banks and bed of the existing drainage channels (peat production drains) to facilitate drain blocking, levelling of existing stock piles, reprofiling areas of cutover peat to remove preferential flowpaths to drainage channels, movement of peat to create various dams/speedbumps and cell bunds, regulate pumping to facilitate creation of wetlands. It will require the use of machinery and involve the removal of waste, including raw material, potentially contaminated soils or peat, railway infrastructure, and fuel.

3.3.4.1 Water quality effects due to sedimentation or the release of deleterious materials

Alone

Erosion and deposition are natural process in watercourses varying naturally throughout the year. However, additional sediment contributions entering the watercourse, such as from D&R in, adjacent to or upstream of individual watercourses, could have negative implications for fish and invertebrates due to physical damage and reduced feeding/foraging, as well as negative impacts due to compaction of spawning gravels by sediment causing mortality impacts for salmonid eggs (affecting recruitment) and interfering with invertebrate life stages within gravel substrates (interstitial spaces). These impacts may be mobilised downstream and affect river reaches at a distance from the physical works. Effects on these receptors may in turn affect SCI species /waterbirds or QI species of mammals (e.g. Otter) which utilise fish and invertebrates as food resources. In addition, water quality effects due to contamination by fuels, oils or cementitious material has the potential to lead to direct toxicity events, or sub-lethal degradation of aquatic habitat quality.

The release of large volumes of sediment and /or deleterious materials to habitats adjacent to, within, or upstream from an SPA may reduce the quality of terrestrial and riparian habitats as foraging or roosting resources for SCI's, and/or result in effective habitat loss should SCI's cease to utilise degraded habitats.

Overall effects may reduce the suitability of the receiving waters as a resource for SCI's, thus affecting Site Integrity and/or Conservation Objectives – particularly those which seek to maintain or restore the favourable conservation condition of the wetland habitat at the designated SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.

In combination

There is potential for cumulative effects from other plans or projects which may result in similar source-impact-pathways to waterbodies upstream of or within the SPA's under consideration.

The decommissioning and rehabilitation of Derrycolumb Bog by BnM, may result in likely significant/potentially adverse effects on water quality; this project is known to temporally overlap works proposed for Edera and Derrycashel Bogs, both which support connectivity to the Upper Shannon Catchment and Lough Ree.

In the absence of mitigation measures to avoid/reduce harmful effects, the order of cumulative effects is that of both projects combined, notwithstanding that it is assumed that Appropriate Assessment and mitigation measures, if required, will be undertaken and put in place.

Various sources of water-quality related effects - with linkage to activities such as Agriculture or Turbary - within the SPA constitute activities requiring consent (ARC) of the minister and therefore are unlikely to result in in combination adverse effects.

Regarding the proposed amenity walkway at Derrycolumb and the proposed Shannon Wilderness Park, there is no temporal overlap with PCAS activities. It is assumed that Appropriate Assessment will be carried out of any potentially adverse effects on European Sites at the proposed time of construction and/or operation, and applicable mitigation put in place accordingly.

All other plans or projects identified are subject to Appropriate Assessment/and or consented mitigation measures and it is assumed that in-combination effects are therefore unlikely, due to the requirement for mitigation if potentially adverse effects are identified.

Stage 2 Evaluation

In the absence of measures to avoid/reduce harmful effects, the magnitude of effects (alone and in combination) is evaluated as high, with adverse effects on European Sites/Conservation Objectives evaluated as likely.

3.3.4.2 Alteration of flow regimes or changes to watercourse morphology

Alone

Watercourse morphology relates to the shape of a watercourse channel, its bed and banks and how erosion, transportation of water, sedimentation and the composition of riparian vegetation changes this shape over time. In the absence of mitigation there is potential for sediment deposition at a scale which may alter tributary channel morphology within or ex-situ an SPA thus reducing the suitability of receiving habitats for SCI's and affect Site Integrity and/or Conservation Objectives – particularly those which seek to maintain or restore the favourable conservation condition of the wetland habitat at the designated SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.

The following Hydrological effects may occur to the local environment as a result of the proposed PCAS activities and may influence flow regimes to the receiving environment and receiving watercourses. These include:

- Increases in groundwater levels which may affect neighbouring lands across hydraulic gradients;
- Reductions in conveyance capacity around or through the Derrycolumb Bog, or;
- Marginal alteration of topographical catchments, also resulting in flooding as a result of increased run-off.

Increased flooding and consequent run-off to lands adjacent to and surrounding Derrycolumb Bog could result in increased run-off of potential pollutants to the receiving watercourses; i.e. the Ledwithstown River which provides connectivity to Lough Ree SAC. Changes to the hydrological regime (reductions or increases in run-off) could result in consequent effects to ex-situ water dependent species using the downstream areas of the Ledwithstown River. Increased flow volumes / regimes to receiving watercourses may change localised watercourse morphology (as a result of localised erosion / scouring) which could contribute ex-situ effects to SCI species using the downstream areas of Lough Ree SPA.

In combination

There is potential for cumulative effects from other plans or projects which may result in similar source-impact-pathways to waterbodies upstream of or within the SPA's under consideration.

The decommissioning and rehabilitation of Derrycolumb Bog by BnM, which is also within the Upper River Shannon catchment and upstream of Lough Ree, may result in likely significant/potentially adverse effects on water quality; this project is known to temporally overlap works proposed for Edera and Derrycashel Bogs. Both of these proposed bog rehabilitation sites are located in relative proximity to the Derrycolumb site and support connectivity with Lough Ree and the Shannon (Upper)_090 subcatchment. The Shannon (Upper)_090 subcatchment is located downstream of the Derrycolumb rehabilitation site.

In the absence of mitigation measures to avoid/reduce harmful effects, the order of cumulative effects is that of both projects combined, notwithstanding that it is assumed that Appropriate Assessment and mitigation measures, if required, will be undertaken and put in place.

Various sources of flow regime or water morphology related effects, with linkage to activities such as Agriculture or Turbary, within the SPA constitute activities requiring consent (ARC) of the minister and therefore are unlikely to result in in combination adverse effects.

All other plans or projects identified are subject to Appropriate Assessment/and or consented mitigation measures and it is assumed that in-combination effects are therefore unlikely, due to the requirement for mitigation if potentially adverse effects are identified.

Stage 2 Evaluation

In the absence of measures to avoid/reduce harmful effects, the magnitude of effects (alone and in combination) is evaluated as high, with adverse effects on European Sites/Conservation Objectives evaluated as likely.

3.3.4.3 Spread of invasive species

Alone

Invasive aquatic species include non-native, terrestrial invasive species such as Rhododendron, Japanese knotweed or Himalayan balsam, invasive riparian vegetation (such as Japanese knotweed) and also fish and mobile invertebrate fauna (such as Asian clam, Signal crayfish, or non-native shrimp species). Aquatic invasive species may be introduced to unaffected catchments or spread within infected watercourses to

hydrologically connected SPA's during the course of instream works or transported via excavated material by site machinery.

Aquatic invasive species have the potential for significant ecosystem disturbance, disrupting the predator/prey balance or causing habitat disruption within aquatic systems. The spread of aquatic invasive species is not restricted in extent to the footprint of construction/instream works but can be transported both upstream (mobile species and 3rd party transport) and downstream (hydrological transport) within a watercourse, potentially extending throughout the catchment.

No non-native invasive species have been recorded at Derrycolumb.

Non-native, invasive species potentially affecting the aquatic environment can also include terrestrial species which compromise bank integrity, riparian structural diversity and riparian invertebrate production contributing to habitat diversity and feeding inputs within the aquatic system.

Were the impacts described above to occur within, in close proximity to, or upstream of an SPA watercourse it may result in adverse effects on SCI's and Conservation objectives such as the resource status and favourable condition of SCI habitat, by virtue of effects to structure and composition of SCI habitat, an altered hydrological regime and through secondary effects on prey item species, affecting the supporting habitat quality for SCI Species.

In instances where this impact occurs it may, dependant on source magnitude, degree of hydrological connectivity and presence or absence of mitigating measures in line with tried and tested methods, have secondary adverse effects on supporting habitats and/or species for ecologically connected SCI's, thus affecting Site Integrity/Conservation Objectives similarly.

In combination

There is potential for cumulative effects from other plans or projects which may result in similar source-impact-pathways to the SPA's under consideration.

The decommissioning and rehabilitation of Derrycolumb Bog by BnM, which is also within the Upper River Shannon catchment and upstream of Lough Ree, may result in likely significant/potentially adverse effects on water quality; this project is known to temporally overlap works proposed for Edera and Derrycashel Bogs. Both of these proposed bog rehabilitation sites are located in relative proximity to the Derrycolumb site and support connectivity with Lough Ree and the Shannon (Upper)_090 subcatchment. The Shannon (Upper)_090 subcatchment is located downstream of the Derrycolumb rehabilitation site. In the absence of mitigation measures to avoid/reduce harmful effects, the order of cumulative effects is that of both projects combined, notwithstanding that it is assumed that Appropriate Assessment and mitigation measures, if required, will be undertaken and put in place.

Various sources of vectors for the introduction of invasive species, with linkage to activities such as Agriculture or Turbary, within the SPA constitute activities requiring consent (ARC) of the minister and therefore are unlikely to result in in combination adverse effects.

All other plans or projects identified are subject to Appropriate Assessment/and or consented mitigation measures and it is assumed that in-combination effects are therefore unlikely, due to the requirement for mitigation if potentially adverse effects are identified.

Stage 2 Evaluation

In the absence of measures to avoid/reduce harmful effects, the magnitude of effects (alone and in combination) is evaluated as high, with adverse effects on European Sites/Conservation Objectives evaluated as likely.

3.3.5 Indirect or Ex-Situ disturbance or displacement of bird species of Special Conservation Interest.

3.3.5.1 Alone

Disturbance/displacement can result in effective habitat loss, which, should it be permanent or irreparable and within the boundary of an SPA, is considered to adversely affect the integrity of the European Site(s) and its conservation objectives – particularly the maintenance or restoration of the favourable conservation condition of the bird species listed as Special Conservation Interests for these SPAs.

Short term disturbance events, or events which promote weak responses in SCI's outside the SPA, may be significant but dependant on availability of displacement habitat and specific species tolerance to disturbance, may not adversely affect an ecologically meaningful proportion of the SCI population and hence European Site integrity. However, a precautionary approach is taken throughout given the possible scale and extent of sources of disturbance (in the absence of mitigating measures such as timing works to avoid sensitive periods), and the presence of certain species for which sensitivity to disturbance is higher.

As the construction phase of decommissioning and rehabilitation will involve the use of heavy machinery, disturbance/displacement effects on waterbirds listed as Special Conservation Interests for the various SPA's to which possible connectivity has been established has been identified as a potential source impact pathway for likely significant effects, and in the absence of protective measures potentially adverse effects on European Site Integrity/Conservation Objectives.

It should be noted that the relative magnitude of sources of disturbance is limited to similar levels as for prior peat extraction, i.e. a single crew of operators plus associated machines.

Seeing as the construction phase is expected to be of a temporary to short-term duration, the disturbance effects are considered similarly temporary to short term in duration. Due however to the proximity of suitable SCI habitat to the proposed works, and the possibility of works taking place during the winter/migration season, the potential for adverse effects through the disturbance/displacement of wintering or passage wildfowl is considered and examined herein. However, it should be noted that site walkover surveys completed in 2020 and 2021 did not observe a consistent trend of Lough Ree SPA SCI species utilising the Derrycolumb Bog site or its immediate environs and much of the site is unsuitable to support SCI species foraging or roosting habitat (See Section 2.5.2.2).

To determine if disturbance effects are likely to result in adverse effects, a literature review looked at the tolerances of bird species to disturbance. Although these distances, often referred to as the Minimum Approach Distance (MAD; a function of observed Flight Initiation Distances (FID)) are not considered to be the best determinant of whether disturbance will affect birds, they nevertheless remain the most effective approach for establishing set-back distances (or buffers) to limit disturbance effects around areas where birds occur. Livezey et al. (2016) reviewed a substantial number of such studies between 2009 and 2015 where FIDs had been calculated for the species groups which are pertinent for the current appraisal, including non-breeding Anseriformes (wildfowl, including Whooper Swan, Wigeon, Teal, Shoveler, Tufted Duck, Common Scoter, Goldeneye and Mallard), Charadriiformes (waders including Golden Plover, Lapwing and Common Tern), Gruiformes and Podicipediformes. As it offers the most comprehensive review currently available, the MADs presented in Livezey et al., (2016) in respect of motorised vehicles and/or pedestrians (with the highest MAD from either selected) were considered an appropriate basis for use in the current appraisal; these were 123.2m for Anseriformes, 42.2m in Charadriiformes, 87.3m for Gruiformes and 50.7m for Podicipediformes.

An evaluation of the significant effects due to noise and disturbance resulting from the proposed development on SCI species potentially occurring in proximity to Derrycolumb is presented in **Table 22**.

Table 22: SCI Disturbance evaluation

SCI	MAD (m)	Sensitivity	Notes
Little Grebe	50.7	Foraging / Roosting	No direct effects on SCI individuals within the SPA, potential for ex-situ effects only. None recorded at Derrycolumb in field surveys. Suitable habitat within 50.7m of PCAS activities and usage cannot be precluded; significant disturbance effect.
Whooper Swan	71	Foraging/ Roosting	No direct effects on SCI individuals within the SPA, potential for ex-situ effects only. Whooper Swan not recorded within Derrycolumb Bog site, but seen overflying the site during the December 2020 walkover survey. Suitable habitat within 71m of works and usage cannot be precluded; significant disturbance effect.
Teal	123.2	Foraging/ Roosting	No direct effects on SCI individuals within the SPA, potential for ex-situ effects only. Teal not recorded at Derrycolumb in field surveys. Suitable habitat within 123.2m of PCAS activities usage cannot be precluded; significant disturbance effect
Mallard	123.2	Foraging/roosting	No direct effects on SCI individuals within the SPA, potential for ex-situ effects only. Mallard not recorded at Derrycolumb in field surveys. Suitable habitat within 123.2m of PCAS activities usage cannot be precluded; significant disturbance effect
Coot	87.3	Foraging/Roosting	No direct effects on SCI individuals within the SPA, potential for ex-situ effects only. Coot not recorded at Derrycolumb in field surveys. Suitable habitat within 87.3m of works and usage cannot be precluded; significant disturbance effect.
Golden Plover	33.5	Foraging	No direct effects on SCI individuals within the SPA, potential for ex-situ effects only. Small flock (n 42 birds) recorded on one occasion at Derrycolumb Bog during the winter 2020/2021 walkover surveys. Suitable habitat within 42.2m of works and usage cannot be precluded; significant disturbance effect. Roosting birds which might utilise cutaway peat are excluded as sufficient displacement habitat is available - significant effects are unlikely.
Lapwing	42.2	Foraging/roosting	No direct effects on SCI individuals within the SPA, potential for ex-situ effects only. None recorded at Derrycolumb in field surveys. Suitable habitat within

SCI	MAD (m)	Sensitivity	Notes
			42.2m of works and usage cannot be precluded; significant disturbance effect.
Wetland and waterbirds	123.2*	Foraging/Roosting	No direct effects on wetlands and waterbirds within the SPA, potential for ex-situ effects only. Suitable habitat present and usage cannot be precluded; significant disturbance effect.

* MAD for Anseriformes utilised as all Site Synopses include at least one other member of this order.

3.3.5.2 In combination

There is potential for cumulative effects from other plans or projects which may result in similar source-impact-pathways to the SCI's under consideration, and their respective SPA; Lough Ree SPA.

The decommissioning and rehabilitation of Derrycolumb Bog by BnM, which is also within the Upper River Shannon catchment and upstream of the Lough Ree, may result in likely significant/potentially adverse effects on SCI's similarly; this project is known to temporally overlap works proposed for Derrycashel and Edera Bogs, both which are located in the Upper River Shannon catchment.

In the absence of mitigation measures to avoid/reduce harmful effects, the order of cumulative effects is that of both projects combined, notwithstanding that it is assumed that Appropriate Assessment and mitigation measures, if required, will be undertaken and put in place.

Additional sources of disturbance such as baseline agricultural activities /turbary within or in close proximity to the SPA's under consideration, and in suitable habitat for SCI's, are considered in the large part unlikely to result in in combination adverse effects- primarily due to habituation to these background baseline activities. In instances where sources of disturbance greater than baseline levels occur within SPA's they may constitute Activities Requiring Consent and thus be regulated in terms of the likelihood of significant effects stemming from these. Regarding the proposed amenity walkway at Derrycolumb and the proposed Shannon Wilderness Park, there is no temporal overlap with PCAS activities. It is assumed that Appropriate Assessment will be carried out of any potentially adverse effects on European Sites at the proposed time of construction and/or operation, and applicable mitigation put in place accordingly.

All other plans or projects identified are subject to Appropriate Assessment and it is assumed that in-combination effects are therefore unlikely, due to the requirement for mitigation if potentially adverse effects are identified.

3.3.5.3 Stage 2 Evaluation

In the absence of measures to avoid/reduce harmful effects, the magnitude of effects (alone and in combination) is evaluated as high, with adverse effects on European Sites/Conservation Objectives evaluated as likely.

It is acknowledged that, following decommissioning and rehabilitation, the presence of an undisturbed wetland habitat the size of **Derrycolumb Bog**, may provide foraging opportunities, attract wildfowl species as a refugium, and/or act as a disturbance buffer to birds utilising Lough Ree and its environs. These positive quality effects may ultimately positively impact the SCI's and benefit the Conservation Objectives of the adjacent SPA. For the avoidance of doubt however, this is not considered in the evaluation above, nor is any reliance placed on this in the consideration of effects.

3.4 Mitigation Measures

3.4.1 Description of the measure

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

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

- Bog restoration/rehabilitation works will be restricted to within the footprint of the proposed rehabilitation works area.
- The proposed rehabilitation works will have due regard to noise limits and hours of operation (i.e. dusk and dawn) to minimise any potential disturbance on resident and local fauna that utilise the site and immediate environs.
- A standard operating procedure overseen by the Project Ecologist will be in place for all PCAS activities to avoid any significant effects on breeding birds. This will include ground nesting birds and will apply to silt pond cleaning, and cutaway activities. Restriction zones will be in place to avoid effects on any identified ground nesting birds/waterfowl as appropriate.
- All plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations (SI 359/1996).
- The proposed works will be restricted to daylight hours and there will be no requirement for artificial lighting.
- Silt ponds will be inspected and maintained as per the IPC Licence.
- During periods of heavy precipitation and run-off, works will be halted.
- Works will be carried out using a suitably sized machine and, in all circumstances, excavation depths and volumes will be minimised where possible.
- All machines will be regularly checked and maintained prior to arrival at the site to prevent hydrocarbon leakage.
- Hoses and valves will be checked regularly for signs of wear and will be closed and securely locked when not in use.
- Fuelling and lubrication of equipment shall only be carried out in designated areas away from surface water drainage features and ecologically sensitive areas.
- Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for disposal or re-cycling.
- All waste will be sorted by the works crews, managed within the site in designated waste disposal facilities, and removed to a licenced waste facility, in line with BnM Standard operating practice.
- Vehicles will never be left unattended during refuelling.
- No direct discharges to waters will be made. No washings from vehicles, plant or equipment will be carried out on site.
- All plant refuelling will take place using mobile fuel bowsers. Only dedicated trained and competent personnel will carry out refuelling operations.
- All fuels required for machinery and equipment will be stored in a designated location, away from main traffic activity, at the nearest BnM Compound. All fuel will be stored in bunded, locked storage containers. Diesel or petrol fuel and mechanical oils will also be used by site vehicles.
- Mobile storage such as fuel bowsers will be bunded to 110% capacity to prevent spills. Tanks for bowsers and generators shall be double skinned. When not in use, all valves and fuel trigger guns from fuel storage

containers will be locked. All pumps using fuel or containing oil will be locally and securely bunded where there is the possibility of discharge to waters.

- Potential impacts caused by spillages etc. during rehabilitation works will be reduced by keeping spill kits and other appropriate equipment on-site.
- Site works will be carried out in accordance with 'best practice'. In order to ensure compliance and implementation of 'best practice', these measures will be communicated to relevant Bord na Móna staff and updated as required.
- All waste water will be removed by a licenced waste contractor to a licenced waste water treatment facility.
- Any fertiliser used will be Rock Phosphate and will not be applied in the following conditions:
    1. The land is waterlogged;
    2. The land is flooded, or it is likely to flood;
    3. The land is frozen, or covered with snow;
    4. Heavy rain is forecast within 48 hours (forecasts will be checked from Met Éireann).
    5. The ground slopes steeply and there is a risk of water pollution, when factors such as surface run-off pathways, the presence of land drains, the absence of hedgerows to mitigate surface flow, soil condition and ground cover are taken into account.
- 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.

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

The below image / flow chart provides Bord na Mona's proposed clean up procedures for fuel/oil and peat.

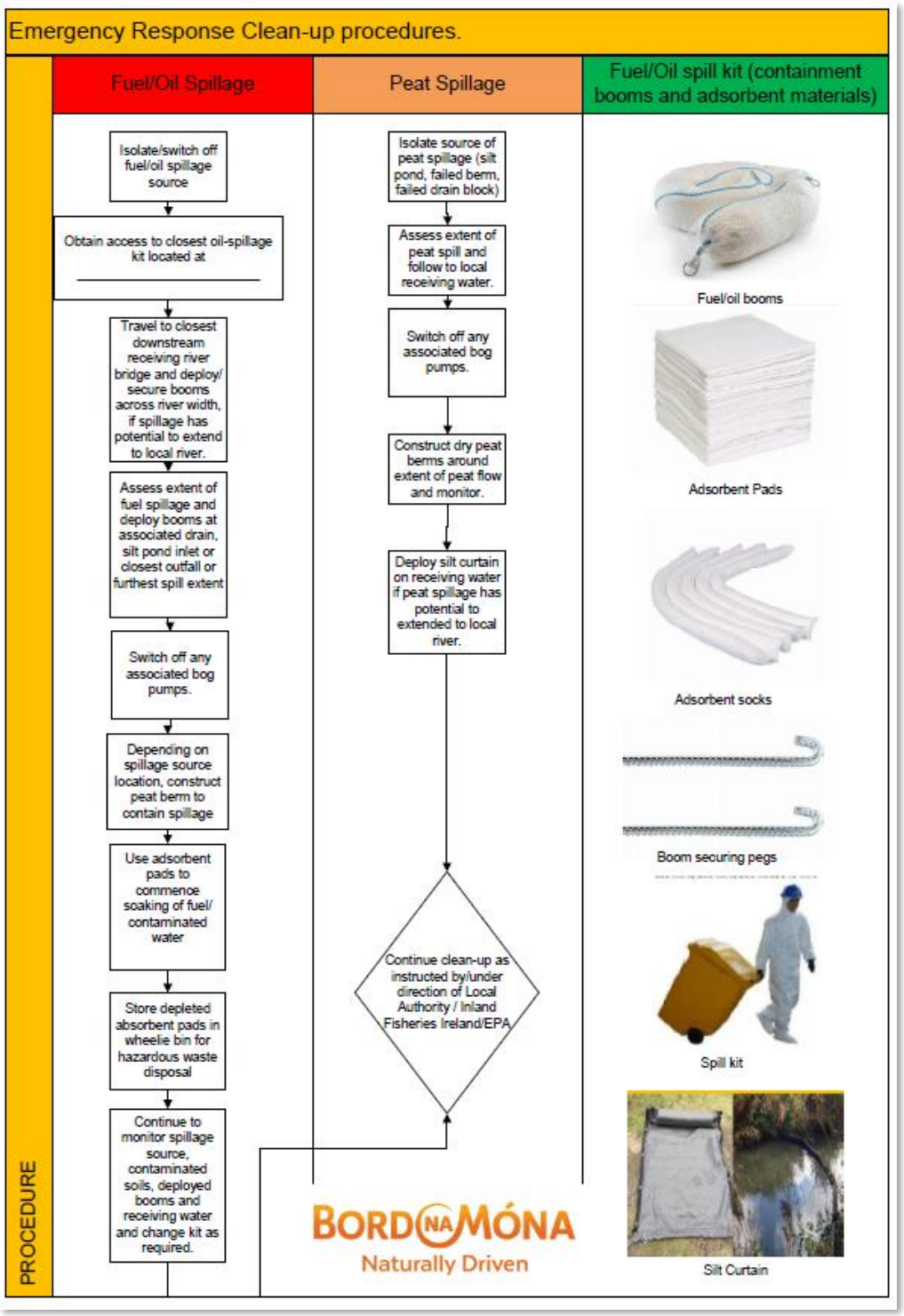


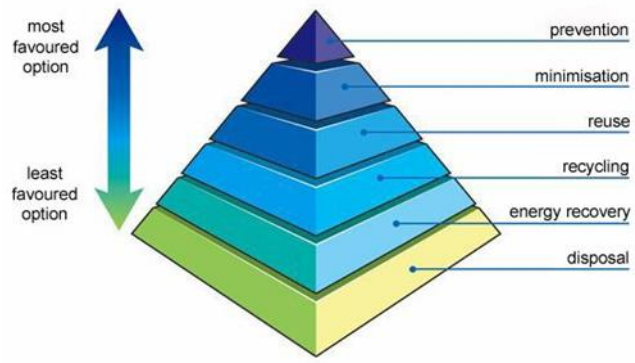
Figure 17: BnM Emergency Response Clean Up Procedures

3.4.1.2 Best Practice Measures around the treatment of Waste

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

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

- Waste sent off-site for recovery or disposal shall only be conveyed to a waste contractor, as agreed by the Agency, and only transported from the site of the activity to the site of recovery/disposal in a manner which will not adversely affect the environment.
- A full record, which shall be open to inspection by authorized persons of the Agency at all times, shall be kept by the licensee on matters relating to the waste management operations and practices at this site. This record shall as a minimum contain details of the following:
    - The names of the agent and transporter of the waste.
    - The name of the persons responsible for the ultimate disposal/recovery of the
    - waste.
    - The ultimate destination of the waste.
    - Written confirmation of the acceptance and disposal/recovery of any hazardous waste consignments sent off-site.
    - The tonnages and EWC Code for the waste materials listed in Schedule 2(i) Hazardous Wastes for Disposal/Recovery and Schedule 2(ii) Other Wastes for Disposal/Recovery sent off-site for disposal/recovery.
    - Details of any rejected consignments.
- A copy of this Waste Management record shall be submitted to the Agency as part of the AER for the site.
- As required by the licence, these waste items will be removed for recycling or disposal, using external contractors with the required waste collection permits, as agreed by the EPA, with waste records maintained as required for inspection by authorized persons of the EPA at all times.
- Where possible, Bord na Mona will utilize the appropriate waste hierarchy to identify waste that can reused or recycled ahead of disposal.



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

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

3.4.1.3 Best Practice & Biosecurity

The potential for importation or introduction of non-native plant species (such as Japanese Knotweed, Himalayan Balsam, etc.) has been identified. 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.
- For any material entering the site, the supplier must provide an assurance that it is free of invasive species.
- All plant and equipment employed on the proposed works (e.g. diggers, tracked machines, footwear etc.) must be thoroughly cleaned down using a power washer unit, and washed into a dedicated and contained area prior to arrival on site and on leaving site to prevent the spread of invasive aquatic / riparian species such as (but not limited to) Japanese knotweed (Fallopia japonica) and Himalayan Balsam (Impatiens glandulifera). A sign off sheet must be maintained by the contractor to confirm cleaning;
- Good site hygiene will be employed to prevent the introduction and spread of problematic invasive alien plant species (i.e. Japanese Knotweed (*Fallopia japonica*), Himalayan Balsam (*Impatiens glandulifera*), Himalayan Knotweed (*Persicaria wallichii*), etc.) by thoroughly inspecting and washing vehicles prior to entering the works area.

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

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

- All water quality monitoring equipment which has been used in water will be treated with a disinfectant or a strong saline solution and then thoroughly dried (ideally over 24 hours) BEFORE being used in water again.
- Check, Clean, Dry protocol will be adhered with before and after visiting a river or lake for monitoring, in line with Best Practice[25] or for activities such as Sphagnum inoculation.
- Virkon Aquatic will be available as required.

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

3.4.1.4 Silt Ponds

Silt Ponds – 10 no. Silt ponds with a total volume of 15958.14m^3 and area of 1.0ha are in place at Derrycolumb Bog. There are seven treated surface water outlets to the Ledwithstown IE_SH_26L840850 and Drumnee IE_SH_26D080850 rivers and eventually the Shannon Upper IE_SH_25SO21660.

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

These silt ponds and associated outfalls, already stipulated and in use as mitigation measures in respect of Peat Extraction under IPC license, will continue to function as an attenuation measures in terms of sediment release to receiving waterbodies. It should be noted, that the silt pond network at Derrycolumb Bog will not be the sole mitigation measure to attenuate silt laden waters emanating from the site during the project construction and operational phases. The design of the PCAS scheme requires the creation of internal drain blocking measures (including terminal dams), which will in itself reduce the possibility of surface run-off to the receiving environment during the rehabilitation works. Once rehabilitation works are completed and the bog has been rehabilitated, the bog will act as a natural repository for surface water, regulating and slowing the movement of surface water from Derrycolumb Bog to the receiving environment. It is considered that the silt pond network will provide further attenuation and regulation to those measures associated with the PCAS measures during the project construction phase and the rewetted peatland habitat during the project's operational phase.

Regular cleaning and reporting on same already forms part of annual (AER) reporting submitted to EPA. All Silt Ponds at Derrycolumb Bog are currently compliant with EPA requirements. **Table 23** below, and **Figure 18** overleaf summarise and illustrate the onsite Silt Pond locations, the latter also illustrates the current flow regime within the main drainage network (into which any other drains also feed). Continued maintenance and reporting on same will be reported on annually until IPC license Surrender.

Table 23: Silt Ponds in use at Derrycolumb Bog

Bog Name	IPC License Reference	Pond No.	Area (m^2)	Volume (m^3)
Derrycolumb	504_01	103/104	1416.66	2124.99
Derrycolumb	504_01	DC100A/B	1226.83	1838.07
Derrycolumb	504_01	DC104D	775.11	1162.66
Derrycolumb	504_01	DC102	347.93	521.89
Derrycolumb	504_01	DC101	1096.45	1644.68
Derrycolumb	504_01	DC101B	1236.29	1854.43
Derrycolumb	504_01	DC104C	1058.51	1587.77
Derrycolumb	504_01	DC98	639.66	959.50
Derrycolumb	504_01	DC98A	1333.22	1999.83
Derrycolumb	504_01	DC99	1509.54	2264.32
		Total	**10,640.20**	**15958.14**

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

The attenuation of silt and particulate matter generated as a result of the proposed works is a key mitigation measure for the proposed rehabilitation and decommissioning works. The main source of potential impact to influence significant adverse effects to the downstream areas of Lough Ree SAC relate to particulate matter run-off from the site, during the rehabilitation works. A key consideration in this regard will be drain blocking as described in Section 3.4.1.5 below. This methodology relies on the placement of terminal dams at the extremity of the drain; i.e. that closest to watercourse within the receiving environment. The securing of strategic peat dams will allow the hydraulic separation between the proposed rehabilitation works and the receiving and downstream aquatic environment, and in so doing isolating these works from sensitive ecological and environmental receptors within the project zone of influence and in the case of Derrycolumb Bog and Lough Ree SPA / SAC.

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

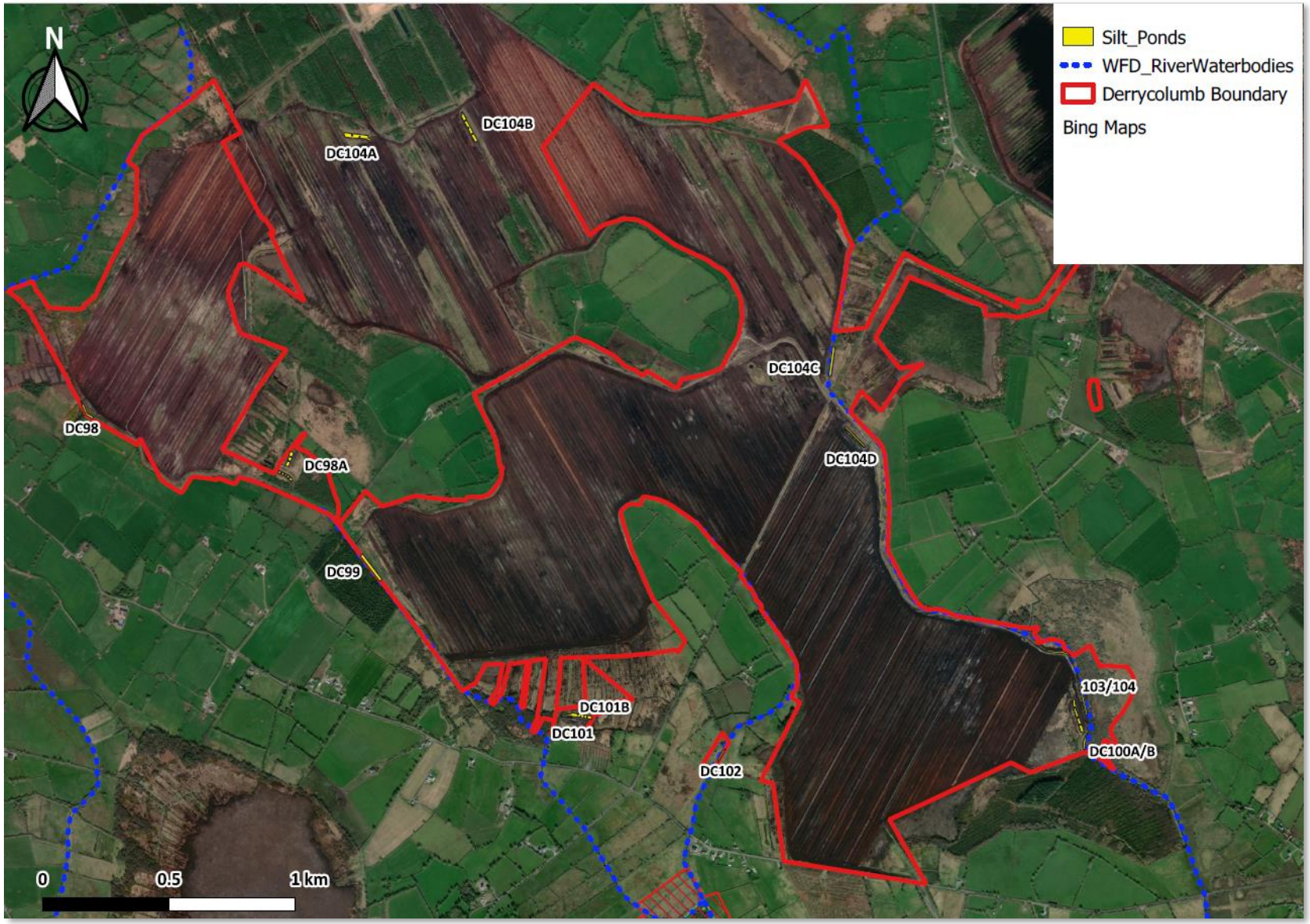


Figure 18: Derrycolumb Site Drainage and Silt Ponds

3.4.1.5 Measures to avoid runoff when carrying out drain blocking

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

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

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

3.4.1.6 Measures for cleaning Silt Ponds within EPA Blue line features

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

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

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

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

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

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

3.4.1.7 Silt Control Design Features

Further detail is provided in this section on the proposed wetland attenuation area near the south-eastern corner of Derrycolumb Bog, in addition to silt control measures for Derrycolumb Bog.

It is anticipated that once the pump near the south-eastern corner of the site is turned off, water levels within the nearby bog area will rise. Therefore, it is proposed to create an attenuation area at this location that will allow the settlement and subsequent controlled release of attenuated water from this section of the bog. This measure will also provide optimum water depth in this area for proposed rehabilitation measures. The development of the attenuation area in this location is a bespoke silt attenuation measure that will inadvertent release of silt as a result of flood related pathways. Furthermore, it is proposed to develop DPT4 cell bunding south of the attenuation area. The DPT4 features will act as individual silt ponds further mitigating the risk of silt release from this area to the receiving environment. The location of the silt control measures and silt ponds for Derrycolumb Bog are presented in **Figure 19** below.

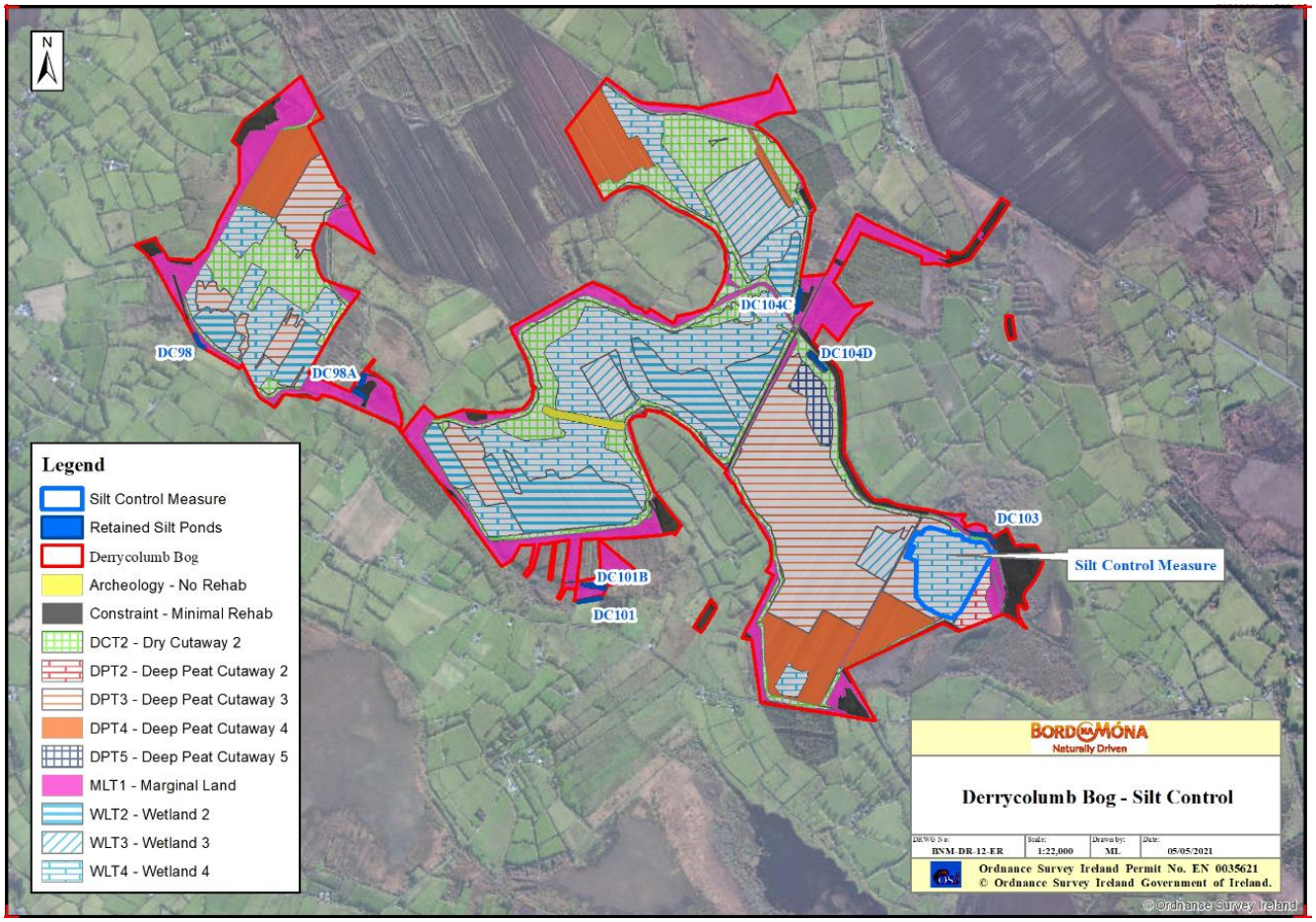


Figure 19 – Silt control measures for Derrycolumb Bog

3.4.1.8 Mortality or disturbance to Otter

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

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

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

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

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

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

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

Boundary drains may require upgrading to retain their functionality as hydraulic breaks between the site and adjoining lands. These works will be completed during periods of low flow and will follow the below sequencing:

- Prior to commencement of channel works, at least 2 no. check dams will be placed at the downstream end of the drainage channel to control the flow of suspended sediment downstream to receiving watercourses.
- The most downstream check dam will comprise locally sourced turves and double bagged sand bags to initially secure and check downstream flow within the channel. At least 10m upstream of this check dam, a peat dams will be created and keyed into the adjoining drainage channel banks following the methodologies presented in Section 2.6.
- The build-up of silt material upstream of the constructed check dams will be monitored during upgrade works and the silt material will be removed from the drainage channel during works as it builds up. The material will be removed from the channel, spread and levelled into the adjacent field, a minimum of 10m from the nearest drain.
- The constructed check dams will be inspected during periods of dry weather to ensure no 'cracking' of peat has occurred which might allow for discharge.
- Upon completion of the upgrade works, all silt will be removed from the drainage channel immediately upstream of the 2 standard drain blocks prior their removal. The 2 standard drain blocks will only be removed once all upgrade works are completed and once all water within the channel is suitably settled with no evidence of suspended solids within the water column.
- Where a new drain is required, it will be formed and established prior to connecting the drainage channel to wider drainage network. Only once it has formed and become established, with the bed and banks stabilised will it be connected to the wider drainage network. This approach will minimise to a negligible level the potential for suspend solids to be generated in waters within the new drainage channel and conveyed downstream to receiving watercourses and European Sites.

- An Emergency Response Plan will be available in the event of any inadvertent release of a large volume of sediment.

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

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

3.4.1.11 Emergency Response Plan for Berm Failure

The below mitigation measures will be put in place when constructing and working with berm features as part of the bog rewetting and rehabilitation process. The berm design adopts an empirical design approach. It is proposed to apply proven sizes, proportions, materials, and assemblies from existing successful rehabilitation measures and flood defence berm features carried out in the past by Bord na Mona. Further details on berm design and mitigation incorporated into berm design is provided in Appendix E - Engineering and Rehabilitation Design Specification.

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

Mitigation through maintenance and avoidance:

- Ongoing monitoring of completed peat drain blocks in the weeks after formation will ensure they have consolidated.
- The risk associated with peat drain block failure from an environmental and rehabilitation measures impact is generally categorised as low as a peat drain block failure will result in an impact that is localised and silt control measures are provided upstream of all discharge points. There is an allowance for a reactive approach to remediation measures where required.
- A post rehabilitation Lidar and imagery survey will take place which will capture any areas where failures occurred resulting in remediation measures in a particular area if required. The Lidar survey will be implemented when the rehabilitation measures have been in place for a reasonable period of time allowing areas of weakness or potential concern to become apparent.
- In the event of a peat drain block failure, the adjacent peat drain blocks will generally have sufficient capacity to accommodate any additional hydrostatic pressures generated ensuring the negative impact is localised.

- If, after heavy rainfall, significant water flows in the drains cause localised drain block failure, the regular and frequent placing of drain blocks along the drain further downstream will mitigate the impact to the immediate area.
- As peat drain blocks are designed to retain water on the cutover resulting in a reduction in discharge into the boundary drains, preventing any negative impacts on adjacent agricultural land.

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

3.4.1.12 Standard Operating Procedures for Loading of remaining Peat Stockpiles within Derrycolumb Bog

The loading and removal of the remaining milled peat stockpiles at Derrycolumb Bog will take place in 2021 and will follow the below Standard Operating Procedures (SOPs). The below schematic / flow diagram displays how peat loading and removal will be completed at the Derrycolumb Bog site. This will ensure that loading and removal of remaining peat stockpiles will be controlled, will follow an agreed protocol and will not result in the release or spread or milled peat to the receiving or surrounding environment and by extension European Sites within the project Zone of Influence.

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

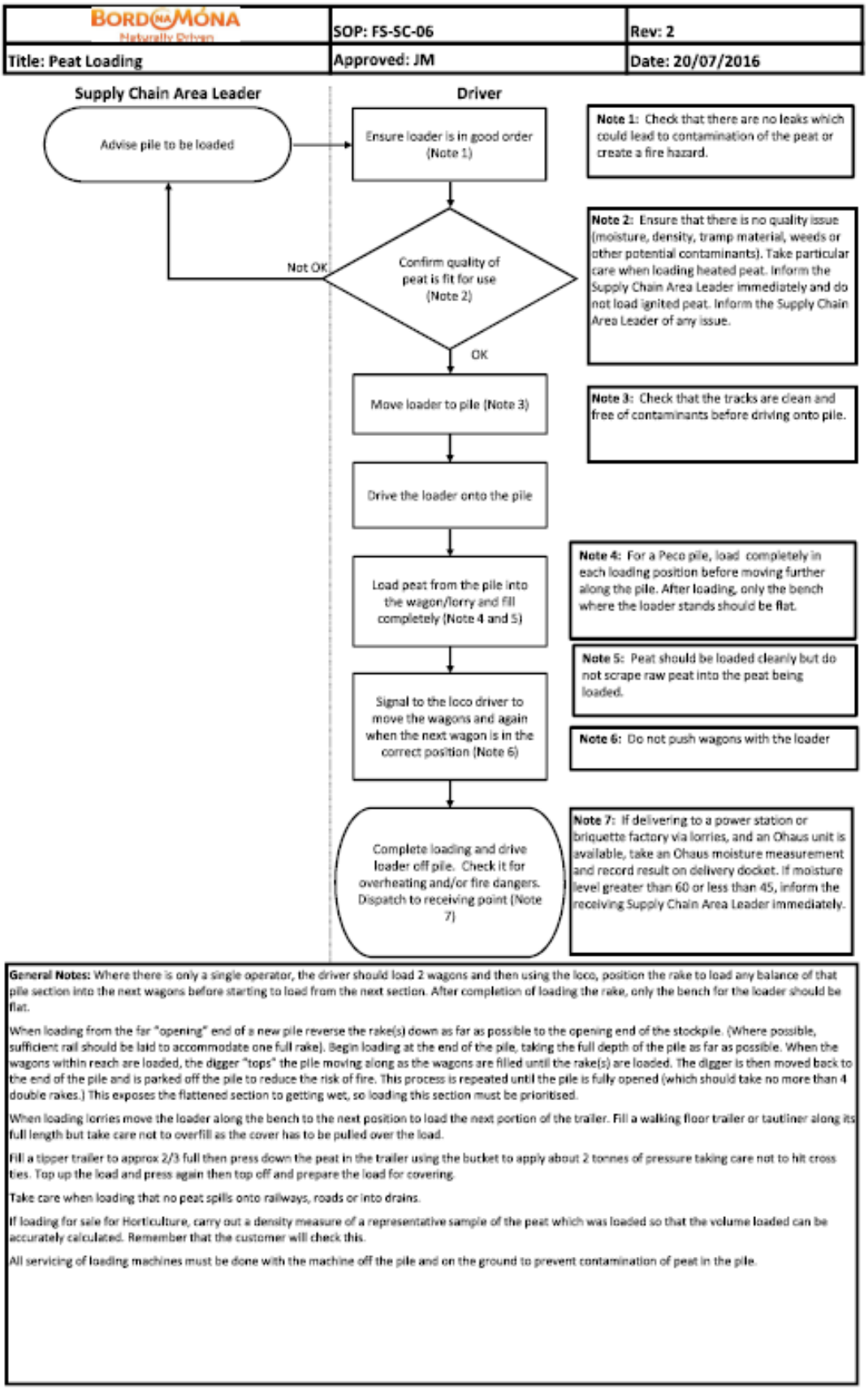


Figure 20: BnM Peat Loading SOPs

General Dust Control Steps:

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

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

Headland Harvesting

- Keep the headland continuously ridged.
- Harvest headland peat every third crop, as per FS-PR-13 standard.

  · By Haku trailer where possible or,

  · Harvest to fields, disengage crossing drains and outfalls.

  · By utilising headland harvesters.

- Hydraulic Harrows where available, spoons will be lifted when travelling on a headland.
- Headland peat collection will be fully documented and recorded on PQMS form 023.
- Miller drums will be disengaged and lifted when approaching or travelling on a headland.
- Slow speeds should be maintained on a headland.
- Optimise routes to avoid dust sensitive areas.

3.4.1.13 Measures to avoid disturbance or displacement to SCI bird species of Lough Ree SPA

The below mitigation measure has been designed to avoid disturbance and displacement effects to ex-situ SCI bird species of Lough Ree SPA, should they utilise suitable areas of Derrycolumb Bog as an over-wintering feeding or roosting habitat.

Birds

- An Ecological Restriction Zone will be in place which includes a buffered area within 123.2m[26] of suitable wetland areas within the Derrycolumb site where pathways for effects to overwintering SCI's have been identified – see **Figure 21** overleaf. Any potential disturbance to SCI birds outside of this Ecological Restriction Zone within Derrycolumb Bog are considered to be reversible and not significant. The proposed Ecological Restriction Zone supports ephemeral standing water that has been confirmed as temporary or seasonal habitat for over-wintering bird species, should suitable

[26] In accordance with Minimum Approach Distance evaluation presented in Table 22

water levels and depths be present at appropriate times of the year. PCAS activities will be restricted within this zone for the non-breeding period associated with the SCI species for which potentially adverse effect pathways exist.

- The extent of restriction will be overseen by the Project Ecologist dependant on water levels within the Ecological Restriction Zone and the usage of the site by avifauna. Periodic checks at 2 weekly intervals, initiated prior to commencement of PCAS activity, will take place to decide the requirement or not for identified restriction zones.
- Once an Ecological Restriction Zone is operational, no PCAS scheme activities will take place within the prescribed zone. Travel and access within these sections of the site to undertake cleaning or maintenance activities may be permitted as they are likely to be intermittent, short term and of low intensity and duration. General usage will be restricted to use of existing rail and travel passes. All will be overseen by the Project Ecologist
- The timing restrictions associated with the Ecological Restriction Zone will be communicated to staff through toolbox talks, incorporated into the EMP for the project and visual markers will be placed on the peat extraction area to delineate the avoidance zone.
- Locations of these restriction zones will also be presented to the machine drivers via the built-in GPS tablet and ESRI application and the machine drivers will use this technology to avoid entering any restricted areas.
- Conformance will be audited through compliance checks by the Project Ecologist (with 'stop-works' authority).
- Derrycolumb Bog is considered unsuitable to support breeding SCI species for Lough Ree SAC. Nonetheless, a standard operating procedure overseen by the Project Ecologist will be in place for all PCAS activities to avoid any significant effects on breeding birds. This will include ground nesting birds and will apply to silt pond cleaning, and cutaway activities. Restriction zones will be in place to avoid effects on any identified ground nesting birds/waterfowl as appropriate.

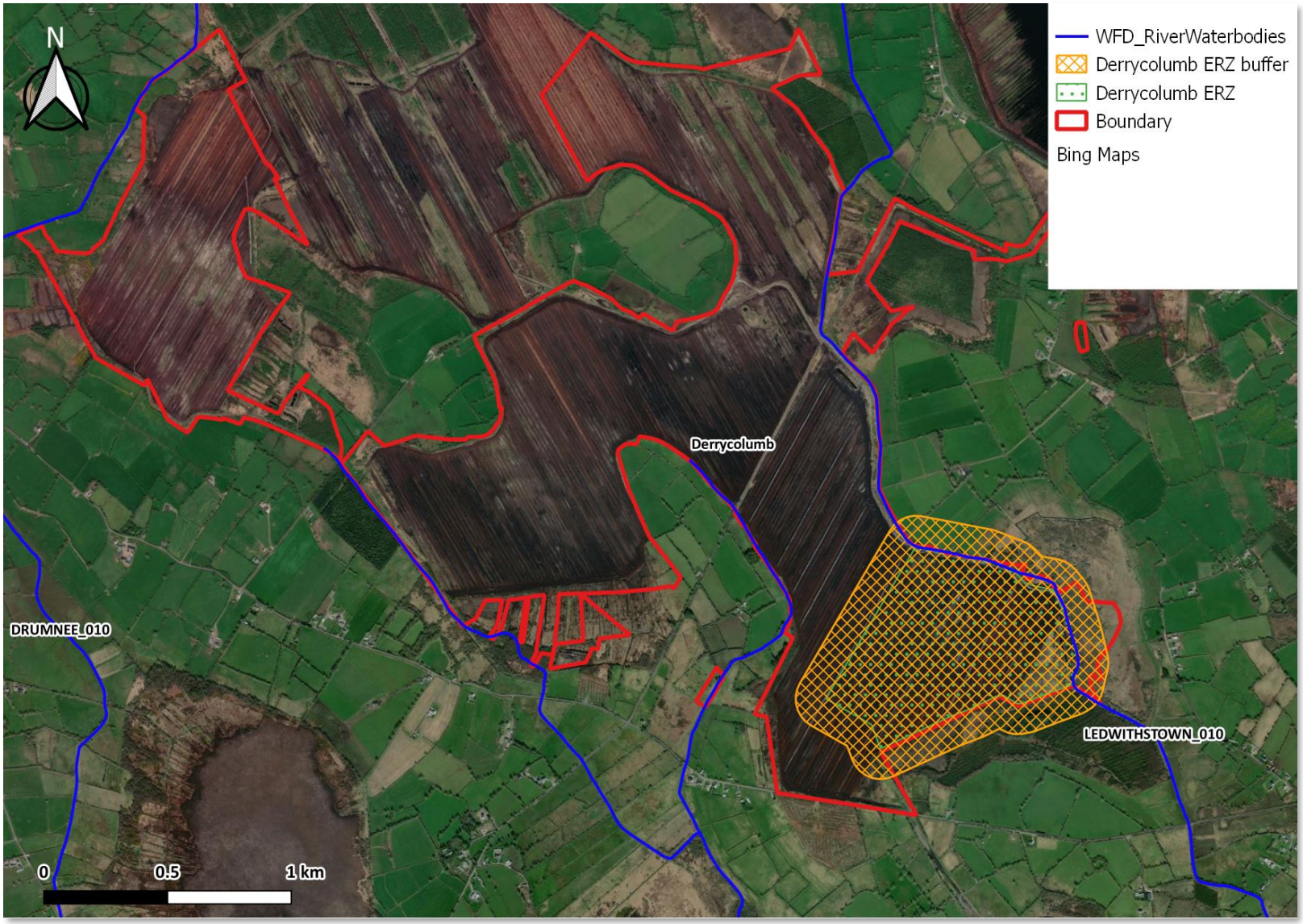


Figure 21: Ecological Restriction Zone in respect of potential SCI species for Lough Ree SPA

3.4.2 Effectiveness of these measures

The Mitigation Measures (Project Design Measures, Management Plans, Environmental Emergency Response Measures and Best Practice Measures), listed in Section 3.4.1 above, have been developed by the hydrological/drainage and ecological expert members of the Decommissioning and Rehabilitation project team and use best practice water quality protection techniques which are tried and tested regularly across the country. Furthermore, a suitably qualified Environmental Supervisor will be employed during the construction stage to monitor the effectiveness of these measures on a daily basis. The Environmental Supervisor will be supported and assisted by members of the BnM Ecology Team as required. An Environmental Management Plan (EMP) has also been prepared for the proposed works (See Appendix F).

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

3.4.2.1 Watercourse crossing works and aquatic habitat protection guidance

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

3.4.2.2 Pollution Prevention Guidance Notes (PPGs) & Guidance for Pollution Prevention (GPP)[27]

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

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

3.4.2.3 Construction Industry Research and Information Association (CIRIA)[28]

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

3.4.2.4 Invasive Species Guidance

- Managing Japanese knotweed on development sites - The Knotweed Code of Practice produced by the Environmental Agency (2013)[29];
- NRA Guidelines on The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads (2010)[30];
- Managing Invasive Non-native Plants in or near Freshwater, Environment Agency (2010)[31];
- Best Practice Management Guidelines Japanese knotweed *Fallopia japonica*, Invasive Species Ireland (2015);
- IFI Biosecurity Protocol for Field Survey Work, Inland Fisheries Ireland (2010[32]).

3.4.2.5 Guidance relating to Bird Disturbance

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

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

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

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

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

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

3.4.2.6 Guidance relating to Mammal Disturbance

- OPW (2013) Construction, Replacement or Alteration of Bridges and Culverts[33].
- National Roads Authority. Guidelines for the treatment of Otters prior to the construction of National Road Schemes. https://www.tii.ie/tii-library/environment/construction-guidelines/Guidelines-for-the-Treatment-of-Otters-prior-to-the-Construction-of-National-Road-Schemes.pdf

3.4.3 Implementation of Mitigation Measures

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

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

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

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

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

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

3.4.5 Monitoring of the Implementation and Effectiveness of the Mitigation Measures

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

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

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

- There will be **initial quarterly monitoring assessments** of the site to determine the general status of the site, the condition of the silt-ponds, assess the condition of the rehabilitation work, monitoring of any potential impacts on neighbour's land, general land security, boundary management, dumping and littering.
- The number of these site visits will reduce after 2 years to bi-annually and then after 5 years to annual visits.
- These monitoring visits will also consider any requirements, if required, for further practical rehabilitation measures.
- The **baseline condition of the site will be established** post-rehabilitation implementation by using an aerial drone survey to take an up to date aerial photo, when rehabilitation is completed. The extent of bare peat will be assessed using this baseline data, and habitat maps will be updated, if required.
- A **water quality monitoring programme** at the bog will be established. The main objective of this water quality monitoring programme will be to establish a baseline and then monitor the impact of peatland rehabilitation on water quality from the bog. Monitoring of key environmental variables will include: Ammonia, Phosphorous, Suspended solids (silt), pH and conductivity. Water quality samples will be collected at monthly intervals during rehabilitation and for 2 years thereafter. Results will be reviewed for potential exceedances of SSCO thresholds likely to result in negative quality effects on downstream European Site targets.
- If, after three years, key criteria for successful rehabilitation are being achieved and critical success factors are being met, then the water quality monitoring programme will be reviewed, with consideration of potential ongoing research on site. The water quality data, the drone surveys and the habitat mapping will be collated and will be submitted to the EPA as part of the final validation report.
- If, after three years, key criteria for successful rehabilitation have **not** been achieved and critical success factors have **not** been met, then the rehabilitation measures and status of the site will be evaluated and enhanced, where required. This evaluation may indicate no requirement for additional enhancement of rehabilitation measures but may demonstrate that more time is required before key criteria for rehabilitation has been achieved. Monitoring of water quality will then also continue for another period to be defined.
- Where other uses are proposed for the site, these will be assessed by Bord na Móna in consultation with interested parties. Other after-uses can be proposed for licensed areas and must go through the appropriate assessment process and planning procedures.

3.4.6 How any mitigation failure will be addressed

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

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

Nonetheless contingency measures will be in place for unforeseen events such as oil/fuel spillages, water pollution or any inadvertent release of sediment. This will ensure any unforeseen potentially adverse effects

are identified in a timely manner and appropriate remedial action taken immediately. The Ecologist, Environmental Compliance Officer, Engineer, H & S Manager, Site Supervisor and PSCS will have a 'stop-works' authority to temporarily stop works over part of the site to avoid an infringement of the Environmental Commitments or an unforeseen environmental event. Works will not be allowed to re-commence until the issue is resolved.

3.5 Evaluation of the impact of Derrycolumb Bog Decommissioning and Rehabilitation on the Integrity of the European Sites under consideration

Using the checklist in the **Table 24** below, the proposed Derrycolumb Bog Decommissioning and Rehabilitation Plan, as described in Appendix B, both alone and in-combination with other projects, for adverse impacts on the integrity of the European Sites under consideration is examined, following the implementation of the measures described herein.

Table 24: Integrity of European Site checklist

Does the project or plan have the potential to: **Yes/No**	**Lough Ree SPA (Site Code 004064)**	**Lough Ree SAC (Site Code 000440)**
- cause delays in progress towards achieving the conservation objectives of the site?	No	No
- interrupt progress towards achieving the conservation objectives of the site?	No	No
- disrupt those factors that help to maintain the favourable conditions of the site?	No	No
- interfere with the balance, distribution and density of key species that are the indicators of the favourable condition of the site?	No	No
- change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the site?	No	No
- interfere with predicted or expected natural changes to the site (such as water dynamics or chemical composition)?	No	No
- reduce the area of key habitats?	No	No
- reduce the population of key species?	No	No
- change the balance between key species?	No	No
- reduce diversity of the site?	No	No
- result in disturbance that could affect population size or density or the balance between key species?	No	No

3.6 Conclusion

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

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

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

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

- Disturbance and displacement of SCI waterbird species occurring within Lough Ree SPA;
- Impacts to the following Annex I habitats as a result of deterioration in water quality Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation (3150) and alkaline fens (7230) in the downstream sections of Lough Ree SAC,
- Disturbance and / or displacement of the otter population associated with Lough Ree SAC.

were not found to result in adverse effects due to the timing of the works and the protective measures proposed.

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

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

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

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

4 REFERENCES

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

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

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

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

Chanin P (2003). *Ecology of the European Otter.* Conserving Natura 2000 Rivers Ecology Series No. 10. English Nature, Peterborough.

Chanin, P., (2013) *Otters (The British Natural History Collection).* Whittet Books Ltd.

Charles, P, Edwards, P (eds) (2015). Environmental Good Practice on Site. CIRIA.

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

Cramp, S. (1977-1993). *Handbook of the birds of Europe, the Middle East and North Africa: the birds of the Western Palearctic* (7 Vols). Oxford University Press, Oxford.

Crowe, O. (2005). Irelands Wetlands and their Waterbirds: Status and Distribution. Birdwatch Ireland, Newcastle, Co. Wicklow.

Department of Environment, Heritage and Local Government (2009) Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities, DoEHLG, Dublin.

Duffy, M. (2018) The Corncrake Conservation Project Annual Report. 2018. Available online at: https://www.npws.ie/sites/default/files/general/corncrake-report-2018.pdf

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

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

Fox, T. & Stroud, D.A. (2002). The Greenland White-fronted Goose *Anser albifrons flavoristris*. BWP Update 4: 65-68.

Gann, G.D., McDonald, T., Walder, B., Aronson, J., Nelson, C.R., Jonson, J., Hallett, ,J.G., Eisenberg, C., Guariguata, M.R., Liu, J., Hua,F., Echeverría, C., Gonzales, E., Shaw, N., Decleer, K. & Dixon, K.W. (2019).

International Principles and Standards for the practice of Ecological Restoration. Restoration Ecology 27(S1): S1–S46.

Hayhow, D.B. (2009). *Consequences of winter habitat use in a migratory shorebird. Thesis submitted for the degree of Doctor of Philosophy at the University of East Anglia, Norwich, 2009*. Available at: https://ueaeprints.uea.ac.uk/id/eprint/10607/1/Thesis_hayhow_d_2009.pdf

Heery, S. (2018) Birds in Central Ireland. 6th mid Shannon Bird Report. 2012-2016. BirdWatch Ireland, Kilcoole, County Wicklow.

Hinde, S., Rosenburgh, A., Wright, N., Buckler, M. and Caporn, S. 2010. Sphagnum re-introduction project: A report on research into the re-introduction of Sphagnum mosses to degraded moorland. Moors for the Future Research Report 18. Moors For The Future Partnership.

EU Birds Directive (2009) Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (codified version) Official Journal of the European Union 26.1.2010 L20/7 – L20/25

EU Habitats Directive (1992) Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora Official Journal of the European Communities 22/07/1992 L206/07 – L206/50

Environment and Heritage Service (2002) The Habitats Regulations: A guide for competent authorities. Environment and Heritage Service, Belfast.

European Commission (2018) Managing Natura 2000 Sites: The Provisions of Article 6 of the 'Habitats Directive' 92/43/EEC. https://ec.europa.eu/environment/nature/natura2000/management/docs/art6/EN_art_6_guide_jun_2019.pdf

Fox, A.D, I. Francis, D. Norriss & Alyn Walsh. 2019. Report of the 2018/2019 International Census of Greenland White-fronted Geese. Greenland White-fronted Goose Study / National Parks & Wildlife Service report, Kalo

Inland Fisheries Ireland (2016) Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters. Available online at: https://www.fisheriesireland.ie/documents/624-guidelines-on-protection-of-fisheries-during-construction-works-in-and-adjacent-to-waters/file.html

Irish Statute Book (Various) European Communities (Natural Habitats) Regulations 1997 (S.I. 94/97) as amended in 1998 (S.I. No. 233/1998), 2005 (S.I. No. 378/2005) and 2011 (SI No. 477/2011). Dublin, Ireland

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

Lewis, L.J., Burke, B., Fitzgerald, N., Tierney, T.D. & Kelly, S. (2019). Irish Wetland Bird Survey: Waterbird Status and Distribution 2009/10-2015/16. Irish Wildlife Manuals, No. 106. National Parks and Wildlife Service, Department of culture, Heritage and the Gaeltacht, Ireland.

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

Livezey KB, Ferna´ndez-Juricic E, Blumstein DT. Database of bird flight initiation distances to assist in estimating effects from human disturbance and delineating buffer areas. Journal of Fish and Wildlife Management 7(1):181-191; e1944-687X. doi: 10.3996/082015-JFWM-078

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

Mackin, F., Flynn, R., Barr, A. and Fernandez-Valverde, F. (2017b). Use of geographical information system-based hydrological modelling for development of a raised bog conservation and restoration programme. Ecological Engineering 106 (2017) 242–252.

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

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

NPWS (2017). National Raised Bog SAC Management Plan 2017-2022. Available at: https://www.npws.ie/sites/default/files/files/FOR%20UPLOAD%20Plan(WEB_English)_05_02_18%20(1).pdf

NPWS (2014) Ballynamona Bog and Corkip Lough SAC 002339. Version dated 09.01.2014. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2013) Lisduff Turlough SAC 000609. Version dated 04.09.2013. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2014) Glenloughaun Esker SAC 002213. Version dated 03.01.2014. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2014) Killeglan Grassland SAC 002214. Version dated 03.01.2014. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2016) Conservation Objectives: Lough Ree SAC 000440. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

NPWS (2019) Lough Ree SAC 000440. Version dated 23.08.2019. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2020) Conservation objectives for Lough Ree SPA 004064. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.

NPWS (2015) Lough Ree SPA 004064. Version dated 30.05.2015. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2015) Conservation Objectives: Corbo Bog SAC 002349. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2014) Corbo Bog SAC 002349. Version dated 09.01.2014. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2018) Conservation Objectives: Fortwilliam Turlough SAC 000448. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

NPWS (2013) Fortwilliam Turlough SAC 000448. Version dated 22.08.2013. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2020) Conservation objectives for Mount Jessop Bog SAC [002202]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.

NPWS (2017) Mount Jessop SAC 002202. Version dated 14.09.2017. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2016) Conservation Objectives: Brown Bog SAC 002346. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2014) Brown Bog SAC 002346. Version dated 09.01.2014. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2018) Conservation Objectives: Lough Funshinagh SAC 000611. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

NPWS (2015) Lough Funshinagh SAC 000611. Version dated 23.11.2015. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2020) Conservation objectives for Ballykenny-Fisherstown Bog SPA [004101]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.

NPWS (2012) Ballykenny-Fisherstown Bog SPA 004104. Version dated 24.04.2012. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2016) Conservation Objectives: Lough Forbes Complex SAC 001818. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2013) Lough Forbes Complex SAC 001818. Version dated 21.05.2013. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 3: Species Assessments. Unpublished NPWS report. Edited by:Deirdre Lynn and Fionnuala O'Neill

NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill

NPWS (2015) A framework for Corncrake Conservation to 2022. National Parks and Wildlife Service, Department of Arts, Heritage & the Gaeltacht. Available online at:

https://www.npws.ie/sites/default/files/publications/pdf/A%20Framework%20for%20Corncrake%20Conservation%20to%202022%20%28Nov2015%29.pdf

NPWS (2015). Article 12 Reporting: Annex 2: Bird Species status and trends reporting format for the period 2008-2012. Available online at:

http://cdr.eionet.europa.eu/Converters/run_conversion?file=/ie/eu/art12/envuvesya/IE_birds_reports-14328-144944.xml&conv=343&source=remote#A082_B

NRA (2008) Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes; Available online at: https://www.tii.ie/tii-library/environment/construction-guidelines/Guidelines-for-the-Crossing-of-Watercourses-during-the-Construction-of-National-Road-Schemes.pdf

Office for Official Publications of the European Communities (2000) Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC. Office for Official Publications of the European Communities, Luxembourg.

Office for Official Publications of the European Communities (2001) Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC. Office for Official Publications of the European Communities.

OPW (2013) Construction, Replacement or Alteration of Bridges and Culverts. Available online at: https://www.gov.ie/en/publication/957aa7-consent-requirements-constructionalteration-of-watercourse-infrastru/

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

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

Schouten, M.G.C. 2002. Conservation and Restoration of Raised Bogs: Geological, Hydrological and Ecological Studies. Dúchas - The Heritage Service of the Department of the Environment and Local Government, Ireland; Staatsbosbeheer, the Netherlands; Geological Survey of Ireland; Dublin.

Scottish Natural Heritage. (2017) '*Survey Methods for use in assessing the impacts of onshore windfarms on bird communities'* Version 2. SNH, Battleby, Scotland.

Scottish Natural Heritage. (2017) '*Assessing Connectivity with Special Protection Areas (SPA's).* SNH, Battleby, Scotland. Available online at: https://www.nature.scot/sites/default/files/2018-08/Assessing%20connectivity%20with%20special%20protection%20areas.pdf

Scottish National Heritage (2016) *Dealing with Construction and birds. Guidance Version 3*. SNH, Battleby ,Scotland.

Scottish National Heritage (2016) *Assessing Connectivity with Special Protection Areas (SPAs). Guidance Version 3*. SNH, Battleby ,Scotland.

Scottish National Heritage (2009) *Monitoring the impact of onshore wind farms on birds - January 2009. Guidance Note*. SNH, Battleby, Scotland.

Tobin Consulting Engineers (2019) Derryadd Wind Farm Environmental Impact Assessment Report (EIAR) Volume II. EIAR Main Report.

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

Wernham, C.V., Toms, M.P., Marchant, J.H., Clark, J.A. Sitiwardens, G.M.&Baillie, S.R. (eds). 2002. *The Migration Atlas; movements of the birds of Britain and Ireland.* T. & A.D.Poyser, London.

Wetlands International. (2018). *Waterbird Population Estimates*. wpe.wetlands.org.

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

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

Appendix A FONSE

Finding of No Significant Effects Report (FONSE)

In accordance with the EC (2001) guidance document, *Assessment of plans and projects significantly affecting Natura 2000 sites – Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC*, A Finding of No Significant Effects Report has been completed for the proposed Decommissioning and Rehabilitation Plan for Derrycolumb Bog. The standard matrix for this report provided in Annex 2 of the guidance document was followed. Line items in italics are taken directly from the guidance document.

Finding of No Significance Effects Report	
Name and location of the Natura 2000 sites	The Screening Evaluation provided herein has examined the potential for any effects arising via source pathway linkages with regard to connectivity to designated European Sites (SACs and SPAs) within the zone of influence of all predicted Project impacts. An extended buffer zone of 15km was further considered, in line with NPWS guidance (DoEHLG, 2009), for evaluation of effects on any European Site which may arise associated with the proposed decommissioning and rehabilitation of Derrycolumb Bog, as required. There is a total of 9 European sites located within the 15km zone of consideration: - Lough Ree SAC 000440 - 290m south-west of Derrycolumb and 366m downstream at its closest point. - Lough Ree SPA 004064- 350m south-west of Derrycolumb and 520m downstream at its closest point. - Corbo Bog SAC 002349 - 12km north-west - Fortwilliam Turlough SAC 000448 - 3.7km north-west - Mount Jessop Bog SAC 002202 - 7.9km north-east - Brown Bog SAC 002346 - 12.9km north/north-east - Lough Funshinagh SAC 000611- 14.6km south-west - Ballykenny / Fisherstown Bog SPA 004101 - 12.9km north - Lough Forbes Complex SAC 001818 - 12.9km north
Description of the project or plan	**Overview:** Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Mount Dillon bog group (Ref. P0504-01). As part of Conditions 10.1 and 10.2 of this license, respectively, decommissioning and rehabilitation must be undertaken to ensure the permanent rehabilitation of the bog lands within the licensed area. Derrycolumb bog is part of the Mount Dillon bog group. Derrycolumb Bog is located in Co. Longford. A document titled 'Derrycolumb Bog Cutaway Bog Decommissioning and Rehabilitation Plan 2021' has been prepared specifically to describe the proposed decommissioning and rehabilitation measures at **Derrycolumb Bog** as appended to this document as Appendix B. **Purpose:** The decommissioning and Rehabilitation of Derrycolumb **Bog** as required under IPC license.

Finding of No Significance Effects Report	
Is the Project or Plan directly connected with or necessary to the management of the site (provide details)?	No
Are there other projects or plans that together with the project of plan being assessed could affect the site (provide details)?	Yes: In addition to the proposed decommissioning and rehabilitation plan the following projects were considered: 1 Other BnM Bog Group Decommissioning and Rehabilitation – Edera Bog and Derrycashel Bog 2 NPWS Raised Bog Restoration at Lough Forbes Complex SAC and Aghnamona Bog NHA 3 Agricultural Activity 4 Turbary 5 Agriculture 6 Local Authority Development Plans 7 Local and Regional Amenity Developments 8 Local small residential and agricultural developments, extensions, alterations
The Assessment of Significant Effects	
Describe how the project or plan (alone or in combination) is likely to affect the Natura 2000 site	- Disturbance of SCI species using sections of Derrycolumb Bog and environs, ex-situ of Lough Ree SPA. - Disturbance of QI species using upstream, adjoining and downstream sections of the Ledwithstown River and Lough Ree SAC. - Indirect effects to downstream sections of the Ledwithstown River and Lough Ree SAC (and their associated aquatic habitats and species) as a result of run-off to receiving watercourses (such as siltation, hydrocarbons etc.) and further downstream to Lough Ree SAC.
Explain why these effects are not considered significant	Following examination and analysis, and taking account of the protective measures proposed, the potential for disturbance and displacement of SCI waterbird species occurring within Lough Ree SPA were found not to result in adverse effects due to the protective measures around timing and scheduling of works, such as the implementation of an exclusion zone during the period when SCI's may present. This exclusion zone is selected based on the largest Minimum Approach Distance or MAD for the SCI species under consideration and constitutes Best Available Scientific knowledge. The key protective measure being retention of silt laden water and potentially deleterious materials associated with the decommissioning and rehabilitation works to the project footprint. The attenuation of silt and particulate matter generated as a result of the proposed works is a key mitigation measure for the proposed rehabilitation and decommissioning

Finding of No Significance Effects Report			
	works. The main source of potential impact to influence significant adverse effects to the downstream areas of the Lough Ree SAC relate to particulate matter run-off from the site, during the rehabilitation works. A key consideration in this regard will be drain blocking. This methodology relies on the placement of terminal dams at the extremity of the drain; i.e. that closest to watercourse within the receiving environment. The securing of strategic peat dams will allow the hydraulic separation between the proposed rehabilitation works and the receiving and downstream aquatic environment, and in so doing isolating these works from sensitive ecological and environmental receptors within the project zone of influence and in the case of Derrycolumb Bog and the River Lough Ree SAC.	
Name of Agency or Body Consulted	**Summary of Response**		
NPWS	Formal consultation has been undertaken with NPWS regarding proposed Decommissioning and Rehabilitation Plans, including protected Sites. The findings and feedback from the consultation process have been fed into the final rehabilitation and decommissioning plans. Due cognisance was also given to information available on the NPWS website at: https://www.npws.ie/development-consultations#.		
Data Collected to Carry out the Assessment			
Who carried out the assessment	*Sources of Data*	*Level of assessment completed*	*Where can the full results of the assessment be accessed and viewed*
Delichon Ecology	A combination of consultation, desktop studies and field surveys.	Screening for Appropriate Assessment Appropriate Assessment – Natura Impact Statement	Bord na Mona, Leabeg, Blueball, Tullamore, Co. Offaly, R35 P304.

Appendix B Derrycolumb Bog: Cutaway Bog Decommissioning and Rehabilitation Plan 2021

Derrycolumb Bog

Cutaway Bog Decommissioning and Rehabilitation Plan 2021

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

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

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

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

Industrial peat production has now fully ceased at Derrycolumb Bog. Bord na Móna have now announced the complete cessation of industrial peat production.

In addition, to preparing this document to comply with Condition 10 of IPC Licence Ref. PO504-01, due regard was also given to the proposed 'Peatlands Climate Action Scheme' (PCAS) announced by the Minster. This Scheme will see the Minister support, via the Climate Action Fund, Bord na Móna in developing a package of measures, 'the proposed 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 proposed Scheme will be supported by Government through the Climate Action Fund, 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 Derrycolumb 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 proposed 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 proposed Scheme.

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

Document Control Sheet	
Document Name:	Derrycolumb Bog Decommissioning and Rehabilitation Plan 2021
Document File Path:	https://bnmproject.sharepoint.com/:f:/t/ENERGY/DEC_RHB/EsCkB47UnKZEoM4ARuhyojcBxBq-U2UbP-HeoJS234WBPQ
Document Status:	Draft

This document comprises :	DCS	TOC	Text (Body)	References	Maps	No. of Appendices
	1	1	53	4	(11)	(12)

Rev. 4.0	Author(s):	Checked By:	Approved By:
Name(s):	CC	MMC	MMC
Date:	12/10/2020	22/10/2020	22/10/2020

Rev. 5.0	Author(s):	Checked By:	Approved By:
Name(s):	CC	CC	MMC
Date:	12/10/2020	22/02/2021	23/02/2021

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SUMMARY

Name of bog: Derrycolumb Bog **Area:** 455.8 ha

Site description:

- Derrycolumb Bog is located close to Lough Ree in Co. Longford.
- Derrycolumb Bog was in industrial peat production from the mid-1980s until 2019. The peat was formerly used as fuel peat in Lough Ree Power in Lanesborough.The bog comprises three main sections that are divided by minor public roads.
- Derrycoloumb Bog has a partially pumped drainage regime.
- The majority of the former peat production footprint is bare peat and contains active drainage channels.
- The south/eastern section of the bog contains the deepest residual peat of between 1.1m and 2.6m of peat.
- The Bilberry River flows along the north-eastern boundary of part of Derrycolumb.
- One area of remnant marginal raised bog present includes a small number of 'active' raised bog habitat.
- The site is located adjacent to Lough Ree and several designated conservation sites. Part of Derrycolumb Bog overlaps an adjacent proposed NHA.

Rehabilitation goals and outcomes

Bord na Móna is committed to discharging the obligations arising from Condition 10 of the IPC licence. The primary goals and outcomes of this plan are:

- Meeting conditions of the IPC License.
- Stabilisation or improvement in water quality parameters (e.g. suspended solids).
- Optimising hydrological conditions for **climate action benefits as part of PCAS.** This will be achieved via **deep peat re-wetting and optimising re-wetting on shallower cutaway areas** and eventually naturally functioning wetland/peatland habitats.
- Environmental stabilisation.
- Rehabilitation will support the National Policies on Climate Action and GHG mitigation by maintaining and enhancing the current peat storage capacity of the bog (locking the carbon into the ground). It is expected that the bog will have reduced emissions (reduced source) and in time develop its carbon sink function, in part, as some peat-forming habitats develop on site. 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 Derrycolumb Bog.
- EPA IPC Licence - Ref. P0504-01. As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. The key objective of 'rehabilitation', as required by this licence, is achieved by the **environmental stabilisation** of the bog.
- **The proposed Scheme (PCAS)** includes enhanced measures which are designed to exceed/meet the standard stabilisation requirements as defined by the IPC Licence and to enhance the ecosystem services of Derrycolumb Bog, in particular, optimising **climate action benefits**.
- The local environmental conditions of this bog. Derrycolumb Bog has variable environmental characteristics with a range of residual peat depths, hydrology and topography. Part of the site is dependent on pumped drainage and is suited to wetland development.
- The key goals and outcomes of rehabilitation at this bog outlined above.

- To minimise potential impacts on neighbouring land, some boundary drains around Derrycolumb Bog will be left unblocked, as blocking boundary drains could affect adjacent land.
- Other constraints including archaeology and rights of way.

Criteria for successful rehabilitation:

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

- Rewetting of residual deep peat in the former area of industrial peat production to slow water movement across the site to retain silt, encouraging development of vegetation cover via natural colonisation, and reducing the area of bare exposed peat (IPC Licence validation). The target will be the delivery of measures and this will be measured by an aerial survey after rehabilitation is completed. (IPC Licence validation).
- Stabilising/improving key 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 catchment (WFD). This will be measured by the EPA WFD monitoring programme.
- Optimising the extent of suitable hydrological conditions for climate action and setting the site on a trajectory towards establishment of a mosaic of compatible peatland and wetland habitats, and eventually towards a reduced carbon source/carbon sink (Climate action verification). This will be measured by an aerial survey and a bog condition assessment after rehabilitation has been completed.
- Reduction in carbon emissions (Climate action verification). Baseline monitoring will be carried after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.
- Improvement in biodiversity and ecosystem services. (Climate action verification).

Summary of measures:

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

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

Timeframe:

- 2020-2021: Short-term planning actions.
- 2021: Short-term practical actions.
- 2021-2024: Any Long term practical actions; Evaluate success of short-term rehabilitation measures outlined above and remediate, where necessary.
- 2024: Decommission silt-ponds, if necessary.

Budget and Costing

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

Monitoring, after-care and maintenance

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

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

Additional Monitoring:

- The monitoring and validation of re-vegetation via natural colonisation and changes in bog condition will be carried out using an aerial remote sensing survey, after rehabilitation measures are implemented. It is proposed that sites can be monitored against this baseline in the future.
- Biodiversity Ecosystem services will be monitored using specific indicators during PCAS.
- 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.

Validation and IPC Licence surrender

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

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

1. INTRODUCTION

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Mount Dillon bog group (Ref. P0504-01). As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. The bog is part of the Mount Dillon bog group (see Appendix II for details of the bog areas within the Mount Dillon Bog Group). Derrycolumb Bog is located in Co. Longford.

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

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

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

- Description of site management and status;
- Main issues and approaches to rehabilitation;
- Consultation to date with interested parties;
- Interaction with other policy and legislative frameworks (Appendix VI);
- The planned rehabilitation goals and outcomes:
- The scope of the rehabilitation plan;
- Criteria which define the successful rehabilitation and critical success factors required for successful 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 (PCAS) on peatlands previously used for energy production. Note this proposal is also known colloquially as the 'Peatlands Climate Action Scheme'. The additional costs of the proposed Scheme will be supported by Government through the Climate Action Fund, 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 enhanced rehabilitation. This proposed Scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations (Appendix VII&IX) under existing EPA IPC licence conditions. Interventions 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, it is important for all stakeholders to understand that 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 proposed Scheme. Bord na Móna have now announced the complete cessation of industrial peat production across its estate (January 2021).

It is expected that the proposed Scheme (PCAS) will have benefits accruing from biodiversity provision, water quality and storage attenuation as well as increased carbon storage, reduced carbon emissions and acceleration

towards carbon sequestration. The Scheme will also facilitate monitoring of carbon fluxes (Greenhouse Gases and fluvial carbon) in selected areas (in addition to other established Research programmes), to monitor changes in where the interventions will accelerate the trajectory towards a naturally functioning peatland ecosystem.

It is envisaged that the 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 pump management, drain-blocking and cell bunding;
- re-profiling that will deliver suitable conditions for development of wetlands, fens and bog habitats;
- targeted fertiliser applications,
- seeding of targeted vegetation; and
- proactive inoculation of suitable peatland areas with *Sphagnum.*

These are collectively designed to optimise hydrological conditions (ideally and where possible water-levels <10 cm) for climate action benefits and to accelerate the trajectory of the site towards a naturally functioning ecosystem, and eventually a reduced carbon source/carbon sink again. In some areas of dry cutaway this trajectory will be significantly longer and it is not feasible in the short-term to re-wet some areas, which will develop other habitats. Other areas will naturally have deeper water). 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.

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

1.1 Constraints and Limitations

This document covers the area of **Derrycolumb**.

Future land-use at Derrycolumb has not been defined by Bord na Móna. Biodiversity and ecosystem services have been identified as the current primary land use. Bord na Móna will continue to review the future after-use of its land-bank. Any consideration of any other future after-uses for Derrycolumb 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 at Derrycolumb Bog permanently ceased in 2019. Currently the former peat production area is bare peat. It is anticipated that the combination of active enhanced rehabilitation measures and natural colonisation will quickly support the development of pioneer vegetation. Nevertheless, it will take some time (30-50 years) for naturally functioning peatland ecosystems to fully re-establish.

Parts of Derrycolumb Bog (outside the areas owned and under the control of Bord na Móna) are currently 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 Derrycolumb Bog that are outside of the control of Bord na Móna. Nevertheless, Bord na Móna

are aware of such issues which may constrain the proposed rehabilitation actions, and this rehabilitation plan considered potential impacts of these on the delivery of the stated objectives.

Rehabilitation in other areas of the bog may also be constrained due to other property issues or issues such as rights of way. In addition, there is substantial Archaeology evidence present at Derrycolumb; this is similarly treated as a constraint.

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 proposed Scheme (PCAS). The development of this enhanced rehabilitation plan also 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 proposed 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 Derrycolumb 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.
- Quinty & Rochefort (2003). Peatland Restoration Guide, second edition. Canadian *Sphagnum* Peat Moss Association and New Brunswick Department of Natural Resources and Energy.
- Regan *et al*. (2020). Ecohydrology, Greenhouse Gas Dynamics and Restoration Guidelines for Degraded Raised Bogs. EPA Research Report. Prepared for the Environmental Protection Agency by Trinity College Dublin.
- Renou-Wilson *et al*. (2011). BOGLAND - Sustainable Management of Peatlands in Ireland. STRIVE Report No 75 prepared for the Environmental Protection Agency.
- Schouten (2002). Conservation and Restoration of Raised Bogs: Geological, Hydrological and Ecological Studies. Dúchas - The Heritage Service of the Department of the Environment and Local Government, Ireland;
- Thom (2019). Conserving Bogs – Management Handbook.
- Wheeler & Shaw (1995). Restoration of Damaged Peatlands – with Particular Reference to Lowland Raised Bogs Affected by Peat Extraction.
- Wittram *et al*. (2015). A Practitioners Guide to Sphagnum Reintroduction. Moors for the Future Partnership.

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

- Moundillion Integrated Pollution Control Licence;
- Mountdillion Annual Environmental Reports;
- Review of the National Biodiversity Data Centre (NBDC) webmapper;
- Inland Fisheries Ireland (IFI) Reports;
- Environmental Protection Agency database (www.epa.ie);
- EPA Guidance on Requests for Alterations to a Licensed Industrial or Waste Activity;
- BirdWatch Ireland online data (including I-WeBS and CBS datasets; www.birdwatchireland.ie);
- Geological Survey of Ireland - National Draft Bedrock Aquifer map;
- Geological Survey of Ireland - Groundwater Database (www.gsi.ie);
- Historic Environment Viewer at https://webgis.archaeology.ie/historicenvironment/
- National Parks & Wildlife Services Public Map Viewer (www.npws.ie);
- Water Framework Directive catchments.ie/maps/ Map Viewer (www.catchments.ie);
- OPW Indicative Flood Maps (www.floodmaps.ie);
- CFRAM Preliminary Flood Risk Assessment (PFRA) maps (www.cfram.ie);
- River Basin Management Plan for Ireland 2018 – 2021;
- Bord na Móna Annual Report 2020.
- Spatial data in respect of Article 17 reporting, available online at https://www.npws.ie/maps-and-data/habitat-and-species-data/article-17.

2.2 Consultation

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

2.3 Field Surveys

Bord na Móna carried out a baseline ecological survey of all of its properties in 2009-2012 and developed habitat maps. As part of this exercise, Derrycolumb Bog was surveyed in July 2012 and surveyed again during 2018. Additional ecological walk-over surveys and visits have taken place at Derrycolumb Bog between 2012-2020 to inform rehabilitation planning and habitat maps have been updated, where required- the latest site visit took place in October of 2020. This rehabilitation plan is informed by the original baseline survey as well as subsequent confirmatory site walk-over surveys and visits, and updates to baseline data.

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

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

3. SITE DESCRIPTION

Derrycolumb Bog (hereafter Derrycolumb) is located approximately 9.5km to the west of Ballymahon in County Longford. This bog comprises three main sections that are divided by minor public roads. Derraghan Bog is located immediately adjacent to two sections of Derrycolumb and is connected via a rail link to Derrycolumb. To the south east, the next adjacent Bord na Móna Bog (Edera Bog) is also connected to Derrycolumb via a rail line. There are travel paths and drainage channels maintained around the bog formerly used for access and drainage of industrial peat production areas (Figure 3.1).

Derrycolumb is one of a cluster of bogs that has developed along the floodplains of the River Shannon. It is one of a group with the Mount Dillon bog group that frequently is inundated with surface water during winter periods. In each of these bogs, a significant portion of the industrial peat production areas lie below the winter flood level of the Shannon. Derrycolumb had a partially pumped drainage regime to facilitate peat extraction.

3.1 Status and Situation

3.1.1 Site history

Derrycolumb Bog was in industrial peat production from the mid-1980s until 2019. The peat was formerly used as fuel peat in Lough Ree Power in Lanesborough.

3.1.2 Current land-use

Industrial peat production has now completely ceased at Derrycolumb Bog. Several small stock-piles are still present on the site and these will be removed before rehabilitation and decommissioning is complete. There are licensed turbary plots overlapping the bog boundary.

Longford County Council also proposes to undertake a project comprising the construction of amenity trackway through part of Derrycolumb Bog[1].

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.

[1] See: https://www.longfordcoco.ie/longfordcoco/services/planning/part-viii/no-81-amenity-trackway-through-derrycolumb-bog/

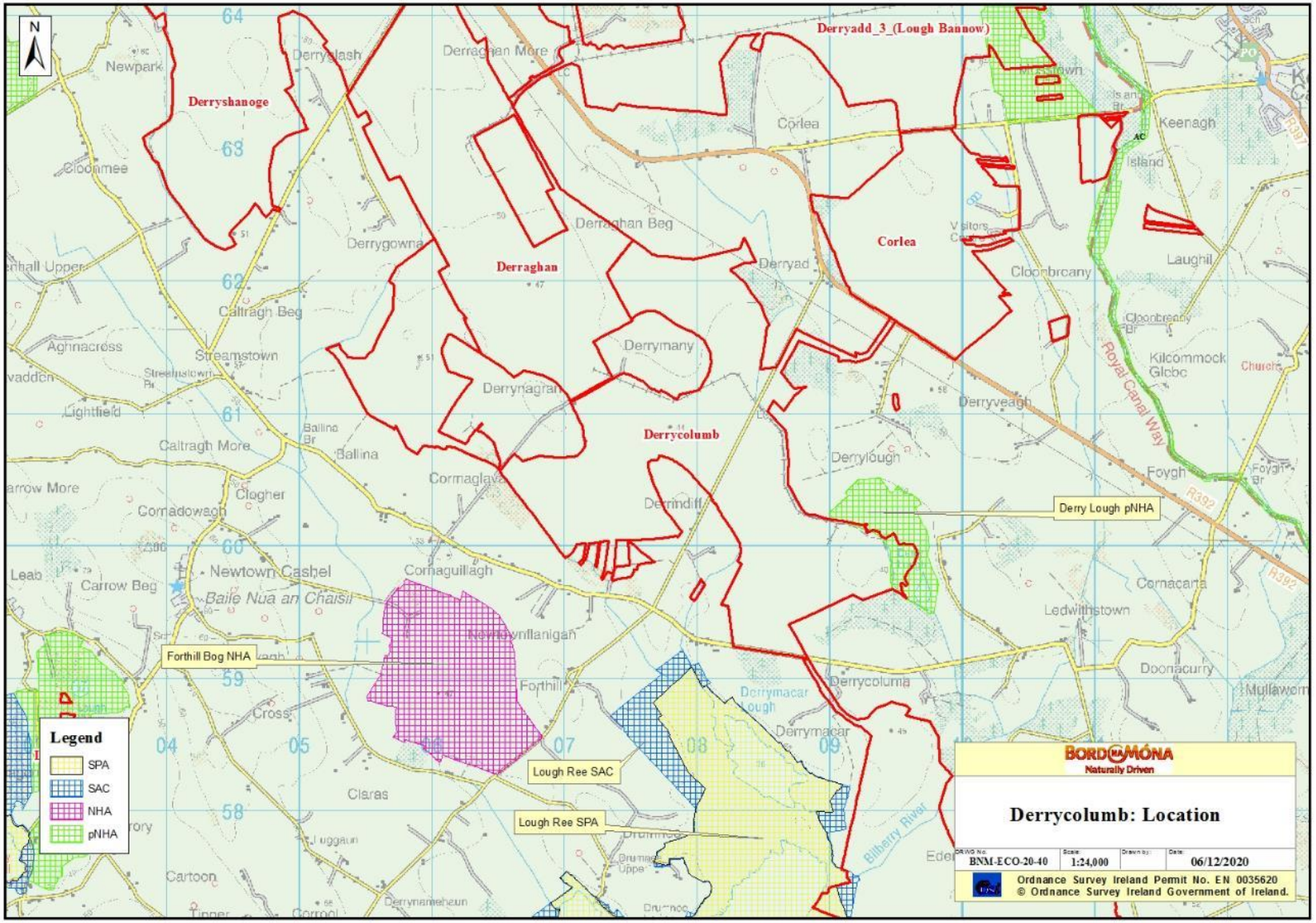


Figure 3.1 Location of Derrycolumb in context to other Bord na Móna bogs, surrounding area and Conservation sites.

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

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."

It is anticipated that the proposed 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 Derrycolumb Bog comprises Visean Limestones (undifferentiated)[2]. Subsoils at Derrycolumb comprise Silty clays, silty clay loams overlain by deposits of organic mud or marl deposits. The peat is underlain by glacial deposits interbedded with glacio-fluvial deposits made up of mixed gravels and till.

Lacustrine deposits (lake deposits) are also present under the peat (lacustrine shell marl) in parts of the site.

3.2.2 Peat type and depths

Commercial peat extraction has only been undertaken at Derrycolumb Bog relatively recently (i.e. since the mid 1980's). A substantial portion of the residual peat on site is "red" or "*Sphagnum* peat". The south/eastern section of the bog contains the deepest peat reserves of between 1.1m and 2.6m of peat. Some sections, particularly in the north-east part of the site and through the remainder of the site, have been cutaway and have shallow or no residual peat and exposed marl and gravel (Figure 8.2).

3.3 Key Biodiversity Features of Interest

The majority of Derrycolumb Bog within the Bord na Móna boundary is bare peat as this bog was in production until 2019 (Figure 8.1).

3.3.1 Current habitats

A small area in the south-eastern corner of the site is within the area that is designated as the Derry Lough proposed NHA (Site Code 001444, hereafter pNHA). The pNHA where it overlaps consists of Wet Grassland (Fossitt Code GS4), Poor Fen (PF1), Bog Woodland (WN7) and open water/wetland habitats. There is no production bog within the pNHA. The Bilberry River flows along the north-eastern boundary of this part of Derrycolumb and a berm was constructed along a section of the river in 2010 in order to prevent flooding to the former production bog area.

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

South of the Bilberry River, the boundary of this section of Derrycolumb encloses some Raised or high bog (PB1) that includes a small number of 'active' raised bog. This habitat contains Heather (*Calluna vulgaris*), Purple Moor Grass (*Molinia caerulea*), Bog Asphodel (*Narthecium ossifragum*), Bog Cotton (*Eriophorum spp*.), Sundew species and Deer Grass (*Trichophorum cespitosum*) along with Sphagnum mosses (*Sphagnum magnellanicum, S. subnitens* and *S. papillosum*). A silt pond and a section of Birch (*Betula spp.)* woodland (WN7) is also located in this area. The southern boundary of this section has a small area of remnant raised bog (PB1) that is used for domestic turf cutting and some scrub (WS1) and Wet Grassland (GS4) is further present.

The mid-section of Derrycolumb is the largest portion of the bog and this area curves around farmland (primarily improved agricultural grassland GA1) that is located to the north. The majority of the mid-section was until recently in active industrial peat production however some cutaway bog (PB4) has emerged in recent years. These areas of cutaway are becoming vegetated by a mix of emergent Soft Rush (*Juncus effusus*) along with Birch and Willow (*Salix spp.)* This area is bounded to the south west by the Newtownflanagan Stream.

The north/western section of Derrycolumb was in industrial peat production for a number of years and the centre of this section has been cutaway and is becoming vegetated with Soft Rush and Marsh Arrow Grass (*Triglochin palustris*) (pioneering Poor Fen PF1 habitat). A relatively large section of Birch woodland (WN7) is located in the southern section of this part of Derrycolumb and is made up of Birch and Willow.

Other habitats along the margins of Derrycolumb overall include further Birch woodland, wet grassland, dry heath (HH1) and cutover bog (PB4) or mosaics of same.

Figure 3.2 Raised Bog remnant at Derrycolumb (October 2020)

Figure 3.3 Flood defence berm and adjacent cutaway at Derrycolumb Bog (October 2020)

Figure 3.4 Cutaway Bog at Derrycolumb Bog (October 2020)

A habitat map of Derrycolumb Bog is shown in Figure 3.5.

3.3.2 Species of conservation interest

A review of available Biodiversity records from the National Biodiversity Data Centre (hereafter NBDC) of bird records from the recent 2007-2011 Bird Atlas, found 92 species of birds have been recorded at or near Derrycolumb Bog.

Common species observed at Derrycolumb by Bord na Móna ecologists include Grey Heron (*Ardea cinerea*), Hooded Crow (*Corvus cornix*), European Robin (*Erithacus rubecula*), Common Blackbird (*Turdus merula*) and Raven (*Corvus corax*).

Studies to inform the nearby Derryadd Wind Farm planning application[3] recorded flight activity proximal to Derrycolumb of (Amber listed- Colhoun & Cummins 2013[4]) Lesser Black-backed Gull (*Larus fuscus*) during Spring passage; and evidence of breeding (Amber listed) Common Snipe (*Gallinago gallinago*) in suitable habitat. A Common Buzzard (*Buteo buteo*) breeding territory was confirmed at Derrygowna, immediately northwest of Derrycolumb.

Wintering (Amber listed) Whooper Swan (*Cygnus cygnus*) are known to occur at a number of wetlands in the hinterland of Derrycolumb, such as Fort William Turlough, Cordora Turlough and at Carrowmore[5].

Signs of several mammal species have been noted by Bord na Móna ecologists during surveys of Derrycolumb including Red Fox (*Vulpes vulpes*), Badger (Meles meles), Pine Marten (*Martes martes*) and Otter (*Lutra lutra*). Irish Hare (*Lepus timidus subsp. hibernicus*), West European Hedgehog (*Erinaceus europaeus*) and American Mink (*Mustela vison*) are likely to occur in suitable habitat based on records from the NBDC website.

Common Frog (*Rana temporaria*) and Smooth Newt (*Lissotriton vulgaris*) are likely to occur in suitable habitat based on records from the NBDC website.

Marsh Fritillary (*Euphydryas aurinia*) have been recorded to the south of Derrycolumb at Ledwithstown, Co. Longford, and to the east at Corlea, Co. Longford (NBDC data viewer) but there are no on-site records yet. Bord na Móna ecologists have recorded Green Veined White (Pieris napi), Small Heath (*Coenonympha pamphilus*), Painted Lady (*Vanessa cardui*), Wall Brown (*Lasiommata megera*), Small Copper (*Lycaena phlaeas*) and Meadow Brown (*Maniola jurtina*) Butterflies at Derrycolumb.

3.3.3 Invasive species

There are recorded invasive species known from Derrycolumb. 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 (Appendix V).

[3]McCarthy Keville O'Sullivan Ltd. (2017). Bord na Móna Breeding Surveys 2017 Derryadd Co. Longford Survey Report.

[4] Colhoun, K. & Cummins, S. (2013). Birds of Conservation Concern in Ireland 2014-2019. Irish Birds 9: 523-544.

[5] MWP (2017). Ornithology Report. Bord na Móna Winter Bird Survey 2016/17.

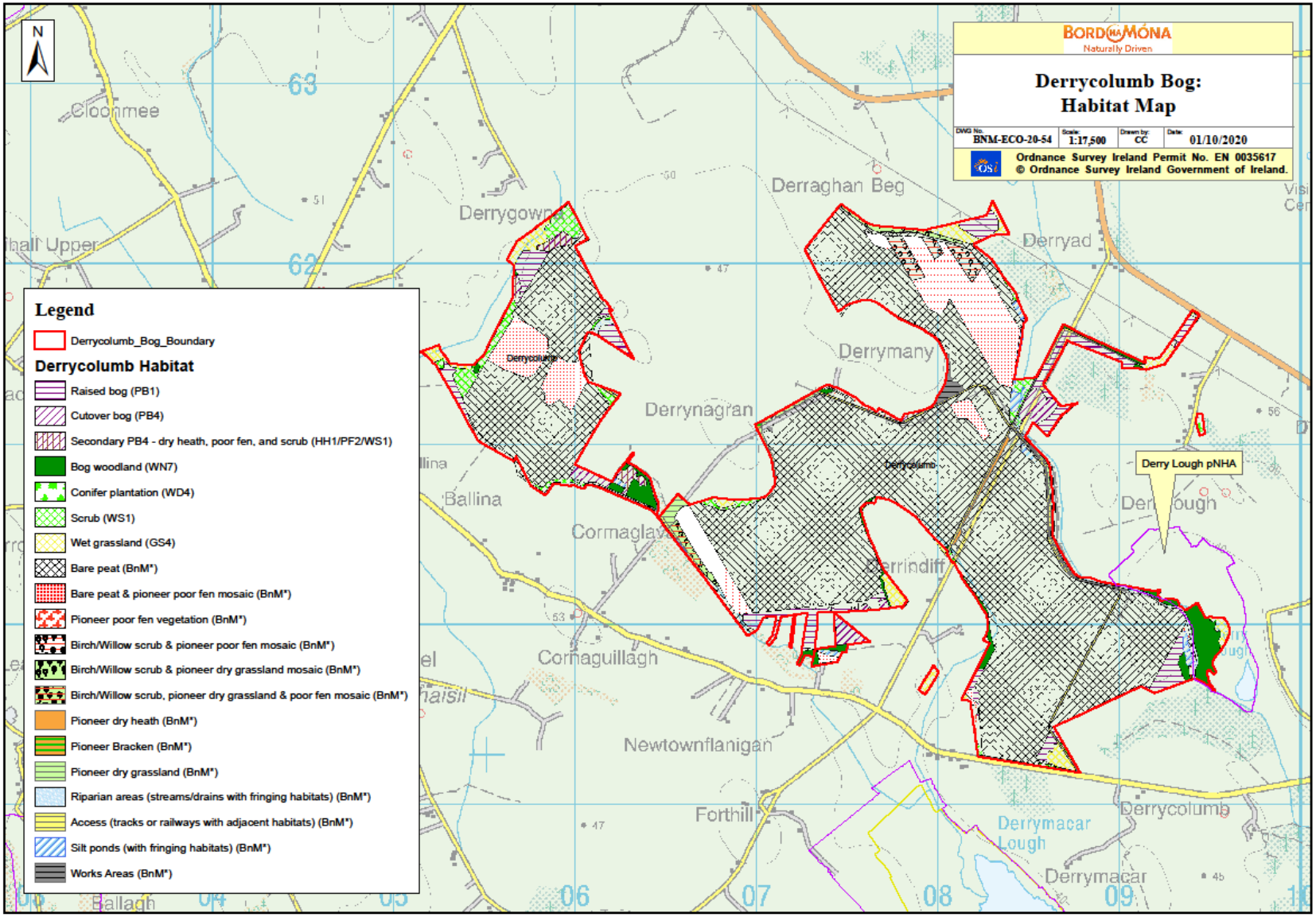


Figure 3.5 Habitat map of Derrycolumb Bog showing Bord na Móna habitat categorisation

3.4 Statutory Nature Conservation Designations

Derrycolumb Bog partially overlaps Derry Lough pNHA (NPWS Site Code: 001444) (Figure 3.1). In addition, Forthill Bog NHA (Site code 001448) is ca.1km to the south west of Derrycolumb. Lough Ree NHA (Site Code 00040) is less than 400m due west of Derrycolumb and shares a hydrological link via the Derrymanny Stream (EPA Code 26D90), and the Newtownflanigan Stream (EPA Code 26N06) both of which drain from the middle section of Derrycolumb southwards towards Lough Ree, in addition to the Bilberrry River and the Drumnee Stream.The Royal Canal pNHA (Site code 2103) lies within 2.5km of the eastern boundary of Derrycolumb.

Lough Ree SAC (Site Code 000440) and Lough Ree SPA (Site Code 004064) are similarly connected to Derrycolumb via the Derrymany, Newtownflanagan and Drumnee streams and Bilberry River and both European Sites occur within 500m of the bog boundary.

Lough Ree SAC (and pNHA) is designated for the natural eutrophic lake as well as active raised bogs, degraded raised bogs capable of natural regeneration, bog woodland and Otter. Lough Ree SPA is designated for the assemblage of wintering wildfowl, many species of which occur in nationally important numbers, in addition to breeding Common Tern (*Sterna hirundo*) and Common Scoter (*Melanitta nigra*).

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 Derrycolumb Bog (i.e. within 3km) The closest Ramsar Sites to Derrycolumb Bog include Mongan Bog in Co. Offaly and Lough Glen on the border of Longford and Westmeath.

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

3.5 Hydrology and Hydrogeology

Derrycolumb Bog has a partially pumped drainage regime. Hydrological modelling (Figure 8.3 & 8.4) indicates that much of the bog is a natural basin with significant potential for re-wetting. Some of the modelled basins overlap with residual deeper peat. It is likely that some of these basins will re-wet with deeper water, creating a mosaic of wetland habitats, when pumping ceases. There are two pumps on Derrycolumb. The northern pump mainly controls discharge from the adjacent Derraghan. The south-east pump was important for the drainage of the south-east catchments. There are 12 different sub-catchments across Derrycolumb.

There is likely to be some alkaline influence on the water chemistry of the ground water of a portion of this bog due to exposed sub-soils that are limestone-based.

Derrycolumb Bog is located in the Upper River Shannon catchment. The majority of the bog is drained by the Bilberry River, Derrymany Stream and Newtownflanagan Streams. In addition, an unnamed tributary of the Drumnee Stream (EPA Code 26D08) occurs along the boundary of the north-westernmost section of Derrycolumb; this watercourse flows south into the Drumnee which drains to Lough Ree, west of Saints Island.

Silt pond systems are present around the margins of the bog to manage discharges into the various watercourses which drain the site.

Field drains run north-east to south west in both the southeast and northwest sections of Derrycolumb, whereas the middle section field drains are orientated northwest to southeast.

The bog is located in an area with a regionally important aquifer- Karstified (conduit)(Rkc) (EPA map-viewer). An aquifer is an underground body of water-bearing rock or unconsolidated materials (gravel or sand) from which groundwater can be extracted in useful amounts. GSIs Aquifer classes are divided into three main groups based on their resource potential, and further subdivided based on the type of openings through which groundwater flows. There are nine aquifer categories in total. Regionally important aquifers can supply regionally important abstractions (e.g. large public water supplies). The continuous aquifer unit generally has an area of >25 km^2. Groundwater flow predominantly occurs through fractures, fissures and joints.

Rkc aquifers are those aquifers in which the degree of karstification limits the potential to develop groundwater. They have a high 'flashy' groundwater throughput, but a large proportion of flow is concentrated in conduits, numerical modelling using conventional programs is not usually applicable, well yields are variable with a high proportion having low or minimal yields, large springs are present, storage is low, locating areas of high permeability is difficult and therefore groundwater development using bored wells can be problematical.

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

The peat is underlain by glacial deposits interbedded with glacio-fluvial deposits over limestone bedrock. The glacial deposits generally consist of grey gravelly clay/silt (present on an adjacent cutaway site). The bog water table across the site is expected to be high when bog drains are blocked, and perched above the underlying regional groundwater table.

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. The silt ponds are inspected and maintained in accordance with the licence. Industrial peat production has now permanently ceased at Derrycolumb Bog.

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

Derrycolumb bog has silt ponds that discharge surface water to the Ledwithstown IE_SH_26L840850 and Drumnee IE_SH_26D080850 rivers and eventually the Shannon Upper IE_SH_25SO21660. Peat extraction is identified as pressure in the second cycle of the river basin management plan it is not indicated as remaining so in the third cycle, currently under preparation.

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 attached water quality map as Figure 3.7.

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 1.42mg/l and COD 100mg/l.

From an analysis of any monitoring over the past 5 yrs. of the IPC licence environmental monitoring programme, indicate that results were under the ELV for SS and the majority of the trigger levels for ammonia and COD.

Bog	SW	Monitoring	Sampled	pH	SS	TS	Ammonia	TP	COD	Colour
Derrycolumb	SW-88	Q4 19	07/11/2019	7.6	9	260	1.7	0.05	45	249
Derrycolumb	SW-88A	Q4 19	07/11/2019	7.7	12	185	0.163	0.05	43	310
Derrycolumb	SW-89	Q4 19	07/11/2019	7	5	85	0.409	0.05	37	216
Derrycolumb	SW-90	Q4 19	07/11/2019	7.9	7	264	0.255	0.05	53	257
Derrycolumb	SW-91	Q4 19	07/11/2019	7.8	7	309	0.107	0.05	65	251
Derrycolumb	SW91-A	Q4 19	07/11/2019	7.3	6	213	0.094	0.05	82	396
Derrycolumb	SW-92	Q4 19	13/11/2019	7.8	3	360	0.107	0.05	72	232
Derrycolumb	SW-93	Q4 19	13/11/2019	7.4	2	233	0.112	0.05	85	339
Derrycolumb	SW-93A	Q4 19	13/11/2019	7.40	2	257	0.315	0.05	51	128
Derrycolumb	SW-88	Q2 17	29/05/2017	7.9	6	632	0.2	0.05	40	114
Derrycolumb	SW-88A	Q2 17	29/05/2017	7.7	5	320	0.37	0.05	39	124
Derrycolumb	SW-89	Q2 17	29/05/2017	7.7	5	374	0.17	0.05	50	144
Derrycolumb	SW-90	Q2 17	31/05/2017	7.7	6	280	0.46	0.05	42	110
Derrycolumb	SW-91	Q2 17	31/05/2017	7.8	5	408	0.26	0.05	42	116
Derrycolumb	SW91-A	Q2 17	31/05/2017	7.9	7	368	0.32	0.05	57	108
Derrycolumb	SW-92	Q2 17	31/05/2017	7.5	5	219	3.9	0.05	48	144
Derrycolumb	SW-93	Q2 17	31/05/2017	7.8	6	628	0.53	0.05	51	111
Derrycolumb	SW-93A	Q2 17	31/05/2017	7.6	10	308	0.05	0.05	42	125
Derrycolumb	SW-91	Q2 16	09/06/2016	7.3	19	302	0.85	0.33	112	267
Derrycolumb	SW-92	Q3 16	12/09/2016	7.2	12	176	0.16	0.12	89	225

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

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

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

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 adequate 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, where applicable, in the WQ map as Figure 3.7.

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 up to 70% of a bogs 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 quarterly 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.

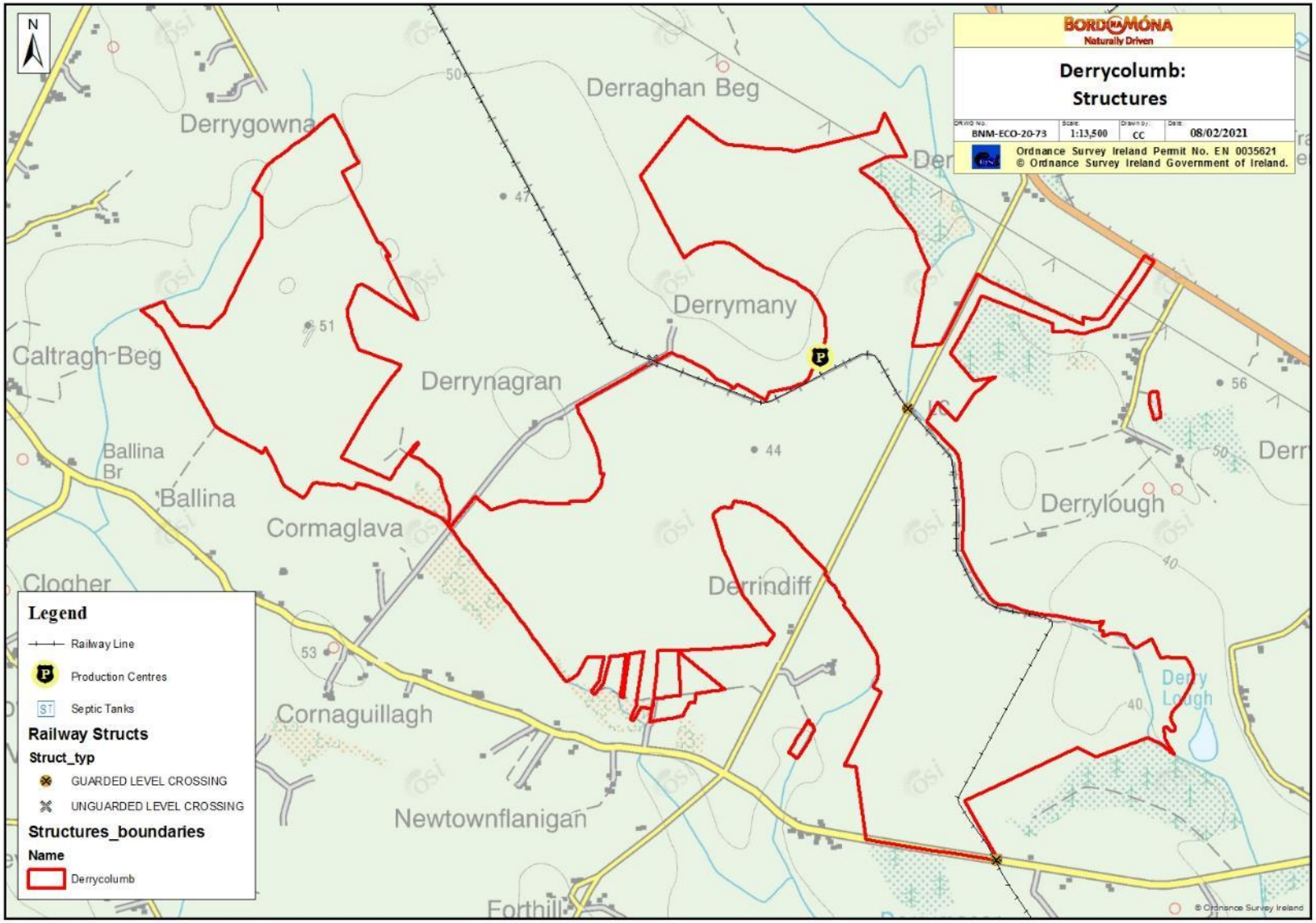


Figure 3.6 Habitat map of Derrycolumb Bog showing relevant structures

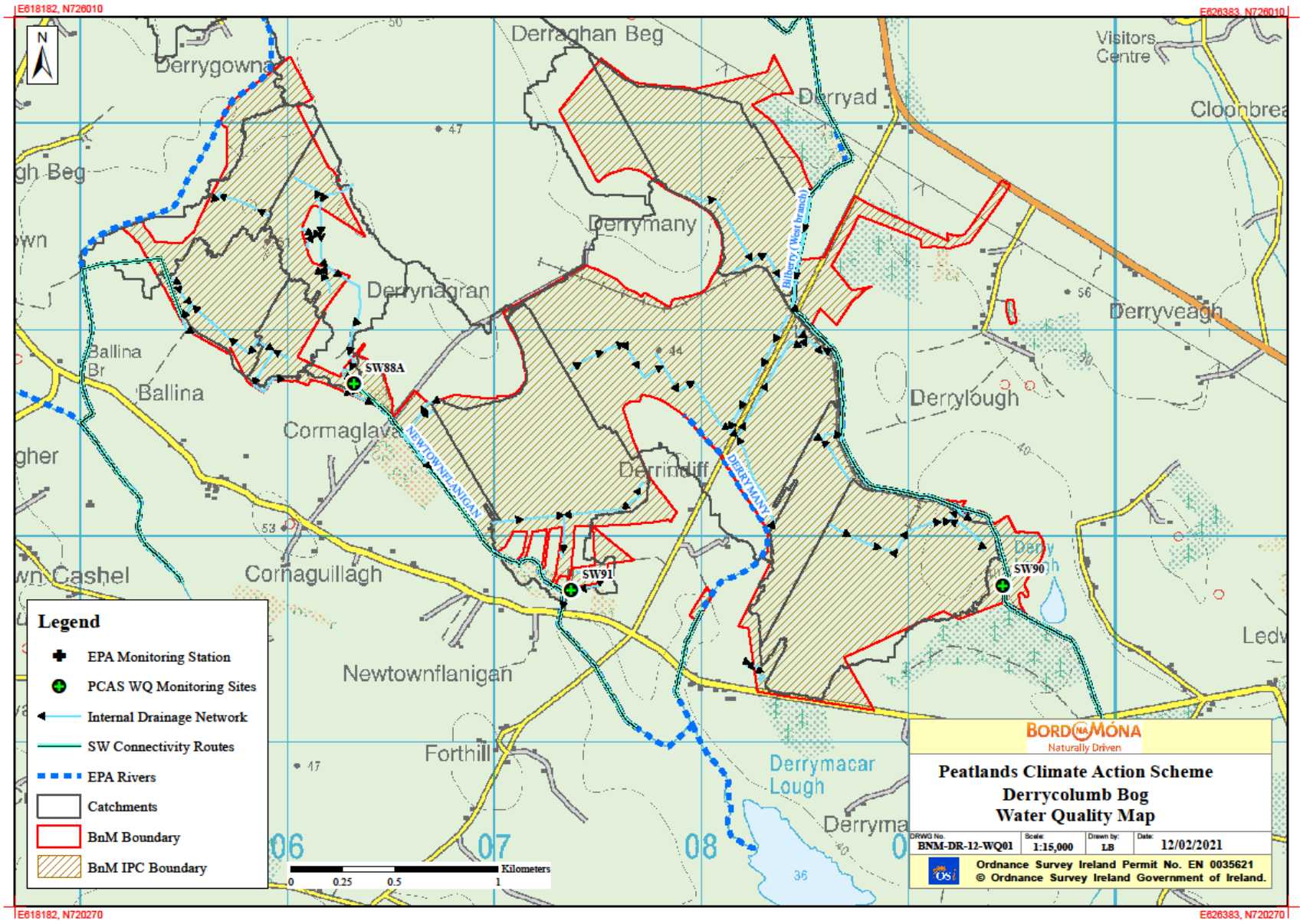


Figure 3.7 Water management features and water quality monitoring points at Derrycolumb Bog

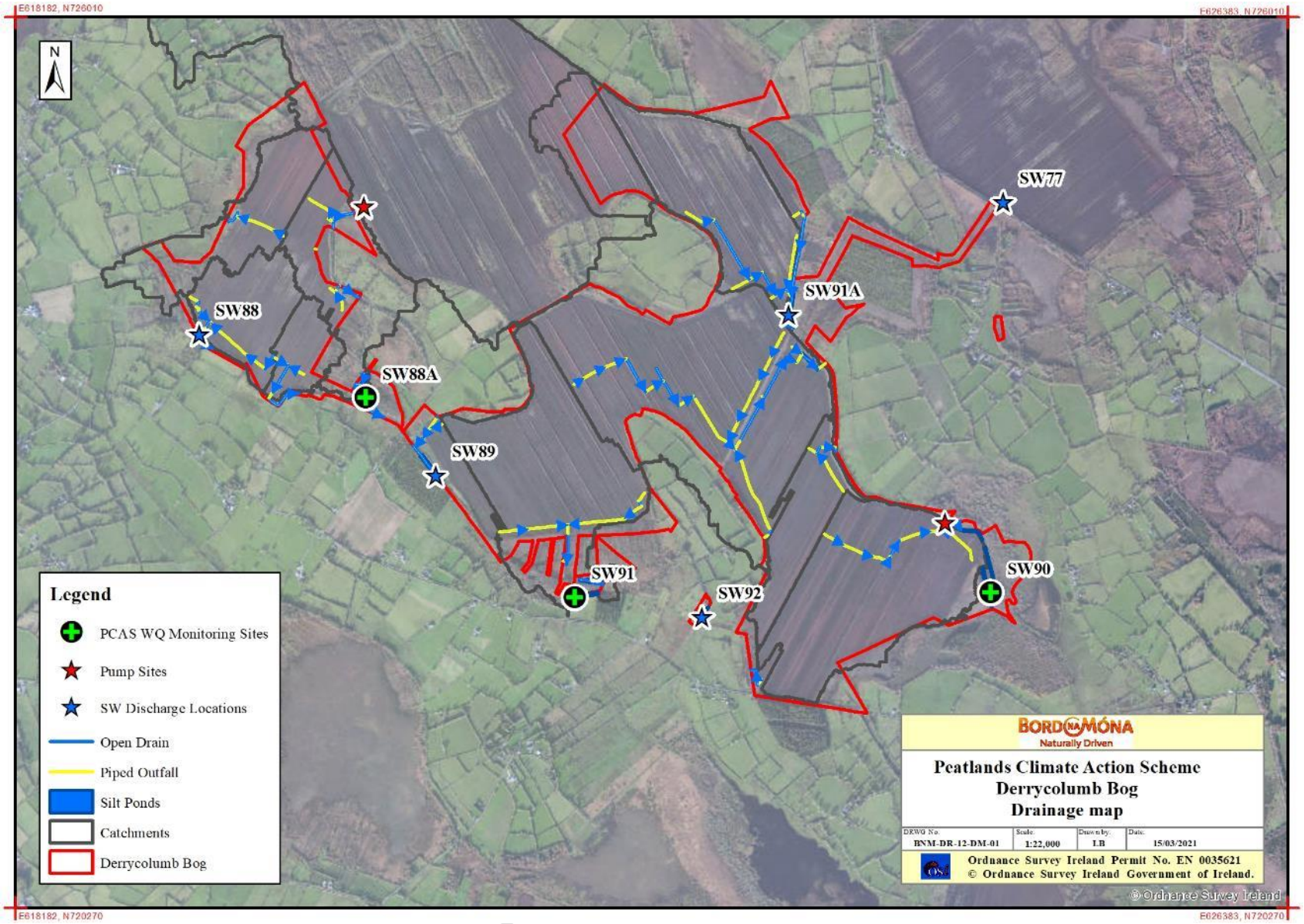


Figure 3.8 Pump sites at Derrycolumb Bog.

3.7 Fugitive Emissions to air

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

3.8 Carbon emissions

The bog is likely to be a carbon source as it is a drained (degraded) peatland with some active drainage, which facilitates the oxidation of peat. Peat extraction generally transforms a natural peatland 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 Derrycolumb Bog will become a reduced Carbon source following rehabilitation. The site does have potential to become a carbon sink in part, in the longer-term. This depends on the success of the rehabilitation measures, the extent of development of *Sphagnum*-rich habitats, the balance of carbon fluxes from different cutaway habitats (some of the cutaway is expected to develop Reed Swamp and fen habitats with alkaline emission factors) and future climatic conditions.

3.9 Current ecological rating

(Following NRA (2009) Evaluation Criteria)

Current ecological rating (ranges from Local Importance (lower and higher value) to National Importance; following NRA (2009) Evaluation Criteria)

The majority of Derrycolumb Bog is deemed to be of Local Importance (lower value) due to the dominance of bare peat managed for industrial peat production. Some pioneer and semi-natural habitats such as birch woodland are rated higher and are deemed to be of **Local Importance (higher value)**. The bog partially overlaps with Derry Lough pNHA (NPWS Site Code: 001444) within its eastern section and where this occurs the area is deemed to be of **National Importance**.

3.10 Derrycolumb Bog Characterisation Summary

Derrycolumb is located approximately 9.5km to the west of Ballymahon in County Longford. This bog comprises three main sections that are divided by minor public roads. Derraghan Bog is located immediately adjacent to two sections of Derrycolumb and is connected via a rail link to Derrycolumb. To the south east, the next adjacent Bord na Móna Bog (Edera Bog) is also connected to Derrycolumb via a rail line. There are travel paths and drainage channels maintained around the bog formerly used for access and drainage of industrial peat production areas.

The margin of Derrycolumb Bog partially overlaps a proposed NHA (Derry Lough). It has historically been a pumped bog.

The current character of Derrycolumb Bog is best distinguished as a mosaic of cutaway bog comprising relatively shallow peat (western section), along with areas where deeper residual peat is still retained (eastern section). The deeper peat in the east lends itself towards development of embryonic peat forming habitats, whilst the western part of the bog is more suitable to the development of wetlands, as it now naturally contains a basin which will hold water. The bog has a partially pumped drainage regime and it is expected that some sections will develop as wetlands when pumping ceases.

There are areas of former production area that are constrained from Rehab due to the presence of Archaeological features. Longford County Council are proposing the construction of an amenity walkway within part of the bog, this proposed project is deemed compatible with the currently proposed rehabilitation.

4. CONSULTATION

4.1 Consultation to date

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

There has been ongoing consultation about rehabilitation, biodiversity and other general issues over the years about Mount Dillion group bogs including Derrycolumb 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.
- Longford Wetland Wilderness (general proposal led by Longford County Council and other stakeholders. This has had several iterations. See Lough Ree and Mid Shannon, Spirit Level 2017. A feasibility study for Longford County Council).
- Feehan, J. (2004) A Long-Lived Wilderness; the future of the north midlands peatland network UCD/NWWPC.
- Lauder, A. & O'Toole L. (2017). Concept development for a landscape-scale Wetland Wilderness Park in the Mid Shannon Region. A report funded by the Heritage Council's Heritage Grant Scheme.
- Foss, P.J., Crushell, P. & Gallagher, M.C. (2017). Counties Longford &Roscommon Wetland Study. Report prepared for Longford and Roscommon County Councils.
- Midlands & East Regional WFD Operational Committee (River Basin Management Plans).
- Sub-committee on Shannon Flooding Work Programme and Measures (OPW, Waterways Ireland, ESB, LA's, Fisheries Ireland, NPWs etc).
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).
- Midlands & East Regional WFD Operational Committee (River Basin Management Plans).
- Sub-committee on Shannon Flooding Work Programme and Measures (OPW, Waterways Ireland, ESB, LA's, Fisheries Ireland, NPWs etc.).
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).
- Proposed greenway development at Derrycolumb (Longford County Council).

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

An advertisement about PCAS was also printed in the Longford Leader (January 2021) (a local newspaper that covers the Derrycolumb Bog area).

Further to the above, telephone correspondence was undertaken as either follow up to submissions received, or to instigate consultation. All correspondence received has been acknowledged and evaluated against the rehabilitation work proposed here; these are also summarised in Appendix XI.

4.2 Issues raised by Consultees

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

4.2.1 Assessments of rehabilitation

Queries on pre-rehabilitation assessments were raised by NPWS, DAFM, Longford County Council and the National Museum of Ireland in relation to Appropriate Assessment, Environmental Impact Assessment and Strategic Environmental Assessment.

4.2.2 Restoration scope

Restoration/rehabilitation of marginal habitats was raised by IPCC and BCI as worthy of consideration within the rehabilitation measures to support carbon sequestration and biodiversity objectives.

4.2.3 Monitoring

Further details on monitoring of ecological metrics, and how and where reporting on this monitoring would take place, was raised in the IPCC submission. Butterfly Conservation Ireland also suggested that monitoring of Large Heath butterfly be considered to assess the success of the proposed rehabilitation actions. The ICMSA queried if a hydrological baseline was being established on surrounding private land in relation to assessing ex-situ impacts arising from re-wetting. Michael Fitzmaurice TD queried what monitoring was being undertaken to assess carbon emission reductions and storage within the bogs as part of PCAS.

4.2.4 Flooding of adjacent land

Michael Fitzmaurice TD, IFA and ICMSA queried likely impacts arising from the proposed re-wetting associated with the rehabilitation in relation to flooding on adjoining lands and, specifically, with regards to the maintenance of drains. The IFA also raised the issue of Health and Safety in relation to raising water levels as well as possible impacts on land and property prices.

4.2.5 Land Management

The ICMSA queried the long-term management of the Bord na Móna's estate, particularly in relation to maintenance of drainage.

The NARGC suggested that heather be established on large area of the cutaways as this is beneficial from biodiversity and pollinators. NARGC were also keen to minimise the spread of scrub and woodland habitats to reduce habitats from predators (such as foxes) and were keen to seek control of so-called "vermin" species on the rehabilitated bogs.

4.2.6 Other issues

Other issues (raised by IPCC) included after use of the bog and turf cutting on the margins of the bog (outside of the area owned by Bord na Móna).

Longford County Council proposes to undertake a project comprising the construction of amenity trackway through part of Derrycolumb Bog.

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

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

4.3 Bord na Móna response to issues raised during consultation

4.3.1 Assessments of rehabilitation

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

An Archaeological Impact Assessment (AIA) is also being undertaken on all of the bogs in PCAS. The aim for known archaeology on these bogs is to accomplish preservation in situ and we are taking steps to identify and avoid all known archaeology. We are doing this by including all known archaeology on our GIS from the AIA process, and either excluding or defining a buffer zone around these features, which will then be excluded from any ground works in these areas in the final plan. It is anticipated that any archaeology will benefit hugely from the ultimate remit of the rehabilitation, in that water tables will be raised thereby preserving in-situ. There is also an identified procedure for managing reports of stray finds that may arise during rehabilitation works.

An archaeological end of life survey of all the bogs as requested by National Museum of Ireland and National Monuments Unit is not part of the current scope of the scheme. Bord na Móna would be happy to assist such a survey, where possible.

All assessments undertaken as part of PCAS, including any future revisions to this plan or the Appropriate Assessment, will be available for public scrutiny once drafted.

4.3.2 Restoration scope

The scope of this rehabilitation plan covers the former Derrycolumb Bog industrial peat production area. As part of the PCAS, all restoration/rehabilitation options have been developed to support climate action and biodiversity objectives.

4.3.3 Monitoring

As part of the PCAS, a monitoring and verification plan has been developed to support climate action and biodiversity objectives. This will include stratified monitoring of bog condition, habitats and biodiversity at several

different scales. Some fauna monitoring (pollinator transect) is proposed as part of the monitoring and verification at Derrycolumb Bog during the period of the scheme (2021-2025). However, note that fauna typically take longer to respond to the changes in vegetation colonisation and habitats arising from the proposed rehabilitation measures identified for Derrycolumb Bog. The re-colonisation of species such as Large Heath is likely to take a longer timeframe.

Baseline hydrological monitoring will be undertaken as part of the hydrological assessment for Derrycolumb Bog. This will be used for monitoring and verification of the proposed measures.

4.3.4 Flooding on adjacent land

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

External consultants have been appointed to carry a hydrological assessment to identify any potential impacts to neighbouring lands and to mitigate against any such impacts.

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

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

4.3.5 Land Management

Bord na Móna will continue to have responsibilities for managing the land in their ownership as any landowner would. In addition, land still under an IPC licence will need to be managed in accordance with that licence.

It is expected that re-wetting will reduce area being colonised by Birch and other scrub species as conditions will be more suitable for wetter species. However, in drier areas that cannot be re-wetted, particularly where there is shallow (or no) residual peat, it is inevitable that drier vegetation communities, including Birch woodland and Heather-dominated vegetation, will develop. Although Heather-dominated habitats can support particular peatland species, these habitats (analogous to drier raised bog Face-bank ecotope) are typically associated with emitting Carbon from the remnant peat deposits. Such areas will be minimised in general within PCAS and habitats that reduce carbon emissions and, especially habitats with the potential to sequester carbon (such as *Sphagnum*-rich embryonic bog communities) will be promoted. However, it is expected that as naturally functioning peatland ecosystems develop that are analogous to embryonic raised bog, these will colonise with Heather and other ericoid species in time and typical raised bog hummocks will re-develop. Raised bog habitat

in good condition is known to support species such as Snipe, Red Grouse and Curlew and in time these sites could regain this potential.

4.3.6 Other issues (including amenity)

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

Amenity such as the greenway proposed by Longford County Council can be positively aligned and integrated to after-use plans following the completion of the proposed rehabilitation at Derrycolumb Bog. Rehabilitation measures proposed for Derrycolumb Bog do not need to be amended to integrate any future amenity track positioned along the margin of the former production bog or along the former bog railway.

Given the proximity of our peatlands to the Shannon basin, Bord na Móna are positioned to make significant contributions to future amenity and associated green infrastructure initiatives, not least the proposed Mid-Shannon Wilderness Park and proposed Biosphere Reserve. Bord na Móna are currently working with Longford County Council to develop c.10km of greenway trails through our peatlands at other peatland sites in the Mount Dillon bog group, including Corlea, Knappogue and Derryarogue.

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

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).
- 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.
- The main goal and outcome of this plan is the successful rehabilitation (environmental stabilisation) of peatlands used for industrial peat production at the bog in a manner that is acceptable to both external stakeholders and to Bord na Móna and which optimise climate action and other ecosystem service benefits.

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

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

6. SCOPE OF REHABILITATION

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

- The area of Derrycolumb Bog (Figure 3.1).
- EPA IPC Licence - Ref. P0504-01. As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. Derrycolumb bog is part of the Mount Dillon Bog group.
- The proposed Scheme is designed to exceed the stabilisation requirements as defined by the IPC Licence. PCAS is designed to enhance the ecosystem services of Derrycolumb Bog, in particular, optimising **climate action benefits**. The proposed improvements will mean that environmental stabilization is achieved (meaning IPC obligations are met) and, in addition, significant other ecosystem service benefits will be accrued.
- The local environmental conditions of Derrycolumb Bog identify wetland creation and deep peat re-wetting as the most suitable rehabilitation approach for this site. Derrycolumb Bog has a pumped drainage regime and a significant area is likely to develop as wetland habitats, particularly Reed swamp.
- 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 Derrycolumb Bog as **environmental stabilisation** and **optimising deep peat re-wetting, and setting the site on a trajectory towards the development of embryonic peat-forming (*Sphagnum*-rich) vegetation communities on deep peat, and the development of Reed Swamp and fen on shallow more alkaline peat and other subsoils.**
- Rehabilitation of Derrycolumb Bog will support multiple national strategies of climate action, biodiversity action and other key environmental strategies such was the Water Framework Directive.
- **Time frame.** Rehabilitation measures will be carried out during the period of PCAS (2020-2025). The surrender of the licence is likely to extend beyond the PCAS timeframe.
- It is not proposed to carry out any rehabilitation in the narrow marginal raised bog remnants around the margins. Generally, these bog remnants are narrow, or are subject to turbary, and do not have positive bog restoration prospects.

6.1 Key constraints

- **Bog conditions.** Rehabilitation outcomes of sites are constrained by the environmental characteristics of these particular areas. For example, there is potential for raised bog restoration at some sites where there has not been significant industrial peat extraction and the peat body is largely intact (deep peat sites that are drained). At other sites, most of the peat mass has been removed, the environmental characteristics of these areas have therefore changed radically (peat depths, hydrology, water chemistry, substrate type, nutrient status, etc.) and there will therefore be different habitat outcomes (wetlands, fen, heathland, grassland and Birch woodland). At Derrycolumb Bog, production only started in the mid-1980's; the north-western portion has the shallowest depth of remaining peat, whereas the south-eastern portion has remaining peat depths of up to 4m. In addition, this bog was pumped to facilitate peat extraction. These are local factors that will influence the future trajectory of this bog, which need to be considered as part of the wider rehabilitation work.
- **Surrounding landscape and neighbours.** Another key constraint is the interaction between the Bord na Móna sites and the surrounding landscape. Care has to be taken that no active rehabilitation

management is carried out that could negatively and knowingly impact on surrounding land. This includes any hydrological management on neighbouring farmland, as well as potential changes to the hydrology of surrounding designated sites (particularly important for Derrycolumb given its proximity to a pNHA). It is anticipated that the work proposed here (blocking drains and re-wetting cutaway peatlands) will not have any adverse flooding impacts on adjacent land.

- **Archaeology**. The discovery of monuments or archaeological objects during peatland rehabilitation may potentially constrain the rehabilitation measures proposed for a particular area. If this occurs, rehabilitation measures will be reviewed and adapted. An Archaeological Impact Assessment (Appendix XII) was carried out to mitigate against any impact on known archaeology at Derrycolumb. There are known archaeological features present. The proposed rehabilitation will have no impact on any known archaeological material in the application area or the vicinity. In the worst-case scenario works affecting the surface and sub-surface of the bog might disturb previously unknown archaeological deposits or artefacts without preservation by record taking place. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it should be avoided and reported to Bord na Móna Archaeological Liaison Officer and the National Museum of Ireland.
- **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.
- **Amenity development**. Longford County Council proposes to undertake a project comprising the construction of amenity trackway through part of Derrycolumb Bog. Amenity development, such as the development of tracks can be integrated and aligned with peatland rehabilitation. These tracks will generally use the old industrial railway network and will not overlap with peatland rehabilitation.

6.2 Key Assumptions

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

6.3 Key Exclusions

The scope of this rehabilitation plan does not cover:

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

7. CRITERIA FOR SUCCESSFUL REHABILITATION

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

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

Rehabilitation is generally defined by Bord na Móna as

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

In addition, Bord na Móna wish to optimise climate action and other ecosystem service benefits via enhanced rehabilitation measures. Enhanced rehabilitation will significantly go beyond what is required to meet rehabilitation and decommissioning obligations under existing EPA IPC licence conditions. The proposed interventions will mean that environmental stabilization is achieved (meaning IPC obligations are met) and, in addition, significant other benefits particularly for climate action will be accrued.

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

- Rewetting of residual peat in the former area of industrial peat production to offset potential silt run off and to encourage/accelerate development of vegetation cover via natural colonisation, and reducing the area of bare exposed peat. See Table 7.1 for a summary of the criteria for successful rehabilitation and associated monitoring. The target will be the delivery of measures and this will be measured by an aerial survey after rehabilitation is completed.
- That there is a stabilising/improving concentration of suspended solids and ammonia associated with the measures undertaken to stabilise the peat surface by the blocking of the internal drainage system and the maximised rewetting of the peat surface.
- 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 an adjoining Corlea bog in Mountdillon over the past 3 yrs., post cessation of peat extraction with ongoing rehabilitation, were considered. These are indicating a downward trend in Ammonia concentrations. As the monthly monitoring program at Derrycolumb continues in 2021 during the rehabilitation works, and data from the 2020 monitoring program is compiled, further trending will be produced to verify any ongoing trends.

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

- Optimising the extent of suitable hydrological conditions to optimise climate action and other ecosystem service benefits (optimising deep peat re-wetting). This will be measured by an aerial survey after rehabilitation has been completed.
- Accelerating the trajectory of the site towards becoming a reduced carbon source/carbon sink. This will be measured through habitat mapping and the development of cutaway bog condition assessment. This cutaway bog condition assessment will include assessment of environmental and ecological indicators such as vegetation cover, vegetation communities, presence of key species, *Sphagnum* cover, bare peat cover and water levels (similar to ecotope mapping). Baseline monitoring will be carried after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.
- Reduction in carbon emissions. This will be estimated via a combination of habitat condition assessment and application of appropriate carbon emission factors derived from other sites. Baseline monitoring (habitat condition) will be carried after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.
- 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. Minimum area of 428.2Ha rehabilitated following implementation of measures.	Aerial photography after rehabilitation has been completed – to demonstrate measures (drain-blocking)	2021-2025
IPC validation	Key water quality parameters	Stabilization/Improvement of key water quality parameters.	Water quality monitoring. Started in advance of the proposed rehabilitation.	2021-2023

	Ammonia, Phosphorous, Suspended solids, pH and conductivity	Trend at 6 monthly intervals downwards in nature.		
IPC validation	Reducing pressure from peat production on the local water body catchment (WFD)	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	EPA WFD monitoring programme	WFD schedule
Climate action verification	Optimising the extent of suitable hydrological conditions to optimise climate action and setting the site on a trajectory towards establishment of a mosaic of compatible peatland habitats	Optimal extent of suitable hydrological conditions Indicators of establishment of compatible cutaway habitats	Aerial photography, Cutaway bog condition map 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.	2021-2025
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.	2021-2025
Climate action verification	Biodiversity and ecosystem services. Habitat establishment	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	2021-2025

	Presence of key species – Sphagnum Breeding and wintering birds Pollinators		Breeding birds – Breeding bird survey Pollinators – Pollinator walk 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.	

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 through the Climate Action Fund.
- **Bord na Móna to have sufficient resources (staff and training) to deliver the planned rehabilitation with required associated skills and competencies.**
- **Bord na Móna to have sufficient resources (suitable machinery) and staff to maintain this machinery.**
- **Weather conditions to be within normal limits over the rehabilitation plan timeframe.** Long periods of wet weather have the capacity to significantly affect ground conditions and constrain the delivery of rehabilitation. The potential impact of wet weather on ground conditions can be reduced by appropriate planning and management. Bord na Móna have significant experience of managing these issues through 70 years of working in these peatland environments.
- **Rehabilitation measures to be effective.** The rehabilitation measures proposed in this plan are based on 40 years of Bord na Móna experience of peatland management and best practise applied internationally in peatland management. Measures proposed in this plan have already been shown to be affective at other sites. Bord na Móna will apply a flexible and adaptable approach to the more innovative rehabilitation measures proposed in this plan**.** If measures are not initially effective, Bord na Móna will review any requirement for additional practical rehabilitation.
- **Natural colonisation of vegetation to develop semi-natural habitats at a rate within the normal limits.** The development of naturally functioning semi-natural habitats on cutaway peatland takes time. Pioneer vegetation can develop relatively quickly (3-10 years) and wetland habitats can develop relatively quickly. Birch woodland make take 20-30 years to develop. However, it may take 50 years for active raised bog vegetation to re-develop on ground that was previously cutaway. Different environmental conditions will have a significant impact on the rate of natural colonisation, and as a result of the combination of

different environmental conditions and the application of different rehabilitation measures, there will be a variety of habitat outcomes.

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

8. REHABILITATION ACTIONS AND TIME FRAME

Peatland rehabilitation requires detailed planning and the use of data from desktop surveys and field surveys. This data in association with topographical and hydrological modelling (Figure 8.3 & 8.4) 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 (Figure 8.3) 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).

The rehabilitation actions will be a combination of PCAS measures to re-wet peat. The distribution of these measures is provisionally outlined in Figure 8.5. (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 Derrycolumb Bog will include**:**

- Re-wetting the deep peat areas of the bog using berms and field re-profiling. This enhanced measure seeks to create large (c. 45m x 60m) flat areas or cells of shallow (< 10 cm) water conditions on bare peat, across multiple fields that are enclosed by shallow berms to retain shallow surface water;
- Inoculation of *Sphagnum* on compatible residual deep peat areas;
- Re-wetting some deep peat areas of the bog through regular field drain blocking using a dozer to create three peat blockages every 100 m along each field drain;
- Re-wetting some deep peat areas of the bog through more intensive field drain blocking using a dozer to create seven peat blockages every 100 m along each field drain;
- Blocking drains in targeted marginal (degraded) high bog area and re-wetting, where possible, using an excavator to install peat blockages. Some bog remnants are too small to benefit from this approach;
- Management of water levels with overflow pipes;
- The construction of berms to create wetlands;
- Intensive drain blocking to create wetlands, and the introduction of Reeds and other Rhizomes;
- Optimising water retention in wetland areas, including placement of berms where required;
- Re-assessment of the pumping regime and turning off pumps if this desired and has no significant external impact. Initial hydrological modelling indicates that a part of the site will develop a mosaic of wetland habitats with deeper water, when pumping is reduced or stopped. Hydrological management will look to optimise summer water levels to maximise the development of wetland vegetation (by looking to set water depths at < 0.5 m, where possible. It is inevitable that some sections will naturally have deeper water due to the variable topography). Water-levels will be adjusted at outfalls and by adjusting piped drainage. More sustainable permanent gravity drainage solutions will be examined. It is expected that a natural seasonal flooding regime will develop, with water-levels fluctuating in association with levels in the adjacent Lough Ree.
- Targeted fertiliser applications to accelerate vegetation establishment on headlands and high fields.
- Regular drain blocking (3/100) on dry cutaway adjacent to wetland mosaics, along with the blocking of outfalls and management of water levels;
- Silt ponds will be retained and maintained during the rehabilitation phase. During the monitoring and verification phase silt ponds will be continually inspected and maintained, where appropriate. When it is deemed that silt ponds are not required, as the bog has been successfully stabilised and there is no silt

run-off, the condition of the silt ponds will be reviewed. Silt ponds will either be de-watered (water levels lowered to a level where the silt pond will naturally develop as a small wetland feature), left in situ, or infilled (where discharges do not require silt control).

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

Type		**Enhanced Rehabilitation Measure**	Extent (Ha)
Deep peat	DPT1	Regular drain blocking (3/100 m) + blocking outfalls and managing water levels with overflow pipes	
Deep peat	DPT2	More intensive drain blocking (max 7/100 m) + blocking outfalls and managing overflows	2.8
Deep peat	DPT3	More intensive drain blocking (max 7/100 m), + field reprofiling + blocking outfalls and managing overflows	75.2
Deep peat	DPT4	Berms and field re-profiling (45m x 60m cell) + blocking outfalls and managing overflows + drainage channels for excess water + *Sphagnum* inoculation	40.6
Deep peat	DPT5	Cut and Fill cell bunding (30m x 30m cell) + blocking outfalls and managing overflows + drainage channels for excess water + *Sphagnum* inoculation	4.4
Wetland	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	43.2
Wetland	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	20.7
Wetland	WLT4	More intensive drain blocking (max 7/100 m), + blocking outfalls and managing overflows + transplanting Reeds and other rhizomes	95.9
Marginal land	MLT1	No work required	65.7
Silt ponds	MLT1	Silt ponds	1.0
Dry Cutaway	DCT1	Blocking outfalls and managing water levels with overflow pipes	
Dry Cutaway	DCT2	Regular drain blocking (max 3/100m) +blocking outfalls and managing water levels with overflow pipes+ targeted fertiliser treatment	77.8
Archaeology	ARCH	Areas with archaeology	1.6
Constraint	Constraint	Other Constraints (ROW/pNHA)	27.5
Total			**455.8**

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

- Seek formal approval of the enhanced plan 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 proposed Scheme PCAS) will be applied to Derrycolumb 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 hydrology and drainage management assessment of the proposed enhanced rehabilitation measures;
- Carry out a review of known archaeology and an archaeological impact appraisal of the proposed rehabilitation. Incorporate the results of this assessment 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, archaeology, turbary and existing land agreements. A number of rights of way exists along or proximal to the margins of Derrycolumb Bog.
- Carry out a review of remaining milled peat stocks. It is expected that all peat stocks will eventually be removed or decommissioned.
- Carry out an ecological appraisal of the potential impacts of the planned rehabilitation, if needed, such as the presence of sensitive ground-nesting bird breeding species (e.g. Curlew) or larval webs of Marsh Fritillary butterfly, etc. The scheduling of rehabilitation operations will be adapted, as mitigation; and
- Ensure all activities comply with the environmental protection requirements of the IPC Licence.

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 pump management, drain blocking, peat field re-profiling, cell-bunding and fertiliser applications targeting headlands, high fields and other areas. All rehabilitation will be carried out with regard to environmental control measures (Appendix IV);
- Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions;
- Carry out the proposed monitoring, as outlined.
- While natural colonisation is expected to commence almost immediately once peat production ceases, Phase 2 actions will be carried out in targeted areas to accelerate re-vegetation and colonisation of target species. Phase 2 actions may include seeding of targeted vegetation and inoculation of *Sphagnum*;
- Silt ponds will be monitored during this period and there will be continued maintenance and cleaning to prevent potential silt run-off from the site during the rehabilitation phase; and
- Submit an *ex post* report to the Scheme regulator to verify the eligible measures to be carried out in year 1 of the Scheme, and an *ex ante* estimate for year 2 of the Scheme; and so on for each year of the proposed Scheme

8.3 Long-term (>3 years)

- Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary;
- Delivery of a monitoring, aftercare and maintenance programme (See section 10.2 below);
- Decommissioning of silt-ponds will be assessed and carried out, where required; and

- Reporting to the EPA will continue until the IPC License is surrendered.

8.4 Timeframe

- **2020-2021**: Short-term planning actions.
- **2021**: 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, Bord na Móna in developing a package of measures, 'the proposed 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 measures funded by the proposed 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 licence compliance costs of mandatory 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 'mandatory' rehabilitation provision (sufficient to discharge the requirement of Condition 10 in the licence) has been be allocated to the site based on the area of different types of cutaway across the site (See Appendix I).

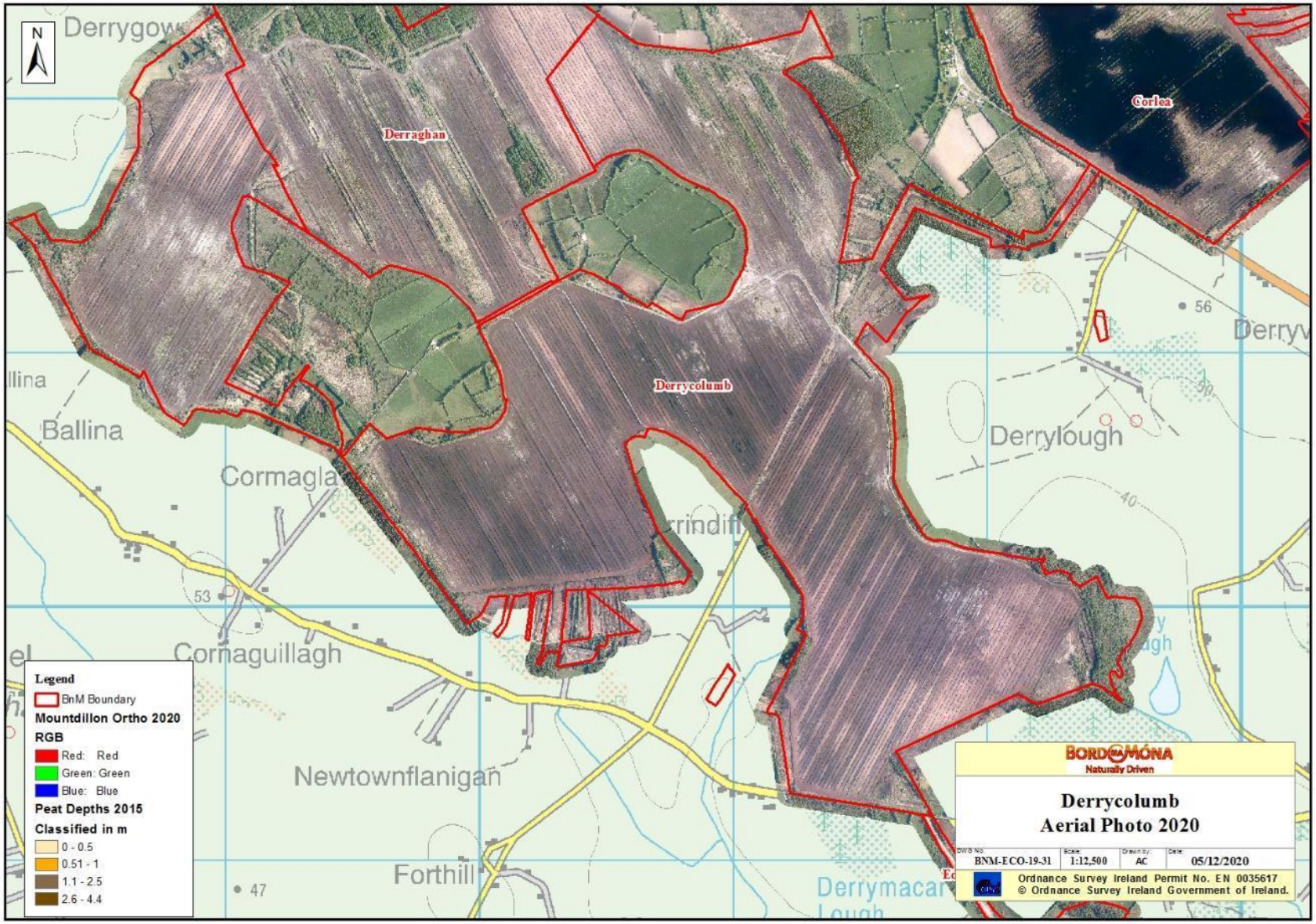


Figure 8.1. Aerial photo of Derrycolumb Bog. The majority of the bog is bare peat.

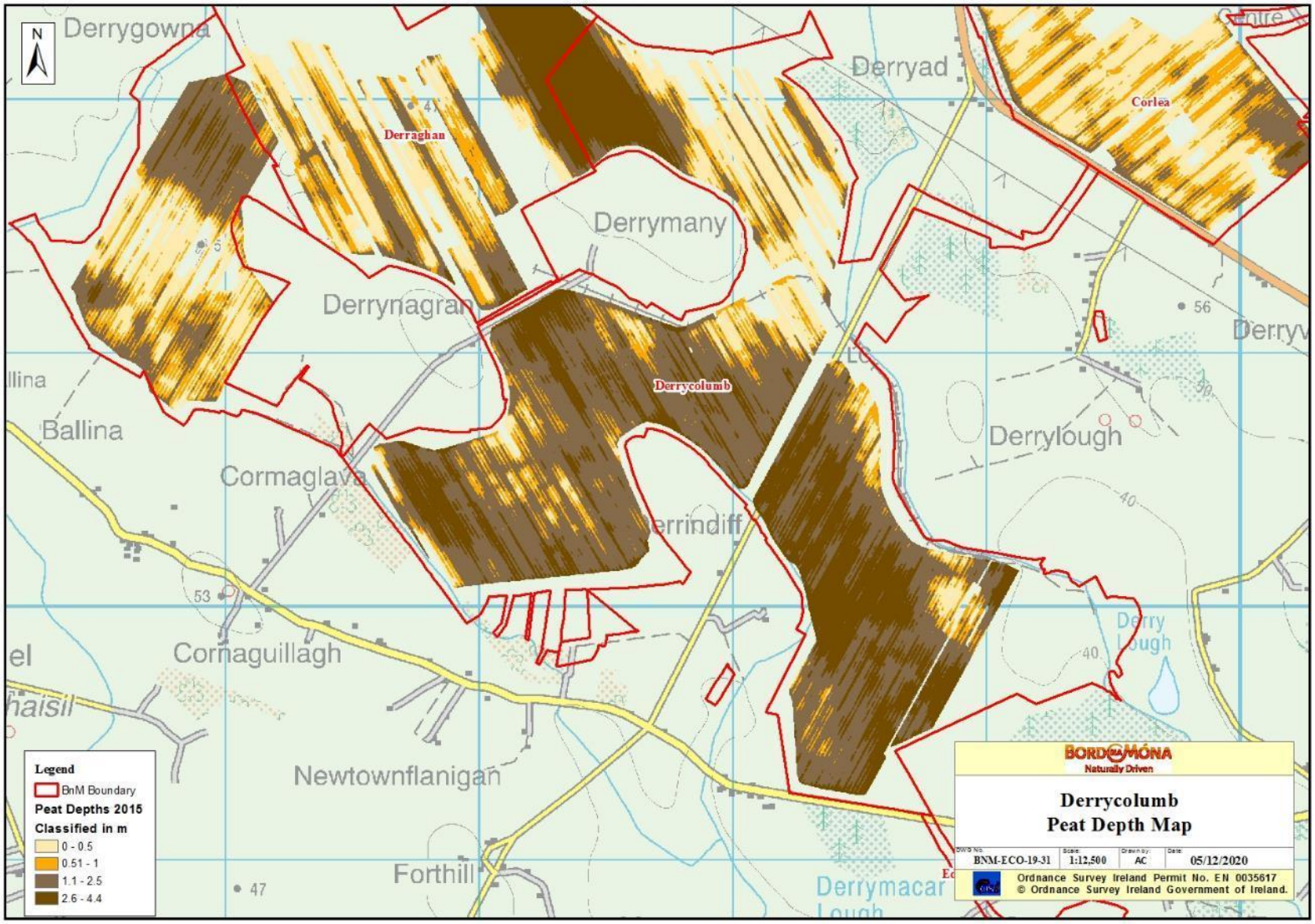


Figure 8.2. Peat Depth Map for Derrycolumb Bog. There are pockets of deep residual peat and areas that have been cutaway.

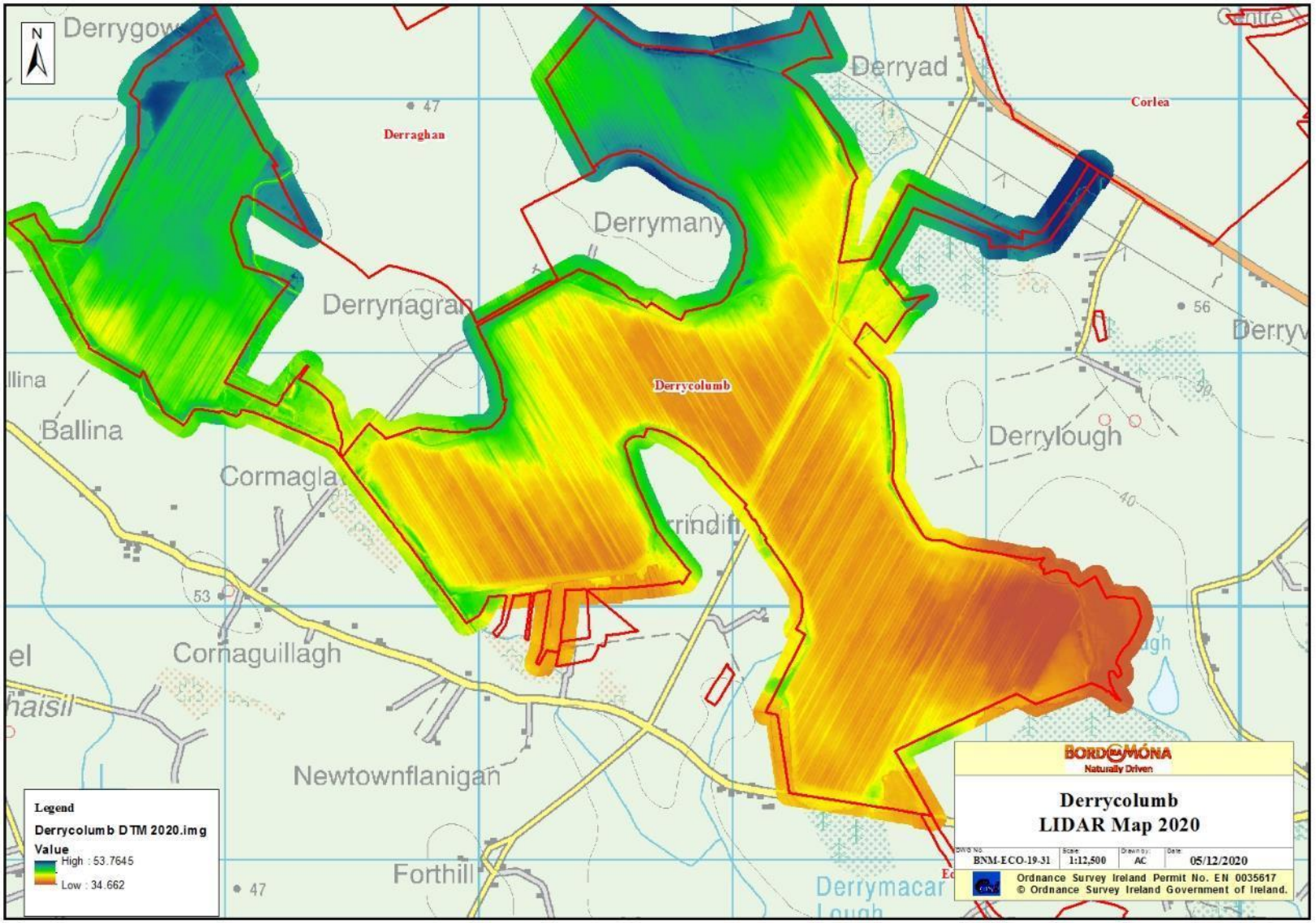


Figure 8.3. LIDAR topography map of Derrycolumb Bog. Low areas and basins are orange-yellow, more elevated areas are blue-green.

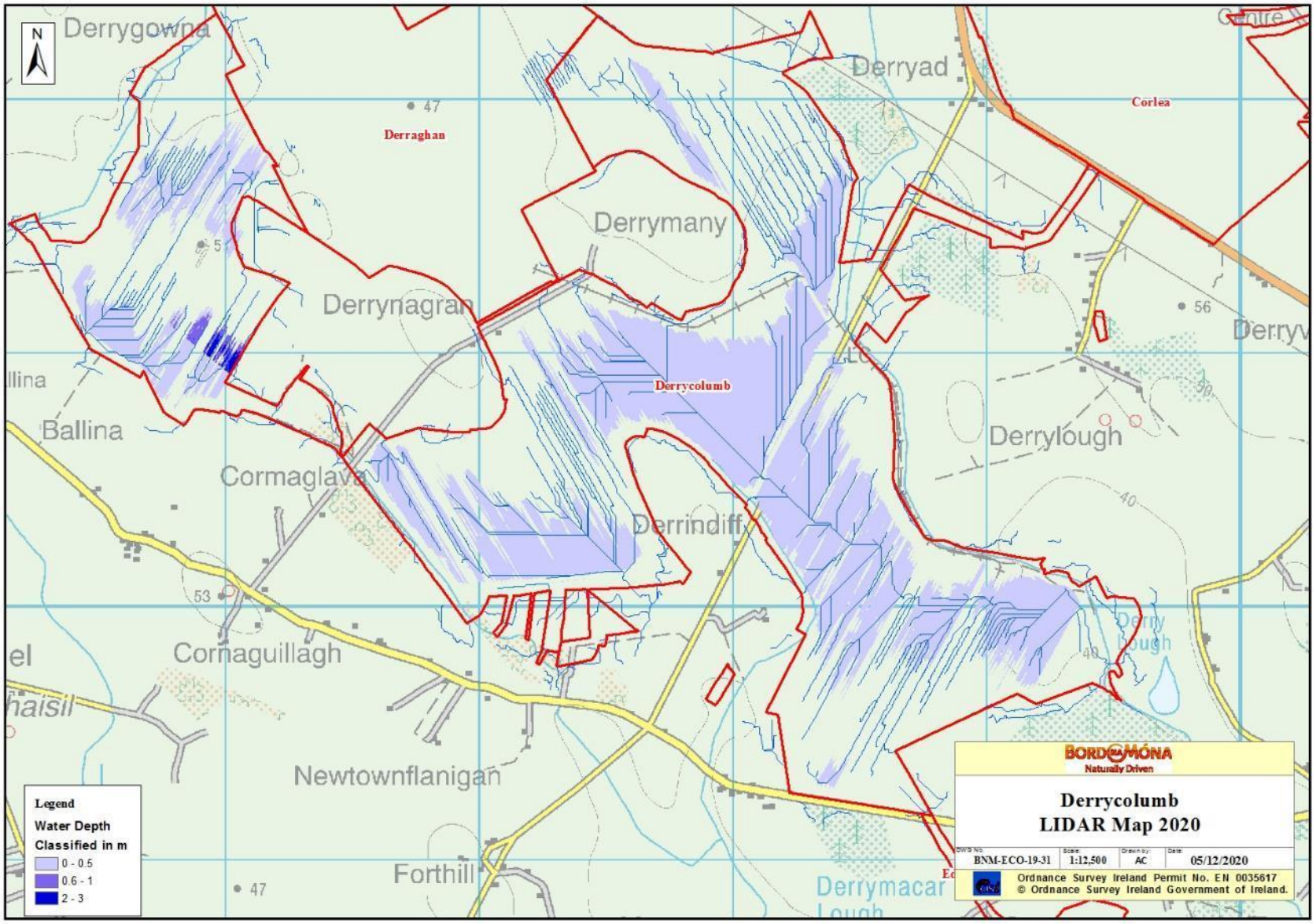


Figure 8.4. Hydrological modelling for Derrycolumb Bog showing range of expected water depths based on current topography and key flow-paths.

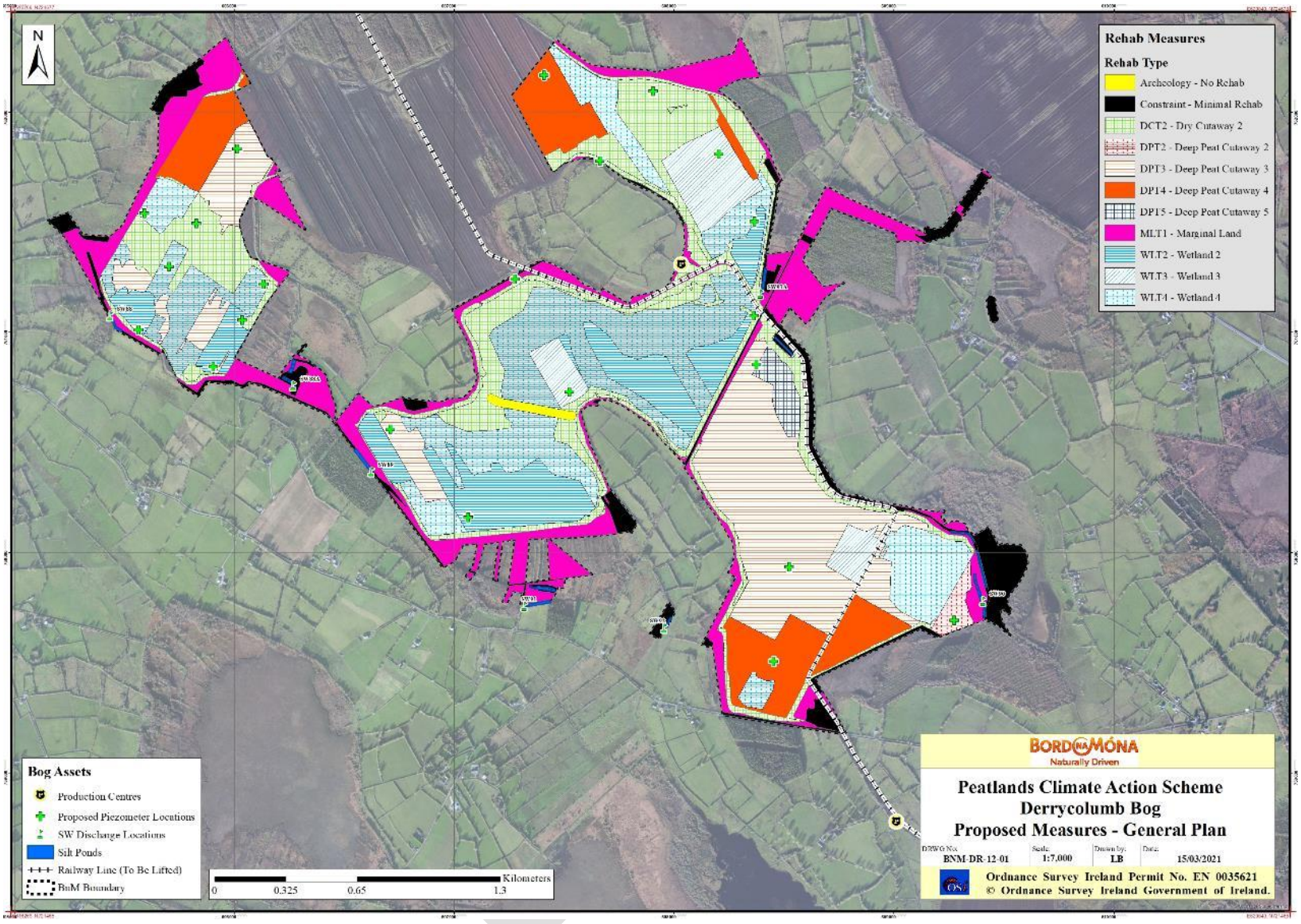


Figure 8.5. Indicative Enhanced Rehabilitation Plan for Derrycolumb Bog. *Note that the types of rehab and areas of rehab may change in response to stakeholder consultation and* refinement of the enhanced rehabilitation measures.

9. AFTERCARE AND MAINTENANCE

9.1 Programme for monitoring, aftercare and maintenance

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

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

rehabilitation has been achieved. Monitoring of water quality will then also continue for another period to be defined.

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

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

- Vegetation and habitat monitoring after rehabilitation is completed using a cutaway bog condition assessment (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. A breeding bird and Pollinator monitoring programme will be established. Specific pollinator indicators will be monitored (Bee and Butterfly). To be defined in relation to monitoring of the overall proposed Scheme and after consultation with stakeholders.

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

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

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

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

10. REFERENCES

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

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

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

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

Bord na Móna (2020). Bord na Móna Annual Report 2020. https://www.bordnamona.ie/wp-content/uploads/2020/07/M12822-BORD-NA-MONA_Annual-Report-2020_WEB2.pdf

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

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

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

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

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

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

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

Department of Arts, Heritage and the Gaeltaght 2015. National Peatland Strategy. Department of Arts, Heritage and the Gaeltacht.

http://www.npws.ie/sites/default/files/general/Final%20National%20Peatlands%20Strategy.pdf

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

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

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

EPA (2019). http://gis.epa.ie/Envision. EPA Envision Map Viewer. (Last Viewed: 31/12/2019).

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

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

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

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

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

Günther, A., Barthelmes, A., Huth, V. et al. Prompt rewetting of drained peatlands reduces climate warming despite methane emissions. Nat Commun 11, 1644 (2020). https://doi.org/10.1038/s41467-020-15499-z

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

Hinde, S., Rosenburgh, A., Wright, N., Buckler, M. and Caporn, S. 2010. Sphagnum re-introduction project: A report on research into the re-introduction of Sphagnum mosses to degraded moorland. Moors for the Future Research Report 18. Moors For The Future Partnership.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Schouten, M.G.C. 2002. Conservation and Restoration of Raised Bogs: Geological, Hydrological and Ecological Studies. Dúchas - The Heritage Service of the Department of the Environment and Local Government, Ireland; Staatsbosbeheer, the Netherlands; Geological Survey of Ireland; Dublin.

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

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

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

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

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

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

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

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

In the event that the proposed 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.

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

Scope of rehabilitation

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

- The area of Derrycolumb Bog (Figure 3.1).
- EPA IPC Licence - Ref. P0504-01. As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. Derrycolumb bog is part of the Mount Dillon Bog group.
- The current condition of Derrycolumb Bog. This site has pumped drainage. Pioneer wetland vegetation is developing across part of the site.
- The key objective of rehabilitation, as defined by this licence, is **environmental stabilisation** of the bog.
- To minimise potential impacts on neighbouring land. Some boundary drains around Derrycolumb Bog will be left unblocked as blocking boundary drains could affect adjacent land.

Rehabilitation goals and outcomes

The key rehabilitation goal and outcome for Derrycolumb Bog is environmental stabilisation of the site via wetland creation and deep peat re-wetting. This is defined as:

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

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

Criteria for successful rehabilitation:

- Rewetting of residual peat in the former area of industrial peat production to offset potential silt run off and to encourage development of vegetation cover via natural colonisation, and reducing the area of bare exposed peat.

- That there is a stabilising/improving concentration of suspended solids and ammonia associated with the measures undertaken to stabilise the peat surface by the blocking of the internal drainage system and the maximised rewetting of the peat surface. This will be demonstrated by developing a stable or downward trajectory of water quality indicators (suspended solids and ammonia) towards what would be typical of a re-wetted cutaway bog. This will be measured via water quality monitoring (suspended solids and ammonia).
- That the main water body associated with surface water from this bog continues to be excluded in the EPA's list of peat pressure water bodies as reported in the River Basin Management Plans. Where the water body has been identified as under pressure from peat extraction, that the intervening EPA monitoring programme associated with its Programme of Measures for this water body shows positive improvements in water quality impacts that were attributable to the original peat extraction activity.

Rehabilitation targets

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

Rehabilitation measures: (see Figure Ap-1)

- Blocking field drains in the former industrial production area using a dozer to create regular peat blockages (three blockages per 100 m) along each field drain;
- Targeted drain blocking using peat blockages (installed with excavator) on the raised bog remnant in the south-east corner of the site.
- Pump management – reducing or ceasing pumping.
- Re-alignment of piped drainage; and management of water levels to create wetlands;
- No measures are planned for the other surrounding marginal peatland habitats.
- Silt ponds will continue to be maintained during the rehabilitation and decommissioning phase.
- Evaluate success of short-term rehabilitation measures and enhance where necessary.
- Decommissioning of silt-ponds will be assessed and carried out, where required.

Timeframe:

- 2021. 1st phase of rehabilitation. Field drain blocking and water-level management.
- 2021. 2nd phase. Further realignment of piped drainage and other re-wetting measures dependent on success of 1st phase re-wetting, as determined by pump management, ongoing monitoring of water levels and re-vegetation.
- Other enhancement measures such as fertiliser treatment will be carried out, if needed. These will be determined by ongoing monitoring.
- 2022-2024. Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.

- 2022-2024. Decommission silt-ponds, if necessary.

Table AP-1. Rehabilitation measures and target area.

Type	Code	Description	Area (Ha)
Deep peat	DPT1	Regular drain blocking (3/100 m) + blocking outfalls and managing water levels with overflow pipes	132.5
Dry cutaway	DCT1	Blocking outfalls and managing water levels with overflow pipes	76.4
Wetland	WLT1	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes	149.1
Marginal Land	MLT1	No work required (Marginal land)	70.0
Silt pond	N/A	Silt ponds	1.0
Other	Other	Other lands (no work required or. Archaeology constrained)	26.8
Total			**455.8**

Monitoring, after-care and maintenance

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

Validation and IPC Licence surrender

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

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

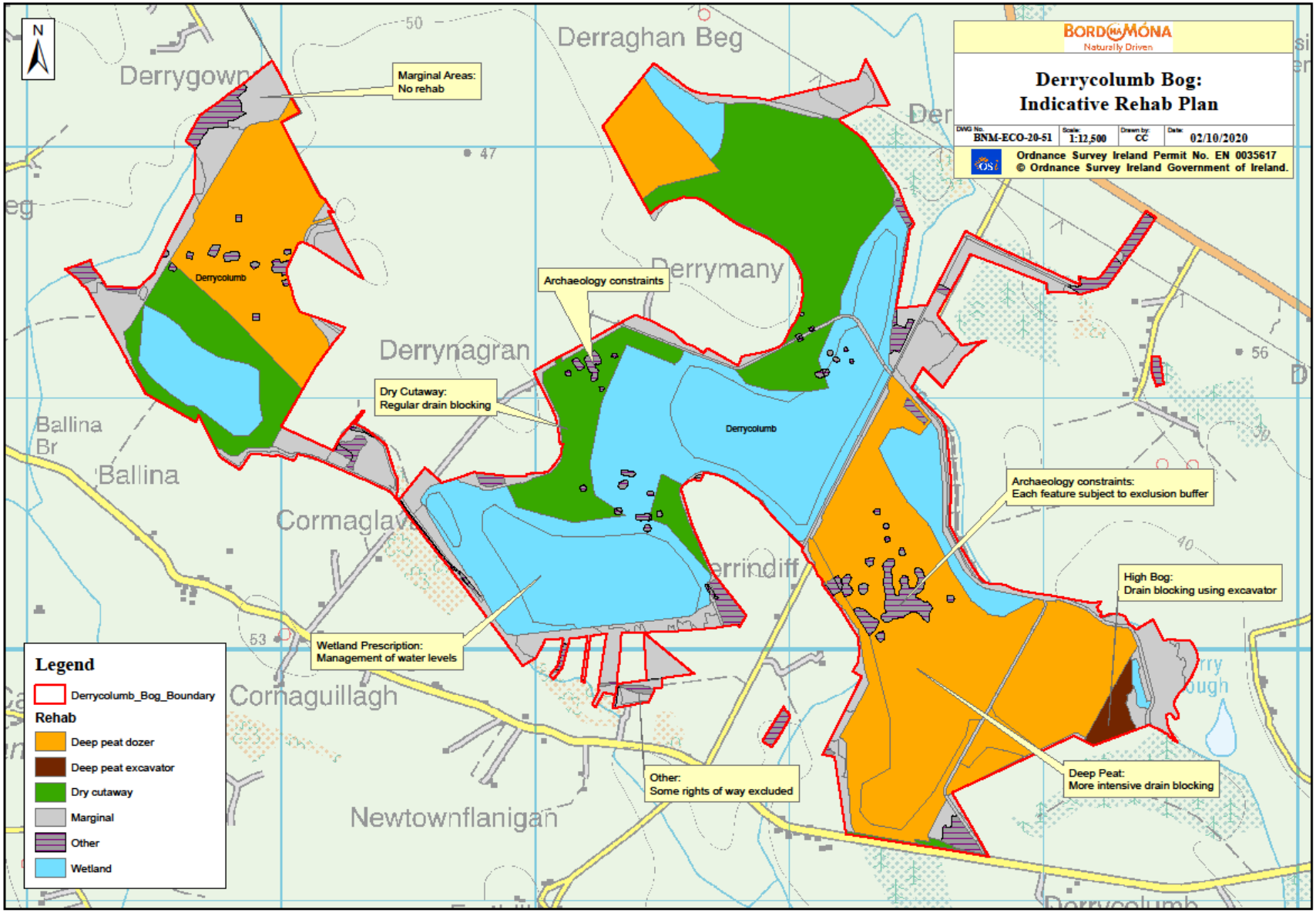


Figure Ap-1. Indicative standard rehabilitation plan for Derrycolumb Bog.

APPENDIX II: BOG GROUP CONTEXT

The Mount Dillon Bog Group IPC Licensed area is made up of two sub-groups Mount Dillion and Mostrim) and have been in industrial peat production for several decades. There are 28 defined sites covering a total area of 11,138 ha. Of the 28 sites, 23 mainly straddle the River Shannon within counties Roscommon and Longford, with five sites partially in County Westmeath to the east. Each bog area further comprises a range of habitats from bare milled peat production areas to re-colonising cutaway to workshops areas and transport infrastructure. Industrial peat extraction from these sites mainly supplied ESB power stations at Lanesborough (LRP) or for horticultural peat products.

Industrial peat extraction in the Mount Dillon Bog Group ceased in 2019. It is planned to supply remaining milled peat stocks to Lanesborough (LRP) during 2020. Both power stations will cease using peat by the end of 2020. All remaining peat stocks will also be removed. Intensive decommissioning and rehabilitation for the Mount Dillon Bog Group is expected to start in 2020/2021.

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

A breakdown of the component bog areas for the Mount Dillon Bog Group IPC License Ref. PO504-01 is outlined in Table Ap-2. These areas are also outlined on Figure Ap-2 (Map of the Mount Dillon Bog Group).

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

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

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Begnagh	265	Cutover Bog Industrial peat production commenced at Begnagh Bog in 1977. Deep peat reserves remain on much of the former production area. Pumped bog drainage.	Begnagh Bog formerly supplied fuel peat for Lough Ree Power Some areas of cutaway on site are developing pioneer cutaway vegetation communities. LCC are proposing an amenity walkway for this bog	2020	Draft 2017
Clooneeny	358	Cutover Bog Industrial peat production commenced at Clooneeny Bog in 1985 and ceased in 2020. Deep peat reserves remain on much of the former production area. Clooneeny is considered a deep peat cutover bog. Pumped bog drainage.	Clooneeny Bog formerly supplied including; horticultural peat and fuel peat for Lough Ree Power Most of the former production area on site is bare peat. Some areas of cutaway on site are developing pioneer cutaway vegetation communities. Bog restoration has been carried out in a bog remnant that was damaged by turf cutting trespass.	2020	Draft 2017

			LCC are proposing an amenity walkway for this bog		
Cloonmore	102	N/A	Never developed for industrial peat production; scattered plots.	N/A	N/A
Cloonshannagh	494	Cutover Bog Industrial peat production commenced at Cloonshannagh Bog in 1985. Deep peat reserves remain across the former production area. Cloonshannagh is considered a deep peat cutover bog.	Cloonshannagh Bog formerly supplied horticultural peat, and fuel peat for Lough Ree Power Restoration work has been carried out on a 38ha section of high bog within Cloonshannagh Bog. Some of the former production area on site is developing pioneer cutaway vegetation communities, the remainder of the site is bare peat	2020	Draft 2017
Cloonshannagh Rail Link	28	Cloonshannagh rail link is a link between sites.	N/A	N/A	N/A
Corlea	163	Cutaway Bog Industrial peat production commenced at Corlea Bog in 1960. Long-term peat extraction has created shallow cutaway. Corlea was a pumped bog. Pumped bog drainage – pumping has ceased.	The former production area at Corlea has already extensively colonised. Pioneer wetland and scrub development has occurred over much of the site. Large wetlands have developed with the cessation of pumping. Some wetland and rehabilitation management was undertaken between 2016-2019. Part of site leased to local community development group to develop amenity walkway in association with Longford County Council. LCC are proposing an amenity walkway for this bog	2018	Finalised 2019
Derraghan	289	Cutover Bog Industrial peat production commenced at Derraghan Bog in the 1940's. Most of the former production area has shallow peat reserves. Some pockets of deep peat remain. Derraghan is considered a shallow peat cutover bog. Pumped bog drainage.	Derraghan Bog formerly supplied fuel peat for Lough Ree Power. Part of the site developed into a licenced ash facility for Lough Ree Power. Much of the former production area at Derraghan has been out of production for some time. These areas have already extensively colonised with pioneer wetland and scrub vegetation communities. A small area has been used for a BirchWater trail as part of the BnM Herbs Project.	2020	Draft 2017
Derryadd	653	Cutover Bog Industrial peat production commenced at Derryadd Bog in 1960. Long-term peat extraction has left shallow cutaway. Some pockets of deep peat remain. Pumped bog drainage.	Much of the former production area has been out of production for some time. These areas have already extensively colonised with pioneer wetland and scrub vegetation communities Derryadd Bog is part of the footprint of Derryadd Windfarm for which planning permissions were granted in 2020. An amenity walkway is proposed.	2020	Draft 2019
Derryadd2	328	Cutover Bog Industrial peat production commenced at Derryadd 2 Bog in 1960. Long-term peat extraction has left shallow cutaway. Some pockets of deep peat remain. Pumped bog drainage.	Much of the former production area has been out of peat production for some time. These areas have already extensively colonised with pioneer wetland and scrub vegetation communities Derryadd 2 Bog is part of the footprint of Derryadd Windfarm for which planning permissions were granted in 2020. An amenity walkway is proposed.	2020	Draft 2019
Derryarogue	895	Cutaway Bog Industrial peat production commenced at Derryarogue Bog in 1941. Long-term peat extraction has left shallow cutaway. Some pockets of deep peat remain. Pumped bog drainage – pumping has been reduced.	Much of the former production area has been out of production for some time. These areas have already extensively colonised with pioneer wetland, cutaway and scrub vegetation communities. Derryarogue Bog is part of the footprint of Derryadd Windfarm for which planning permissions were granted in 2020. An amenity walkway is proposed.	2020	Draft 2019

Derrycashel	388	Cutaway Bog Industrial peat production commenced at Derrycashel Bog in 1951. Long-term peat extraction has left shallow cutaway. Some pockets of deep peat remain. Pumped bog drainage – pumping has been reduced.	Derrycashel Bog formerly supplied fuel peat for Lough Ree Power Much of the former production area at Derryarogue has been out of production for some time. These areas have already extensively colonised with pioneer wetland and scrub vegetation communities. Some wetland and rehabilitation management was undertaken (c.60ha) between 2014-2015.	2018	Draft 2021
Derrycolumb	454	Cutaway & Cutover Bog Industrial peat production commenced at Derrycolumb Bog in the 1980's. Most of the former production area still has deep peat reserves. Pumped bog drainage.	Derrycolumb Bog formerly supplied fuel peat for Lough Ree Power Much of the former production area at Derrycolumb has been out of production for some time. These areas have already extensively colonised with pioneer wetland and scrub vegetation communities. LCC are proposing an amenity walkway for this bog	2019	Draft 2021
Derrymoylin	356	Cutover Bog Industrial peat production commenced at Derrymoylin Bog in 1985 and ceased in 2020. This site still has residual deep peat.	Derrymoylin Bog formerly supplied fuel peat for Lough Ree Power. Most of the former production area on site is bare peat.	2020	Draft 2017
Derryshannoge	452	Cutover Bog Industrial peat production commenced at Derryshannoge Bog in 1985 and ceased in 2020. This site still has residual deep peat. Pumped bog drainage.	Derryshannoge Bog formerly supplied fuel peat for Lough Ree Power. Much of the former production area at Derryshannoge has been out of production for some time. These areas have already extensively colonised with pioneer cutaway and scrub vegetation communities.	2020	Draft 2017
Edera	281	Cutover Bog Development for industrial peat production commenced at Edera Bog in 1990's. Active extraction from Edera began in 2003 and ceased in 2018. This site still has residual deep peat.	Edera Bog formerly supplied fuel peat for Lough Ree Power. The majority of the former production area is bare peat. LCC are proposing an amenity walkway for this bog	2020	Draft 2021
Erenagh	93	Cutover Bog Development for industrial peat production commenced at Erenagh Bog in 1970's. This site still has residual deep peat. Pumped bog drainage.	Erenagh Bog formerly supplied; fuel peat for Lough Ree Power. Much of the former production area has been out of production for some time. These areas have already extensively colonised with pioneer cutaway and scrub vegetation communities.	2020	Draft 2017
Granaghan	212	Cutover Bog Development for industrial peat production commenced at Granaghan Bog in 1980's. This site still has residual deep peat. Pumped bog drainage.	Granaghan Bog formerly supplied horticultural peat, and fuel peat for Lough Ree Power. The majority of Granaghan Bog former production area is bare peat.	2020	Draft 2017
Killashee	110	Cutover Bog Development for industrial peat production commenced at Killashee Bog in 1985. This site still has residual deep peat.	Killashee Bog formerly supplied horticultural peat, and fuel peat for Lough Ree Power. The majority of Killashee Bog former production area is bare peat. Some areas have colonised with pioneer cutaway and scrub vegetation communities.	2020	Draft 2017
Knappoge	313	Cutaway Bog Peat Production at Knappoge bog commenced in 1963. Peat depths on the former production area are generally shallow. Pumped bog – pumping has now been stopped	Knappoge Bog formerly supplied fuel peat for Lough Ree Power. The majority of Knappoge Bog former production area is bare peat. Some areas have colonised with pioneer cutaway and scrub vegetation communities. Ceasing pumping has created large wetlands. An amenity trackway is under construction.	2018	Draft 2021
Lough Bannow	739	Cutaway Bog Peat Production at Lough Bannow bog commenced in the 1960's,. Peat depths on the former production area are generally shallow.	Much of the former production area at Lough Bannow has been out of production for some time. These areas have already extensively colonised with pioneer cutaway and scrub vegetation communities.	2020	Draft 2019

		Pumped bog	A small (35ha) conifer plantation was established in 1980's by Coillte. Lough Bannow is part of the footprint of Derryadd Windfarm for which planning permissions were granted in 2020. An amenity walkway is proposed.		
Moher	483	Cutover Bog Peat Production at Moher bog commenced in the 1960'S.. Peat depths on the former production area remain relatively deep. Pumped bog drainage.	Moher Bog formerly supplied fuel peat for Lough Ree Power. Much of the former production area is bare peat	2020	Draft 2017
Mount Dillon	592	Cutaway Bog Peat Production at Mount Dillon bog commenced in the 1940'S. Peat depths on the former production largely shallow. Pumped bog	Mount Dillon Bog formerly supplied fuel peat for Lough Ree Power. Much of the former production area at Mount Dillon has been out of production for some time. These areas have already extensively colonised with pioneer cutaway, wetland and scrub vegetation communities.	2020	Draft 2017

Table Ap-2b: Mount Dillon Bog Group names, area and indicative status (Mostrim sub-group).

Bog Name	**Area (ha)**	**Stage of development**	**Land-Use and History**	**Peat Production Cessation**	**Rehab Plan Status**
Clonwhelan	212	Development Bog. Clonwhelan Bog was drained in the 1980's but never brought into commercial peat production. Clonwhelan is a deep peat development bog.	Rehabilitation complete Raised bog restoration completed 2019	N/A	Finalised 2018
Clynan	402	Development Bog. Clynan Bog was drained in the 1980's. Sod peat production occurred around the margins and over a portion of the site.	Clynan Bog formerly supplied horticultural peat (sod moss) & fuel turf. Some rehabilitation work has been carried out on Clynan bog East already to buffer an undrained bog remnant. Raised bog restoration potential.	2020	Draft 2017
Coolcraff	412	Cutover Bog Industrial peat production commenced at Coolcraff Bog in the 1980's. The site was developed for milled peat production 2015-2018. Deep peat reserves remain over the majority of the former production area.	Coolcraff Bog formerly supplied a range of commercial functions including; horticultural peat. Much of the former production area at Coolcraff is bare peat. One section of high bog to the north or site was excluded from production and so never developed on the basis of high conservation value raised bog habitat.	2020	Draft 2017
Coolnagun	668	Cutaway Bog Industrial peat production commenced at Coolnagun Bog in 1941. Coolnagun is considered a deep peat cutover bog with areas of shallow cutaway.	Coolnagun Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat for Lough Ree Power. Much of the former production area at Coolnagun is bare peat. Some small patches of pioneer cutaway vegetation communities are developing. Some bog restoration work was undertaken already along the eastern margin.	2020	Draft 2017

Glenlough	328	Development bog Glenlough Bog was first developed in the 1980's. It was re-ditched in 2003-2005. Only a small part of the bog was fully brought into peat production for sod peat. Deep peat reserves remain over the majority of the former production area. Some of the bog has never been subject to commercial peat extraction.	Glenlough Bog formerly supplied a range of commercial functions including; horticultural pea. Degraded high bog vegetation remains over the majority of the bog. The former production area is a mosaic of vegetation. This site has raised bog restoration potential.	2020	Draft 2020
Milkernagh	627	Cutover Bog Industrial peat production commenced at Milkernagh Bog in 1950. Long-term peat extraction has created shallow cutaway in places. Deep peat reserves remain in parts on the former production area. Milkernagh is considered cutover bog with variable peat depths. Milkernagh has a pumped drainage regime.	Milkernagh Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat for Lough Ree Power. Much of the former production area at Milkernagh is bare peat. Pioneer cutaway vegetation communities are developing in places.	2020	Draft 2017
Mostrim	442	Development Bog/Cutover Bog The majority of Mostrim was drained but never developed. Industrial peat production commenced in parts of Mostrim Bog in the 1980's. Peat extraction has significantly affected parts of this bog but deep peat reserves remain on the former production area.	Mostrim Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat for Lough Ree Power. Raised bog restoration at Mostrim is ongoing with > 50% completed in Jan 2021.	2020	Finalised 2020

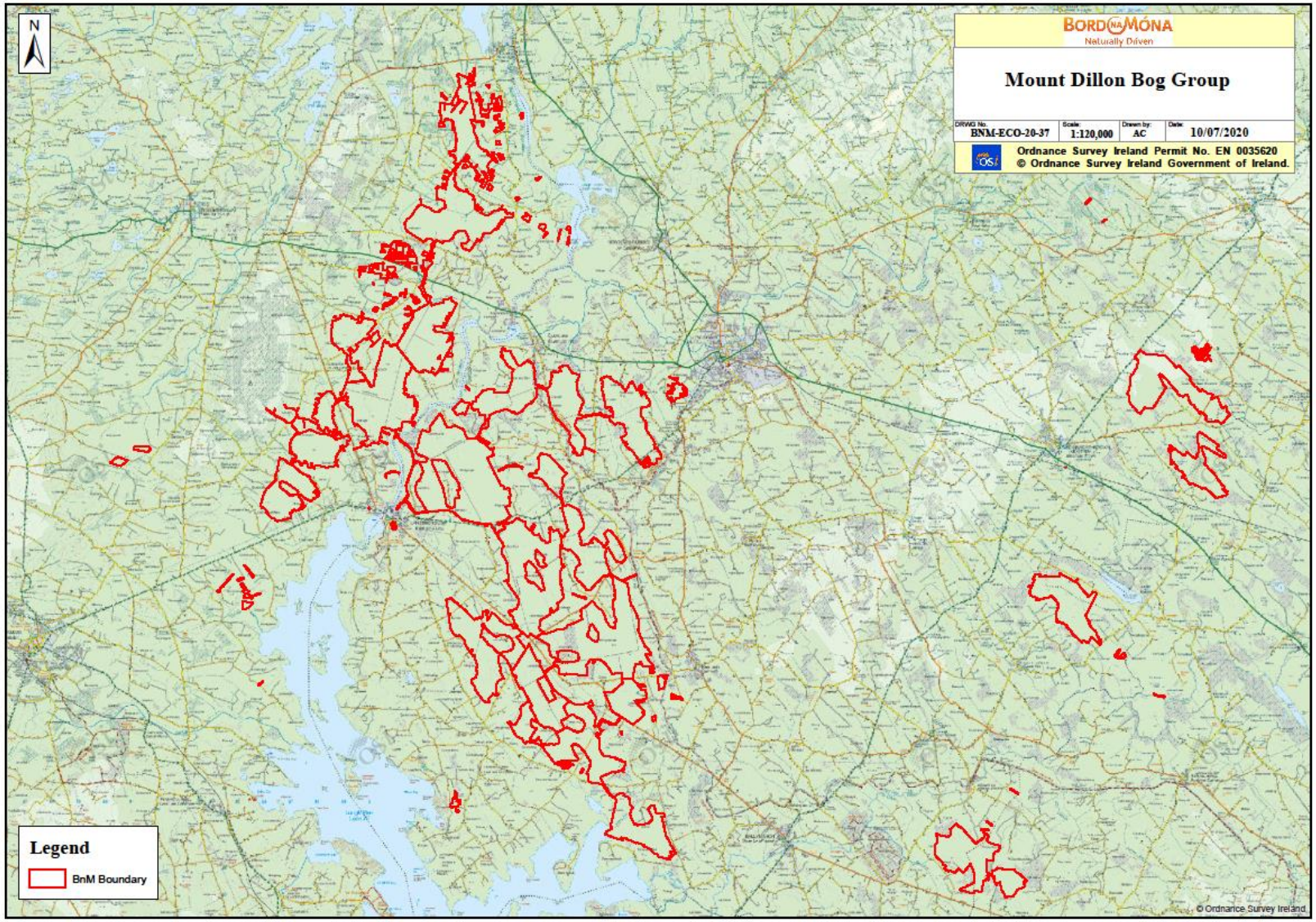


Figure Ap-2: Mount Dillon Bog Group

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:	**Derrycolumb**	**Area (ha):**	458ha
Works Name:	Mount Dillon	**County:**	Longford
Recorder(s):	BnM Ecology Section	**Survey/ monitoring Date(s):**	19th & 23rd July 2012 September 2012 March 2013

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).
- Pioneer dry heath communities (dHeath)
- Silt Ponds (Silt) with associated habitats such as scrub, Bracken, rank grassland (GS2), dry calcareous grassland (gCal) and typical pioneer communities of disturbed areas (disTuss).

The most common habitats present around the margins at this site include:

- Birch woodland (WN7) (Codes refer to Heritage Council habitat classification, Fossitt 2000), See Appendix II)
- Scrub (WS1) (Gorse scrub and Birch scrub developing of dry high bog around margins)
- Raised bog (PB1)
- Cutover bog (PB4) (several small fragments)
- Wet grassland (GS4).

Description of site

Derrycolumb Bog is located approximately 9.5km to the west of Ballymahon in County Longford. This site is located within three main sections that are divided by minor public roads. Derraghan Bog is located immediately adjacent to two sections of the site and a rail link connects Derrycolumb Bog with Derraghan Bog to the north and Edera Bog to the south. The overall majority of the site is in active industrial peat production. The peat is used as fuel peat in Lough Ree Power in Lanesborough. Derrycolumb Bog has been in full industrial peat production to supply Lough Ree Power. A number of pumps are located on the site.

Derrycolumb Bog is divided in three main sections – south-eastern, mid and northern-western sections. These sections are separated by minor public roads.

The south/eastern section of the site contains the deepest peat reserves of between 1.1m and 2.6m of peat, a large proportion of which is “red” or “Sphagnum” peat. A small area in the south eastern corner of this section is within the area that is designated as the Derry Lough pNHA. The pNHA consists of wet grassland, fen, fen woodland and open water; there is no production bog within the pNHA. The boundary of this section of the site contains a section of raised bog that includes a small number of active areas. This area contains Heather, Purple Moor Grass, Bog Asphodel, Bog Cotton, sun dew (including *Drosera intermedia*) and Deer Grass along with *Sphagnum magnellicum*, *S. subnitens* and *S. papillosum*. A silt pond and a section of Birch woodland is also located in this area. The southern boundary of the site has a small area of remnant raised bog that is used for domestic turf cutting. A river flows along the northern boundary of the site and a berm was constructed along a section of the river in 2010 in order to prevent the site from flooding in times of high flow.

The mid-section of the site is the largest portion of the site and this area curves around a section of farmland that is located to the north. The majority of this section is in active industrial peat production however a section of cutaway has emerged in recent years. These areas of cutaway are becoming vegetated by a mix of emergent Soft Rush along with Birch and Willow.

The north/western section of the site has been in industrial peat production for a number of years and the centre of this section has been cutaway and is becoming vegetated with Soft Rush and Marsh Arrow Grass. A relatively large section of Birch woodland is located in the southern section of the site and is made up of Birch and Willow. There has been some dumping of construction waste and old cars in this area.

Other habitats along the margins of the site include Birch woodland, wet grassland, dry heath and cutover bog. Overall, large areas of the site contain less than 2m of peat and contain exposed marl and gravel; however some areas of the bog are young in terms of industrial peat production and still retain a dome and "red" or "Sphagnum" peat. A number of pumps are situated around the site and are used to prevent flooding.

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

- Derry Lough pNHA (site code- 001444) overlaps with the boundary of the south eastern corner of the site.

Adjacent habitats and land-use

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

Watercourses (major water features on/off site)

- Tributaries of the Bilberry River are located along the northern and southern boundaries of the site.
- The site is within the Shannon region.

Peat type and sub-soils

Some sections of the site contain in excess of 2.6m of peat, however the majority of the site contains less than 2m of peat with considerable areas of the site at a point where they are cutaway or almost cutaway.

Fauna biodiversity

Birds

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

- Common species observed at the site include Grey Heron, Grey Crow, Robin, Blackbird and Raven.

Mammals

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

- Fox
- Badger
- Pine Marten
- Otter

Other species

Green Veined White, Small Heath, Painted Lady, Wall Brown, Small Copper and Meadow Brown Butterflies.

References

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

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

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

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

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

- Bog restoration/rehabilitation measures will be restricted to within the footprint of the proposed rehabilitation area.
- The proposed rehabilitation will have due regard to noise limits and hours of operation (i.e. dusk and dawn) to minimise any potential disturbance on resident and local fauna that utilise the site and immediate environs.
- All plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations (SI 359/1996).
- The proposed activities will be restricted to daylight hours and there will be no requirement for artificial lighting.
- Silt ponds will be inspected and maintained as per the IPC Licence.
- During periods of heavy precipitation and run-off, activities will be halted.
- Measures will be carried out using a suitably sized machine and in all circumstances, excavation depths and volumes will be minimised where possible.
- All machines will be regularly checked and maintained prior to arrival at the site to prevent hydrocarbon leakage.
- Hoses and valves will be checked regularly for signs of wear and will be closed and securely locked when not in use.
- Fuelling and lubrication of equipment shall only be carried out in designated areas away from surface water drainage features and ecologically sensitive areas.
- Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for disposal or re-cycling.
- Vehicles will never be left unattended during refuelling.
- No direct discharges to waters will be made. No washings from vehicles, plant or equipment will be carried out on site.
- All plant refuelling will take place using mobile fuel bowsers. Only dedicated trained and competent personnel will carry out refuelling operations.
- Mobile storage such as fuel bowsers will be 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 Derrycolumb 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 washing vehicles prior to entering the area.

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

In addition to the above, Best Practise measures around the prevention and spread of Crayfish plague[6] and any other aquatic based IAS 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 have now announced the complete cessation of industrial peat production across its estate (January 2021).

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

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

1 EPA IPC Licence

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Mount Dillon bog group (Ref. PO-504-01). As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. The bog is part of the Mount Dillon Bog 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) appreciates the Minister's intention to support, via the Climate Action Fund, Bord na Móna in developing a package of measures, 'the proposed Scheme', for the enhanced decommissioning, rehabilitation and restoration of cutaway peatlands, referred to as the 'Peatlands Climate Action Scheme'. The enhanced decommissioning, rehabilitation and restoration of the peatlands funded by the proposed 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.

It is envisaged that Bord na Móna carry out an enhanced decommissioning, rehabilitation and restoration scheme, (PCAS), across a footprint of 33,000 ha. This proposed 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 costs associated with the additional and

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

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. 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 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.

5 National River Basin Management Plan 2018-2021 (Water Framework Directive)

The National River Basin Management Plan (2018-2021) (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 outlines 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) is part of the WFD (2018-2021) programme of measures. The NRBMP takes account of the fact that Bord na Móna is 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 rehabilitation target is set to be superseded by the acceleration of the Bord na Móna de-carbonisation programme and the proposed Scheme **(PCAS)**.

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

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.

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.

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 2015-2020

The All-Ireland Pollinator Plan 2015-2020 outlines key objectives and actions to protect and support pollinating insects and the habitats they rely on. There are several Bord na Móna specific actions in this plan including 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, wind energy, and economy/enterprise.

Derrycolumb Bog is located in an area zoned by Longford County Council as open countryside[7].

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.

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 endeavour to adhere to this code of practise during the peatland rehabilitation phase and appropriate archaeology mitigation is carried out before and during cutaway peatland rehabilitation. An Archaeological Impact Assessment is being carried out for the proposed rehabilitation at this site (Appendix IX). The recommendations of this assessment have been incorporated into the rehabilitation plan to minimise impacts on known archaeology. In addition, Bord na Móna will adhere to the Archaeology Code of Practise relating to management of stray archaeological finds that may arise during cutaway peatland rehabilitation and decommissioning.

[7] http://www.longfordcoco.ie/services/planning/development-plan-2015-2021/longford-cdp-2015-2021-written-statement.pdf

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 Mónas 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."*

The Derrycolumb Bog 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 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 will 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 has also committed to a significantly larger rehabilitation target. This is 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 plan to restore a further 1,000 hectares of raised bog habitat by 2025. These targets are significant in both timing and scale and are indicative of Bord na Móna's increased new ambition in this area.

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.

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

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

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

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

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

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

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

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

waste.

7.3.3 The ultimate destination of the waste.

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

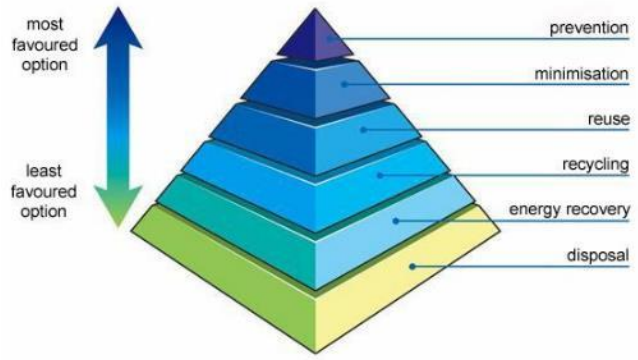
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

7.3.6 Details of any rejected consignments.

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

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

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



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

2. Enhanced Decommissioning.

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

Item	Enhanced Decommissioning Type	Derrycolumb Decommissioning Plan
1	Removal of Railway Lines	Removal of Railway Lines
2	Decommissioning Bridges and Underpasses	Not Applicable
3	Decommissioning Railway Level Crossing	Decommissioning Railway Level Crossing
4	Restricting Access (bogs and silt ponds)	Restricting Access to Bog.
5	Removal of High Voltage Power Lines	Where feasible

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 proposed Scheme, which is proposed to externally funded.

Enhanced rehabilitation: This is defined as rehabilitation carried out under proposed 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 proposed 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 proposed Scheme.

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

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

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

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

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

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

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

APPENDIX IX. EXTRACTIVE WASTE MANAGEMENT PLAN

(Minimisation, treatment, recovery and disposal)

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

Scope:
This plan covers IPPC Licence's P0504-01, Mountdillon Group of Bogs in Counties Roscommon, Longford and Westmeath,

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

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

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

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

2.0 P0504-01 IPPC Licence Extractive Waste Conditions

2.1 Condition 7.5 Extractive Waste Management
The licensee shall draw up a Waste Management Plan (to be known as an Extractive Waste Management Plan) for the minimisation, treatment, recovery and disposal of extractive waste. This Plan shall meet the requirements of regulation 5 of the Waste Management (Management of Waste from the Extractive Industries) Regulations,2009. The Plan shall be submitted for agreement by the Agency by the 31' 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 Mountdillon IPPC Licence Coordinators office.
The location in relation to the silt pond excavations and cleanings are adjacent to the silt ponds, which are considered under the Shannon River Basin Management Plan in accordance with the requirements of Directive 2000/60/EC.
Screenings and bog timbers are all naturally occurring elements of peatland and 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 Mountdillon IPPC Licence P0504-01.

APPENDIX X. MITIGATION MEASURES FOR THE APPLICATION OF FERTILISER

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

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

APPENDIX XI. CONSULTATION SUMMARIES

Table APXI -1 Consultees contacted

Bog Name	Contact Organisation	Contact Name	Date of Issue	Communication Format	Date Response Received	Response format
Derrycolumb	Longford County Council - Director of Services (Strategic Infrastructure and Climate Change)	John Brannigan	04/01/2021	E-mail		
Derrycolumb	Longford County Council	Donal Mac Beatha	04/01/2021	E-mail	01/12/2020	E-mail
Derrycolumb	Longford County council	Liam Flynn Executive Planner	04/01/2021	E-mail		
Derrycolumb	Longford County Council - Heritage Officer	Mairead Ni Chonghaile	04/01/2021	E-mail		
Derrycolumb	Eastern and Midland Regional Assembly		04/01/2021	E-mail		
Derrycolumb	Chairperson of Longford County Council	*Paul Ross (pross@longfordcoco.ie)*	04/01/2021	E-mail		
Derrycolumb	*Longford County Councillors - Ballymahon District*	*Cllr. Colm Murray (colmmurray@longfordcoco.ie)*	04/01/2021	E-mail		
Derrycolumb	*Longford County Councillors - Ballymahon District*	*Cllr. Mick Cahill (mcahill@longfordcococ.ie)*	04/01/2021	E-mail		
Derrycolumb	*Longford County Councillors - Ballymahon District*	*Cllr. Mark Casey (markcasey@longfordcoco.ie)*	04/01/2021	E-mail		
Derrycolumb	*Longford County Councillors - Ballymahon District*	*Cllr. Gerard Farrell (gfarrell@longfordcoco.ie)*	04/01/2021	E-mail		

Derrycolumb	*Longford County Councillors - Ballymahon District*	*Cllr. Pat O'Toole (potoole@longfordcoco.ie)*	04/01/2021	E-mail		
Derrycolumb	TD Roscommon - Longford Westmeath	Peter Burke (peter.burke@oireachtas.ie)	04/01/2021	E-mail		
Derrycolumb	TD Roscommon - Longford Westmeath	Sorca Clarke (sorca.clarke@oireachtas.ie)	04/01/2021	E-mail		
Derrycolumb	TD Roscommon - Longford Westmeath	Joe Flaherty (joe.flaherty@oireachtas.ie)	04/01/2021	E-mail		
Derrycolumb	TD Roscommon - Longford Westmeath	Robert Troy (robert.troy@oireachtas.ie)	04/01/2021	E-mail		
Derrycolumb	Environmental Protection Agency	Brian Meeney	07/01/2021	E-mail		
Derrycolumb	National Parks and Wildlife Service	Brian Lucas, Adele Shelton, Ciaran o Keeffe, Deirdre Lynn.	04/01/2021	E-mail		
Derrycolumb	NPWS Regional Network	District Conservation Officer (North Midlands) 0761002579.	04/01/2021	E-mail		
Derrycolumb	Dept of the Housing Local Government and Heritage	Malcom Noonan (Minister of State for Heritage and Electoral Reform)	AMC			
Derrycolumb	National Monuments Service	Margaret Keane (Margeret.keane@chg.gov.ie)	04/01/2021	E-mail		
Derrycolumb	National Museum of Ireland (Irish Antiquities Division)	Isabella Mulhall (imulhall@museum.ie)	04/01/2021	E-mail		
Derrycolumb	Dept of Environment Climate and Communications	Minister - Eamon Ryan	AMC			

Derrycolumb	Dept of Environment Climate and Communications	Noel Regan	04/01/2021	E-mail		
Derrycolumb	Dept of Rural and Community Development	Minister - Heather Humpreys				
Derrycolumb	Office of Public Works	Minister of State - Patrick O Donovan				
Derrycolumb	Dept of Agriculture, Food and the Marine	Pippa Hackett Minister of State for Land Use and Biodiversity)	AMC			
Derrycolumb	Inland Fisheries Ireland	general email contact (info@fisheriesireland.ie)	04/01/2021	E-mail		
Derrycolumb	Waterways Ireland	head office - info email	04/01/2021	E-mail		
Derrycolumb	The Heritage Council	Lorcan Scott (mail@heritage council.ie)	04/01/2021	E-mail		
Derrycolumb	An Forum Uisce (The Water Forum)	info@thewaterforum.ie	04/01/2021	E-mail		
Derrycolumb	Longford Wilderness Park (Clandillon Civil Consulting)	Heather Scully	04/01/2021	E-mail		
Derrycolumb	Longford Wilderness Park (Longford County Council)	Brian Ross (bross@longfordcoco.ie)	04/01/2021	E-mail		
Derrycolumb	An Taisce	info@antaisce.org	04/01/2021	E-mail		
Derrycolumb	Friends of the Irish Environment	admin@friendsoftheirishenvironment.org	04/01/2021	E-mail		
Derrycolumb	Friends of the Earth	Oisin Coughlan	04/01/2021	E-mail		
Derrycolumb	Birdwatch Ireland	general email contact (info @birdwatchireland.ie) or Oonagh Duggan (oduggan@birdwatchireland.ie)	04/01/2021	E-mail		

Derrycolumb	Irish Peatlands Conservation Council	Email: bogs@ipcc.ie	04/01/2021	E-mail	25/01/2021	E-mail
Derrycolumb	Irish Wildlife Trust	Email: info@iwt.ie	04/01/2021	E-mail		
Derrycolumb	Bat Conservation Ireland	info@batconservationireland.org	04/01/2021	E-mail		
Derrycolumb	Woodlands of Ireland	info@woodlandsofireland.com	04/01/2021	E-mail		
Derrycolumb	Butterfly Conservation Ireland	Jesmond Harding/info email	04/01/2021	E-mail	12/01/2021	E-mail
Derrycolumb	Community Wetlands Forum (part of Irish Rurallink)	info@irishrurallink.ie	04/01/2021	E-mail		
Derrycolumb	Turf Cutters and Contractors Association	General e-mail contact	15/01/2021	E-mail		
Derrycolumb	Longford Public Participation Network (PPN)	General e-mail contact	04/01/2021	E-mail		
Derrycolumb	Sustainable Water Action Network (SWAN)	http://www.swanireland.ie/	04/01/2021	E-mail		
Derrycolumb	Irish Farmers Association (Roscommon/ Sligo/ Leitrim/Longford)	roscommon@ifa.ie	04/01/2021	E-mail	21/01/2021	E-mail
Derrycolumb	Irish Farmers Association (Head Office)	Tim Cullinan (President)	04/01/2021	E-mail		
Derrycolumb	National Association of Regional Game Councils	Email - nargc@nargc.ie	04/01/2021	E-mail		
Derrycolumb	Midlands & East Regional WFD Operational Committee	Ray Spain Co-ordinator Local Authority Water Programme (rspain@lawaters.ie)	04/01/2021	E-mail		
Derrycolumb	Shannon Flood Risk State Agency Co-ordination Working Group	Jackie Stewart - Flood Risk management Policy (Jackie.Stewart@opw.ie)	04/01/2021	E-mail		

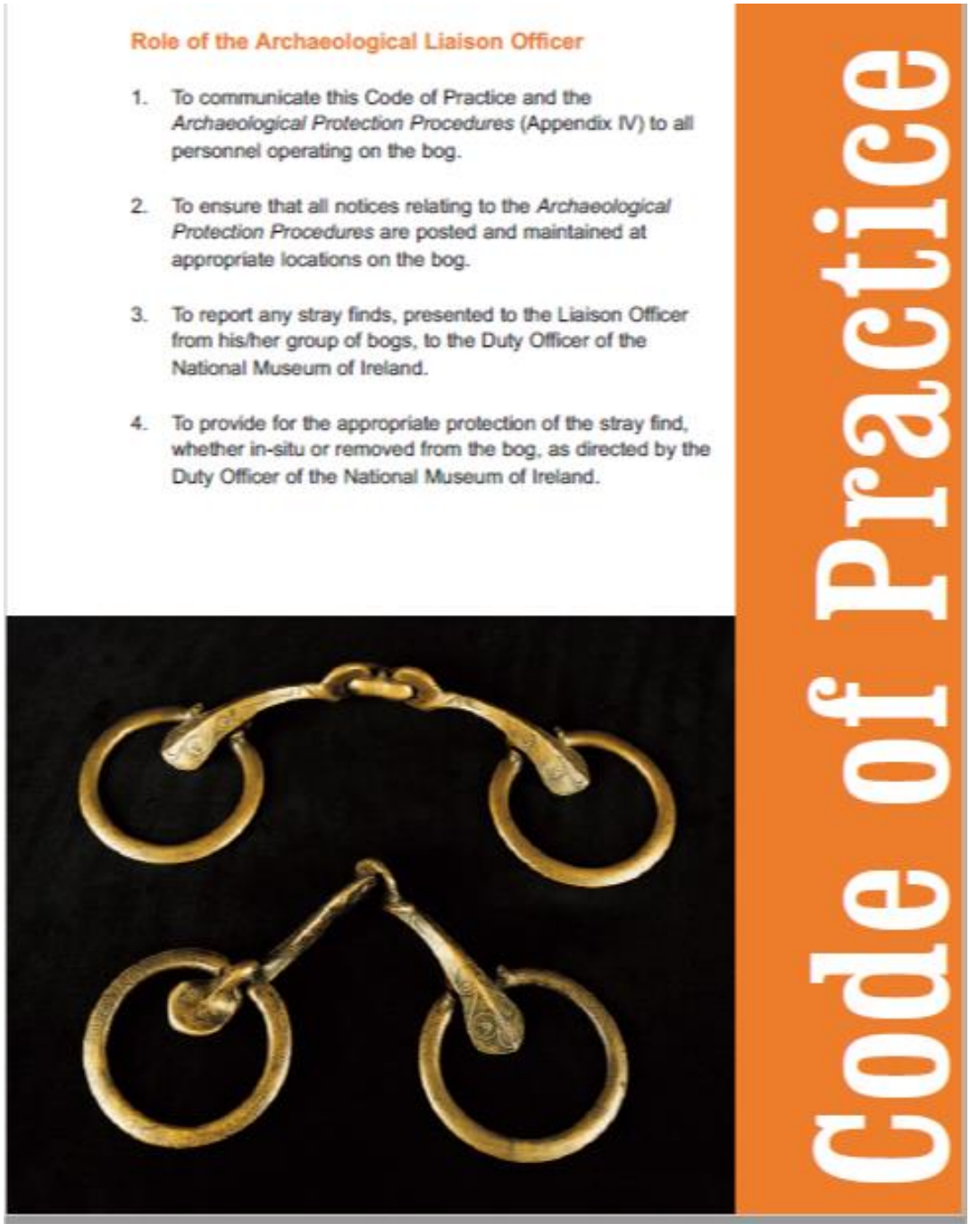
Derrycolumb	ICMSA (Irish Creamery Milk Suppliers Association)	General e-mail contact	04/01/2021	E-mail		
Derrycolumb	ICSA (Irish Cattle and Sheep Farmers Association	General e-mail contact	04/01/2021	E-mail		
Derrycolumb	Just Transition Commissioner	Kieran Mulvey				
Derrycolumb	CARO (Climate Action Regional Office) Eastern and Midlands	Alan Dunney	04/01/2021	E-mail		
Derrycolumb	Local Authority Water Programme	Margaret Keegan	01/02/2021	E-mail		

Table APXI -2 Response summary from Consultees contacted

Organisation	Summary of Response by Stakeholder	BnM Response
Longford County Council	Longford County Council responded to consultation via e-mail and made the following points; 1) Longford County Council supports proposed rehabilitation measures and any actions that seek to enhance the biodiversity of the region. 2) Acknowledges the role BnM play in the rehabilitation of post industrialised lands for the just transition agenda within the state. 3) State that a AA screening and EIA screening is desirable for each site. 4) Suggest tree planting programme be integrated into rehabilitation measures. 5) Describes the potentially positive impact the PCAS scheme can have on the application for biosphere reserve designation of the surrounding lands. 6) Provided planning documentation for a proposed amenity walkway close to/through Derrycolumb Bog	BnM acknowledged and will give due cognisance to all points raised, within the rehabilitation plan for Derrycolumb Bog. BnM responded via e-mail.
National Parks and Wildlife Service	Responded through e-mail thread on the 02, 03,07,09/12/2020. Points discussed were; 1) To advise of the requirement to investigate if assessment under the SEA and birds directives for each site.	BnM acknowledged via e-mail. Also, phone conversation with local NPWS Conservation Ranger Sue Moles.
National Museum of Ireland (Irish Antiquities Division)	Responded through e-mail 28/12/2020, Issues raised were; 1) The request that due diligence be taken during works to protect any archaeologically significant findings or areas 2) The NMI reiterated the importance of peatlands for the preservation of archaeology and requested they be consulted as part of any EIA undertaken	BnM acknowledged and responded via e-mail to assure BnM will give due cognisance to all points within the rehabilitation plan for all bogs. A virtual meeting/PCAS presentation was held for NMI on 18/01/2021
Office of Public Works	Responded via e-mail 01/12/2020 querying the reason for inclusion of OPW in the stakeholders list.	BnM responded with an explanation via e-mail on 01/12/2020.
Local Authority Waters Programme	To advise of dual roles within LawPro and request shapefiles of bogs where works would be conducted.	BnM acknowledged and will give due cognisance to all points within the rehabilitation plan for all sites. BnM responded via e-mail.
Irish Peatlands Conservation Council	Responded to consultation through e-mail. Among issues raised for Derrycolumb were; 1. Request that local stakeholders and landowners are considered with regard to hydrological planning. 2. Request that dissolved organic carbon be monitored and reported. 3. Request that a map describing areas that could be utilised by conservation groups to carry out species specific conservation projects be included in rehabilitation plans. 4. Request that hydrological maps and data should be included in the rehabilitation plans. 5. Request the tracking of the development of peat forming plant species.	BnM acknowledged and will give due cognisance to all points raised, within the rehabilitation plan for Derrycolumb Bog. BnM responded via e-mail.
Butterfly Conservation Ireland	Responded to consultation via e-mail with a submission on Derrycolumb. Concerns raised were: 1) Alterations to the text of the rehab plan. 2) Request for all turf cutting on BnM land to end. 3) Suggest monitoring for Large Heath Butterfly or food plant Hare's-tail Cottongrass. 4) Suggested alterations to habitat design in rehab plan to further connect regional high bog habitats. 5) Raised concerns over future land use. 6) Suggest that Small Heath and Wall Brown butterfly species habitat requirements are taken into account by rehabilitation plan.	BnM acknowledged via e-mail; Phone conversation with Jesmond Harding 19/01/2021.
Midlands & East Regional WFD Operational Committee	Responded via e-mail on 03-07/12/2020 to voice support for PCAS and provide a list potentially supportive NGOs	BnM acknowledged and will give due cognisance to all points within the rehabilitation plan for all sites. BnM responded via e-mail.

Irish Farmers Association	Responded to consultation regarding Derrycolumb and the PCAS project at large on multiple dates throughout ongoing discourse. Specific submission on Derycolumb Bog received from Roscommon, Sligo, Leitrim and Longford IFA Office. Concerns raised were: 1) Potential for flooding on adjacent lands. 2) Health and Safety 3) Perceived potentially detrimental impact of PCAS on property value	A meeting was held by BnM on 18/02/2021 the to present details on PCAS to the IFA and members. Dialogue is ongoing.
ICMSA (Irish Creamery Milk Suppliers Association)	Responded to consultation regarding the PCAS project at large on multiple dates throughout ongoing discourse. Concerns raised included future management and care and maintenance of BnM sites, particularly in relation to boundary drains, with a request for a written commitment to avoid flooding on adjacent lands. Also sought a baseline assessment of hydrology on BnM land and neighbouring areas.	A virtual meeting was held by BnM on 17/12/2020 and 03/03/2021 (when a presentation was provided) to provide details on PCAS to the ICMSA and members. Dialogue is ongoing.
Lorcán Scott (The Heritage Council)	Responded to consultation via e-mail on 04/01/2021 asking for more information on PCAS and looking to be involved in any seminar or information events.	BnM responded via phone conversation 11/01/2021.
Irish Raptor Study Group	Responded to consultation via email on 09/01/2021 asking for more information on PCAS.	BnM acknowledged and responded to queries via email on 11/01/2021; Phone conversation with Ryan Wilson Parr 21/01/2021.
National Association of Regional Game Councils (NARGC)	Responded seeking a meeting and made a submission. Main points raised were: 1. Need to grow heather in the cutaways as part of PCAS 2. Need to remove birch and other tree species and avoid scrub encroachment. 3. Control of “vermin” species.	A virtual meeting was held by BnM on 28/01/2021 (when a presentation was provided) to provide details on PCAS to the NARGC and members.
Dept. of Agriculture, Food & the Marine (DAFM)	Submission by e-mail to express support for PCAS. Recommended; 1) That local landowners and stakeholders be considered as part of the consultation process. 2) EIA assessment be carried out prior to PCAS works. 3) Hydrological assessments are carried out with a view to protecting adjoining lands from adverse impacts	BnM acknowledged and responded via e-mail to assure BnM will give due cognisance to all points within the rehabilitation plan for Derrycolumb Bog. A virtual meeting/PCAS presentation was held for DAFM on 11/12/2020

APPENDIX XII. ARCHAEOLOGY



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

1) Purpose

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

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

2) Procedure

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

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

Your Archaeological Liaison Officer is ……

3) Records

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

Archaeological Impact Assessment of Proposed Bog Rehabilitation at Derrycolumb Bog, Co. Longford. Dr. Charles Mount. Nov 2020.

Archaeological Impact Assessment of Proposed Bog Decommissioning and Rehabilitation at Derrycolumb Bog, Co. Longford

Report For

Bord Na Móna Energy Ltd.

Author

Dr. Charles Mount

Bord Na Móna Project Archaeologist

Introduction

The EPA (2020) *Guidance on the process of preparing and implementing a bog rehabilitation plan* notes that the licensee should characterise the bog prior to embarking on detailed planning and implementation. This characterisation should detail how the land is classified in terms of statutory protections, e.g. as European sites, world heritage sites, RAMSAR sites, National Heritage Areas, national monuments, archaeological heritage, etc. This archaeological impact assessment report was prepared by Dr. Charles Mount for Bord na Móna Energy Ltd to fulfil this characterisation in relation to archaeological heritage. It represents the results of a desk-based assessment of the impact of proposed bog rehabilitation of c.456 hectares at Derrycolumb Bog, Co. Longford on the known archaeological heritage of the bog. The proposed rehabilitation actions will be a combination of measures to create wetlands and re-wet deep peat as outlined in the draft Methodology Paper for the proposed Bord na Móna Decommissioning, Rehabilitation and Restoration Scheme. These enhanced measures for Derries Bog will include:

- Blocking field drains in the former industrial production area using a dozer to create regular peat blockages (three blockages per 100 m) along each field drain.
- Targeted drain blocking using peat blockages (installed with excavator) on the raised bog remnant in the south-east corner of the site.
- Pump management – reducing or ceasing pumping.
- Re-alignment of piped drainage; and management of water levels to create wetlands.
- No measures are planned for the other surrounding marginal peatland habitats.
- Silt ponds will continue to be maintained during the rehabilitation and decommissioning phase.
- Evaluate success of short-term rehabilitation measures and enhance where necessary.
- Decommissioning of silt-ponds will be assessed and carried out, where required.

Derrycolumb Bog is located c.1.8km north-east of Newtown Cashel, Co. Longford, south-west of the R392 road. The bog occupies the townlands of Ballina, Cormaglava, Derrindiff, Derryad, Derrycolumb, Derrygowna, Derrylough, Derrymacar, Derrymany, Derrynagran, Derrynagran beg and Forthill, on OS 6 inch sheet Longford No. 22.

Methodology

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

- The IAWU Peatland Survey
- The Bord na Móna 1999 Re-assessment Survey
- The Bord na Móna excavation programme
- The Sites and Monuments Record that is maintained by the Dept of Housing, Local Government and Heritage
- The Excavations database
- Previous assessments

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

Desktop assessment

IAWU Peatland survey

Derrycolumb Bog was surveyed (unlicenced) by the Irish Archaeological Wetland Unit (IAWU) in 1991 as part of the Archaeological Survey of Ireland Peatland Survey. In total 78 sightings of archaeological material were noted. This included 77 sightings of Toghers and one sighting of worked wood. It was not part of the remit of the IAWU to produce reports on individual bogs prior to 2000 but the survey results were notified to the National Monuments Service (NMS) and included as part of the Record of Monuments and Places (RMP) (see Fig. 1). The depths of the sightings below the surface were not recorded.

Recorded Monuments

The Record of Monuments and Places (RMP) for Co. Longford which was established under Section 12 of the National Monuments (Amendment) Act, 1994 was examined as part of the assessment (DAHGI 1996). This record was published by the Minister in 1996 and includes sites and monuments that were known in Derrycolumb Bog before that date. This review established that there are 78 sightings of archaeology in the RMP grouped into five archaeological complexes situated in the proposed rehabilitation area (see Fig. 1). These are the sightings recorded by the IAWU in 1991 and reported to the NMS.

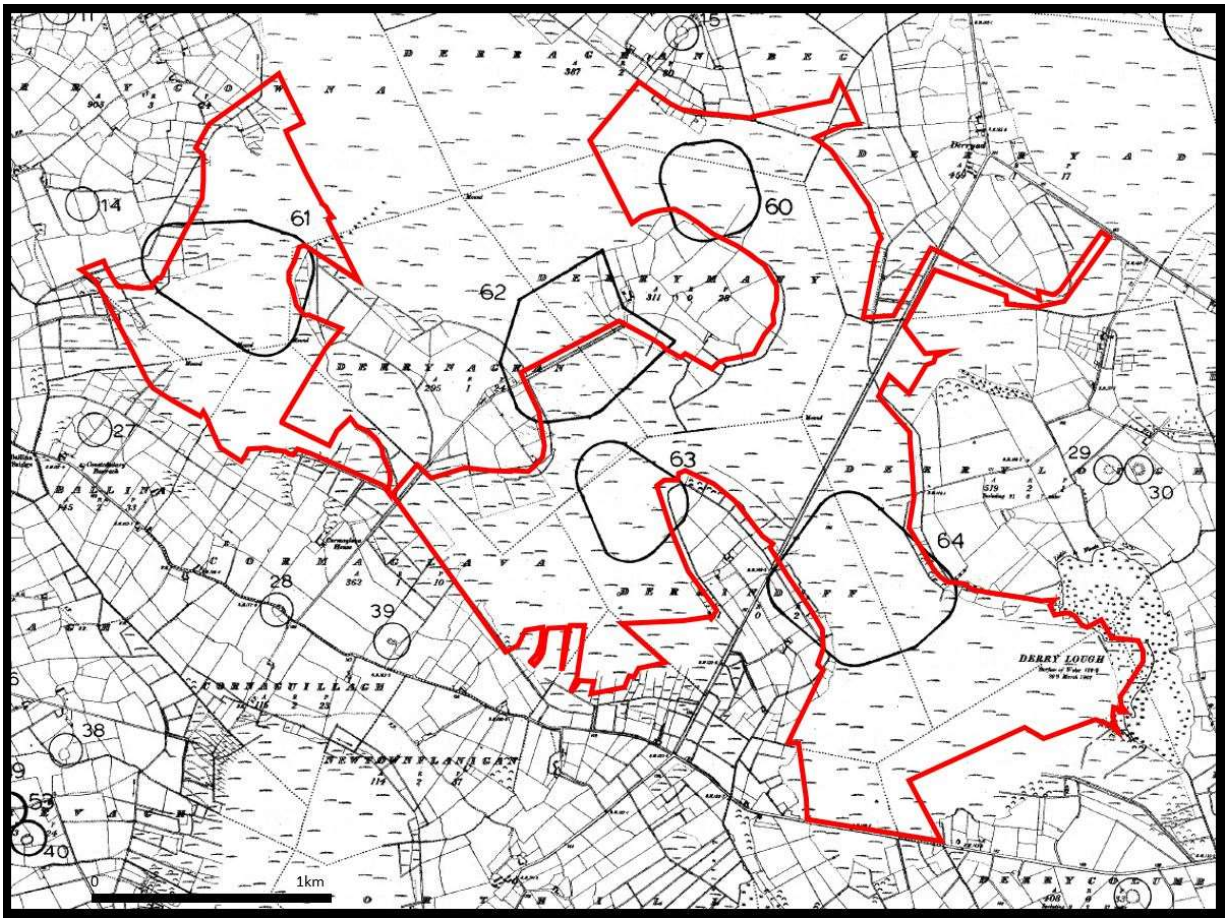


Fig. 1. Derrycolumb Bog, Co. Longford, detail of the Record of Monuments and Places map sheet No. 22. The proposed rehabilitation area is outlined with the redline. There are numerous Recorded Monuments in the rehabilitation area grouped into five complexes.

RMP No.	NGR E	NGR N	Townland	RMP Classification	SMR Classification
LF022-059----	20784	26296	Derraghan Beg/Corlea	Togher Possible	Road - class 3 togher
LF022-060---	20780	26186	Derrymany	Archaeological Complex	-
LF022-06001-	20779	26179	Derrymany	Togher	Road - class 3 togher
LF022-06002-	20775	26184	Derrymany	Togher	Road - class 3 togher
LF022-06003-	20774	26189	Derrymany	Togher	Road - class 3 togher
LF022-06004-	20781	26189	Derrymany	Togher	Road - class 3 togher
LF022-06005-	20785	26182	Derrymany	Togher	Road - class 3 togher
LF022-061---	20585	26146	Derrygowna	Archaeological Complex	
LF022-06101-	20559	26155	Derrygowna	Togher	Road - class 3 togher
LF022-06102-	20562	26149	Derrygowna	Togher	Road - class 3 togher
LF022-06103-	20579	26157	Derrygowna	Togher	Road - class 3 togher
LF022-06104-	20578	26155	Derrygowna	Togher	Road - class 3 togher
LF022-06105-	20587	26154	Derrygowna	Togher	Road - class 2 togher
LF022-06106-	20584	26153	Derrygowna	Togher	Road - class 3 togher
LF022-06107-	20594	26151	Derrygowna	Togher	Road - class 3 togher
LF022-06108-	20603	26151	Derrygowna	Togher	Road - class 3 togher
LF022-06109-	20595	26130	Derrygowna	Togher	Road - class 3 togher
LF022-062---	20780	26186	Derrynagran/Derrymany	Archaeological Complex	-
LF022-06201-	20726	26111	Derrynagran	Togher	Road - class 3 togher
LF022-06202-	20726	26112	Derrynagran	Togher	Road - class 3 togher
LF022-06203-	20723	26113	Derrynagran	Togher	Road - class 3 togher
LF022-06204-	20723	26113	Derrynagran	Togher	Road - class 3 togher
LF022-06205-	20723	26113	Derrynagran	Togher	Road - class 3 togher
LF022-06206-	20727	26110	Derrynagran	Togher	Road - class 3 togher
LF022-06207-	20728	26113	Derrynagran	Togher	Road - class 3 togher
LF022-06208-	20728	26114	Derrynagran	Togher	Road - class 3 togher
LF022-06209-	20711	26105	Derrynagran	Worked Wood	Structure - peatland
LF022-06219-	20718	26108	Derrynagran	Togher	Road - class 3 togher
LF022-06232-	20713	26124	Derrynagran	Togher	Redundant record
LF022-06242-	20728	26106	Derrynagran	Togher	Road - class 3 togher
LF022-06243-	20728	26139	Derrymany	Togher	Road - class 3 togher
LF022-06244-	20728	26109	Derrynagran	Togher	Road - class 3 togher
LF022-06247-	20728	26114	Derrynagran/Derrymany	Togher	Road - class 3 togher
LF022-06248-	20730	26112	Derrynagran	Togher	Road - class 3 togher
LF022-06249-	20729	26114	Derrynagran	Togher	Road - class 3 togher
LF022-06250-	20729	26115	Derrynagran	Togher	Road - class 3 togher
LF022-06259-	20736	26115	Derrymany	Togher	Road - class 3 togher
LF022-06260-	20730	26112	Derrynagran	Togher	Road - class 3 togher
LF022-06261-	20710	26122	Derrymany	Togher	Road - class 3 togher
LF022-06262-	20724	26113	Derrynagran	Togher	Road - class 3 togher
LF022-06263-	20721	26116	Derrynagran	Togher	Road - class 3 togher
LF022-063---	20748	26058	Derrindiff	Archaeological Complex	-
LF022-06301-	20758	26055	Derrindiff	Togher	Road - class 2 togher
LF022-06302-	20749	26046	Derrindiff	Togher	Road - class 3 togher
LF022-06303-	20740	26068	Derrindiff	Togher	Road - class 3 togher
LF022-064---	20844	26024	Derrindiff/Derrylough	Archaeological Complex	-
LF022-06401	20843	26017	Derrindiff	Togher	Road - class 3 togher
LF022-06402	20827	26026	Derrindiff	Togher	Road - class 3 togher
LF022-06403	20828	26021	Derrindiff	Togher	Road - class 3 togher
LF022-06404	20823	26024	Derrindiff	Togher	Road - class 3 togher
LF022-06405	20822	26023	Derrindiff	Togher	Road - class 3 togher
LF022-06406	20818	26021	Derrindiff	Togher	Road - class 2 togher
LF022-06407	20832	26012	Derrindiff	Togher	Road - class 3 togher
LF022-06408	20841	26029	Derrindiff	Togher	Road - class 3 togher
LF022-06409	20841	26031	Derrindiff	Togher	Road - class 3 togher
LF022-06410	20841	26032	Derrindiff	Togher	Road - class 3 togher
LF022-06411	20847	26020	Derrindiff	Togher	Road - class 3 togher
LF022-06412	20847	26019	Derrindiff	Togher	Road - class 3 togher
LF022-06413	20846	26018	Derrindiff	Togher	Road - class 3 togher
LF022-06414	20846	26012	Derrindiff	Togher	Road - unclassified

LF022-06415	20848	26013	Derrindiff	Togher	Road - class 1 togher
LF022-06416	20838	26008	Derrindiff	Togher	Road - class 3 togher
LF022-06417	20836	26008	Derrindiff	Togher	Road - class 3 togher
LF022-06418	20841	26003	Derrindiff	Togher	Road - class 3 togher
LF022-06419	20846	26012	Derrindiff	Togher	Road - class 3 togher
LF022-06420	20847	26012	Derrindiff	Togher	Road - class 3 togher
LF022-06421	20841	26011	Derrindiff	Togher	Road - class 3 togher
LF022-06422	20837	26007	Derrindiff	Togher	Road - class 3 togher
LF022-06423	20836	26005	Derrindiff	Togher	Road - class 3 togher
LF022-06424	20839	26047	Derrylough	Togher	Road - class 3 togher
LF022-06425	20840	26041	Derrylough	Togher	Road - class 3 togher
LF022-06426	20847	26024	Derrylough	Togher	Road - class 3 togher
LF022-06427	20849	26017	Derrylough	Togher	Road - class 3 togher
LF022-06428	20857	26021	Derrylough	Togher	Road - class 3 togher
LF022-06429	20857	260021	Derrylough	Togher	Road - class 3 togher
LF022-06430	20849	26017	Derrylough	Togher	Road - class 3 togher
LF022-06431	20859	26016	Derrylough	Togher	Road - class 2 togher
LF022-06432	20853	26015	Derrylough	Togher	Road - class 3 togher
LF022-06433	20855	26014	Derrylough	Togher	Road - class 3 togher
LF022-06434	20859	26011	Derrylough	Togher	Road - class 3 togher
LF022-06435	20868	26018	Derrylough	Togher	Road - class 3 togher
LF022-06436	20829	26110	Derrylough	Togher	Road - class 3 togher
LF022-06437	20826	26112	Derrylough	Togher	Road - class 3 togher

Table 1. List of sightings of archaeology recorded by the IAWU in Derrycolumb Bog notified to the NMS and include in the SMR.

Bord na Móna rea-assessment survey

Derrycolumb Bog was surveyed (unlicenced) by the ADS Ltd in 1999 as part of the Bord na Móna re-assessment survey. Only four of the sightings identified by the IAWU in 1991 could be located (see Table 2). As peat harvesting continued every year between 1991 and 1999 the 74 sightings that could not be relocated were presumably removed.

SMR No	1999 catalogue number	IAWU catalogue number
LF022-064006-	99DBSE0033a-f	DYH0011
LF022-064014-	99DBSE0019a	DIF0019
LF022-064015:-	99DBSE0007a-t	DIF0020
LF022-063001-	99DBNW0014a-s	DIF0001

Table 2. List of sightings of archaeology identified by IAWU in 1991 that could be relocated by the 1999 re-assessment survey in Derrycolumb Bog.

The 1999 re-assessment survey reported an additional 26 sightings of new material within the rehabilitation area consisting of 14 platforms, 10 toghers, 1 post row and 1 redundant record (see Table 3). These sightings were reported to the NMS and incorporated into the SMR.

SMR No.	1999 Cat No.	NGR E	NGR N	Townland	SMR Classification	Depth BS cm
LF022-169----	99DNSW0014A-B	605637	761570	Derrygowna	Road - class 3 togher	0
LF022-106----	99DBNW024A	607335	761650	Derrindiff	Road - class 3 togher	0
LF022-107----	99DBNW0026A-B	607324	761576	Derrindiff	Road - unclassified togher	0
LF022-108----	99DBNW0021A	607443	761527	Derrindiff	Platform - peatland	0-20
LF022-109----	99DBNW0020A	607411	761529	Derrindiff	Platform - peatland	0
LF022-111----	99DBSE035A	608514	760245	Derrindiff	Road - class 3 togher	0
LF022-112----	99DBSE031A-B	607458	760153	Derrindiff	Road - class 2 togher	0
LF022-113----	99DBNW018A	607383	761697	Derrindiff	Platform - peatland	0
LF022-115----	99DBSE0028A	608389	760259	Derrindiff	Platform - peatland	0-20
LF022-116----	99DBNW0017A-B	607452	761616	Derrindiff	Road - unclassified togher	55-60
LF022-117----	99DBNW0013A	607488	761544	Derrindiff	Road - unclassified togher	0

LF022-118----	99DBSE0002A	608286	760232	Derrindiff	Platform - peatland	0
LF022-119----	99DBSE036A	608442	760149	Derrindiff	Platform - peatland	0
LF022-120----	99DBSE018A	608393	760198	Derrindiff	Platform - peatland	0
LF022-121----	99DBSE027A	608389	760221	Derrindiff	Platform - peatland	0-20
LF022-122----	99DBSE0017A	608367	760185	Derrindiff	Redundant record	Not in situ
LF022-123----	99DBSE0004A	608290	760173	Derrindiff	Road - unclassified togher	0
LF022-124----	99DBSE0006A	608316	760243	Derrindiff	Platform - peatland	0-20
LF022-132----	99DBSE0020A	608480	760200	Derrylough	Platform - peatland	0
LF022-135----	99DBSE0026A	608442	760338	Derrylough	Post row - peatland	0
LF022-136----	99DBSE0037A	608521	760274	Derrylough	Platform - peatland	0
LF022-137----	99DBSE0032A	608538	760122	Derrylough	Road - unclassified togher	0
LF022-164----	99DNSW0005A	605992	761525	Derrygowna	Platform - peatland	0-20
LF022-165----	99DNSW0006A	605981	761511	Derrygowna	Platform - peatland	0-20
LF022-166----	99DNSW0012A-C	605829	761713	Derrygowna	Road - unclassified togher	0
LF022-180----	99DBNW0027A	607189	761642	Derrynagran	Platform - peatland	0-20

Table 3. List of sightings of archaeology in the rehabilitation area made by the 1999 re-assessment survey included in the SMR.

Most of the sightings made by the 1999 re-assessment survey were on the surface and the deepest sighting was 99DBNW0014S (RMP LF022-06301-) at 1.05m. This trackway extended across the bog a distance of 385m across 19 fields, and when last investigated in 1999 its depth ranged from on the surface down to 1.05m in depth. In 2015 a sighting this trackway (RMP LF022-06301-) was still visible just below the surface (see Fig. 2). Data provided by Bord na Móna relating to the period 2008-2015 indicated that an average of 0.81m depth of peat had been removed from the bog surface during that seven-year period. This would have removed all of the sightings identified by the 1999 survey except for RMP LF022-06301-.

Fig. 2. Sighting 99DNSE0014h of RMP LF022-06301- taken in 2015.

Sites and Monuments Record

The Sites and Monuments Record (SMR) which is maintained by the Department of Housing, Local Government and Heritage was examined as part of the assessment on the 2nd of February 2021. The SMR consists of records included in the RMP and additional sites and monuments notified to the Dept. since the publication of the RMP. This review established that 128 sightings of archaeological material have

been entered in the SMR in the proposed rehabilitation area. The sightings are indicated in Table 1 above and continued in Table 4 below and in Fig. 2. These are all sightings identified by the IAWU survey in 1991 and the re-assessment survey in 1999 that were notified to the NMS It is known that 74 of these sightings could not be relocated by the re-assessment survey in 1999 and had presumably been removed by that date. Since 2008 more 0.81m depth of peat of bog has been removed from the bog.

SMR No.	1999 Cat No.	NGR E	NGR N	Townland	SMR Classification
LF022-060006-	-	607783	761748	Derrymanny	Road - class 3 togher
LF022-061010-	-	605972	761515	DERRYGOWNA	Structure - peatland
LF022-169----	99DNSW0014A-B	605637	761570	DERRYGOWNA	Road - class 3 togher
LF022-062064-	-	607214	761065	Derrynagran	Redundant record
LF022-062065-	-	607113	761098	Derrynagran	Redundant record
LF022-062069-	-	607253	761130	Derrynagran	Redundant record
LF022-064038-	-	608309	760126	Derrindiff	Road - class 3 togher
LF022-064040-	-	608387	760128	Derrindiff	Road - class 3 togher
LF022-064041-	-	608340	760206	Derrindiff	Redundant record
LF022-064042-	-	608400	760136	Derrindiff	Road - class 3 togher
LF022-064043-	-	608351	760546	Derrylough	Road - class 3 togher
LF022-064044-	-	608335	760463	Derrylough	Redundant record
LF022-064045-	-	608549	760169	Derrylough	Road - class 3 togher
LF022-106----	99DBNW024A	607335	761650	Derrindiff	Road - class 3 togher
LF022-107----	99DBNW0026A-B	607324	761576	Derrindiff	Road - unclassified togher
LF022-108----	99DBNW0021A	607443	761527	Derrindiff	Platform - peatland
LF022-109----	99DBNW0020A	607411	761529	Derrindiff	Platform - peatland
LF022-110----	-	607926	760904	Derrindiff	Post row - peatland
LF022-111----	99DBSE035A	608514	760245	Derrindiff	Road - class 3 togher
LF022-112----	99DBSE031A-B	607458	760153	Derrindiff	Road - class 2 togher
LF022-113----	99DBNW018A	607383	761697	Derrindiff	Platform - peatland
LF022-115----	99DBSE0028A	608389	760259	Derrindiff	Platform - peatland
LF022-116----	99DBNW0017A-B	607452	761616	Derrindiff	Road - unclassified togher
LF022-117----	99DBNW0013A	607488	761544	Derrindiff	Road - unclassified togher
LF022-118----	99DBSE0002A	608286	760232	Derrindiff	Platform - peatland
LF022-119----	99DBSE036A	608442	760149	Derrindiff	Platform - peatland
LF022-120----	99DBSE018A	608393	760198	Derrindiff	Platform - peatland
LF022-121----	99DBSE027A	608389	760221	Derrindiff	Platform - peatland
LF022-122----	99DBSE0017A	608367	760185	Derrindiff	Redundant record
LF022-123----	99DBSE0004A	608290	760173	Derrindiff	Road - unclassified togher
LF022-124----	99DBSE0006A	608316	760243	Derrindiff	Platform - peatland
LF022-132----	99DBSE0020A	608480	760200	Derrylough	Platform - peatland
LF022-135----	99DBSE0026A	608442	760338	Derrylough	Post row - peatland
LF022-136----	99DBSE0037A	608521	760274	Derrylough	Platform - peatland
LF022-137----	99DBSE0032A	608538	760122	Derrylough	Road - unclassified togher
LF022-144----	-	608142	761099	Derrymanny	Platform - peatland
LF022-145----	-	608117	761093	Derrymanny	Road - unclassified togher
LF022-146----	-	608224	761193	Derrylough/Derrymanny	Road - gravel/stone trackway - peatland
LF022-153----	-	608045	761336	Derrynagran	Road - unclassified togher
LF022-154----	-	607172	761125	Derrynagran	Platform - peatland
LF022-155----	-	607175	761121	Derrynagran	Platform - peatland
LF022-160----	-	608086	761274	Derrynagran	Road - unclassified togher
LF022-164----	99DNSW0006A	605992	761525	DERRYGOWNA	Platform - peatland
LF022-165----	99DNSW0006A	605981	761511	DERRYGOWNA	Platform - peatland
LF022-166----	99DNSW0012A-C	605829	761713	DERRYGOWNA	Road - unclassified togher
LF022-180----	99DBNW0027A	607189	761642	Derrynagran	Platform - peatland
LF022-181----	-	607159	761145	Derrynagran	Platform - peatland
LF022-182----	-	607166	761136	Derrynagran	Platform - peatland
LF022-183----	-	607170	761136	Derrynagran	Platform - peatland
LF022-187----	-	607164	761130	Derrynagran	Platform - peatland

Table 4. List of additional sightings added to the SMR following the 1999 re-assessment survey. Note this table also includes sightings and redundant records from the 1991 IAWU survey not included in the RMP.

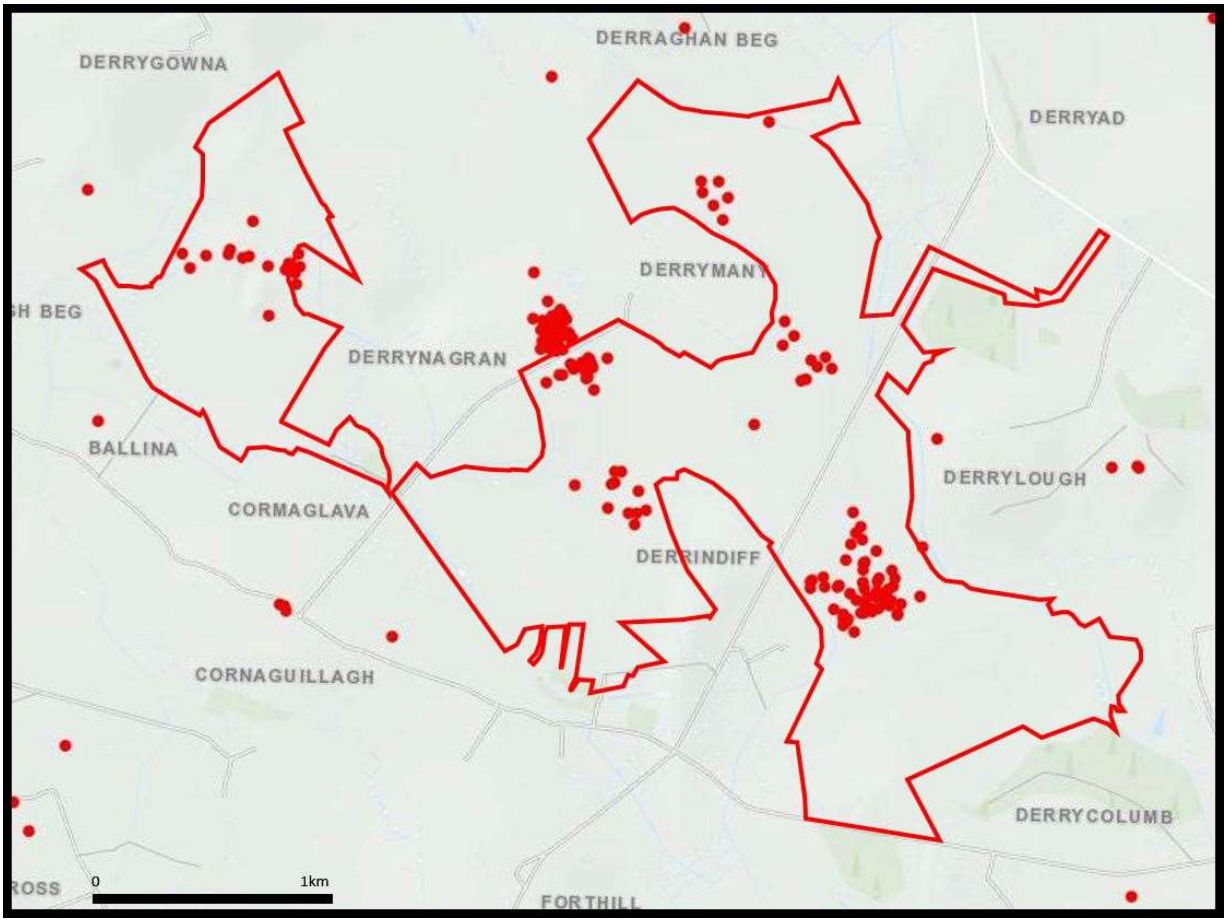


Fig. 2. Derrycolumb Bog, Co. Longford, detail of the Sites and Monuments Record. The proposed rehabilitation area is outlined with the redline. There are numerous SMRs in the area.

Archaeological excavations

An 18m stretch of a Bronze Age Road-Class 1 Togher (LF022-064015, 99DBSE0007A-T) in Derrindiff and Derrylough townlands was excavated by the IAWU in 1991 (Moloney 1993). When visited in 1999 this togher was found to be at the surface and being milled. A Bronze Age Road-Class 2 Togher which was visible for 385m (LF022-063001-, 99DBNW0014A-S) was also excavated by the IAWU in 1991. In 2001, 18 cuttings were excavated under 10 licences by Jane Whitaker in the rehabilitation area as part of the Bord na Móna excavation programme (see Table 5) (Whitaker 2009).

SMR No.	1999 Cat No.	NGR E	NGR N	Townland	Classification	Cuttings	License No.
LF022-064015-	99DBSE007A-T	20848	26013	Derrindiff	Road - class 1 togher	4	01E0585
LF022-106----	99DBNW024A	607335	761650	Derrindiff	Road - class 3 togher	1	01E0766
LF022-121----	99DBSE027A	608389	760221	Derrindiff	Platform - peatland	1	01E0587
LF022-112----	99DBSE031A-B	607458	760153	Derrindiff	Road - class 2 togher	1	01E0589
LF022-06406-	99DBSE0033A-F	20818	26021	Derrindiff	Road - class 2 togher	5	01E0590
LF022-111----	99DBSE035A	608514	760245	Derrindiff	Road - class 3 togher	1	01E0591
LF022-120----	99DBSE018A	608393	760198	Derrindiff	Platform - peatland	1	01E0586
LF022-119----	99DBSE036A	608442	760149	Derrindiff	Platform - peatland	1	01E0592
LF022-111----	99DBSE035A	608514	760245	Derrindiff	Road - class 3 togher	1	01E0591
LF022-113----	99DBNW018A	607383	761697	Derrindiff	Platform - peatland	1	01E0765

Table 5. Licensed excavations carried out in Derrycolumb Bog.

Reported finds

There are three reported finds from Derrycolumb Bog recorded in the Topographical Files of the National Museum of Ireland. These are the upper stone of a rotary quern (1979:75) from Derrymanny townland; a socketed bronze dagger (1956:458a) from Derrynagran townland and a pointed wooden stake (1956:458b) found in association with the bronze dagger.

Previous assessments

Derrycolumb Bog has been the subject of an Environmental Impact Assessment Report carried out by Irish Archaeological Consultancy LTD in 2018 for Bord na Móna Energy Limited in relation to IPC Licence P0500-01. The assessment noted that there was a high potential for archaeological features to be uncovered during the course of any future development works in Derrycolumb Bog.

Impact assessment

There are 128 known sightings of archaeology in the rehabilitation area. It is known that 74 of these sightings could not be relocated by the re-assessment survey in 1999 and had presumably been removed by that date. The remaining 54 sightings were mostly visible on the surface with some extending to a maximum depth of 1.05m. Estimates of the peat removed from the bog based on the results of drone survey of the bog carried out by Bord na Móna indicates that since 2008 more 0.81m depth of peat of bog has been removed from the bog. This would have removed all the remaining sightings of archaeology except for some sightings of RMP LF022-06301- (99DBNW0014A-S) which when surveyed in 1999 extended for 385m across 19 fields (see Fig .3). The proposed rehabilitation works may have an impact the remaining sightings of RMP LF022-06301- (99DBNW0014A-S). The proposed works also have the potential to impact previously unknown archaeological material.

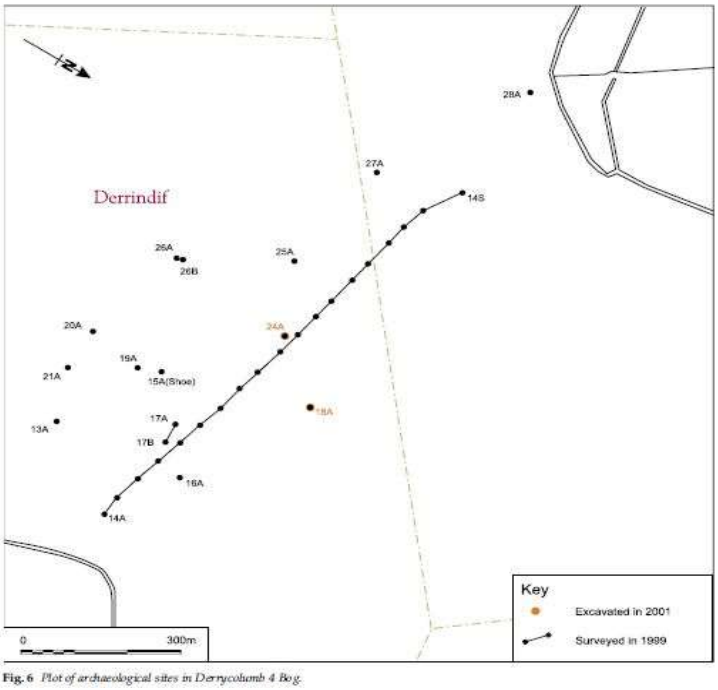


Fig. 6 *Plot of archaeological sites in Derrycolumb 4 Bog.*

Fig 3. Plan of the 19 sightings of RMP LF022-06301- (99DBNW0014A-S) indicated with the continuous black line.

Recommendations

There is only one known surviving archaeological monument in Derrycolumb Bog RMP LF022-06301-. The area of this monument should be avoided by the regeneration works. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it should be avoided and reported to the Bord na Móna Archaeological Liaison Officer and the National Museum of Ireland.

Conclusion

This is a desk-based archaeological assessment and includes a collation of existing written and graphic information to identify the likely archaeological potential of the proposed rehabilitation area. There is only one known surviving archaeological monument in Derrycolumb Bog RMP LF022-06301-. The area of this monument should be avoided by the regeneration works. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it should be avoided and reported to the Bord na Móna Archaeological Liaison Officer and the National Museum of Ireland.

References

DAHGI 1996. Recorded Monuments Protected under Section 12 of the National Monuments (Amendment) Act, 1994. County Longford.

EPA 2020. Guidance on the process of preparing and implementing a bog rehabilitation plan.

Mackin *et al.* 2017. Best practice in raised bog restoration in Ireland. Irish Wildlife Manuals, No. 99. National Parks and Wildlife Service.

Moloney, A. 1993. Survey of the raised bogs of Co. Longford. *IAWU Transactions 1*, Dublin.

Whitaker, J. 2009. *Peatland Excavations 2001-2002 Mountdillon Group of Bogs, Co. Longford.* Dublin.

Dr. Charles Mount
15 February 2021

Appendix C Site Synopses

SITE SYNOPSIS

SITE NAME: LOUGH REE SPA

SITE CODE: 004064

Situated on the River Shannon between Lanesborough and Athlone, Lough Ree is the third largest lake in the Republic of Ireland. It lies in an ice-deepened depression in Carboniferous Limestone. Some of its features (including the islands) are based on glacial drift. The main inflowing rivers are the Shannon, Inny and Hind, and the main outflowing river is the Shannon. The greater part of Lough Ree is less than 10 m in depth, but there are six deep troughs running from north to south, reaching a maximum depth of about 36 m just west of Inchmore. The lake has a very long, indented shoreline and hence has many sheltered bays. It also has a good scattering of islands, most of which are included in the site.

Beds of Common Reed (*Phragmites australis*) are an extensive habitat in a number of the more sheltered places around the lake; monodominant stands of Common Club-rush (*Scirpus lacustris*), Slender Sedge (*Carex lasiocarpa*) and Saw Sedge (*Cladium mariscus*) also occur as swamps in suitable places. Some of these grade into species-rich calcareous fen or freshwater marsh. Lowland wet grassland, some of which floods in winter, occurs frequently around the shore.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Whooper Swan, Wigeon, Teal, Mallard, Shoveler, Tufted Duck, Common Scoter, Goldeneye, Little Grebe, Coot, Golden Plover, Lapwing and Common Tern. 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.

Lough Ree is one of the most important Midland sites for wintering waterfowl, with nationally important populations of Little Grebe (52), Whooper Swan (139), Wigeon (2,070), Teal (1,474), Mallard (1,087), Shoveler (54), Tufted Duck (1,012), Goldeneye (205), Coot (338), Golden Plover (3,058) and Lapwing (5,793) – all figures are three year mean peaks for the period 1997/98 to 1999/2000. Other species which occur in winter include Great Crested Grebe (29), Cormorant (99), Curlew (254) and Black-headed Gull (307) as well as the resident Mute Swan (85). Greenland White-fronted Goose has been recorded on occasion on the flooded margins of the site.

The site supports a nationally important population of Common Tern (90 pairs in 1995). It is a traditional breeding site for Black-headed Gull and whilst a full survey has not been carried out in recent years, substantial numbers of nesting birds were present on at least one island in 2003. Lesser Black-backed Gull and Common Gull have bred in the past and may still breed. Lough Ree is a noted site for breeding duck and grebes: Tufted Duck (202 pairs) and Great Crested Grebe (32 pairs) – records from 1995. Of particular note is that Lough Ree is one of the two main sites in the

country for breeding Common Scoter, a Red Data Book species. Surveys have recorded 39 pairs and 32 pairs in 1995 and 1999 respectively. Cormorant also breeds on some of the islands within the site – 86 nests were recorded in 2010. The woodland around the lake is a stronghold for Garden Warbler and this scarce species probably occurs on some of the islands within the site.

Lough Ree SPA is of high ornithological importance for both wintering and breeding birds. It supports nationally important populations of eleven wintering waterfowl species. The site has a range of breeding waterfowl species, notably nationally important populations of Common Scoter and Common Tern. Of particular note is the regular presence of three species, Whooper Swan, Golden Plover and Common Tern, which are listed on Annex I of the E.U. Birds Directive. Parts of Lough Ree SPA are Wildfowl Sanctuaries.

SITE SYNOPSIS

Site Name: Lough Ree SAC

Site Code: 000440

Lough Ree is the third largest lake in Ireland and is situated in an ice-deepened depression in Carboniferous limestone on the River Shannon system between Lanesborough and Athlone. The site spans Counties Longford, Roscommon and Westmeath. Some of its features (including the islands) are based on glacial drift. It has a very long, indented shoreline and hence has many sheltered bays. Although the main habitat, by area, is the lake itself, interesting shoreline, terrestrial and semi-aquatic habitats also occur.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[3150] Natural Eutrophic Lakes
[6210] Orchid-rich Calcareous Grassland*
[7110] Active Raised Bog*
[7120] Degraded Raised Bog
[7230] Alkaline Fens
[8240] Limestone Pavement*
[91D0] Bog Woodland*
[91E0] Alluvial Forests*
[1355] Otter (*Lutra lutra*)

The greater part of Lough Ree is less than 10 m in depth, but there are six deep troughs running from north to south, reaching a maximum depth of about 36 m just west of Inchmore. The lake has been classified as mesotrophic in quality, but the size of the system means that a range of conditions prevail depending upon, for example, rock type. This gives rise to local variations in nutrient status and pH, which in turn results in variations in the phytoplankton and macrophyte flora. Therefore species indicative of oligotrophic, mesotrophic, eutrophic and base-rich situations occur. The water of Lough Ree tends to be strongly peat-stained, restricting macrophytes to depths of less than 2 m, and as a consequence, macrophytes are restricted to sheltered bays, where a typical Shannon flora occurs. Species present include Intermediate Bladderwort (*Utricularia intermedia*), pondweeds (*Potamogeton* spp.), Quillwort (*Isoetes lacustris*), Greater Duckweed (*Spirodela polyrhiza*), stoneworts (*Chara* spp., including *C. pedunculata*) and Arrowhead (*Sagittaria sagittifolia*). The latter is a scarce species which is almost confined in its occurrence to the Shannon Basin.

Reedbeds of Common Reed (*Phragmites australis*) are an extensive habitat in a number of more sheltered places around the lake, but single-species 'swamps' consisting of such species as Common Club-rush (*Scirpus lacustris*), Slender Sedge (*Carex lasiocarpa*), Great Fen-sedge (*Cladium mariscus*) and two scarce species of sedge (*Carex appropinquata* and *C. elata*) also occur in suitable places. Some of these grade up into species-rich alkaline fen with Black Bog-rush (*Schoenus nigricans*) and Whorl-grass (*Catabrosa aquatica*), or freshwater marsh with abundant Water Dock (*Rumex hydrolapathum*) and Hemp-agrimony (*Eupatorium cannabinum*).

Lowland wet grassland is found in abundance around the shore and occurs in two types. One is 'callowland', grassland which floods in winter. This provides feeding for winter waterfowl and breeding waders. The other is an unusual community on stony wet lake shore which is found in many places around the lake, and is characterized by Water Germander (*Teucrium scordium*), a scarce plant species almost confined to this lake and Lough Derg.

Dry calcareous grassland occurs scattered around the lake shore. This supports typical species such as Yellow-wort (*Blackstonia perfoliata*), Carline Thistle (*Carlina vulgaris*) and Quaking-grass (*Briza media*). Orchids also feature in this habitat e.g. Bee Orchid (*Ophrys apifera*) and Common Spotted-orchid (*Dactylorhiza fuchsii*).

Limestone pavement occurs occasionally around the lake shore. The most substantial area is at Rathcline in the extreme north-east. While this has been planted with commercial forestry since the 1950s, it still displays a diverse representation of pavement types, from the typical clint-gryke system to large blocky pavements and scattered boulders. In all cases the pavement is covered by a bryophyte-rich flora, with abundant Ivy (*Hedera helix*), and a scrub layer dominated by Ash (*Fraxinus excelsior*), Hazel (*Corylus avellana*) and some Spindle (*Euonymus europaeus*). The ground flora is variable, though in places it is species-rich.

Dry broadleaved semi-natural woodland occurs in several places around the lake, most notably at St John's Wood and on Hare Island. St John's Wood is recognised as the largest and most natural woodland in the Midlands. Its canopy is dominated by Hazel, Pedunculate Oak (*Quercus robur*), Holly (*Ilex aquifolium*) and Ash, but a range of other trees and shrubs occur, including Wych Elm (*Ulmus glabra*), Yew (*Taxus baccata*), Wild Cherry (*Prunus avium*) and Irish Whitebeam (*Sorbus hibernica*). The ground flora of St John's Wood is species-rich, and is remarkable for the presence of two species, Toothwort (*Lathraea squamaria*) and Bird's-nest Orchid (*Neottia nidus-avis*), which tend to occur in sites with a long history of uninterrupted woodland cover. The tree species composition on Hare Island is similar to that in St John's Wood, with additional non-native species such as Sycamore (*Acer pseudoplatanus*) and Beech (*Fagus sylvatica*). This wood also has an exceptionally rich ground flora. Some of the smaller areas of woodland around Lough Ree are mixed woodland with a high percentage of exotics such as Beech. Some areas of well-developed Hazel scrub also occur.

At St John's Wood, patches of wet alluvial woodland are present along the lakeshore. They are dominated by Ash, Grey Willow (*Salix cinerea*), Alder (*Alnus glutinosa*) and, in places, Downy Birch (*Betula pubescens*). The ground flora includes Creeping Bent (*Agrostis stolonifera*), Wild Angelica (*Angelica sylvestris*), Meadowsweet (*Filipendula ulmaria*), Common Marsh-bedstraw (*Galium palustre*), Yellow Iris (*Iris pseudacorus*), Gipsywort (*Lycopus europaeus*), Water Mint (*Mentha aquatica*), Reed Canary-grass (*Phalaris arundinacea*), Creeping Buttercup (Ranunculus repens) and Wood Dock (*Rumex sanguineus*). Pockets of wet woodland occur elsewhere around the lake. Most of these are dominated by willows (*Salix* spp.), Alder and Downy Birch. In one such wood, at Ross Lough, the terrestrial alga, *Trentopohlia* sp., has a specialised niche on the willow trunks. The ground layer has a rich bryophyte flora (*Calliergon* spp. and *Sphagnum* spp.), scattered clumps of Greater Tussock-sedge (*Carex paniculata*) and a good diversity of herb species, including Water Dock and Fen Bedstraw (*Galium uliginosum*).

Small examples of raised bog occur, which are of interest in that they show a natural transition through wet woodland and/or swamp to lakeshore habitats. Active Raised Bog (ARB) habitat comprises areas of high bog that are wet and actively peat-forming, where the percentage cover of bog mosses (*Sphagnum* spp.) is high, and where some or all of the following features occur: hummocks, pools, wet flats, *Sphagnum* lawns, flushes and soaks. Results from surveys of the raised bog habitat in 2003 indicate the presence of 5.9 ha of Active Raised Bog (ARB). Also present are examples of Degraded Raised Bog (DRB) capable of regeneration. In general the vegetation of these degraded areas is dominated by typical raised bog species such as Cross-leaved Heath (*Erica tetralix*), Heather (*Calluna vulgaris*), Hare's-tail Cottongrass (*Eriophorum vaginatum*), Bog Asphodel (*Narthecium ossifragum*) and Deergrass (*Scirpus cespitosus*). Typically the degraded bog areas have a low cover of peat-forming bog mosses (*Sphagnum* spp.). The current extent of DRB as estimated using a recently developed hydrological modelling technique, based largely on Light Detection And Ranging (LiDAR) data, is 44.7 ha.

Associated with the extensive raised bog system at Clooncraff/Clonlarge are areas of bog woodland. At least two small areas of woodland occur on the raised bog domes. However it would appear that this habitat is in the early stages of development. The largest area is dominated by low trees of Downy Birch and Lodgepole Pine (*Pinus contorta*). Occasional trees of Scots Pine (*Pinus sylvestris*) also occur. The ground layer is wet and quaking with a lush carpet of mosses present, including various species of *Sphagnum*, *Pleurozium schreberi* and *Aulacomium palustre*. The main vascular plant species in the ground flora are Bog-rosemary (*Andromeda polifolia*), Cranberry (*Vaccinium oxycoccos*), Bog-myrtle (*Vaccinium myrtillus*), Hare's-tail Cottongrass and Deergrass. Bog Woodland is of particular conservation importance and is listed with priority status on the E.U. Habitats Directive.

At St John's Wood, there is an interesting area of woodland that grows on cut-away peat. This is dominated by Downy Birch and Alder Buckthorn (*Frangula alnus*). The occurrence of the latter species in such abundance is unusual in Ireland.

Smaller lakes occur around the lake shore, especially on the east side, and these often have the full range of wetland habitats contained within and around them. A number of small rivers also pass through the site.

The site supports a number of rare plant species which are listed in the Irish Red Data Book. Alder Buckthorn and Bird Cherry (*Prunus padus*) are woodland components at St John's Wood and elsewhere. Narrow-leaved Helleborine (*Cephalanthera longifolia*) and Betony (*Stachys officinalis*), both of which are also legally protected under the Flora (Protection) Order, 1999, occur among the ground flora of Hare Island (where the former occurs in notable abundance). They also occur in a number of other woods. The stonewort *Chara tomentosa* is present in shallow water around the lake. The rare, though not legally protected, Marsh Pea (*Lathyrus palustris*) occurs on some of the callowland and in alluvial woodland at St John's Wood. The rare Myxomycete fungus, *Echinostelium colliculosum,* has been recorded from St John's Wood.

The lake itself contains one of only two populations in Ireland of the endangered fish species, Pollan (*Coregonus autumnalis*), which is genetically different from Continental European stock. The shrimp *Mysis relicta* (Class Crustacea) occurs in this lake and is a relict of the glacial period in Ireland.

Small flocks of Greenland White-fronted Goose, an Annex I species on the E.U. Birds Directive, use several areas of callowland around the lake in winter. An average spring count of 92 individuals was obtained for this species over the six seasons 1988/89 to 1993/94, indicating that Lough Ree is a nationally important site for the species. The following bird counts are derived from 6 counts during the period 1984/85 to 1986/87: nationally important populations of Golden Plover (1,350), an Annex I species; Wigeon (1,306); Teal (584); Tufted Duck (1,317) and Coot (798). Other winter visitors are Whooper Swan (32), an Annex I species, Mute Swan (91), Little Grebe (48), Cormorant (91), Mallard (362), Shoveler (40), Pochard (179), Goldeneye (97), Curlew (178), Lapwing (1,751) and Dunlin (48). The callowland is also used by Black-tailed Godwit and other species on migration.

Some of the lake islands provide nesting sites for Common Tern, a species listed on Annex I of the E.U. Birds Directive. The Lough Ree colony, 86 pairs in 1995, is estimated as one of the largest of this species on midland lakes. The lake also provides excellent breeding habitat for wildfowl, including Common Scoter (30-40 pairs), a rare breeding species listed as "Endangered" in the Red Data Book, and Tufted Duck (>200 pairs). The woodlands and scrub around the lake and on the islands are a stronghold of the Garden Warbler (74 territories in 1997), a bird species mainly confined to the Shannon lakes in Ireland.

There is a population of Otter around the lake. This species is listed in the Red Data Book as being threatened in Europe and is protected under Annex II of the E.U. Habitats Directive.

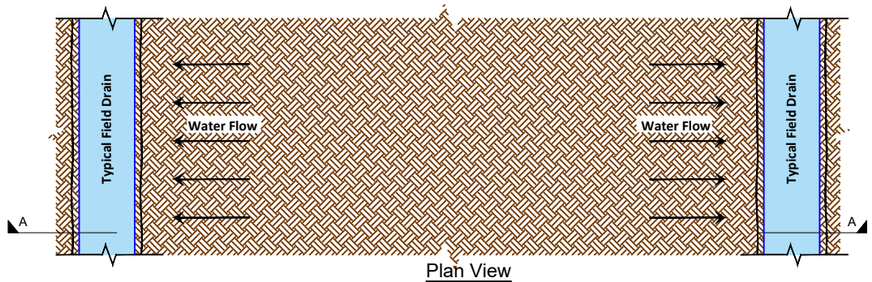
Land uses within the site include recreation in the form of cruiser hire, angling, camping, picnicking and shooting. Chalet accommodation occurs at a few locations around the lake. Low-intensity grazing occurs on dry and wet grassland around the shore, and some hay is made within the site. Some of these activities are damaging, but in a very localised way, and require careful planning. The main threat to the aquatic life in the lake comes from artificial enrichment of the waters by agricultural and domestic waste, and also by peat silt in suspension which is increasingly limiting the light penetration, and thus restricting aquatic flora to shallower waters. At present Lough Ree is less affected by eutrophication than Lough Derg.

Lough Ree and its adjacent habitats are of major ecological significance. Some of the woodlands around the lake are of excellent. St John's Wood is particularly important; it is one of the very few remaining ancient woodlands in Ireland. The lake itself is an excellent example of a mesotrophic to moderate-eutrophic system, supporting a rare fish species and a good diversity of breeding and wintering birds.

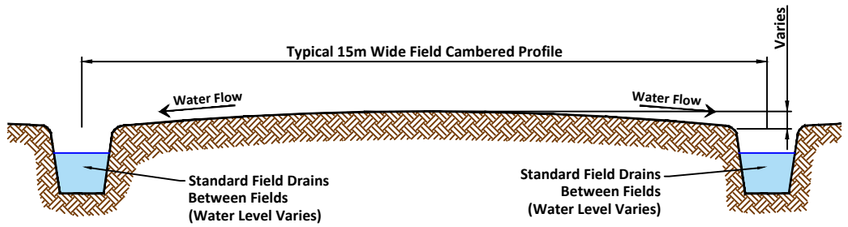
Appendix D Drawings of Proposed Rehabilitation Methodologies

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 Cross berms is to slow the water movement through the bog.



Plan View



Section A-A
(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.
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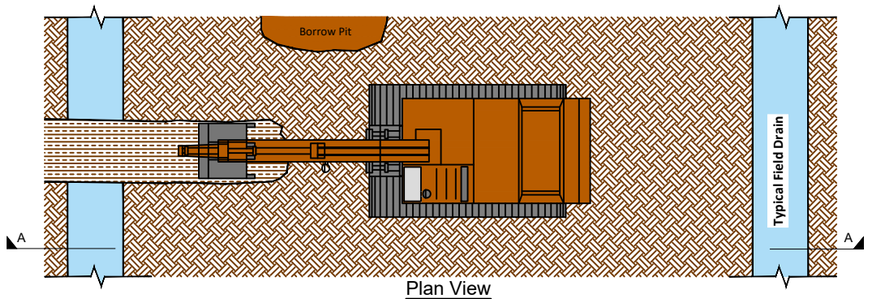
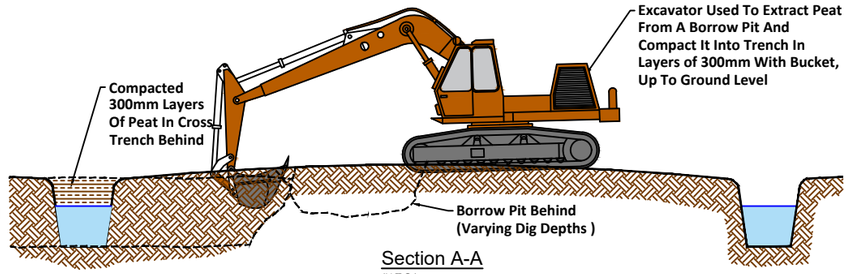
7. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH THE SPECIFICATION FOR THE PARTICULAR BOG AND WITH THE REQUIREMENTS OF THE REHABILITATION PLAN, ANY NATURA IMPACT STATEMENT RECOMMENDED MEASURES IF APPLICABLE, ARCHAEOLOGY REPORTS AND ANY OTHER SPECIFIC ECOLOGICAL MEASURES OR ENVIRONMENTAL REPORTS FOR THIS BOG.

Phase 1
Forming Peat Trench

An Excavator is used to dig a trench approx. 1.2m Wide (4ft. wide excavator bucket) and up to 1.5m Deep where ground conditions allow, along the proposed location of the Berm.
If good 'clay like' ombrotrophic peat exists in trench the peat is turned over and compressed back into trench.
Area behind the machine is used as a borrow pit. Remove degraded peat and 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, until ground level is reached.
Backfill the borrow pit with the degraded peat extracted from the trench and surface of borrow pit.



Plan View



Section A-A
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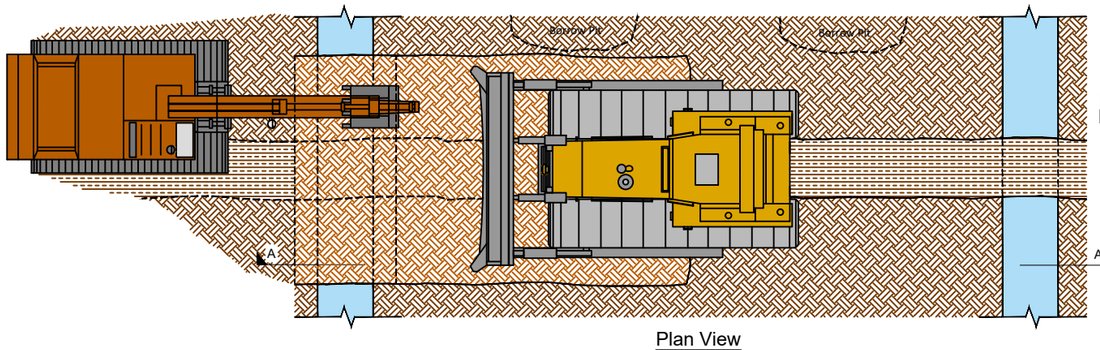
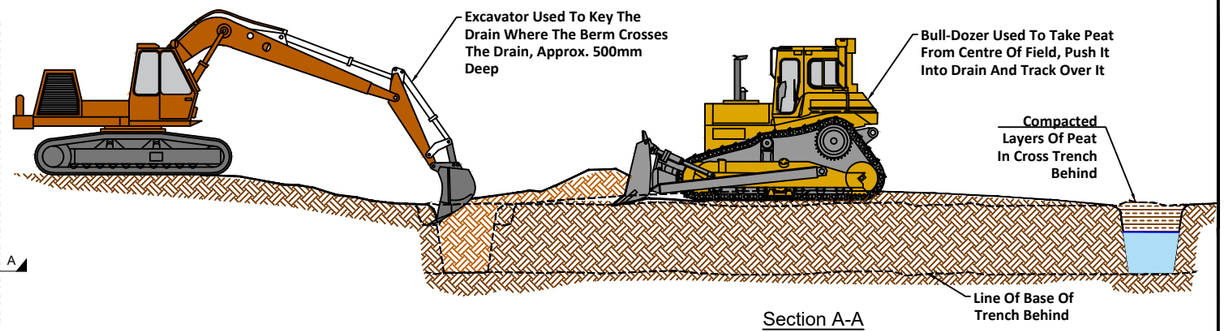
Phase 2
Forming Peat Berm

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.



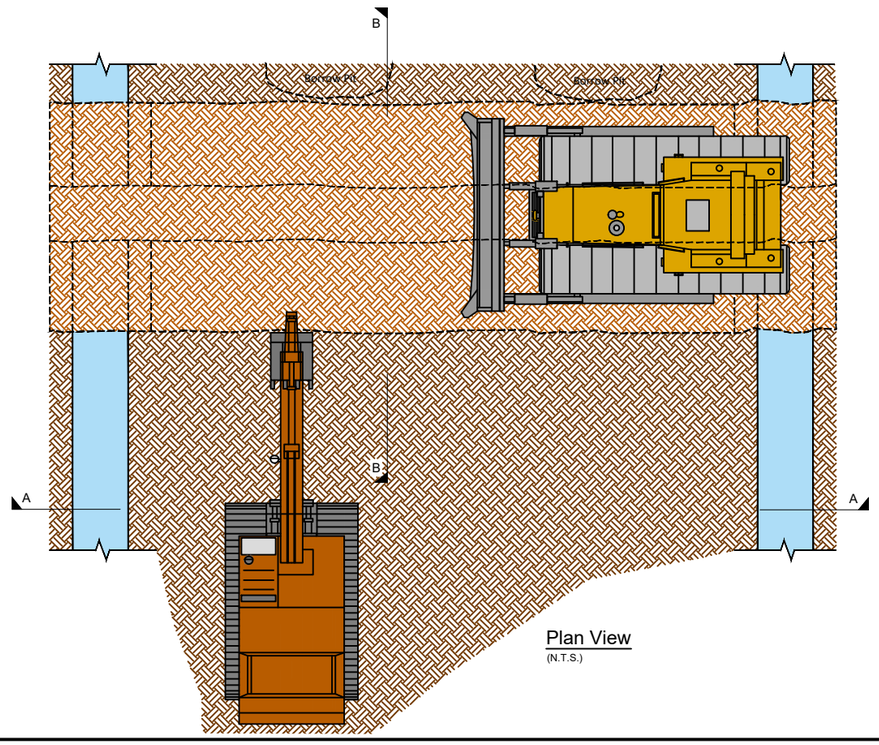
Plan View



Section A-A

Phase 3
Forming Peat Berm

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 1m High Cross Berm.
The peat material in the berm is compacted in layers of 300mm by the dozer tracking over it.
The excavator bucket is used to form and shape the edges of the compacted berm.



Plan View
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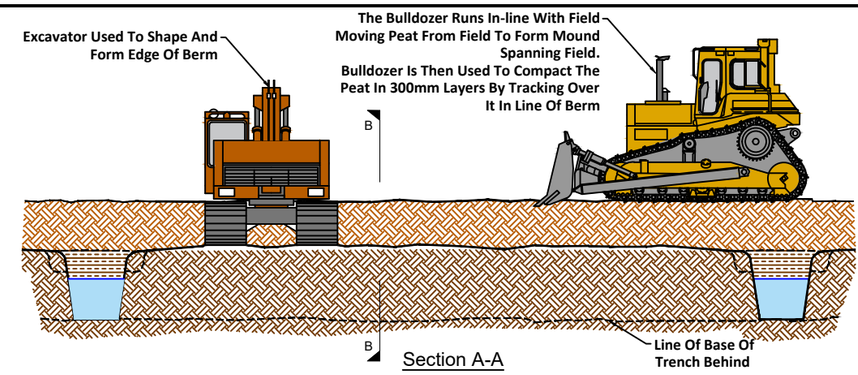
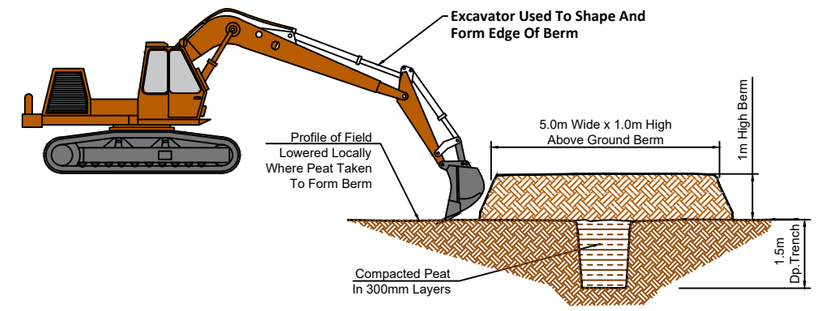


Section A-A



Section B-B

STATUS

Rev	Description	Issued By	Date
a	Issued For Approval	P.K.	12/03/21

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:
Rehabilitation Method
Boundary Berm

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

Date: 28/01/21 | Scale : Not to Scale A3 | Stage: For Approval

Drawing No.: PCAS-0100-015 | Rev: a

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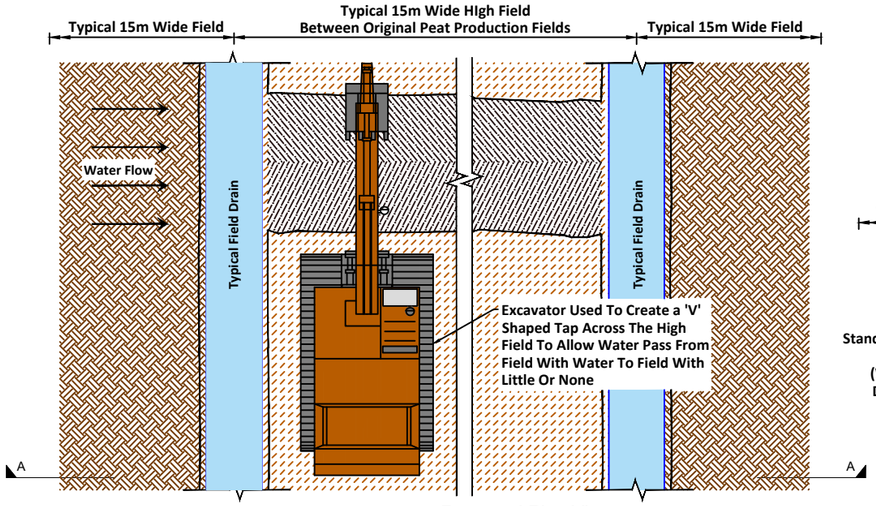
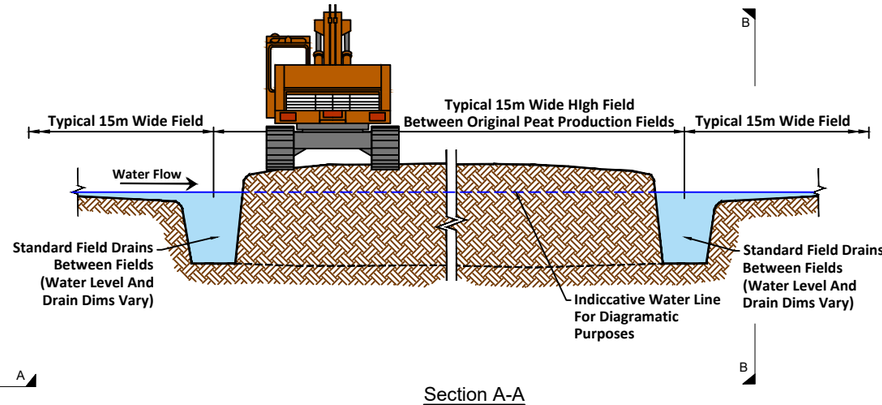
'V' Tap Across High Field To Control Water Levels



Proposed Plan View
(N.T.S.)



Section A-A
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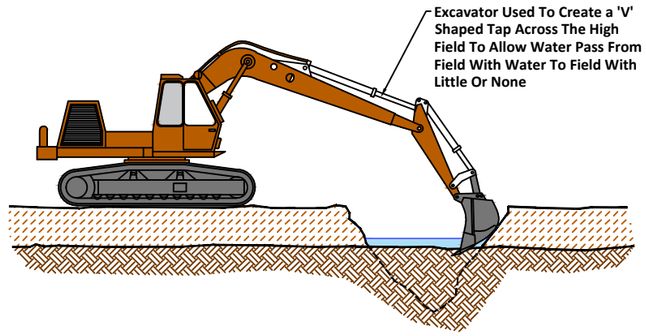
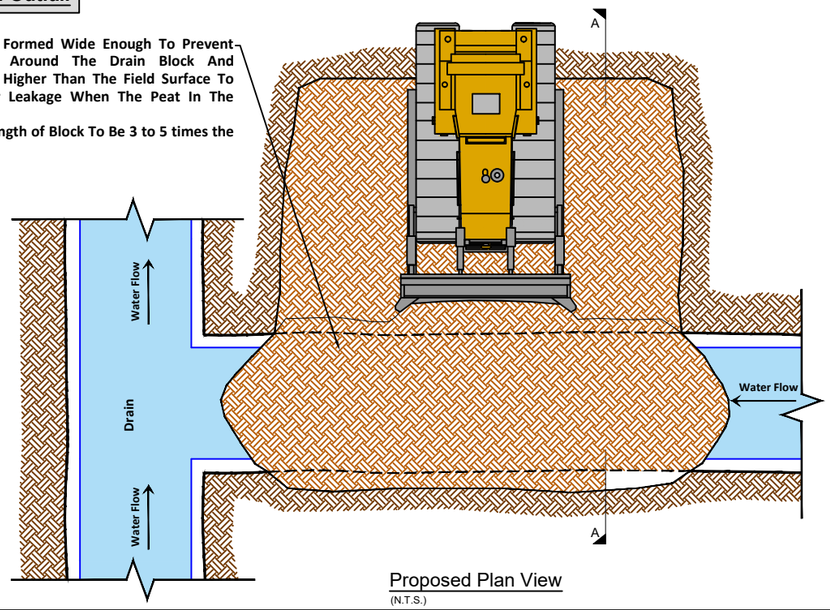


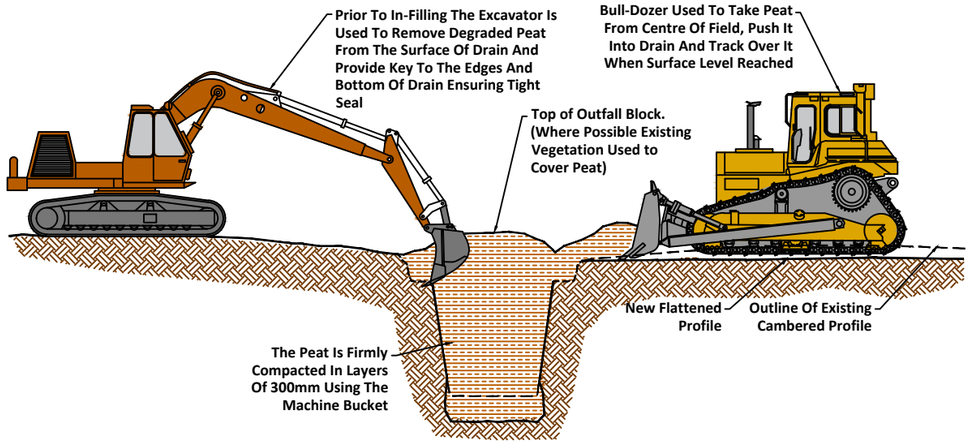
Section B-B
(N.T.S.)

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

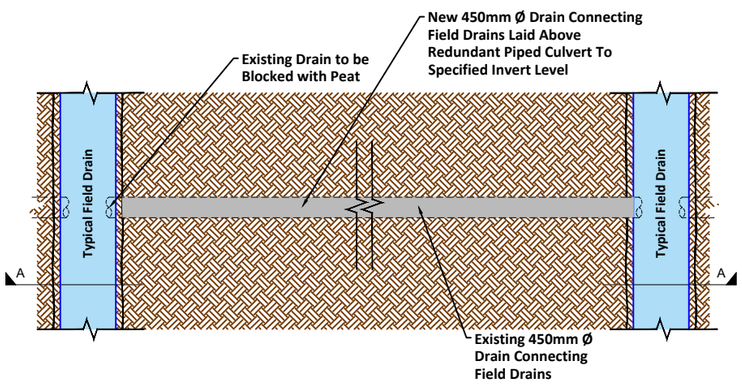


Proposed Plan View
(N.T.S.)

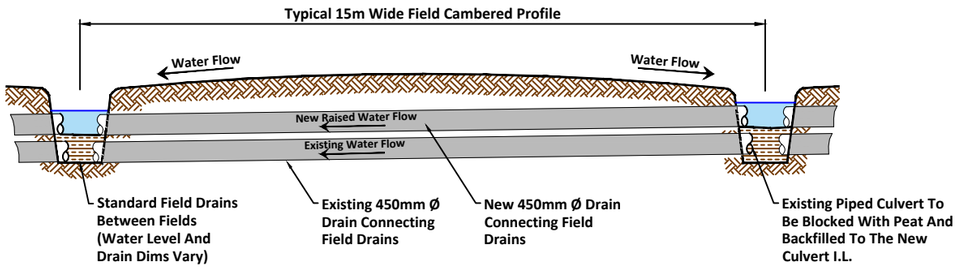


Section A-A
(N.T.S.)

Raise Piped Culverts To Control Water Levels



Proposed Plan View
(N.T.S.)



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

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STATUS

Rev	Description	Issued By	Date
.		.	.
.		.	.
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
Naturally Driven
Bord Na Móna Engineering Department
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: c

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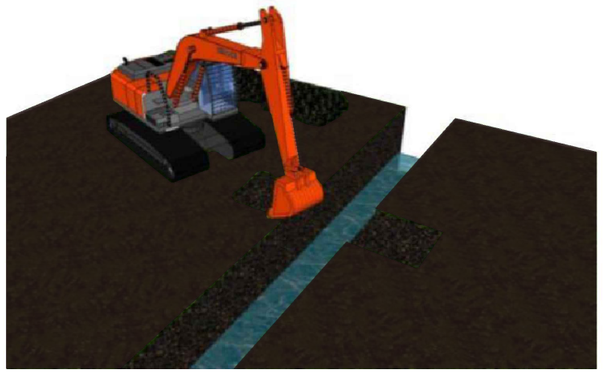
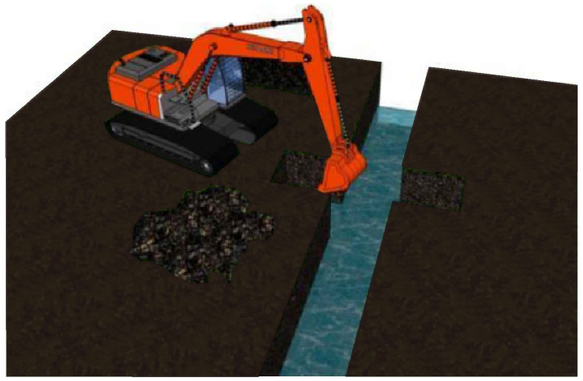
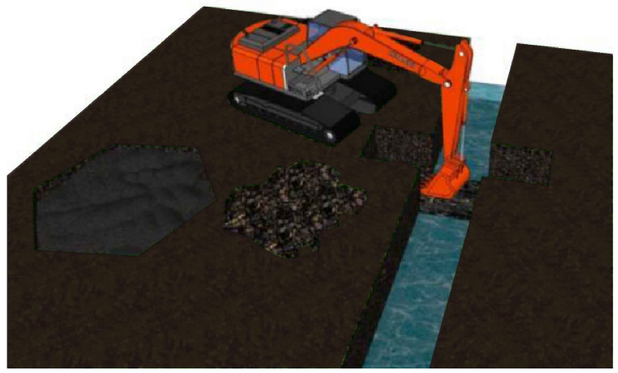
1. Before building drain block, the sides and bottom of the ditch is cleaned using the excavator to remove dry degraded peat, to ensure a good peat-to-peat contact.
(If any vegetation present, it should be carefully removed and left aside for replacement at the end of the process.)

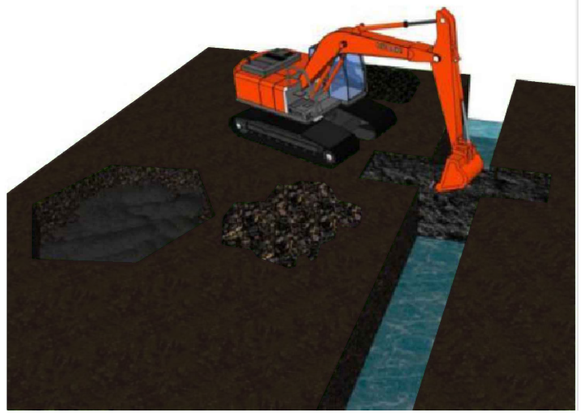




2. Cut key in either side of the drain approximately 500mm deep, and ensure that it is wider than the actual drain.
Remove 500mm of peat from bottom of the drain also and place behind the machine for replacement later.

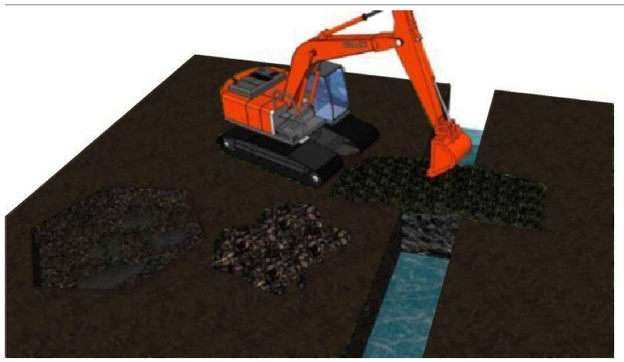
3. Open an area behind machine to be used as a borrow pit. Avoid using the surface layer of peat (top 100-200mm) which is likely to be very permeable. Only use the deeper, more compacted peat to build the drain block.
(If any vegetation present, it should be carefully removed and left aside for replacement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

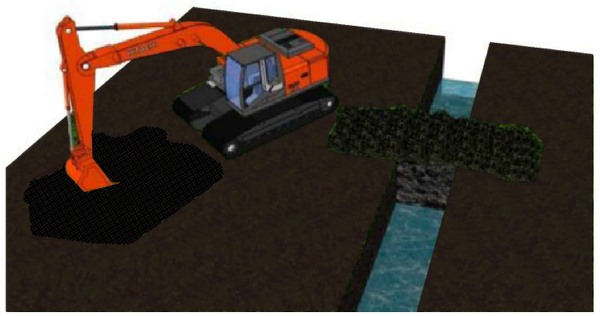




4. Dig out peat from the borrow pit and place into the drain compacting in 300mm layers. Compact the peat firmly using the excavator bucket before laying more peat from the borrow pit.

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
LEABEG, TULLAMORE CO. OFFALY
Tel. 057 9345900
Fax. 057 9345160

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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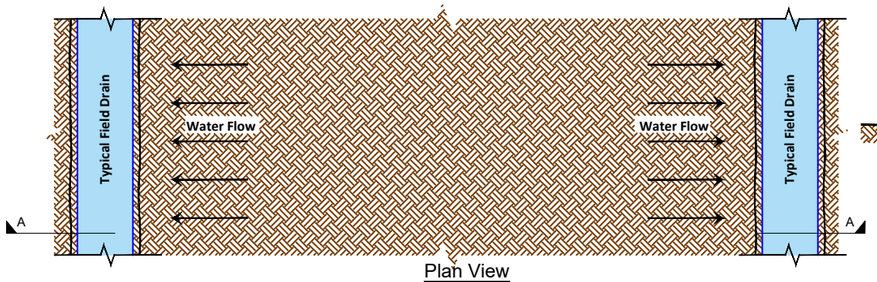
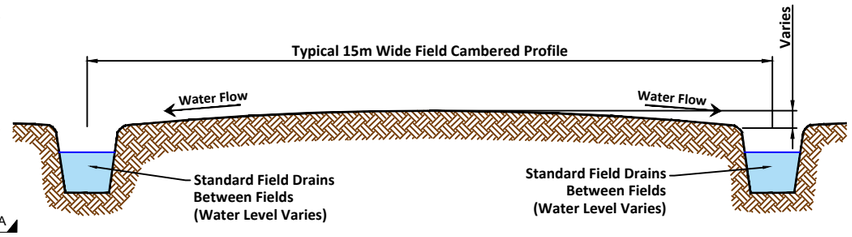
Existing Layout:

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.



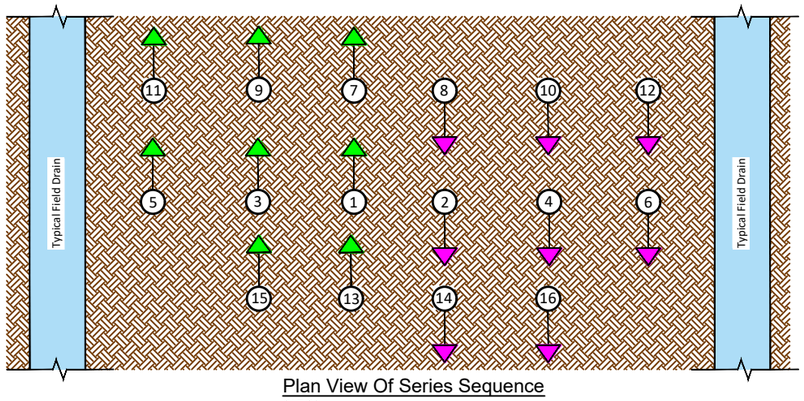
Plan View
(N.T.S.)



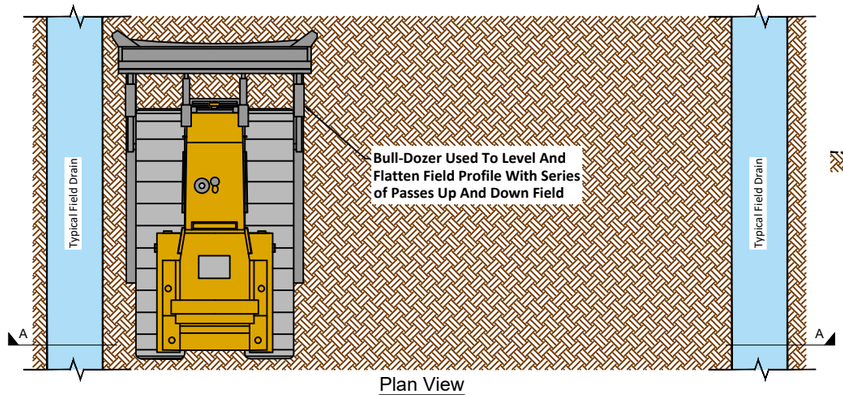
Section A-A
(N.T.S.)

Phase 1
Re-Profiling of Field Surface

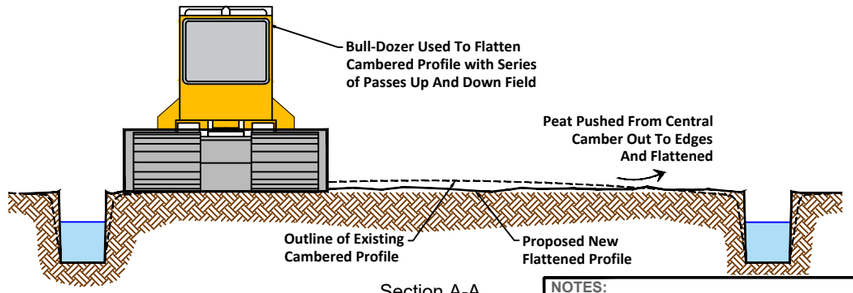
Field to be re-profiled using bull-dozer making a total of 16 passes, 8 passes up and 8 passes down, flattening the camber on the production field. (Sequence of runs shown below)



Plan View Of Series Sequence
(N.T.S.)



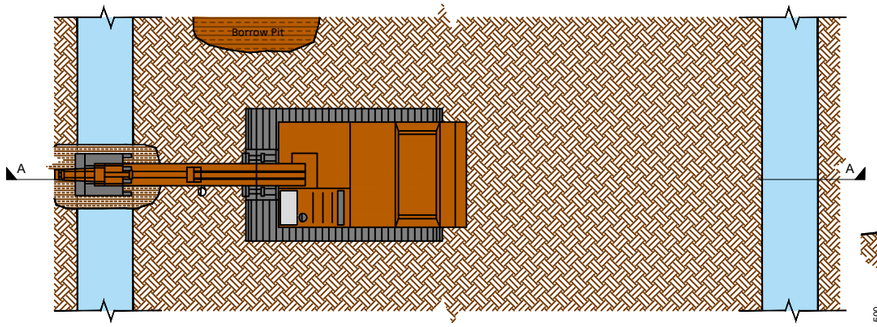
Plan View
(N.T.S.)



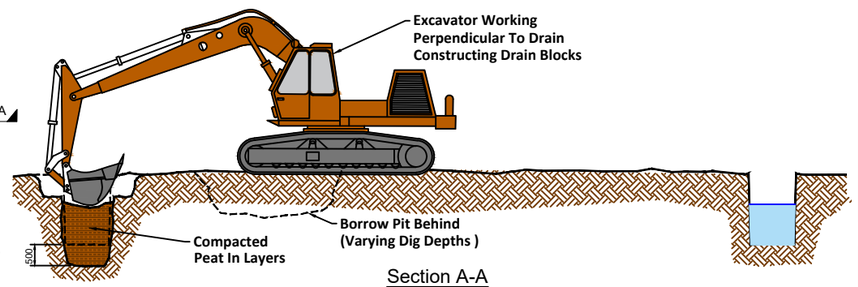
Section A-A
(N.T.S.)

Phase 2
Peat Drain Blocking

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.)



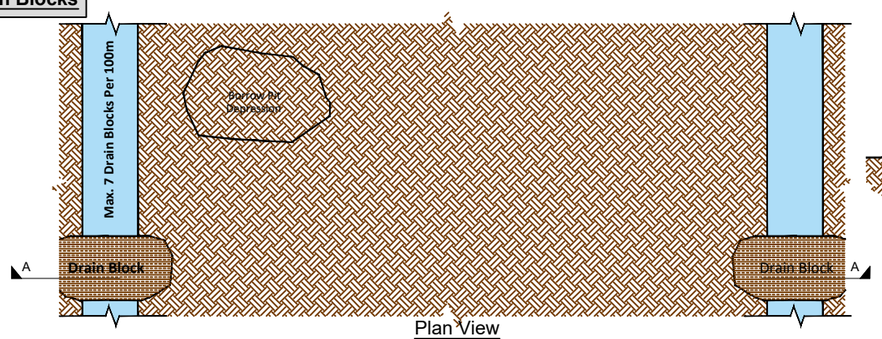
Plan View
(N.T.S.)



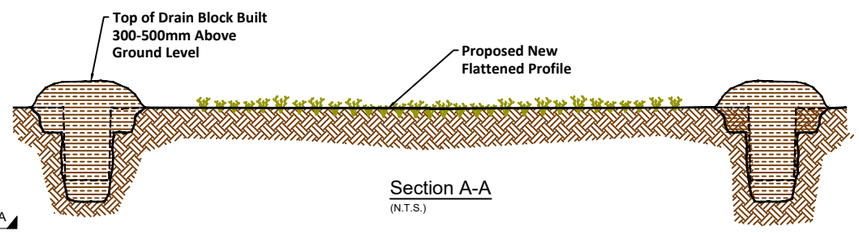
Section A-A
(N.T.S.)

Complete Shallow Field Profile with Regular Drain Blocks

Field re-profiling is developed as a technique to slow the surface water loss from the bog and to retain as much water as possible on the bog, at the required depth.



Plan View
(N.T.S.)



Section A-A
(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.
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
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b	Issued For Approval	P.K.	25/02/21
a	Issued For Information	P.K.	29/01/21

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:
Rehabilitation Method DPT 3A
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-0100-003 | Rev: b

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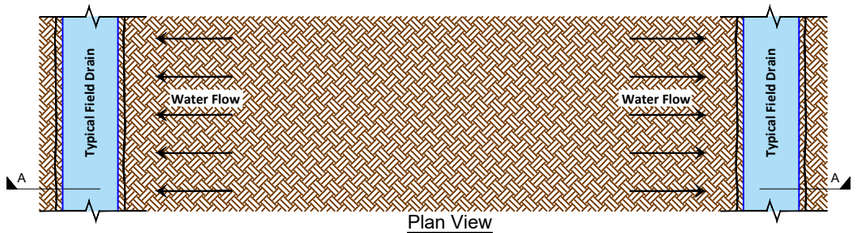
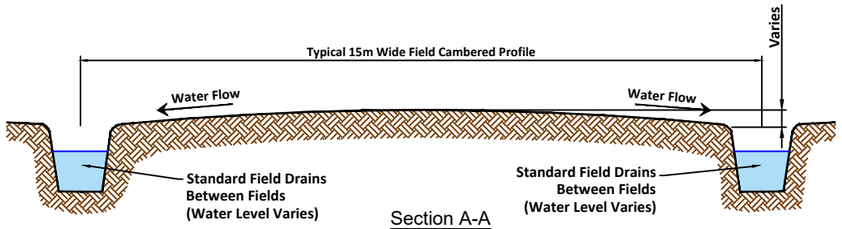
Existing Typical Field Layout:

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.



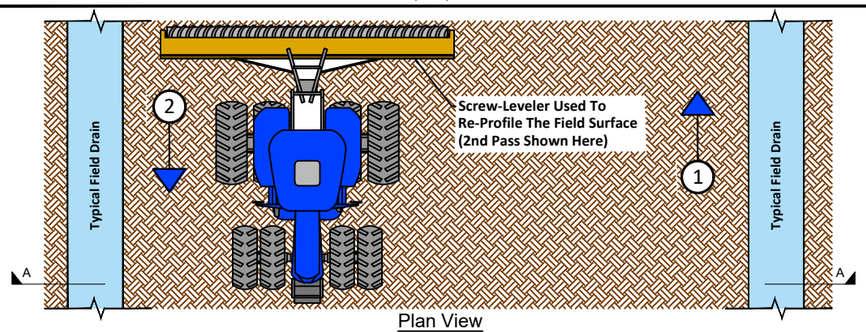
Plan View
(N.T.S.)



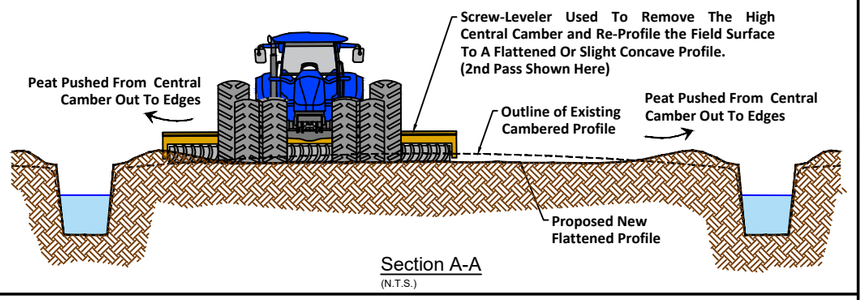
Section A-A
(N.T.S.)

Phase 1
Re-Profiling of Field Surface

The production field is re-profiled 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 is towed using a tractor, with a level axis, will run up one side ① of the production field and down the other side ②, sufficiently offset from drain to ensure the peat does not enter the drain but forms a mound beside the drain.



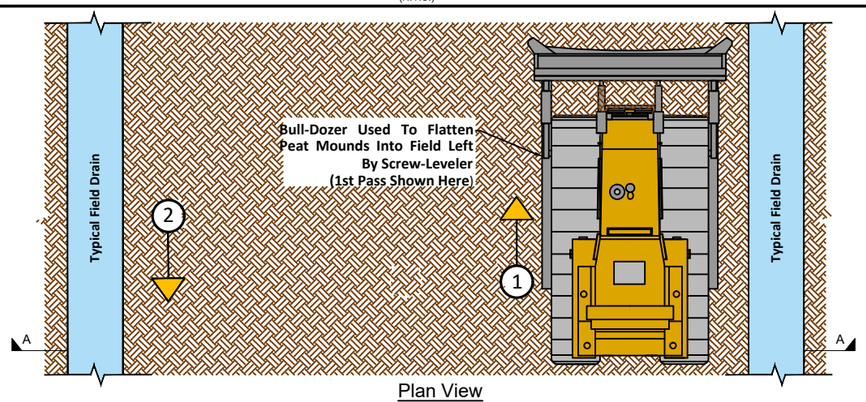
Plan View
(N.T.S.)



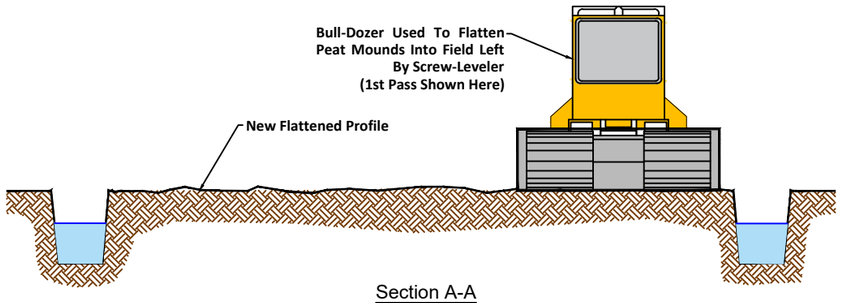
Section A-A
(N.T.S.)

Phase 2
Leveling of Loose Peat

Next the Bull-dozer will run up one edge side ① of the production field and down the other side ② flattening the loose peat mounds, ensuring a minimal amount of peat enters the drains.



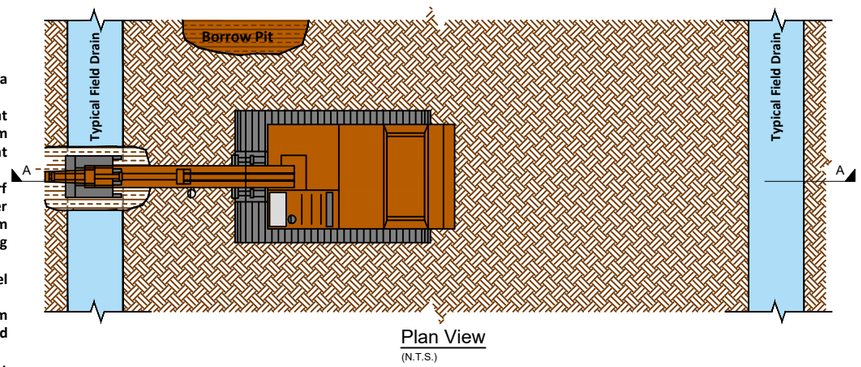
Plan View
(N.T.S.)



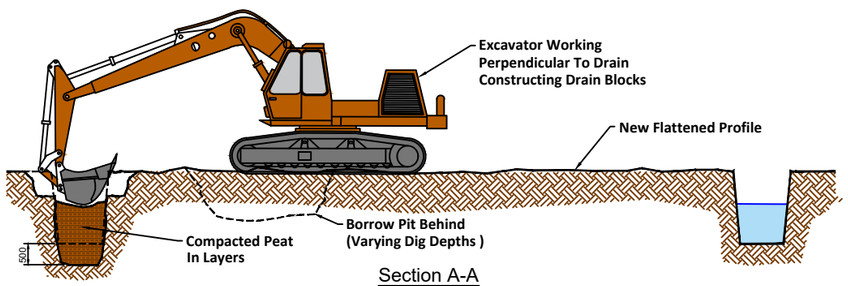
Section A-A
(N.T.S.)

Phase 3
Peat Drain Blocking

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.)



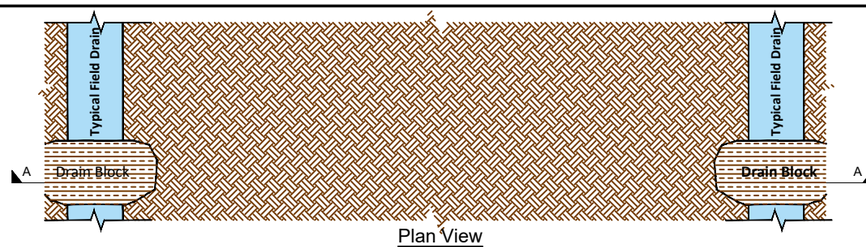
Plan View
(N.T.S.)



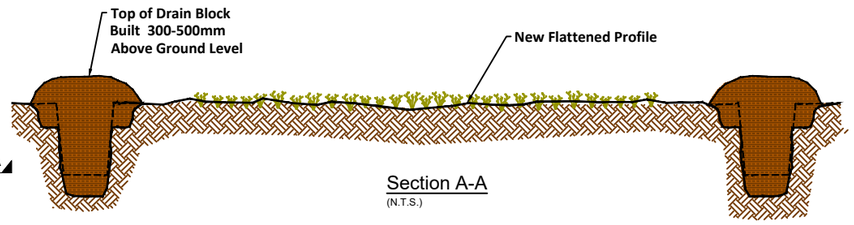
Section A-A
(N.T.S.)

Complete Flattened Field Profile

Field re-profiling is developed as a technique to slow the surface water loss from the bog and to retain as much water as possible on the site. Each re-profiled field will hold a shallow layer of water. In time, these shallows have been shown to quickly infill with peatland vegetation.



Plan View
(N.T.S.)



Section A-A
(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.
4. REFER TO RELEVANT SITE PLAN FOR SPECIFIC FINISHED GROUND LEVELS TO BE ACHIEVED.
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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
b	For Approval	P.K.	03/03/21
a	Issued For Information	P.K.	07/01/21

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:
Rehabilitation Method DPT 3B
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-0100-004 | Rev: b

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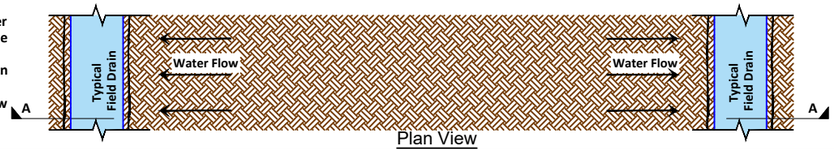
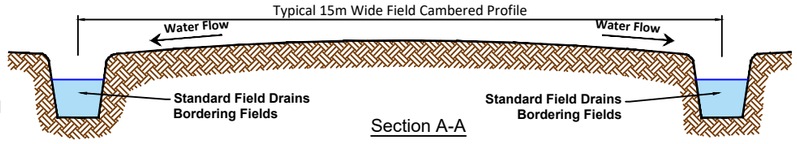
Existing Layout:

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.



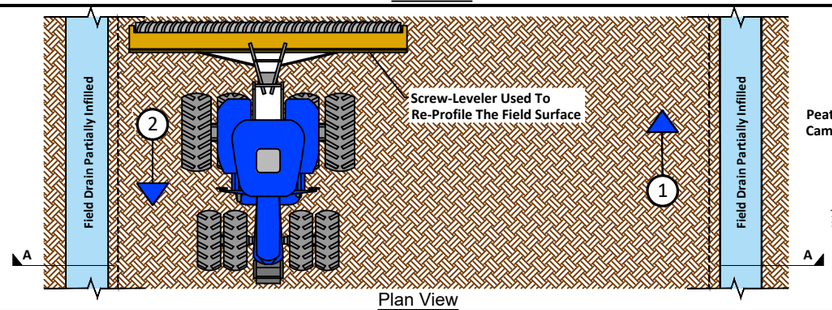
Plan View



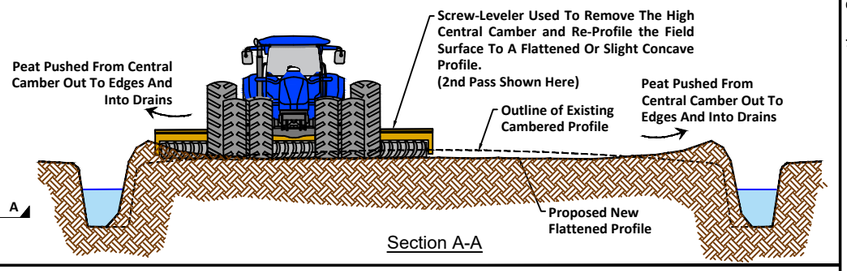
Section A-A

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.



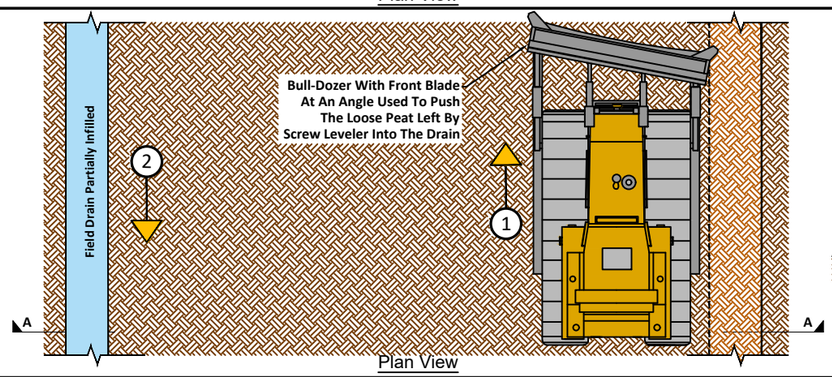
Plan View



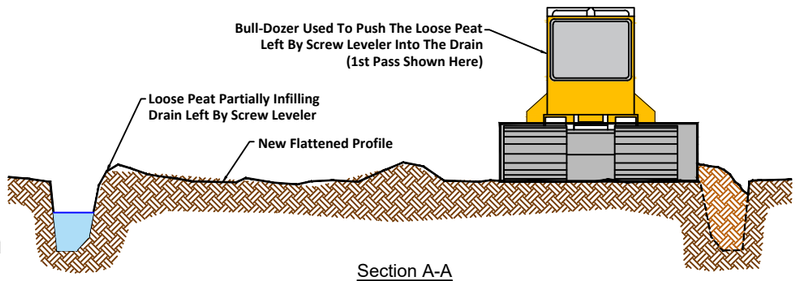
Section A-A

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.



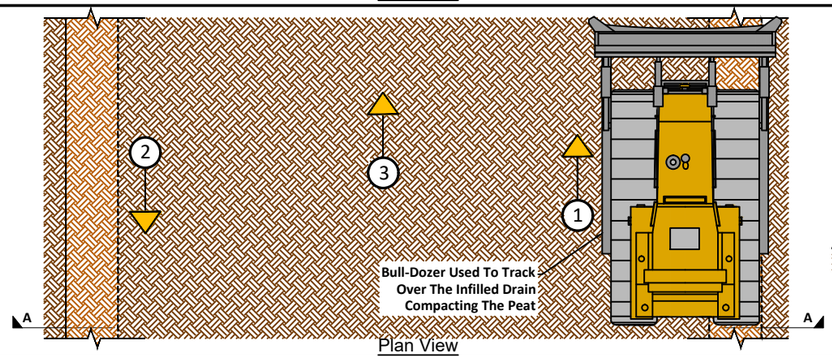
Plan View



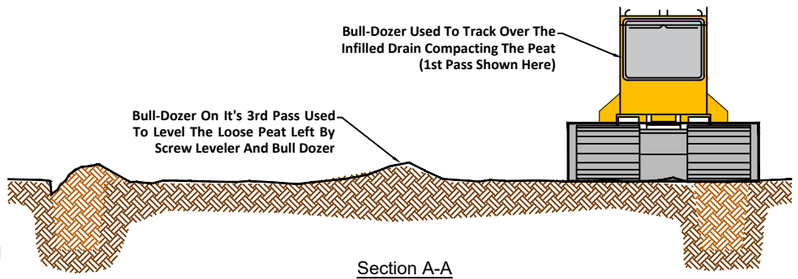
Section A-A

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.



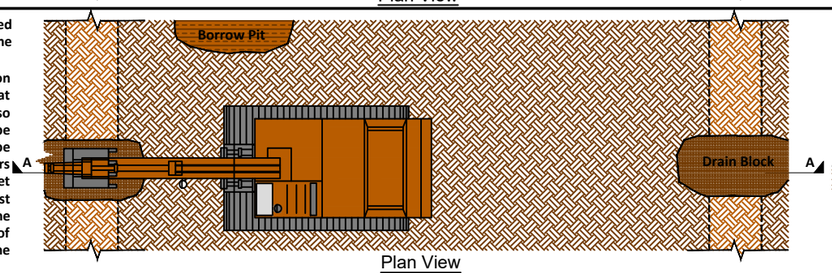
Plan View



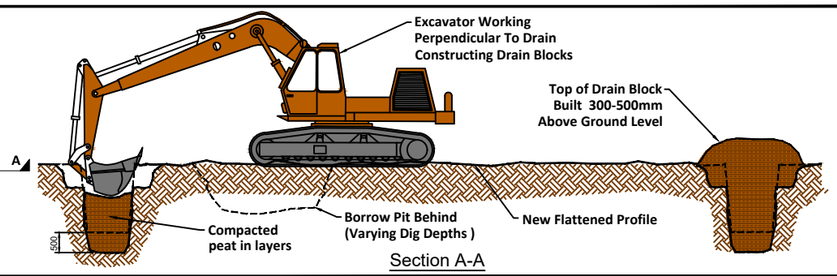
Section A-A

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.



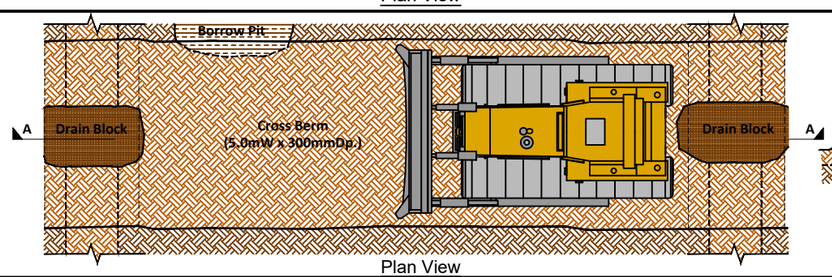
Plan View



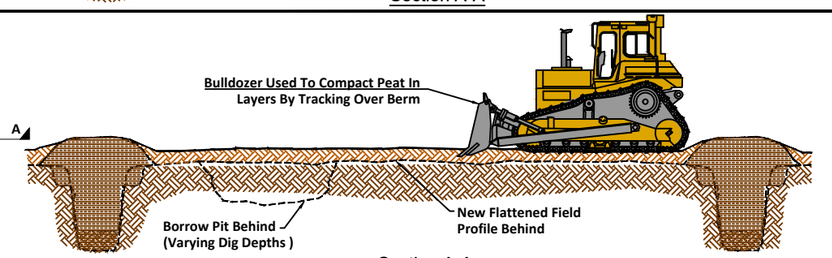
Section A-A

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
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 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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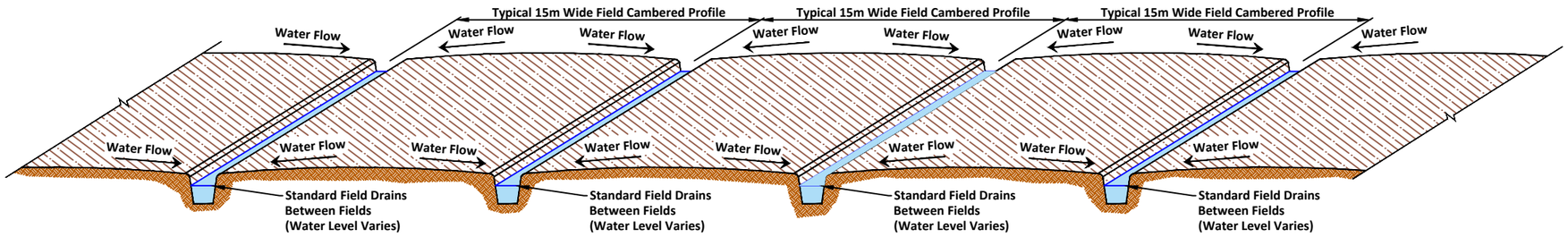
Existing Layout:

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:

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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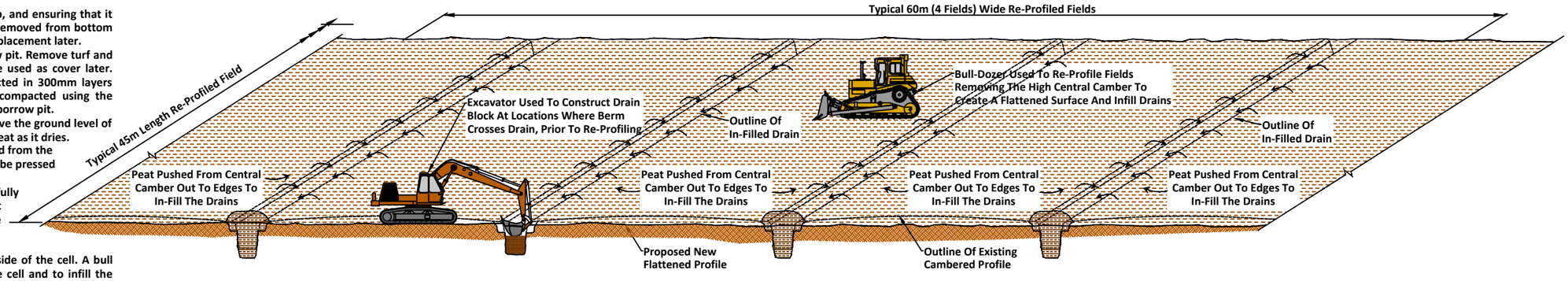
Phase 1
Drain Blocking And Re-Profiling of Fields Surface

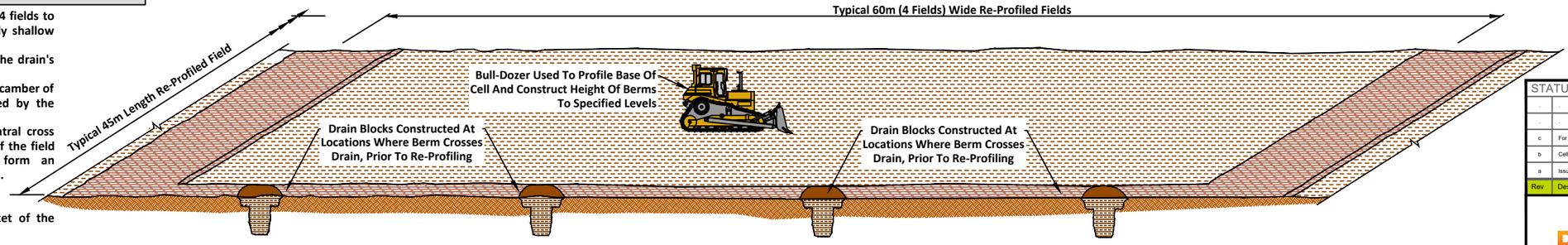
Drain blocks are constructed using an Excavator operating at a perpendicular direction to the field drains.
Key is cut in the drain approximately 500mm deep, and ensuring that it is wider than the actual drain. 500mm of peat is removed from bottom of drain also and placed behind the machine for replacement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

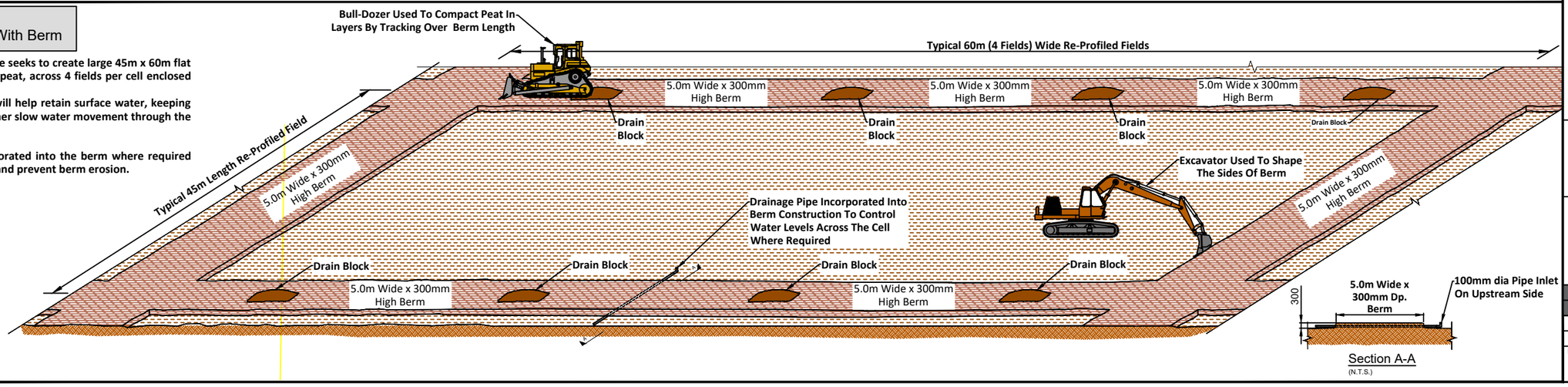
Berms are formed 45m in length and 60m across 4 fields to create an enclosed cell. The berms are relatively shallow (300mm high) and are 5.0 m wide.
An Excavator is used to form a key(5m long) in the drain's edges where the berm crosses.
A strip of peat(5m wide) is taken from the central camber of the 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			
.		.	.
.		.	.
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
Naturally Driven
Bord Na Móna Engineering Department
LEABEG, TULLAMORE CO. OFFALY
Tel. 057 9345900
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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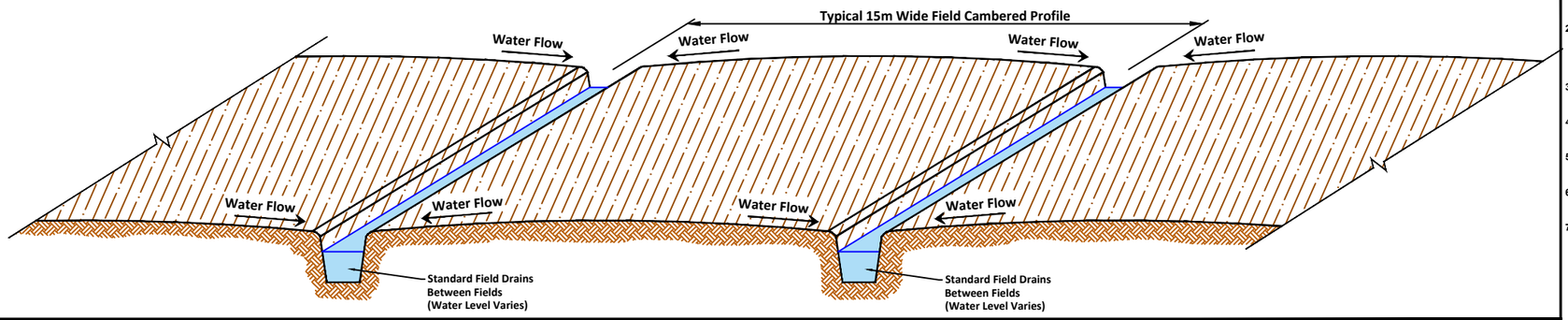
Existing Layout:

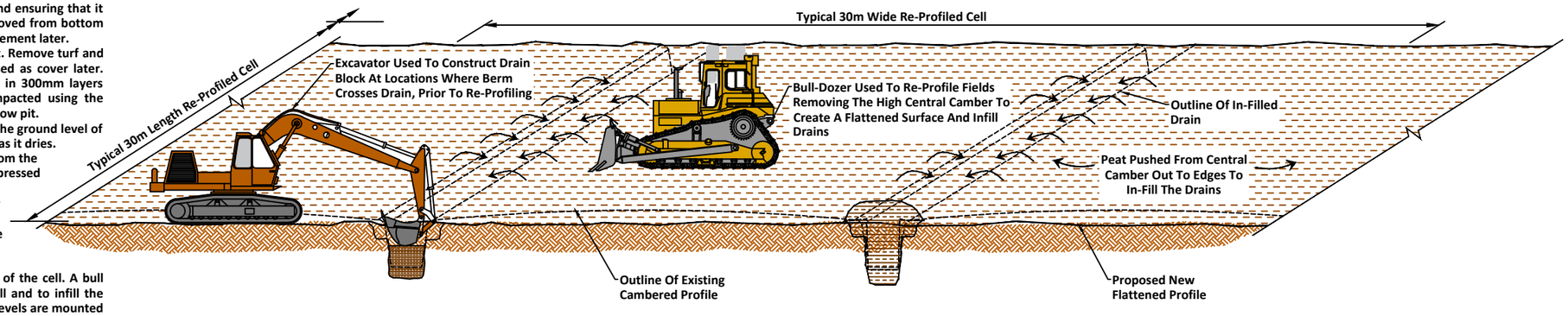
Typical existing bare peat fields are cambered (higher) in the centre and lower towards the drains, helping drainage of the fields but limiting the re-wetting of the central area.



Phase 1
Drain Blocking And Re-Profiling of Fields Surface

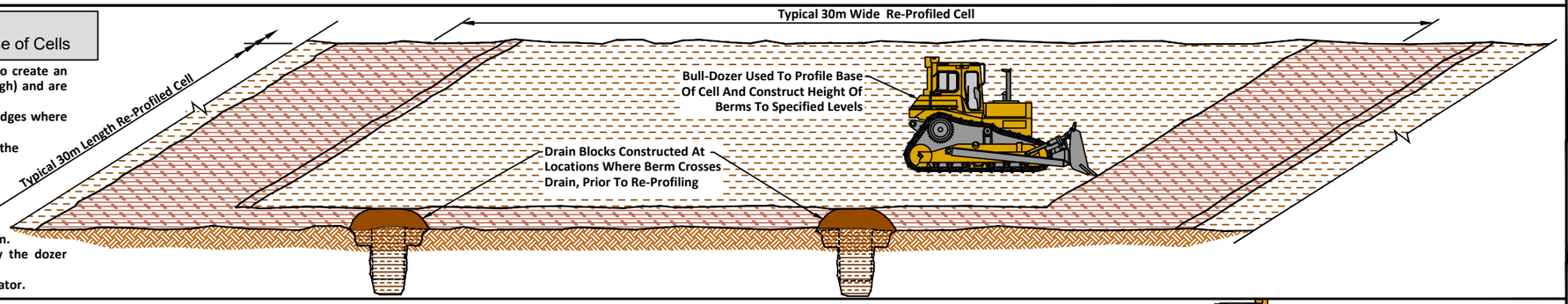
Drain blocks are constructed using an Excavator operating at a perpendicular direction to the field drains.
Key is cut in the drain approximately 500mm deep, and ensuring that it is wider than the actual drain. 500mm of peat is removed from bottom of drain also and placed behind the machine for replacement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

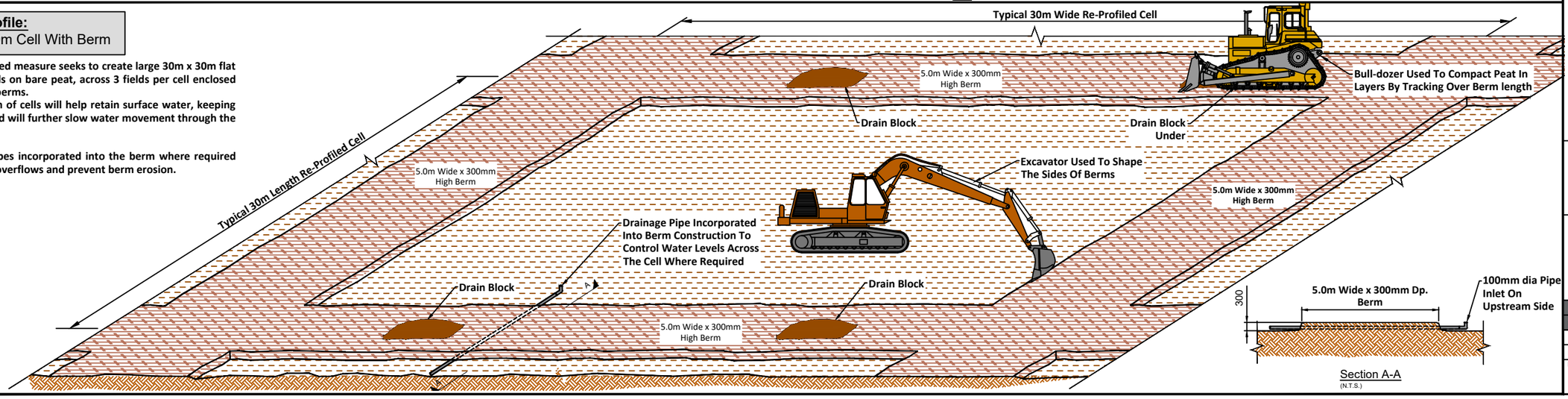
Berms are formed 45m in length and 60m across 4 fields to create an enclosed cell. The berms are relatively shallow (300mm high) and are 5.0 m wide.
An Excavator is used to form a key(5m long) in the drain's edges where the berm crosses.
A strip of peat(5m wide) is taken from the central camber of the 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:
30m x 30m Cell With Berm

This enhanced measure seeks to create large 30m x 30m flat areas or cells on bare peat, across 3 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.



NOTES:

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
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5. ALL DETAILS TO BE AGREED WITH BORD NA MONA OPERATIONS PRIOR TO CONSTRUCTION.
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STATUS

Rev	Description	Issued By	Date
.	.	.	.
.	.	.	.
.	.	.	.
b	For Approval	P.K.	25/02/21
a	Issued For Information	P.K.	28/01/21

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:
Rehabilitation Method DPT 5
30m x 30m 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: 18/12/20 | Scale : Not to Scale A3 | Stage: For Approval
Drawing No.: PCAS-0100-007 | Rev: b

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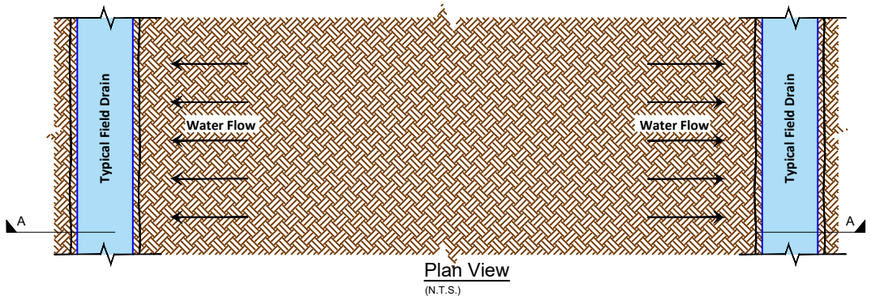
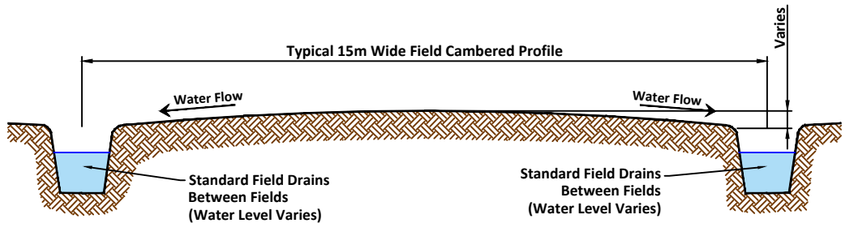
Existing Layout:

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 drain blocking is to raise the water levels in the drains to re-wet the cutaway and slow the water movement through the bog.



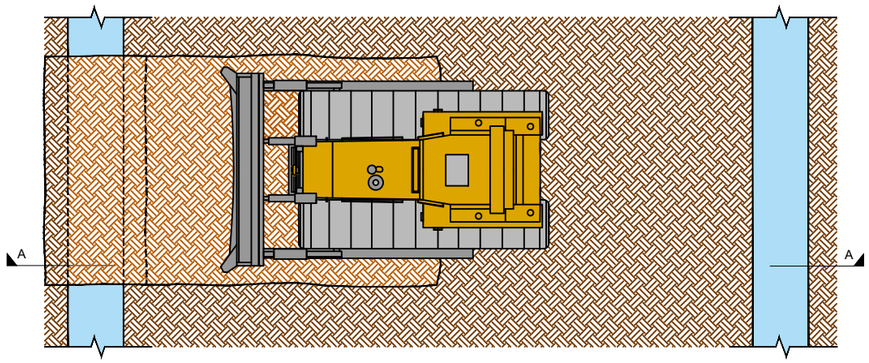
Plan View
(N.T.S.)



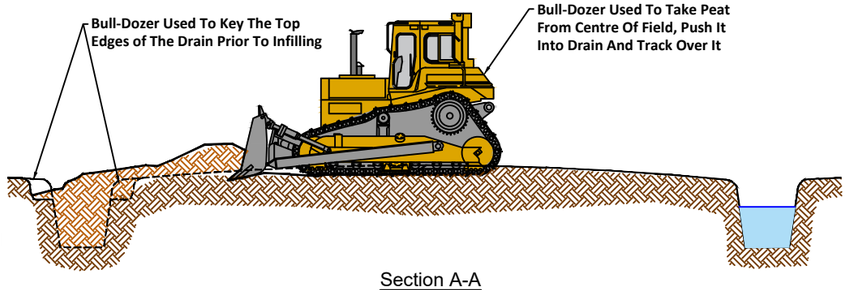
Section A-A
(N.T.S.)

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

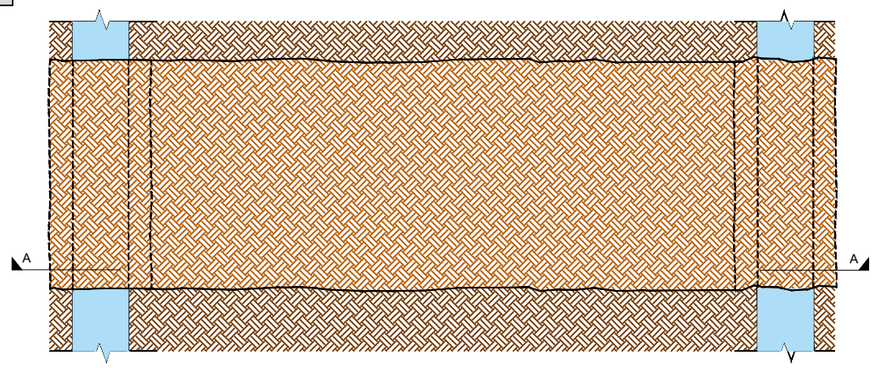


Section A-A
(N.T.S.)

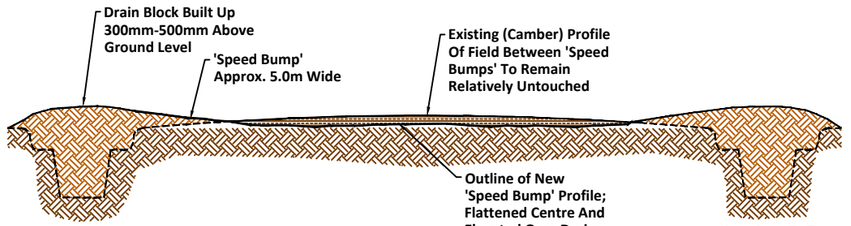
Plan View
(N.T.S.)

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.
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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

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:
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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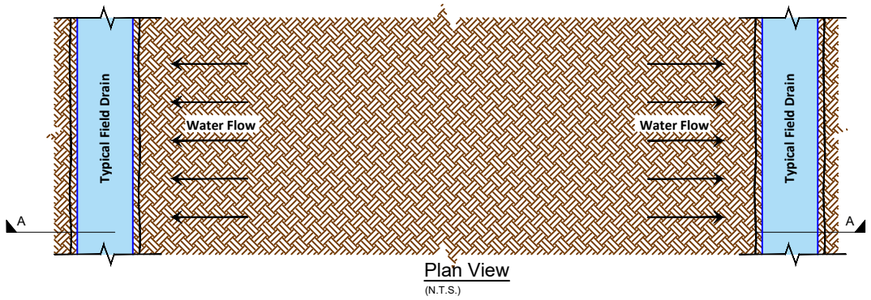
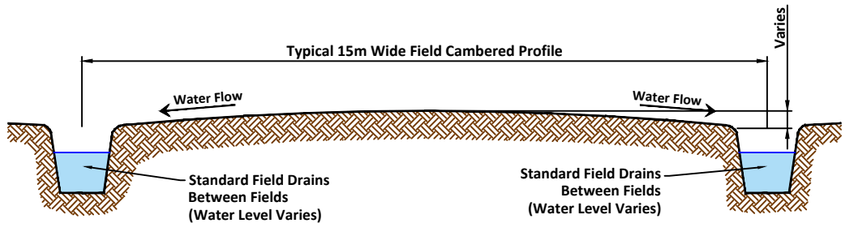
Existing Layout:

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 Cross berms is to slow the water movement through the bog.



Plan View
(N.T.S.)



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

NOTES:

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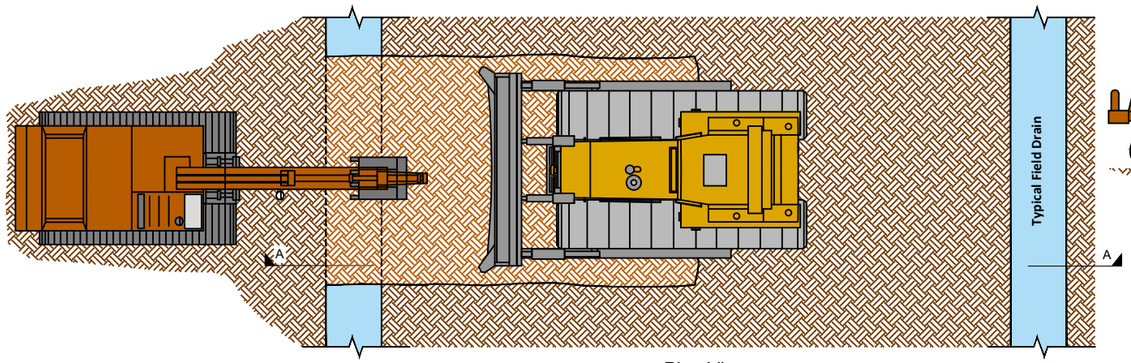
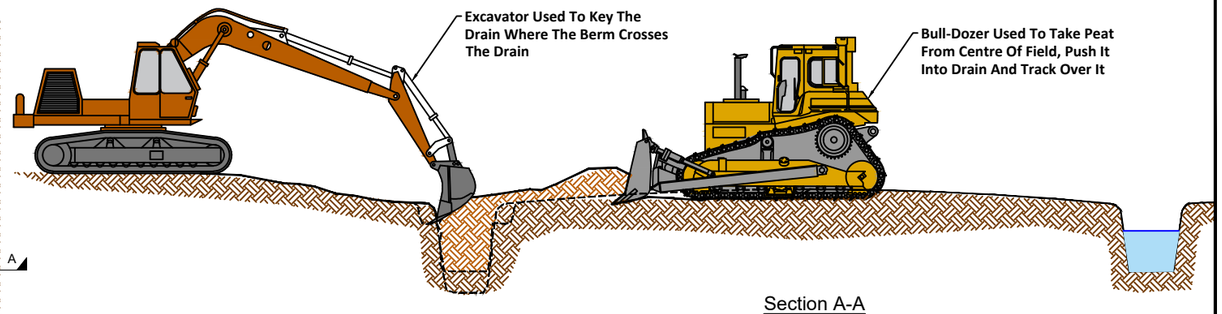
Phase 1
Forming Peat Berm

An Excavator is used to form a key in the drain where the berm crosses.
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.



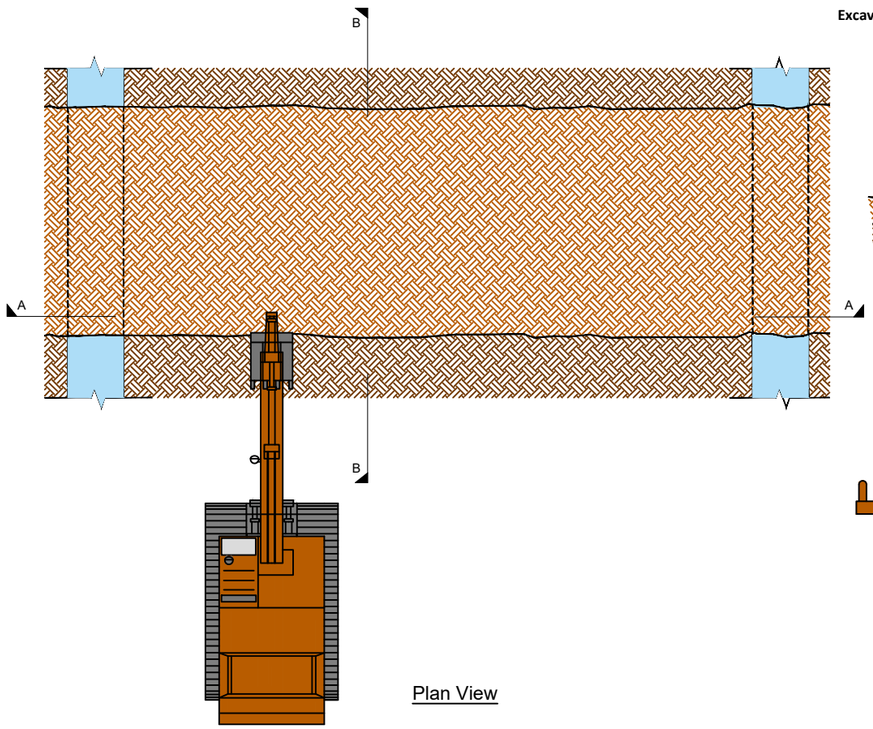
Plan View
(N.T.S.)



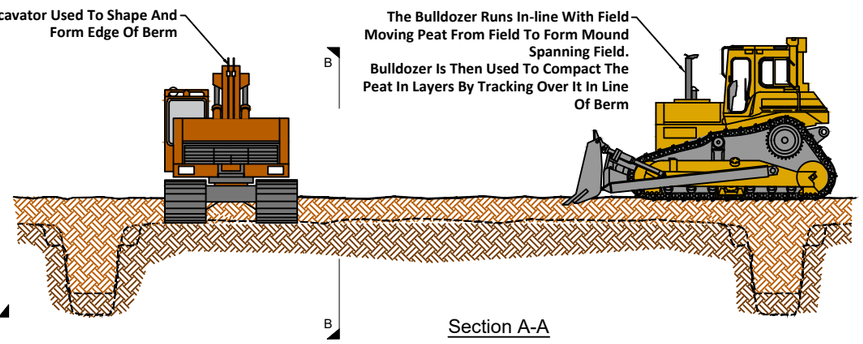
Section A-A
(N.T.S.)

Phase 2
Forming Peat Berm

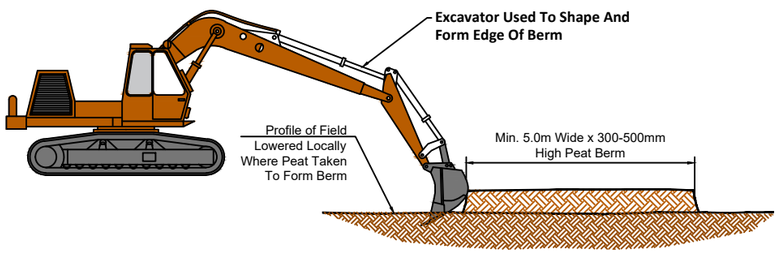
Next the bull-dozer is used to complete the central cross section of Berm by taking peat from the centre of the field and pushing it in line with the field to form a minimum 5m Wide x 300-500mm High Cross Berm.
The peat material in the berm is compacted in layers by the dozer tracking over it.
The excavator bucket is used to form and shape the edges of the compacted berm.



Plan View



Section A-A



Section B-B

STATUS

Rev	Description	Issued By	Date
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c	Berm Dimensions And Details Revised	P.K.	11/03/21
b	Berm Height Increased And Trench Detail Added	P.K.	25/02/21
a	Issued For Information	P.K.	29/01/21

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:
Rehabilitation Method WLT 3
Peat Berm

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

Date: 28/01/21 | Scale : Not to Scale A3 | Stage: Information
Drawing No.: PCAS-0100-010 | Rev: c

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Appendix E Engineering and Rehabilitation Design Specification

PCAS Project

Derrycolumb Bog Rehabilitation Measures

Engineering and Rehabilitation Design Specification

DOCUMENT CONTROL SHEET

Client	Bord na Móna					
Project Title	Derrycolumb Bog Rehabilitation Measures					
Document Title	Engineering and Rehabilitation Design Specification					
Document No.	PCAS-0-DR-01-SP01					
This Document Comprises	DCS	TOC	Text	No. of Tables	No. of Figures	No. of Appendices
	1	1	37	1	14	2

Rev.	Status	Author(s)	Reviewed By	Approved By	Office of Origin	Issue Date
0	TE	PK / LH /GD	DK	PN	BnM CIVIL ENG DEPARTMENT	12/03/2021

Contents

1. Introduction

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within Mount Dillon bog group under IPC Licence (Ref. P0504-01). As part of Condition 10.2 of this licence, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area.

This document – *Derrycolumb Bog Engineering and Rehabilitation Design Specification* – should be read in association with both the *Derrycolumb Bog Site Characterisation and Monitoring 2021* and the *Derrycolumb Drainage Management Plan 2021*. These three reports should be read in association with **Derrycolumb Rehabilitation Plan 2021**, which addresses **all** of the requirements of Condition 10.2 of IPC Licence Ref. P0504-01.

The – *Derrycolumb Bog Rehabilitation Measures Engineering and Rehabilitation Design Specification*- specifically focuses on the design specification of the peatland rehabilitation measures proposed for Derrycolumb Bog and includes the following:

- Description of the proposed rehabilitation measures.
- Identification of the location of the proposed rehabilitation measure.
- Description of the site-specific parameters that resulted in the selection of the proposed rehabilitation measures.
- Description of the method of implementation for each rehabilitation measure.
- Assessment of the likelihood of failure for each rehabilitation measure
- Description of the method of setting out and verification of completion of rehabilitation measures.
- *An **Emergency Response Plan*** is outlined in the event of failure of a rehabilitation element.

2. Site Location

Derrycolumb Bog is located approximately 9.5km to the west of Ballymahon in County Longford. The bog comprises three main sections, south-eastern, mid and north-western sections that are divided by minor public roads.

Derraghan Bog is located immediately adjacent to two sections of Derrycolumb Bog and is connected via a rail link to Derrycolumb. To the south east, the next adjacent Bord na Móna Bog (Edera Bog) is also connected to Derrycolumb via a rail line.

Derrycolumb Bog is located in the Upper River Shannon catchment. The majority of the bog is drained by the Bilberry River, Derrymany Stream and Newtownflanagan Streams. In addition, an unnamed tributary of the Drumnee Stream occurs along the boundary of the north-westernmost section of Derrycolumb Bog; this watercourse flows south into the Drumnee which drains to Lough Ree, west of Saints Island.

There are travel paths and drainage channels maintained around the bog formerly used for access and drainage of industrial peat production areas. The rail line also runs through Derrycolumb Bog.

Derrycolumb Bog was in industrial peat production from the mid-1980s until 2019. The peat was formerly used as fuel peat in Lough Ree Power in Lanesborough.

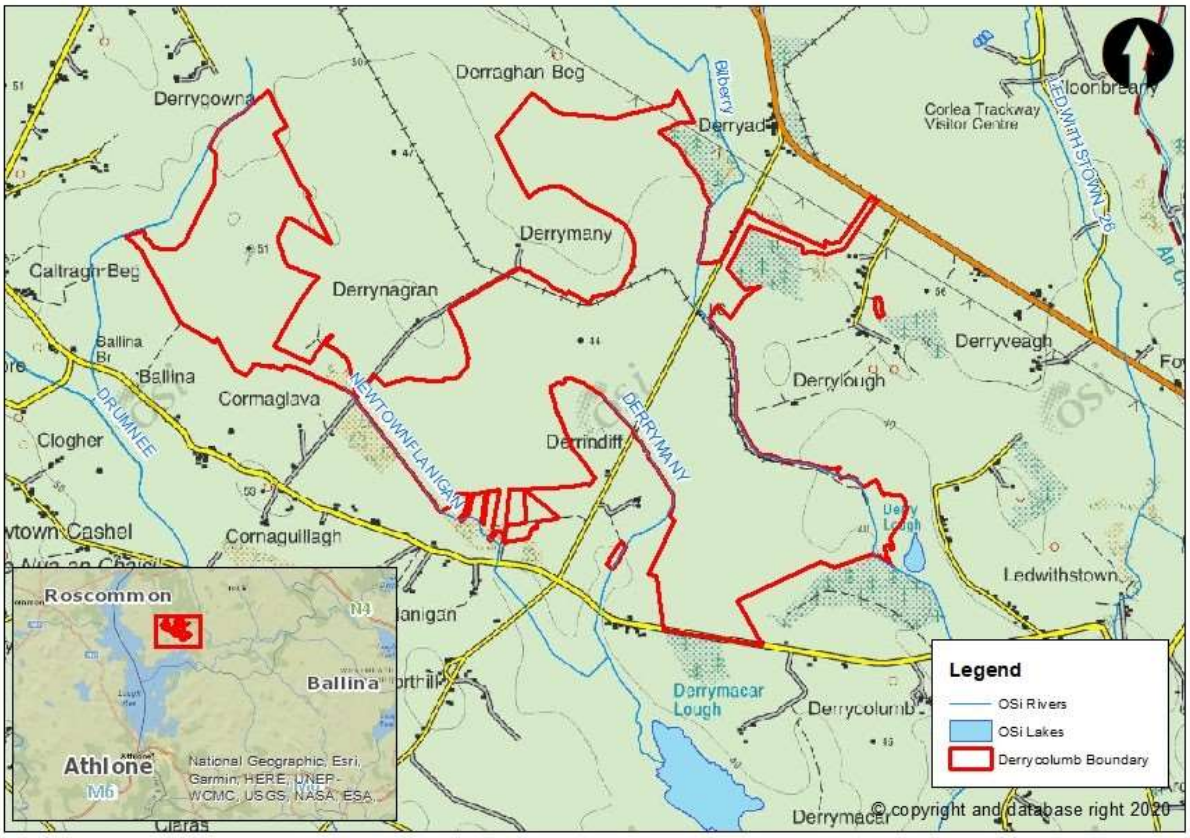

Figure 2.1 Derrycolumb Location Map

3. Scope of Works

The area of proposed rehabilitation measures for Derrycolumb Bog is approximately 425.7 Ha. The rehabilitation measures can be summarised as follows:

- Provision of peat drain blocks within existing drains.
- Provision of berms.
- Field re-profiling.
- Provision of control measures.
- Modifying outfalls.
- Managing water levels.

Pertinent rehabilitation methods are detailed in the following drawings, also provided as part of the PCAS package:

- PCAS-0100-002 Rehab Method DPT 2 – Peat Drain Block
- PCAS-0100-004 Rehab Method DPT 3 – Field Re-profiling
- PCAS-0100-006 Rehab Method DPT 4 – 45m x 60m Cell
- PCAS-0100-007 Rehab Method DPT 5 – 30m x 30m Cell
- PCAS-0100-008 Rehab Method DCT 2 – Speed Bump Peat Drain Block
- PCAS-0100-010 Rehab Method WLT3 – Peat Berm
- PCAS-0100-011 Rehab Method WLT4 – Peat Drain Block
- PCAS-0100-014 Modifying of Outfalls & Managing Water Levels

4. Proposed Rehabilitation Measures

The location of the Proposed rehabilitation measures within Derrycolumb Bog are identified in Figure 4.1 below. A description of each rehabilitation measure and the target area within Derrycolumb bog is outlined in Table 4.1.

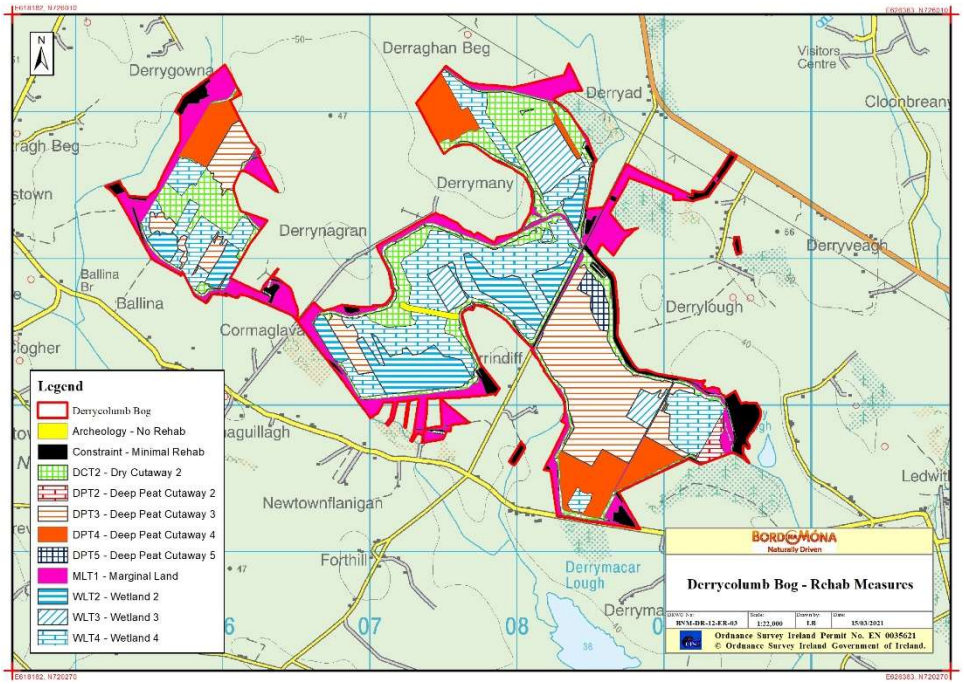

Figure 4.1 Proposed Enhanced Rehabilitation Plan for Derrycolumb Bog

Table 4.1 Rehabilitation measures and the proposed target area for Derrycolumb 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 (max 7/100 m) + blocking outfalls and managing overflows	2.8
	DPT3	More intensive drain blocking (max 7/100 m), + field reprofiling + blocking outfalls and managing overflows	75.2
	DPT4	Berms and field re-profiling (45m x 60m cell) + blocking outfalls and managing overflows + drainage channels for excess water + *Sphagnum* inoculation	40.6
	DPT5	Cut and Fill cell bunding (30m x 30m cell) + blocking outfalls and managing overflows + drainage channels for excess water + *Sphagnum* inoculation	4.4
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	77.8
	DCT3	More intensive drain blocking (max 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	43.2
	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	20.1
	WLT4	More intensive drain blocking (max 7/100 m), + blocking outfalls and managing overflows + transplanting Reeds and other rhizomes	95.9
	WLT5	More intensive drain blocking (max 7/100 m), + field reprofiling + blocking outfalls and managing overflows + transplanting Reeds and other rhizomes	
Marginal land	MLT1	No work required	65.7
	MLT2	More intensive drain blocking (max 7/100 m)	
	MLT3	More intensive drain blocking (max 7/100 m) + blocking outfalls and managing overflows with + boundary berm	
Other		Silt-ponds	1.0
		Constraints	27.5
		Archaeology constraints	1.6
		Riparian	
Total			455.8

The rehabilitation measures have been selected based on a number of site-specific measures below and the basis for the selection of the main rehabilitation types is outlined in the *Derrycolumb Site Categorisation and Monitoring 2021 Report.*

- Bog type, and peat depth;
- Drainage type, gravity or pumped;
- Hydrological and Topographical modelling;
- Type of surface (vegetated or not);
- Slope/topography;
- Hydrology and piezometer baseline data (where available).)

The above criteria feeds into a rehabilitation decision matrix contained in Appendix A which provides a general basis for selecting a particular rehabilitation measure on a specific bog, in combination with site specific issues outlined in the *Derrycolumb Site Categorisation and Monitoring 2021 Report*, Table 4.1 outlines the particular rehabilitation measures for Derrycolumb Bog with a detailed description below.

4.1. Rehabilitation measures proposed at Derrycolumb Bog

The following are the proposed rehabilitation measures at Derrycolumb Bog outlining the process in general and the key criteria necessary to apply the measures to particular areas of the bog.

4.1.1. DPT2- Peat Drain Blocks

DPT2 - More intensive drain blocking (Up to 7 drain blocks per 100 m), blocking of outfalls and managing overflows are the elements within the DPT2 rehabilitation measure which are elaborated upon within Chapter 5.

- DPT2- -This measure is proposed where the peat depth is generally in excess of 2 metres and the topography is relatively flat and is considered an appropriate measure to align with bog best practice restoration.
- DPT2 is adopted within Derrycolumb bog as per Figure 4.1 The key criteria used to adopt the DPT2 approach in Derrycolumb bog is the presence of a deep peat profile in excess of 2 metres along with a relatively level topography. It is also considered that the DPT2 measure will not significantly alter the topography of the sub-catchments that they are located within.

4.1.2. DPT3- Field Re-profiling with Drain Blocks

DPT3 - More intensive drain blocking (Up to 7 drain blocks per 100 m), field reprofiling, blocking of outfalls and managing overflows are the elements within the DPT3 rehabilitation measure which are elaborated upon within Chapter 5.

Typical existing bare peat fields are cambered (higher) in the centre and lower towards the drains to facilitate drainage of the production fields during peat production. This camber limits 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. Field re-profiling is developed as a technique to optimise the extent of suitable water levels (shallow, soggy conditions).

This measure is proposed where the peat depth is generally in excess of 2 metres and the topography is relatively flat.

- DPT3 is adopted in sections of Derrycolumb bog as per Figure 4.1 The key criteria used to adopt the DPT3 approach in these areas is a deep peat profile in excess of 2 metres along with a relatively level topography. This measure is located in areas where it is anticipated to enhance re-wetting impacts by re-profiling the production fields also to ensure an even distribution of water depth or saturation.

4.1.3. DPT4 - 45m x 60m Cell with Berms - Drain Blocks

DPT4- Berms and field re-profiling (45m x 60m cell), blocking outfalls, managing overflows and drainage channels for excess water and *Sphagnum* inoculation are the elements within the DPT4 rehabilitation measure which are elaborated upon within Chapter 5.

The creation of cells will help retain shallow surface water, keeping peat wet while further slowing water movement through the bog.

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.

- DPT4 is adopted in sections of Derrycolumb bog as per Figure 4.1. The key criteria used to adopt the DPT4 approach is a deep peat profile generally in excess of 2 metres and areas that have gentle slopes that require bunding to maintain optimum hydrological conditions.
- **DPT4 A** is an alternative means of achieving a similar outcome to DPT4 and although DPT4A has been implemented and planned for other areas of Derrycolumb bog, there is a potential to substitute DP4A for DP4 in other areas. The DPT4A methodology is detailed in section 4.3 below. Rehabilitation Method DPT 4A Field Re-profiling with Cells and Berms.

DPT4A- Drain blocking at pre-determined intervals, field reprofiling, filling in of drains, Cross berms, blocking outfalls and managing overflows are the elements within the DPT4A rehabilitation measure which are elaborated upon within Chapter 5.

As part of the ongoing rehabilitation measures trials at Castlegar Bog, a variation to DPT4 evolved. This option of using a screw leveller as well as a dozer to re profile the production fields was

identified during the trials. The screw levelling apparatus that was originally used to provide the convex camber on the field when peat harvesting was taking place is inverted which allows the screw leveller to now create a concave camber to the production field and thus reducing significantly the number of passes by the bulldozer to create the desired profile. In addition, the bulldozer places the loose peat within the drains removing their original function and increasing the area to be rehabilitated. The provision of the drain blocks and cross berms are still necessary to ensure there are no preferential flow paths through the drains path. The cross berms which run between high fields control wave action and sheet flow and depending on the intervals between the high fields, longitudinal berms can also be provided to create cells, this approach is seen as a viable alternative to DPT4 Cells due to the following points:

- Simpler construction process to DPT4;
- Broader range of time in which it is expected to be able to carry out the measure (not as sensitive to bad weather as DPT4);
- Equal to or better rehabilitation impacts expected compared to DPT4;
- Increase in extent of re-wetted peat and target water-levels;
- Improvement in health and safety as drains are infilled;
- Potential for improved operator productivity.

The following phases outline the processes of DPT4A which has the capacity replace DPT4 measures in areas of Derrycolumb Bog, further detail in relation to the measures below are outlined in Section 5.

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.

Phase 2: Infilling of Drains

Next the Bull-dozer will run up one 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

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. Key drain blocks will be located downstream of the measures prior to infilling of the drains to ensure no release of silt occurs during the activities.

Phase 5: Cross berms

Cross berms will be placed at regular centres essentially creating large cells across the production fields which will control unfavourable wave action and sheet flow where the measure is located in level areas.

4.1.4. DPT5 – 30m x 30m Cell with Berms with Drain Blocks

DPT5 Cut and Fill cell bunding (30m x 30m cell), blocking outfalls and managing overflows, drainage channels for excess water, *Sphagnum* inoculation are the elements within the DPT5 rehabilitation measure which are elaborated upon within Chapter 5.

The creation of cells will help retain surface water, keeping peat wet further slowing water movement through the bog.

- DPT5 is adopted in sections of Derrycolumb bog as per Figure 4.1. The key criteria used to adopt the DPT4 approach in these areas is a deep peat profile generally in excess of 2 metres and areas that have gentle slopes that require bunding to maintain optimum hydrological conditions.
- DPT5 is adopted rather than DPT4 within areas where it is positioned higher along the hydrology gradient and in areas where it is anticipated to be slightly more difficult to wet.

4.1.5. DCT2 – Regular drain blocking

DCT2 Regular drain blocking (3/100 m) blocking outfalls and managing water levels with overflow pipes and targeted fertiliser treatment.

- DCT2 is adopted in sections of Derrycolumb bog as per Figure 4.1. The key criteria used to adopt the DCT2 approach in these areas is a dry cutaway condition.

4.1.6. WLT2– Designated Wetland Areas

Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes + Targeted blocking of outfalls within are the elements within the WLT2 rehabilitation measures which are elaborated upon within Chapter 5.

Areas prone to seasonal winter inundation are designated for wetland creation. Standing water will be allowed to occur resulting in increased water storage. Areas of Derrycolumb as shown as WLT2 in Figure 4.1 match this criterion.

- WLT2 is adopted in sections of Derrycolumb bog as per Figure 4.1, The key criteria used to adopt the WLT2 Areas that are likely to develop into wetlands which can largely be determined from a combination of LIDAR images, supplemented by flood mapping and surveys of levels (with the latter referencing existing water levels such as silt ponds or other outfalls from the site). Wetland cutaway has 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. Optimal peatland rehabilitation seeks to maintain a water table just above the ground level (circa. 100mm ± 50mm) during the summer.

4.1.7. **WLT3 – Designated Wetland Areas**

WLT3- Turn off or reduce pumping to re-wet cutaway, blocking of outfalls and managing water levels with overflow pipes, Targeted blocking of outfalls within a site, provision of larger berms to re-wet cutaway and transplanting Reeds and other rhizomes are the elements within the WLT3 rehabilitation measures which are elaborated upon within Chapter 5.

Areas prone to seasonal winter inundation are designated for wetland creation. Standing water will be allowed to occur resulting in increased water storage. Areas of Derrycolumb as shown as WLT3 in Figure 4.1 match this criteria.

- WLT3 is adopted in sections of Derrycolumb bog as per Figure 4.1, The key criteria used to adopt the WLT3 Areas that are likely to develop into wetlands can largely be determined from a combination of LIDAR images, supplemented by flood mapping and surveys of levels (with the latter referencing existing water levels such as silt ponds or other outfalls from the site). Wetland cutaway has 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. Optimal peatland rehabilitation seeks to maintain a water table just above the ground level (circa. 100mm ± 50mm) during the summer.

4.1.8. **WLT4 – Peat Drain Block**

WLT4 More intensive drain blocking (Up to 7 drain blocks per 100 m), blocking outfalls and managing overflows and transplanting Reeds and other rhizomes are the elements within the WLT4 rehabilitation measure which are elaborated upon within Chapter 5.

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

This method is similar as that described under Deep Peat methodologies as Dry Cutaway methodology 'DCT3', but is provided in areas more prone to flooding

- WLT4 is adopted in sections of Derrycolumb bog as per Figure 4.1. The key criteria to adopt the WLT4 approach includes areas that are subject to seasonal winter inundation but generally dry out during the summer with the drainage in place. The objective of the measures to eliminate the drainage functionality and to maintain summer water levels close to the ground surface. Areas that are likely to develop into wetlands in a similar manner to that outlined in WLT4

4.1.9. MLT1- Marginal Lands

Lands around the margin of the former peat production area

Marginal lands are defined as those areas (generally around the margins but can also be located on islands within sites) where industrial peat production has not taken place. These can be identified from habitat maps coupled with aerial images of the sites.

The habitat present on these sites can vary substantially, from near-intact raised bog remnants to cutover bog associated with domestic turf-cutting and the varied habitats such activities create (potentially including grasslands, wetlands and woodlands, as well as dry heath or peatland habitats).

It will be dependent upon the habitats and management objectives for the bog as a whole and in particular, adjacent areas of peatland where rehabilitation is being undertaken.

No rehabilitation measures are proposed in the MLT1 areas.

4.1.10. Sphagnum Inoculation

The main objective of *Sphagnum* inoculation is to accelerate the rate of natural colonisation of *Sphagnum* moss at suitable sites by introducing donor material. The presence of *Sphagnum*-rich vegetation on peatlands brings significant benefits as this is considered a potential carbon sink.

It is proposed to use locally sourced *Sphagnum* and procured donor material, sourced from older established Bord na Móna cutover bog sites where possible, to inoculate Bord na Móna deep peat cutover bogs. Small amounts (handfuls) will be distributed into the newly created cells on deep peat cutover bog and this can be scattered by hand or planted into the peat substrate. The use of significant volumes of *Sphagnum* donor material is constrained by the small amount of suitable donor material and donor sites. It is therefore proposed to use *Sphagnum* donor material developed in greenhouses (e.g. Beadaplugs), where suitable donor material can be made available. These *Sphagnum* plugs will then be planted into each cell (c. 1-5m^2 is suggested per cell for planting plugs).

4.1.11. Fertiliser application

In some instances, cutaway bog areas are very slow to colonise naturally. Areas where vegetation is slower to naturally colonise tend to be drier areas such as headlands and high fields that dry out in the summer.

It is proposed to use fertiliser to help accelerate natural colonisation on headlands (the area around the edges of the production bogs) and on high fields (former stockpile fields). Both areas are prone to drying in the summer, inhibiting vegetation establishment and growth. This enhanced measure will be combined with other measures to optimize ecosystem service benefits. Fertiliser will be applied during the August September period to encourage seedling establishment towards the end of the growing season. Seedlings that establish in the spring tend to suffer greater rates of mortality as the peat dries out in the summer and this factor is significantly reduced in the later summer-autumn period.

Where applied, it is proposed to use a slow-release, Phosphorous-rich fertiliser (such as Rock Phosphate) to accelerate natural colonisation and the development of pioneer vegetation cover. Low application rates (aligned to 50% of the recommended rate provided by the Forest Service Guidelines for fertilisation of forestry on peat) will be used. Furthermore, due to Bord na Móna's organic certification status on its landholding, any fertilisers applied will need to conform to these standards.

5. Methods of Site Construction (Elements of various rehabilitation measures)

This Section covers the design and construction approach to the elements which make up the enhanced rehabilitation measures described in section 4 above which includes site clearance; peat drain blocking, berm construction, field re-profiling and managing water levels where required.

5.1. Peat Drain block

Basis for design:

Peat drain blocking is a common proven rehabilitation measure on many bogs in Ireland, resulting in a successful re-wetting of peat through the reduction of water flowing off the bog. This measure is used in the DPT2 and the WLT4 rehabilitation methodologies.

Description of process:

Drain blocks are formed using a tracked excavator operating at a perpendicular direction to the field drains. The method used follows the approach outlined by McDonagh (1996) in accordance with the **Best Practise in Raised Bog Rehabilitation in Ireland (2017).**

- 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. (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.)

- An area behind the machine, within reach of the excavator arm, is used as a borrow pit. 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.

Risks identified:

- Erosion of the drain block particularly in steeply sloping sections.
- Failure of drain block resulting in localised negative impact on rehabilitation measure (excessive ponding etc.).
- Failure of drain block resulting in localised escape of silt/sediment.
- Failure of drain block resulting in localised increase in hydrostatic pressures to adjacent drain blocks.
- Failure of drain block resulting in localised increase in hydrostatic pressure to berms enclosing different rehabilitation measure types.
- Failure of drain block resulting in an increase in water flow to hydraulic breaks protecting adjoining lands.

- **Mitigation through design:**
  - The selection of an appropriate drain block spacing.
  - Drain blocks are formed at a minimum of 300mm higher than the adjacent ground level and are relatively wide to create a relatively strong structure out of peat that will mitigate water flow eroding the drain block construction.
  - The provision of a key in the drain coupled with the compaction of peat in layers (max depth 300mm), ensures a tight seal is maintained and a strong structure is developed to mitigate the formation of preferential flow paths around the edges of the drain block. Design follows best practise.

- Operators assigned to this work element are familiar with the technique and process and provide effective robust drain blocks. The operators are experienced and capable of adapting to the particular conditions encountered within the bog.
- Qualified, experienced Engineers overseeing the works during the installation phase ensure that quality procedures of the various elements are implemented and effectively meet the standards for quality service and performance.

- **Mitigation through maintenance and avoidance:**
  - Ongoing monitoring of completed peat drain blocks in the weeks after formation will ensure they have consolidated.
  - The risk associated with peat drain block failure from an environmental and rehabilitation measures impact is generally categorised as low as a peat drain block failure will result in an impact that is localised and silt control measures are provided upstream of all discharge points. There is an allowance for a reactive approach to remediation measures where required.
  - A post rehabilitation Lidar and imagery survey will take place which will capture any areas where failures occurred resulting in remediation measures in a particular area if required. The Lidar survey will be implemented when the rehabilitation measures have been in place for a reasonable period of time allowing areas of weakness or potential concern to become apparent.
  - In the event of a peat drain block failure, the adjacent peat drain blocks will generally have sufficient capacity to accommodate any additional hydrostatic pressures generated ensuring the negative impact is localised.
  - If, after heavy rainfall, significant water flows in the drains cause localised drain block failure, the regular and frequent placing of drain blocks along the drain further downstream will mitigate the impact to the immediate area.
  - As peat drain blocks are designed to retain water on the cutover resulting in a reduction in discharge into the boundary drains, preventing any negative impacts on adjacent agricultural land. (See chapter 7 below ‘Emergency Failure Response’ outlining mitigation measures to be put in place should any risks of unexpected hydrological impacts occur).

Figure 5.1.1 Peat drain block trials at Castlegar bog

5.2. ‘Speed-Bump’ Drain Block

Basis for design:

Peat drain blocking is a common proven rehabilitation measure on many bogs in Ireland, resulting in a successful re-wetting of peat through the reduction of water flowing off the bog. This measure is particularly effective for bare peat areas that are not prone to flooding and is used in the DCT2 rehabilitation methodology.

Description of process:

- Drain blocks are formed using a bulldozer operating at a perpendicular direction to the field drains. First a key is cut from both edges of the drain using the bulldozer, approximately 500mm deep ensuring that it is wider than the actual drain.
- 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'.
- 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. The drain block is built up and compacted by the bull-dozer tracking over it to at least 300-500mm above the ground level of the bog, to allow for subsequent shrinkage of the peat as it dries.

Risks identified:

- Erosion of the drain block particularly in steeply sloping sections.

- Failure of drain block resulting in localised negative impact on rehabilitation measure (excessive ponding etc.).
- Failure of drain block resulting in localised escape of silt/sediment.
- Failure of drain block resulting in localised increase in hydrostatic pressures to adjacent drain blocks.
- Failure of drain block resulting in localised increase in hydrostatic pressure to berms enclosing different rehabilitation measure types.
- Failure of drain block resulting in an increase in water flow to hydraulic breaks protecting adjoining lands.

- **Mitigation through design:**
  - The selection of an appropriate drain block spacing.
  - Drain blocks are formed at a minimum of 300mm higher than the adjacent ground level and are relatively wide to create a relatively strong structure out of peat that will mitigate water flow eroding the drain block construction.
  - The provision of a key in the drain ensures a tight seal is maintained and a strong structure is developed to mitigate the formation of preferential flow paths around the edges of the drain block.
  - Operators assigned to this work element are familiar with the technique and process and provide effective robust drain blocks. The operators are experienced and capable of adapting to the particular conditions encountered within the bog.
  - Qualified, experienced Engineers overseeing the works during the installation phase ensure that quality procedures of the various elements are implemented and effectively meet the standards for quality service and performance.
- **Mitigation through maintenance and avoidance:**
  - Ongoing monitoring of completed peat drain blocks in the weeks after formation will ensure they have consolidated.
  - The risk associated with peat drain block failure from an environmental and rehabilitation measures impact is generally categorised as low as a peat drain block failure will result in an impact that is localised and silt control measures are provided upstream of all discharge points. There is an allowance for a reactive approach to remediation measures where required.
  - A post rehabilitation Lidar and imagery survey will take place which will capture any areas where failures occurred resulting in remediation measures in a particular area if required. The Lidar survey will be implemented when the rehabilitation measures have

been in place for a reasonable period of time allowing areas of weakness or potential concern to become apparent.

- In the event of a peat drain block failure, the adjacent peat drain blocks will generally have sufficient capacity to accommodate any additional hydrostatic pressures generated ensuring the negative impact is localised.
- If, after heavy rainfall, significant water flows in the drains cause localised drain block failure, the regular and frequent placing of drain blocks along the drain further downstream will mitigate the impact to the immediate area.
- As peat drain blocks are designed to retain water on the cutover resulting in a reduction in discharge into the boundary drains, preventing any negative impacts on adjacent agricultural land. (See chapter 7 below 'Emergency Failure Response' outlining mitigation measures to be put in place should any risks of unexpected hydrological impacts occur).

Figure 5.2.1 'Speed-Bump' Peat Drain Block at Carrickhill Bog

5.3. Berm (300-500mm high)

Basis for Design:

The concept of cross berms is to optimise the extent of re-wetted peat and target water levels, create enclosed areas of peat with shallow water levels and slow the water movement through the bog. These berms are used in the DPT4, DPT5 and WLT3 methodologies.

The berm design adopts an empirical design approach. It is proposed to apply proven sizes, proportions, materials, and assemblies from existing successful rehabilitation measures and flood defense berm features carried out in the past by Bord na Móna. The proposed berms are relatively shallow, circa 300mm high (minimum) and are constructed across or perpendicular to the fields acting to enclose an area to retain a shallow layer of surface water (circa 100mm).

Description of process:

- A tracked excavator working perpendicular to the drain is used to form a 500mm deep key in the drain edges where the berm crosses.
- A strip of peat 5m in width is taken from the central camber of the field, pushed into the drain, using the bucket of a tracked bulldozer. The peat is compacted by the bull-dozer tracking over the drain block to ensure the peat forms a tight seal in the drain.
- A key is also formed similarly in the drain on the opposite side of the production field at the end of the proposed berm and the drain infilled and compacted as above.
- 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 a minimum 5m Wide x 300 / 500mm high cross berm. Consistency of peat is important, which should be firm enough to be shaped and compacted. The peat berm is compacted using the dozer and when this complete the excavator trims and shapes the completed berm. The berm is circa 5m (minimum) in width.

Risks identified:

  - Peat berm failure resulting in localised negative impact on rehabilitation measure (excessive ponding etc.)
  - Peat berm failure resulting in localised escape of silt/sediment.
  - Increase in hydrostatic pressures to adjacent restoration methods leading to berm failure.
  - Increase in hydrostatic pressure to berms enclosing different rehabilitation measure types leading to berm failure.
  - Overtopping of berm resulting in an uncontrolled escape of silt/sediment.
  - Subsidence of berm.

- **Mitigation through design:**
  - Peat Berms are not proposed for use in areas subject to seasonal winter inundation.

- It is recognized that consistency of peat is important, in that it should be firm enough to be shaped and compacted.
- Peat Berms are constructed circa 300mm (min.) higher than the adjacent ground level to create targeted hydrological conditions. The berms are built to a minimum width of 5m to create a low wide strong structure that is capable of maintaining these suitable hydrological conditions.
- The berm installation process includes a key formation in the drains. A 500mm deep key is formed by taking a strip of peat from the field and pushing it in to the drain where it is compacted by the bulldozer ensuring a tight seal. The excavator trims and shapes the completed berm.
- The low and robust design of the peat berms means that overflow pipes are not required for all berms and it is expected that in flatter ground, water will overflow over the berms with minimal risk of erosion. Where necessary they will be incorporated to ensure water levels are controlled, do not rise over top of the berm and mitigate against the erosion of the berm while ensuring water level control.
- Operators assigned to this work element are familiar with the technique and process and provide effective robust berms. The operators are experienced and capable of adapting to the particular conditions encountered within the bog.
- Qualified, experienced Engineers overseeing the works during the installation phase ensure that quality procedures of the various elements are implemented and effectively meet the standards for quality service and performance.

- **Mitigation through maintenance and avoidance:**
  - Avoidance of berms in areas subject to seasonal winter inundation.
  - A post construction lidar and imagery survey will capture the impact of the completed rehabilitation measures indicating if any appropriate remedial action is required or deemed necessary.
  - As peat berms are designed to retain a shallow level of water on the cutover there will be no increase in water discharging into the boundary drains preventing any negative impacts on adjacent agricultural land. (See chapter 7 below ‘Emergency Failure Response’ outlining mitigation measures to be put in place should any risks of undesirable hydrological impacts occur).

Figure 5.3.1 Peat Berm at Castlegar Bog

5.4. Production field re-profiling

Basis for Design:

Field re-profiling is developed as a technique to level the production fields thereby optimising the extent of target re-wetting and water levels and slowing the surface water loss across the bog. From previous Bord na Móna experience and in trials already in operation in Derrycolumb bog, the geometry and process as set out below is proven effective in creating suitable topography and hydrological conditions for re-wetting. This method of re-profiling is utilised in the DPT 3A methodology.

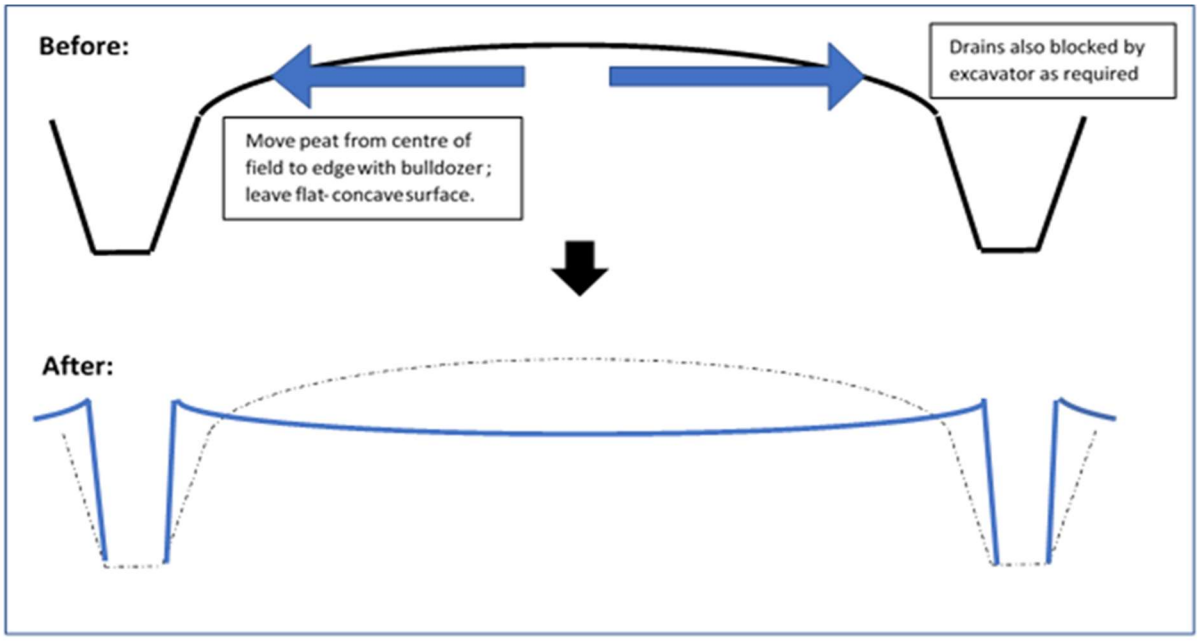

Figure 5.4.1 Indicative methodology for field profiling

Description of process:

- The field is re-profiled using a tracked bulldozer only, making a total of 16 passes; 8 passes up and 8 passes down the length of the former production field, flattening the camber in the centre of the field.

Risks identified:

  - Uncontrolled escape of silt/sediment into adjacent drains and downstream during rainfall events.
  - Excess surface water flow leading to 'Sheet flow' and erosion of silt and emerging vegetation from surface of the bog.

- **Mitigation through design:**
  - Risk of additional silt created by peat disturbance. Field drains upstream and downstream will be blocked to mitigate water flow in the drain to reduce silt run-off. (See chapter 7 below 'Emergency Failure Response' outlining mitigation measures to be put in place should any risks of undesirable increased movement of peat occur during construction stage).
  - Drain blocks provided downstream at the end of the fields in advance of field reprofiling will ensure any silt that enters the drains is retained in the drain.

- Operators assigned to this work element are familiar with the technique and process. The operators are experienced and capable of adapting to the particular conditions encountered within the bog
- Qualified, experienced Engineers overseeing the works during the installation phase ensure that quality procedures of the various elements are implemented and effectively meet the standards for quality service and performance.

- **Mitigation through maintenance and avoidance:**
  - A post construction Lidar and imagery survey will capture the impact of the completed rehabilitation measures indicating if any appropriate remedial action is required or deemed necessary.

Figure 5.4.2 Field re-profiling using Bulldozer Only

5.5. Screw levelling/In-filling of Production field drains

Basis for Design:

This concept of field re-profiling is to level the surface of the individual peat production fields to retain surface water at the required depth. From previous Bord na Móna experience and in similar environments in Derrycolumb bog, the geometry and process as set out above has proven effective by creating a suitable flat profile where water is held at suitable levels by edge berms forming a cell. The basis of empirical design is previous experience. This measure which includes a screw leveller combined with a dozer is used in the DPT4A methodology.

Description of process:

- The first operation in the re-profiling process requires the blocking of the downstream field drains to mitigate silt run-off
- The Screw-Leveller will 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.
- Next the Bulldozer 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.
- The Bulldozer will then 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.
- The original channels will be carefully filled in with suitable material as specified on the drawings. The materials shall be compacted in accordance with the requirements on drawings.

Risks identified:

  - Uncontrolled escape of silt/sediment into adjacent drains and downstream during rainfall events.
  - Excess surface water flow leading to 'Sheet flow' and erosion of silt and emerging vegetation from surface of the bog

- **Mitigation through design:**
  - Risk of additional silt created by peat disturbance. Field drains upstream and downstream will be blocked to mitigate water flow in the drain minimising silt run-off. (See chapter 7 below 'Emergency Failure Response' outlining mitigation measures to be put in place should any risks of undesirable increased movement of peat occur during construction stage).
  - Peat drain blocks to be provided immediately after field reprofiling to prevent preferential flow paths in infilled drains.
  - Operators assigned to this work element are familiar with the technique and process. The operators are experienced and capable of adapting to the particular conditions encountered within the bog.
  - Qualified, experienced Engineers overseeing the works during the installation phase ensure that quality procedures of the various elements are implemented and effectively meet the standards for quality service and performance.
- **Mitigation through maintenance and avoidance:**

- A post construction lidar and imagery survey will capture the impact of the completed rehabilitation measures highlighting if any appropriate remedial action is required or deemed necessary.

Figure 5.5.1 Field re-profiling using Screw-Leveller

5.6. Modifying Outfalls and Controlling Water Levels

A description of several 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’ through high production fields are more applicable to those bogs which are subject to periodic inundation. This inundation may be due to rainfall or flooding or where water needs to be diverted from one part of the bog to another by way of management, or to create wetland areas. Both measures are essential to the management of water levels.

5.6.1. 'V' Tap Across High Field to Control Water Levels

Basis for Design:

This is effectively a method for diverting surface 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. This approach has been implemented across various Bord na Móna bogs to manage water levels and an example of this is Baunmore Bog in Littleton Bog Group.

Description of process:

- 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.

Risk and Proposed Mitigation Measures:

- The analysis of Lidar maps and topography in conjunction with the Drainage Management Plan will be elemental to targeting the most appropriate locations for the “tap”.

Figure 5.6.1.1 ‘V’ Tap across a high field at Baunmore to control water levels

5.6.2. Blocking of Outfall

Basis for Design:

The blocking of outfalls drains on the cutaway is a measure that is only carried out in a limited number of circumstances where it is essential to manage hydrology by raising water levels in a particular area and controlling the overflow via a new channel or pipe at an appropriate level.

It is an effective method of controlling water loss from the bog and is proven in its effectiveness in Littleton Bog. This measure is used in the DPT1, DPT2, DPT3A, DPT3B, DPT4A, DPT4, DPT5 and MLT2 rehabilitation methodologies.

Description of process:

- An Excavator is used to form a key on either side of the drain which forms the outfall from the bog or field. A 500mm depth of peat is removed from bottom of drain also and placed behind the machine for replacement later. (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.)
- 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. For a deep drain the peat will be compacted in layers of 300mm using the bucket of the excavator. The approximate width of the block is 3-5 times the width of the drain.
- The block drain block is built up at least 300mm above the ground level of the bog to allow for subsequent shrinkage of the peat as it dries and it will be wide enough to prevent water moving around the blockage, 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.

Risk and Proposed Mitigation Measures:

- Complete filling of drains should require little ongoing maintenance if carried out to a high standard.
- Prior to infilling, any loose or dried out peat in the base or sides of drain should be removed.
- Blocking of outfalls will be planned so that it will be fully completed in one day and will be carried out in suitable weather conditions.
- Adequate compaction of the peat will be ensured.
- Water level management will be considered and an overflow channel or pipe will be constructed at an appropriate level.

Periodic inspections will be conducted to ensure they remain robust and are working effectively.

5.6.3. Raise Piped Culverts to control water levels

Basis for Design:

This measure is particularly effective for cutaway bogs with relatively flat basins where raising of pipes produces water flow at a higher invert level, within specified areas of the pre-existing drainage network. This measure is utilised in methodologies DPT1, DCT2, WLT2, WLT3 and WLT4. It may also be used in place of a controlled weir where required for other rehab methodologies.

Description of process:

- The drain shall be temporarily blocked upstream of the existing outfall pipe or diverted if blocking of drain is not feasible. Water will still exit at the designated emission points via the silt ponds.
- A new transverse field drain, and pipe is then placed at a higher specified invert level than the existing outfall.
- The pipe shall be placed and covered in accordance with manufacturers specifications and adequate cover shall be provided to protect the pipe integrity.

Risk and Proposed Mitigation Measures:

- Blocking of the outfalls upstream of existing silt ponds will prevent increased silt run-off. The drain will be temporarily blocked upstream or diverted.
- Works will only be carried out in suitable weather conditions.

Figure 5.6.3.1 Raised water outlet at Cavemount

5.7. Post-Rehabilitation Bog drainage to external network

The following section sets out the drainage paths for the proposed rehabilitation measures at Derrycolumb Bog to ensure a defined route for water to discharge back to the external network remains post rehabilitation measures.

5.7.1. Rehabilitation Measures Drainage to external network

The majority of the rehabilitation measures in Derrycolumb such as DPT2, DPT3, DCT2, Wetland measures etc. do not alter the topography of the sub-catchment in which they are contained or do not create berms which enclose the measures and therefore it is anticipated that the pre-rehabilitation flow path to the discharge location will be retained. This is because topographical flow paths for surface water out of the bog (by gravity) will be retained in these areas and the bog is not dependent on a pumping regime to ensure ponding does not occur.

The potential for increased groundwater levels and to a lesser extent marginal alteration of the topographical catchments has been assessed within the Derrycolumb Drainage management plan in line with a precautionary approach. With gravity drainage routes retained it is anticipated that groundwater levels will reach the surface of the peat fields but no higher than this

5.7.2. Pump decommissioning

The bog and its sub catchments are drained mainly by a gravity drainage system with two pump locations within Derrycolumb bog aiding drainage of adjacent land and the bog internal drainage. The two pumps, one located in the North West and the other in the South East will be decommissioned as part of the rehabilitation measures. The pump locations are shown in Figure 5.7.3.1. Within the Drainage management plan an intervention measure is proposed to compensate for the decommissioning of the Pump to the North West. This pump is located at an inflow point from Derraghan Bog which assists the drainage in this area. To decommission this pump it will require upgrading of the drainage network in the area to allow free drainage of the adjacent Derraghan Bog, an adjoining bog in the ownership of Bord Na Mona. Derraghan Bog is lower than Derrycolumb bog and turning off the pump will result in ponding and a wetland area forming. The proposed rehabilitation measure in Derraghan Bog will be prescribed taking this into account and will align with this anticipated ponding. The wetland water levels in this area will need to be regulated as water cannot not be allowed to rise back towards an existing Ash Disposal Facility to the north of the bog. The invert level of the cells of the Ash Disposal Facility is 44mOD and by providing a 500mm freeboard a maximum permissible water level will be set at 43.5m OD. Without the pump operating the water levels will rise to 42.97mOD which is the invert of the pipe downstream of the pump site and this is the level the water will reach before it can drain via this pipe through higher ground to the open drain in Derrycolumb bog. The adjacent bog is lower than Derrycolumb bog.

The Pump to the South East when decommissioned is anticipated to create ponding and wetland conditions in the winter months in the direct vicinity of the pump site, Wetland rehabilitation measures are proposed surrounding the outfall which will align with the likely water levels in this area. The discharge point will revert to a gravity outfall which will serve the sub catchment areas which drain to it from higher levels in the bog.

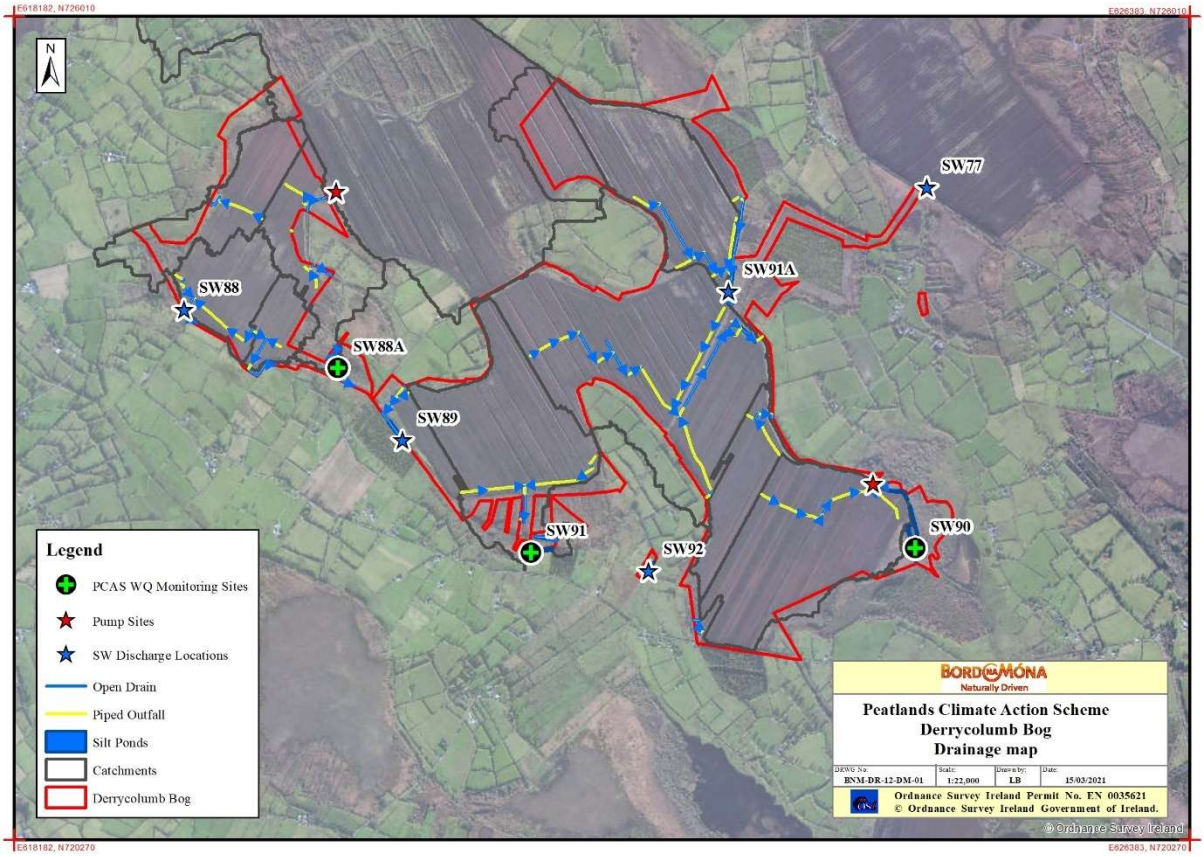

Figure 5.7.3.1 Derrycolumb Pump site and Bog Drainage map

5.7.3. DPT4 & DPT5 Cell drainage to external network

DPT4 & DPT5 measures are located in the areas of Derrycolumb where areas are anticipated to be slightly more difficult to re-wet, The cells are proposed in the NW, NE and SE areas of the bog with the largest area of cells being taken up in the South Eastern section. Within these areas of Derrycolumb bog where the DPT4 & DPT5 cells are located there is a risk of the water levels increasing to excessive depths, particularly in winter months and during large flood events should there not be a defined route for the water to discharge back to the external drainage network.

In Derrycolumb Bog where catchments flow into the areas that DPT4, or DPT5 measures are proposed, as the contributing catchment area increases through subsequent cells there will be greater potential for the cells downstream to be overtopped, increasing risk of erosion of the bunds and generating excessive water depths. To mitigate against this, it is proposed to interconnect the cells with overflow pipes and direct the water flow towards the outfalls. It will not be necessary in all instances to pipe the

cells such as where smaller catchments upstream or no localised depressions exist as infrequent overtopping of these cells is not considered a significant risk given the robust design of the cells. However, in line with a precautionary approach it is proposed to include overflow pipes in any cells with a minimum contributing catchment area of 1 hectares this area is taken from previous experience of drainage within Derrycolumb bog and can be adjusted with the provision of further pipes in the relevant cells to reduce the catchment area if required. Indicative overflow locations are shown in Figure 5.7.3.2 and thus creating a flow path through the cells to the outfalls.

The One Hectare area threshold is an initial threshold adopted based on previous experience within Derrycolumb Bog and other Bord na Móna Bogs. However, this threshold is subject to change from bog to bog depending on a number of factors such as rate of effective rainfall, rate of infiltration etc. However, it is anticipated that the area adopted will enable an assessment of the approach and inform an adjustment of the threshold should it be required.

It should be noted in some instances where catchments are located in depressions and cannot be drained without the use of overflow pipes, then these will also be proposed regardless of whether the cells have a contributing catchment area of <1 hectares or not.

Within the DPT4, DPT4A & DPT5 measures there is an ability to come back on site and install additional pipes to cells and additional taps, where deemed necessary as hydrological conditions begin to stabilise.

As can be seen in Figure 5.7.3.1 DPT4 & DPT5 Cell drainage it is proposed to have overflow pipes from cell to cell in the direction of flow. The flow paths throughout the site following the rehabilitation measures have been considered based on current and anticipated topography. The cells have been designed to drain towards a specific discharge point or open drain which will extend to the outfall. The overall drainage routes and how they connect into the river channels is shown within Figure 5.7.3.2

These main drainage routes will consist of a series of existing pipes sections, open drains and culverts through the high fields where required (taps) and will align with existing discharge outfall points. Some minor modifications may be required based on final surface levels across the site to ensure gravity flow can be maintained. Based on the overall catchment size draining to the outfalls in Derrycolumb Bog it is proposed to tap the high fields with 450mm pipes, which will have an estimated capacity of 0.68 m3/s assuming free flowing and a gradient of 0.05. This is considered conservative in the context of the contributing catchment area and calculated flows for a 1% AEP event. Furthermore, this size of pipe (450mm) is a typical size utilized within BnM bogs to drain similar or greater catchments areas. Any open drains connecting to the taps will have equal to or greater capacity than the 450mm Pipe.

Due to the nature of the measures it is not possible to specify specific levels prior to the rehabilitation measures as the level will depend on amendments to topography through field reprofiling and other measures which will manipulate the ground profile locally. However, an assessment of current and anticipated surface levels along with levels of the current piped outfall indicates that an adequate fall can be achieved (at a higher elevation than the current piped outfall).

Figure 5.7.3.2 Demonstrates the general direction of flow of water through the cells towards the main drainage routes and outfalls.

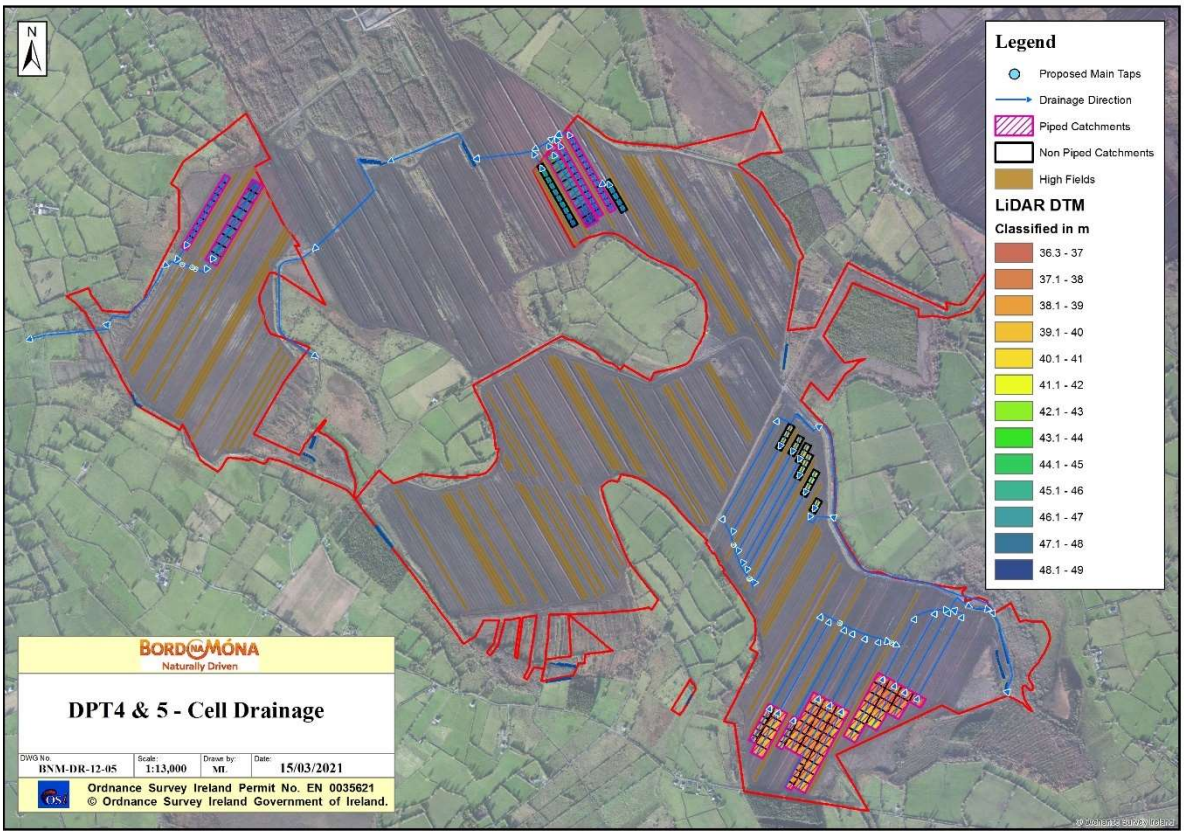

Figure 5.7.3.2 DPT4 & 5- Cell Drainage

6. Setting Out and Archaeology Buffer Zones

6.1. Setting Out Locations of Rehabilitation Measures

The following outlines the procedure for the setting out of locations of rehabilitation measures:

- Prior to commencement on site, co-ordinates of all drain blocks berm locations will be published onto the Bord na Móna ArcGIS Online Cloud.
- Operations staff will access that data using the ESRI Fields Maps application, on high accuracy GPS tablets.
- Locations of these drain blocks and berms will be presented to the machine drivers via the built-in GPS tablet and ESRI application and the machine drivers will use this technology to locate the position of the measures.

- In areas where additional clarity is required as in the case where rehabilitation measures are located in proximity to a designated or a protected site, then the location of the proposed boundary or restricted area will be set out and marked on site by Bord na Móna surveyors.

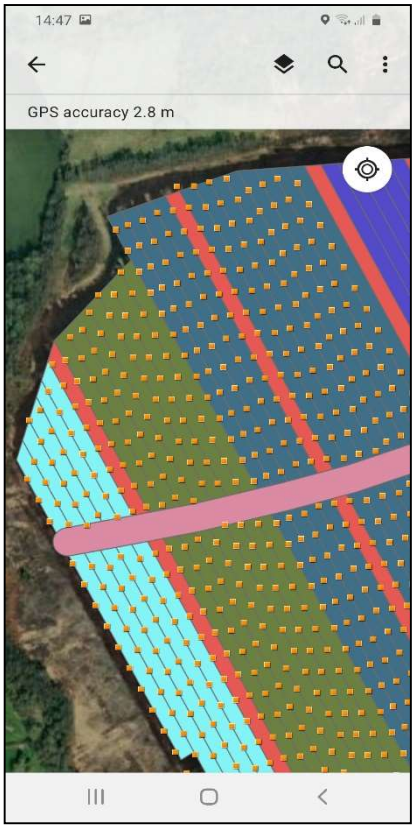

Figure 6.1.1 An example of the onscreen setting out interface

- Engineering staff will use the same ArcGIS cloud technology to verify the rehabilitation measures being carried out. This will enable weekly GIS status maps of works being carried out on a site.

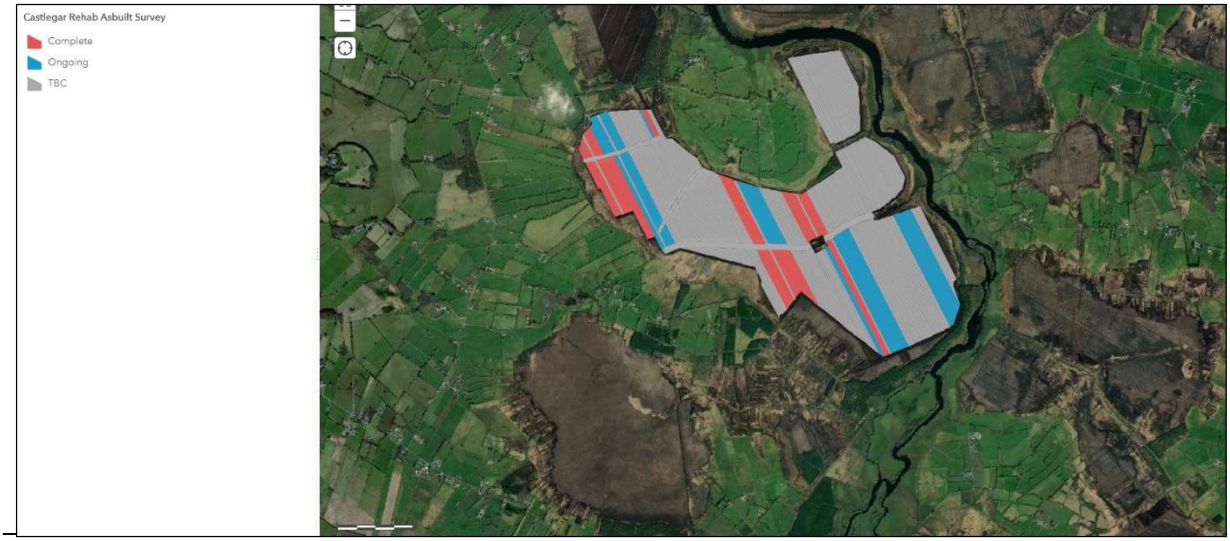

Figure 6.1.1 An example of a site verification survey

6.1.1. Archaeology Buffer Zone

- There is 1 archaeology area identified in Derrycolumb Bog.
- In order to protect the integrity of this area a 20m buffer zone will be implemented where no rehab measures will be undertaken.
- As referred to in Section 6.1 the location of the proposed boundary to this buffer zone will be set out and marked on site by Bord na Móna surveyors prior to measures commencing in that location.

6.1.2. Ecological Restriction Zone

- There is currently no Ecological Restriction Zone proposed for Derrycolumb Bog, however this may change prior to commencement of the measures and if so a buffer zone will be provided.

- As referred to in Section 6.1 the location of the proposed boundary to this buffer zone will be set out and marked on site by Bord na Móna surveyors prior to measures commencing in that location, at the appropriate time prior to the commencement of activities.

7. Emergency Response Plan

The Emergency Response Procedure is included in Appendix B and outlines the procedures to be implemented in the event of a Peat Spillage as follows:

- Isolate the source of peat spillage the source of which could include a silt pond failed berm or failed drain block.
- Assess the extent of the peat spill and follow to bog outfall.
- Switch off any associate bog pumps.
- Construct dry peat berms around extent of peat flow and monitor.
- If the peat spillage is assessed to have the potential to extend to a receiving water deploy a silt curtain on the receiving water.
- Continue clean as instructed by/under direction of Local Authority/ Inland Fisheries Ireland / EPA.

Appendix A

Decision Matrix

Stage 1 What type of BnM bog?	Stage 2 What type of drainage? (Gravity/pumped?) Affected by winter inundation ?	Stage 3 Hydrological/ topographical modelling Can be strongly correlated with previous flooding data	Stage 4 What type of surface (vegetated or not?)	Stage 5 Slopes/topography?	Stage 6 Hydrology/Piezometers	Rehab type	Expected habitats	Typical sites/habitats	FY22 Bogs
Development bog (drained but retains original vegetation)	Gravity (never pumped)	variable	Vegetated	Variable	Variable	Bog restoration proposed (DPT2) block drains Target is to raise water levels close to peat surface	**This will lead to raised bog (active and inactive)**	Examples of typical sites include Ballydangan & Kellysgrove	Kellysgrove
Deep peat production bog (peat depths > 2 m, indication of residual acidic peat, more acidic influence, less groundwater influence)	Deep peat (gravity)	Modelled as wet (topographical basins)	Bare peat	Flatter, more uniform topography	Higher/stable water level for most of year	Deep peat methodologies (DPT 3-5) Should be relatively easy to re-wet when drains are blocked Target is to raise water levels to peat surface (< 10 cm surface water) Sphagnum inoculation?	**This will lead to embryonic raised bog communities (Sphagnum-rich) (Mosaic with Birch scrub/woodland and potential to develop mosaic with Sphagnum-rich bog woodland)**	Examples of typical sites include Castlegar, Timahoe North and Bracklin (Sphagnum-rich, Bog cotton)	Castlegar; Belmont; Edera;
Deep peat			Vegetated	Variable	Variable	bog restoration proposed (DPT2) block drains Should be relatively easy to re-wet when drains are blocked Target is to raise water levels to peat surface (< 10 cm surface water) re-profiling not appropriate (vegetation)	**This will lead to raised bog/embryonic raised bog communities**	Example of typical site is Ballysorrell & Timahoe North	Belmont; Cavemount
Deep peat		Modelled as dry (slopes drain surface)	Bare peat	Flatter, more uniform topography	Higher/stable water level for most of year	Deep peat methodologies (DPT3 with cross bunding) Bunding essential (Consider type 4 /5 if suitable) Target is to raise water levels to peat surface (< 10 cm surface water) Sphagnum inoculation	**This will lead to embryonic raised bog communities (Sphagnum-rich) (Mosaic with Birch scrub/woodland and potential to develop mosaic with Sphagnum-rich bog woodland)**	Examples of typical sites include Castlegar & Pollagh	Belmont; Cavemount; Clonad; Edera;
Deep peat				Fluctuating water level - likely to dry out for periods		Deep peat methodologies (Type 1/3) Drain blocking Bunding (?) Re-profiling not cost-effective Target is re-wet, or to make ground as wet as possible Less intensive measures likely to be more sustainable	**This will lead a mosaic of Birch woodland, Heather and pockets of wet habitats (Sphagnum-rich bog woodland?) (Sphagnum-rich) (Mosaic with drier scrub)**	Examples of typical sites include Castlegar, Clooniff and Pollagh	Turraun; Ummeras
Deep peat				Steep, variable (headlands, high fields, mounds, ridges)	Fluctuating water level - likely to generally dry	Deep peat - DPT1 Block drains (if appropriate - no blocking of marginal drains), Fertiliser treatment Encourage natural colonisation (Removing effect of slope on steep ground is much less cost-effective)	**This will lead to dry bog woodland with Heather Face bank type cutover vegetation**	Examples of typical sites include Castlegar , Clooniff and Pollagh	
Deep peat			Vegetated	Variable	Variable	Deep peat methodologies (DPT3) block drains bunding required (Deep peat 3 with out re-profiling) re-profiling not appropriate (vegetated) Target is to raise water levels to peat surface (< 10 cm surface water) higher areas high fields left to naturally develop	**This will lead to raised bog/embryonic raised bog communities in mosaic with drier Birch woodland**	Example of typical site is Derryhogan, Bracklin and Timahoe North	Oughter
Deep peat	Deep peat (winter flooded or pumped)	Modelled as wet (topographical basins)	Surface water or vegetated	Variable	Higher water level, likely to be permanent surface water	Wetland (WPT1/2) block drains if possible Target is to optimise summer water levels for emergent vegetation Set summer drainage levels via gravity so encourage emergent vegetation (< 10 cm) re-profiling/bunding not appropriate - (too wet)	**Uncertainty as to future habitat development Influence of winter flooding may be most significant and lead to Reed Swamp, poor fen and wet woodland rather than more acidic communities but there is likely to be an eventual ecological continuum based in various hydrological influences**	Examples of typical sites includes parts of Clooniff or Pollagh (currently part deep peat and being pumped). Open water habitat in Timahoe North may be eqivalent. As is the transition mire developing at Derryhogan (Deep peat with deeper water)	
		Modelled as wet (topographical basins)	Bare peat or vegetated	Variable	Higher water level, likely to be some permanent surface water, water levels will flucuate in summer	Wetland methodologies (WPT3/4) block drains Bunding may not be feasible if there is winter flooding or water levels rise significantly Use natural topographical basins to hold water in summer Target is to optimise summer water levels for emergent vegetation Set summer drainage levels so encourage emergent vegetation (< 10 cm) re-profiling not appropriate	**Uncertainty as to future habitat development Influence of winter flooding may be most significant and lead to Reed Swamp, poor fen and wet woodland rather than more acidic communities but there is likely to be an eventual ecological continuum based in various hydrological influences**	Examples of typical sites inlcudes parts of Clooniff or Pollagh (currently part deep peat and being pumped). Open water habitat in Timahoe North may be eqivalent. As is the transition mire developing at Derryhogan (Deep peat with deeper water)	Derrycolumb; Clooniff; Pollagh
Shallow cutaway (peat depths < 2 m, increased ground-water influence)	Shallow cutaway (gravity-drained)	Modelled as wet (topographical basins)	Shallow bare peat (< 2 m deep)	Flatter, more uniform topography	Higher/stable water level for most of year	Wetland methodologies (WPT3/5) Block drains & bunding Should be relatively simple to re-wet Re-profiling may be feasible (on peat) Target is stable water level close to peat or subsoil surface Consider seeding of vegetation - Reeds/rhizomes	**This will lead to a wetland mosaic with fen, Reed Swamp, wet woodland**	Examples of typical sites inlcude Boora, Cavemount, Turraun (fen vegetation)	Mountlucas; Cavemount
			Bare sub-soil (likely strong alkaline influence on water chemistry)	Flatter, more uniform topography	Higher/stable water level for most of year	Wetland methodologies (WPT3) Block drains & Bunding Target is to re-wet as much as possible - should be relatively easy to re-wet Enhanced measures for peat re-wetting not cost-effective as there is no carbon storage benefit (no peat) Consider seeding of vegetation - Reeds/rhizomes	**This will lead to a wetland mosaic with fen, Reed Swamp, wet woodland**	Examples of typical sites inlcude Boora, Cavemount, Turraun (fen vegetation)	Cavemount

						Vegetated (fen, Reedbeds, open water, wet woodland)	Variable - but tends to be flatter (correlated with wetland)	Higher/stable water level for most of year	Wetland methodologies (WPT2) Targeted drain blocking to re-wet basins manage summer water levels via outfall management Bunding not a widespread option due to heavy vegetation Target is to raise water levels across larger areas if possible Optimise water levels for wet emergent vegetation	**This will lead to a wetland/dryland mosaic dominated by Birch, and pockets of wetland, fen, Reed swamp, open water**	Examples of typical sites inlcude Derries bog	Derrybrat; Derries; Oughter; Boora
	Shallow cutaway		Shallow cutaway (gravity-drained)		Modelled as dry (slopes drain surface)	Shallow bare peat (< 2 m deep)	Flatter, more uniform topography	Higher/stable water level for most of year	Wetland methodologies (WPT3-5) Block drains & bunding Bunding essential Re-profiling may be feasible (on peat) Target is stable water level close to peat or subsoil surface	**This will lead to a wetland mosaic with fen, Reed Swamp, wet woodland**	Examples of typical sites include Boora and Turraun (Birch, Heather, Bog Cotton & Molinia)	
	Shallow cutaway		Shallow cutaway (gravity-drained)					Fluctuating or low water level - likely to dry out for periods	Wetland methodologies (WPT3-5) Block drains & bunding Bunding essential Re-profiling may be feasible (on peat) Target is stable water level close to peat or subsoil surface	**This will lead to a wetland/dryland mosaic dominated by Birch, and pockets of wetland, fen, Reed swamp, open water**	Examples of typical sites inlcude Derries bog	
	Shallow cutaway		Shallow cutaway (gravity-drained)				Steep, variable (headlands, high fields, mounds, ridges)	Low water levels - likely to relatively dry	Dryland methodologies (DCT2) Block drains Fertiliser treatment, if required Bunding and re-profiling not likely to be cost effective Encourage natural colonisation	**This will lead to a dry mosaic with Birch woodland pre-dominant**	Examples of typical sites inlcude drier parts of many sites (Birch woodland)	
	Shallow cutaway		Shallow cutaway (gravity-drained)			Bare sub-soil (glacial & marls)	Flatter, more uniform topography (marls)	Fluctuating or low water level - likely to dry out for periods	Wetland methodologies (WPT3) Block drains & Bunding Target is to re-wet as much as possible Enhanced measures like re-profiling for peat re-wetting not cost-effective as there is no carbon storage benefit (no peat)	**This will lead to a wetland mosaic with fen, Reed Swamp, wet woodland**	Typical sites inlcude sections of Garryduff and Kilmacshane that dry out in summer	
	Shallow cutaway		Shallow cutaway (gravity-drained)				Steeper, variable (mounds and ridges of sub-soil, glacial)	Low water levels - likely to relatively dry	Dry cutaway (DCT2) Block drains (if effective, drains may be eroded) Fertiliser treatment Bunding and re-profiling not likely to be cost effective Encourage natural colonisation	**This will lead to a dryland mosaic dominated by Birch, dry grassland with high biodiversity value heath, and pockets of wet habitats**	Examples of typical sites include parts of Drinagh and Clongawny (mounds)	
	Shallow cutaway		Shallow cutaway (gravity-drained)			Vegetated (scrub, heath, woodland, fen)	Flatter, more uniform topography	Fluctuating or low water level - likely to dry out for periods	Wetland methodologies (WPT2) Targeted drain blocking Look to manage summer water levels via outfall management Bunding not likely to be a cost/effective option due to heavy vegetation Target is to raise water levels across larger areas if possible Optimise water levels for wet emergent vegetation	**This will lead to a wetland/dryland mosaic dominated by Birch, and pockets of wetland, fen, Reed swamp, open water**	Examples of typical sites inlcude Derries bog	Oughter; Boora
	Shallow cutaway		Shallow cutaway (gravity-drained)				Steep (headlands, mounds and ridges)	Low water levels - likely to relatively dry	Dry cutaway (DCT2) Targeted drain blocking if there is potential value Leave habitats to naturally develop	**This will lead to a dryland mosaic dominated by Birch, dry grassland with high biodiversity value heath, and pockets of wet habitats**	Examples of typical habitats include Carrickhill, Drinagh and Clongawny (mounds)	
	Shallow peat cutaway		Shallow peat cutaway (winter flooded or pumped)		Modelled for shallower summer water levels	Shallow bare peat (< 2 m deep) & bare sub-soil	Variable - but tends to be flatter (correlated with wetland)	high	Wetland methodologies (WPT2) Block drains reduce or cease pumping manage summer water levels by setting new gravity outfall Bunding not likely to be feasible Target is emergent vegetation with water levels < 10 cm Water levels will rise in the winter	**This will lead to wetland mosaic with Reed swamp, fen, wet woodland mosaic of water-levels**	Examples of typical sites include parts of Oughter, Drinagh, Baunmore	
	Shallow cutaway					Vegetated (wetlands)	Variable - but tends to be flatter (correlated with wetland)	high	Wetland methodologies (WPT2) Block drains reduce or cease pumping manage summer water levels by setting new gravity outfall Target is emergent vegetation with water levels < 10 cm Water levels will rise in the winter	**This will lead to wetland mosaic with Reed swamp, fen, wet woodland**	Examples of typical sites include Cavemount ,Drinagh and parts of Blackwater	
	Shallow cutaway		Shallow peat cutaway (winter flooded or pumped)		Modelled for deeper summer water levels	Shallow bare peat (< 2 m deep) & bare sub-soil	Variable - but tends to be flatter (correlated with wetland)	high	Wetland methodologies (DPT1-2) Reduce or cease pumping manage summer water levels by setting new gravity outfall, if possible (subject to DMP) Target is to minimise deeper water where possible in summer via new gravity outfalls These areas will flood in winter	**This will lead to wetland mosaics (fen, Reedbeds) with greater proportions of permanent deeper open water**	Examples of typical sites include Coolumber (Clooniff), Garryduff, Kilmachshane	
	Shallow cutaway					Vegetated (wetlands)	Variable - but generally flatter as wetlands have already formed	high	Wetland methodologies (WPT1-2) Reduce or cease pumping manage summer water levels by setting new gravity outfall, if possible (subject to DMP) Target is to minimise deeper water where possible in summer via new gravity outfalls Water levels will rise in winter	**This will lead to wetland mosaics with greater proportions of permanent deeper open water**	Examples of typical sites inlcude Knappogue and Derrycashel, Kilmacshane	

Appendix B

Emergency Response Plan

Emergency Response Clean-up procedures.

PROCEDURE

Fuel/Oil Spillage

- Isolate/switch off fuel/oil spillage source
- Obtain access to closest oil-spillage kit located at _____
- Travel to closest downstream receiving river bridge and deploy/ secure booms across river width, if spillage has potential to extend to local river.
- Assess extent of fuel spillage and deploy booms at associated drain, silt pond inlet or closest outfall or furthest spill extent.
- Switch off any associated bog pumps.
- Depending on spillage source location, construct peat berm to contain spillage
- Use adsorbent pads to commence soaking of fuel contaminated water
- Store depleted absorbent pads in wheelie bin for hazardous waste disposal
- Continue to monitor spillage source, contaminated soils, deployed booms and receiving water and change kit as required.

Peat Spillage

- Isolate source of peat spillage (silt pond, failed berm, failed drain block)
- Assess extent of peat spill and follow to local receiving water.
- Switch off any associated bog pumps.
- Construct dry peat berms around extent of peat flow and monitor.
- Deploy silt curtain on receiving water if peat spillage has potential to extended to local river.
- Continue clean-up as instructed by/under direction of Local Authority / Inland Fisheries Ireland/EPA

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Fuel/Oil spill kit (containment booms and adsorbent materials)

Fuel/oil booms

Adsorbent Pads

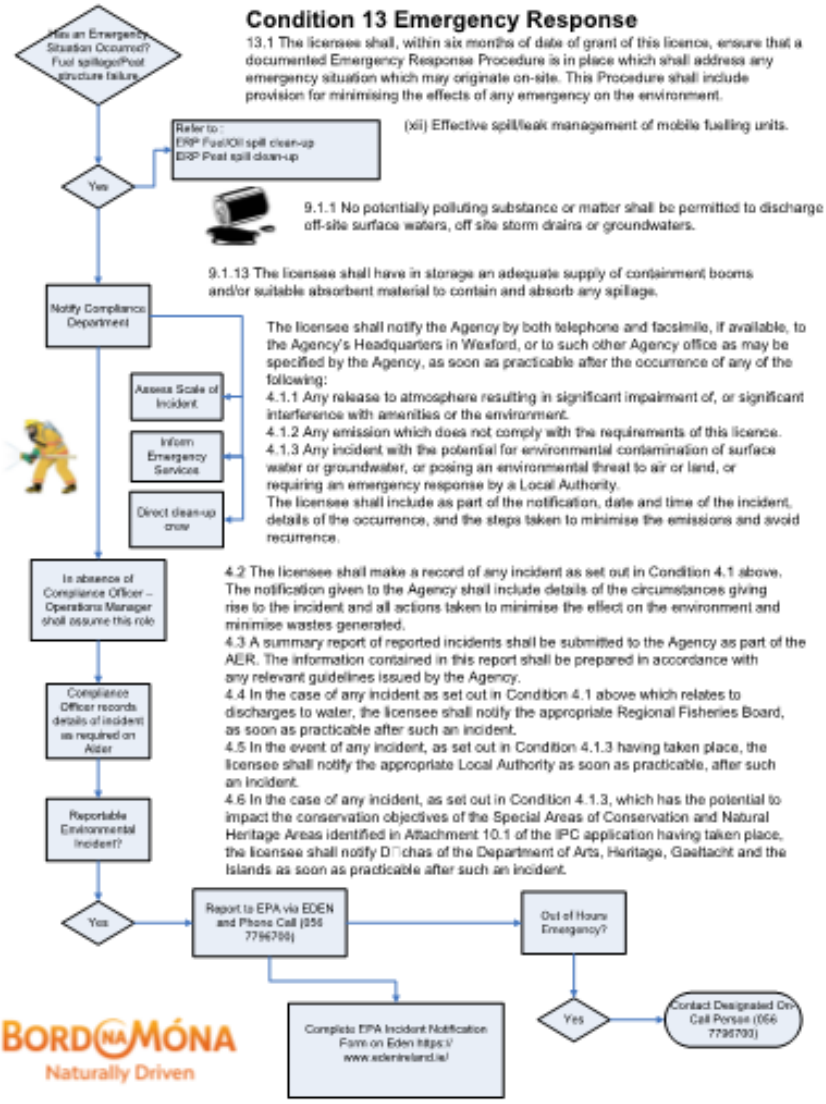
Adsorbent socks

Boom securing pegs

Spill kit

Silt Curtain

EP 5.0 General Emergency Response (IPC Licence Condition 13)



Condition 13 Emergency Response

13.1 The licensee shall, within six months of date of grant of this licence, ensure that a documented Emergency Response Procedure is in place which shall address any emergency situation which may originate on-site. This Procedure shall include provision for minimising the effects of any emergency on the environment.

(xii) Effective spill/leak management of mobile fuelling units.

9.1.1 No potentially polluting substance or matter shall be permitted to discharge to off-site surface waters, off site storm drains or groundwaters.

9.1.13 The licensee shall have in storage an adequate supply of containment booms and/or suitable absorbent material to contain and absorb any spillage.

The licensee shall notify the Agency by both telephone and facsimile, if available, to the Agency's Headquarters in Wexford, or to such other Agency office as may be specified by the Agency, as soon as practicable after the occurrence of any of the following:

4.1.1 Any release to atmosphere resulting in significant impairment of, or significant interference with amenities or the environment.

4.1.2 Any emission which does not comply with the requirements of this licence.

4.1.3 Any incident with the potential for environmental contamination of surface water or groundwater, or posing an environmental threat to air or land, or requiring an emergency response by a Local Authority.

The licensee shall include as part of the notification, date and time of the incident, details of the occurrence, and the steps taken to minimise the emissions and avoid recurrence.

4.2 The licensee shall make a record of any incident as set out in Condition 4.1 above. The notification given to the Agency shall include details of the circumstances giving rise to the incident and all actions taken to minimise the effect on the environment and minimise wastes generated.

4.3 A summary report of reported incidents shall be submitted to the Agency as part of the AER. The information contained in this report shall be prepared in accordance with any relevant guidelines issued by the Agency.

4.4 In the case of any incident as set out in Condition 4.1 above which relates to discharges to water, the licensee shall notify the appropriate Regional Fisheries Board, as soon as practicable after such an incident.

4.5 In the event of any incident, as set out in Condition 4.1.3 having taken place, the licensee shall notify the appropriate Local Authority as soon as practicable, after such an incident.

4.6 In the case of any incident, as set out in Condition 4.1.3, which has the potential to impact the conservation objectives of the Special Areas of Conservation and Natural Heritage Areas identified in Attachment 10.1 of the IPC application having taken place, the licensee shall notify D□chas of the Department of Arts, Heritage, Gaeltacht and the Islands as soon as practicable after such an incident.

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Appendix F Environmental Management Plan

Peatland Climate Action Scheme

Environmental Management Plan

Derrycolumb Bog

Prepared by

Bord na Móna, Civil Engineering Office

DOCUMENT CONTROL SHEET

Client	Bord na Móna					
Project Title	Peatland Climate Action Scheme					
Document Title	Environmental Management - Plan Derrycolumb Bog					
Document No.	PCAS-RP-01-EMP					
This Document Comprises	DCS	TOC	Text	List of Tables	List of Figures	No. of Appendices
	1	1	19	4	0	2

Rev.	Status	Author(s)	Reviewed By	Approved By	Office of Origin	Issue Date
-	Draft	DM	EMcD/MMcC/ DK/CC	PN	BnM Engineering Dept.	05-04-2021

Contents

1.0 Introduction

Bord na Móna have identified a footprint of 33,000 ha of their estate as peatlands suitable for enhanced rehabilitation. This proposed Peatlands Climate Action Scheme (PCAS) will significantly exceed the requirements of the rehabilitation and decommissioning obligations under existing Environmental Protection Agency (EPA) Integrated Pollution Control (IPC) Licence Conditions. Improvements supported by PCAS will ensure that environmental stabilisation is achieved, and significant additional benefits are realised through optimising climate action benefits. This decommissioning, rehabilitation and restoration process will be referred to in subsequent sections of this report as 'the works'.

The objectives of the Environmental Management Plan (EMP) are to:

a) Identify management responsibilities and reporting requirements for environmental management;
b) Identify the relevant Environmental Commitments;
c) Set out the environmental protection measures to be implemented;
d) Outline how compliance with the EMP will be achieved; and
e) Promote best environmental practices for the duration of the development.

This Environmental Management Plan should be read in conjunction with the following site-specific documents for the relevant bog where works are taking place:

- Rehabilitation Plan,
- Preliminary Health & Safety Plan,
- Engineering Construction Package,
- Environmental Compliance Construction Package,
- Ecology Construction Package,
- Associated IPC Licence

The Rehabilitation Plan gives details on the proposed works and outlines control measures and associated monitoring in order to mitigate against any detrimental impacts that may arise on site during the works. It also outlines Bord na Móna's responsibilities under the existing IPC Licence Conditions with respect to peatland rehabilitation.

It is noted that there will be a requirement for Bord na Móna Operations to further develop and widen the scope of this document to create a workable and up-to-date Construction Environmental Management Plan (CEMP). These documents should be treated as live documents, with the content of the CEMP to be revised and updated periodically as the works progress.

2.0 Proposed Rehabilitation Works

The enhanced rehabilitation measures are outlined and detailed in the site-specific Rehabilitation Plan, Engineering Construction Package, Environmental Compliance Construction Package & Ecology Construction Package. These measures are grouped into rehabilitation packages and their suitability for the deployment in different 'high level' categories of land types are outlined in Table 2-1. The Standard Rehab Methodology Drawings in Table 2-2 should be followed with respect to the execution of the various mythologies on site.

Table 2-1 Rehabilitation Packages

Code	Description
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 with a controlled weir outfall + Sphagnum inoculation
DPT3	More intensive drain blocking (7/100 m), + field reprofiling + blocking outfalls and managing overflows with a controlled weir outfall + + Sphagnum inoculation
DPT4	Berms and field re-profiling (45m x 60m cell) + blocking outfalls and managing overflows with a controlled weir outfall + drainage channels for excess water + + Sphagnum inoculation
DPT5	Cut and Fill cell bunding (30m x 30m cell) + blocking outfalls and managing overflows with a controlled weir outfall + 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
DCT3	More intensive drain blocking (7/100 m) + blocking outfalls and managing overflows with a controlled weir outfall + targeted fertiliser treatment
Wetland	
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 with a controlled weir outfall + transplanting Reeds and other rhizomes
WLT5	More intensive drain blocking (7/100 m), + field reprofiling + blocking outfalls and managing overflows with a controlled weir outfall + transplanting Reeds and other rhizomes
Marginal Land	
MLT1	No work required
MLT2	More intensive drain blocking (7/100 m)

Table 2-2 – Schedule of Standard Rehab Methodology Drawings

Drawing No.	Drawing Title
PCAS-0100-001	Rehabilitation Method DPT1
PCAS-0100-002	Rehabilitation Method DPT2
PCAS-0100-003	Rehabilitation Method DPT3A
PCAS-0100-004	Rehabilitation Method DPT3B
PCAS-0100-005	Rehabilitation Method DPT4A
PCAS-0100-006	Rehabilitation Method DPT4
PCAS-0100-007	Rehabilitation Method DPT5
PCAS-0100-008	Rehabilitation Method DCT2
PCAS-0100-009	Rehabilitation Method DCT3
PCAS-0100-010	Rehabilitation Method WLT3
PCAS-0100-011	Rehabilitation Method WLT4
PCAS-0100-012	Rehabilitation Method WLT5
PCAS-0100-013	Rehabilitation Method MLT2
PCAS-0100-014	Modifying of Outfalls & Managing Water Levels
PCAS-0100-015	Field Re-profiling
PCAS-0100-016	Boundary Berm

3.0 Envisaged Sequence of Works

This section provides an outline of the envisaged sequence of works associated with the project. Bord na Móna Operations Risk Assessment Method Statements (RAMS) should include a detailed description of the works, particularly those works which have the potential to impact public spaces. Mitigation measures for these impacts should also be proposed within the RAMS. Refer to **Appendix A** for relevant Risk Assessment Method Statements associated with the works.

3.1 Site Preparation Works

Bord na Móna Operations will be responsible for security of the site and as such, will be required to carry out, among others, the following tasks:

- Ensure that a relevant and robust site induction process is in place for all site personnel.
- Ensure that all site personnel have valid Safe Pass card, and valid CSCS card where applicable.
- Ensure that access to the site by unauthorised persons is restricted, by appropriate means

The site compound may be used as a storage area for various materials throughout the course of the works. Typical materials to be stored include fuels, plant and equipment. Temporary water supply, electricity and sewerage to be satisfied by Bord na Móna Operations.

3.2 General Description of Works

The works involves the construction of peat dams, berms and the adoption of various peat bunding techniques in addition to monitoring activities as per the IPC Licence requirements.

The scope of works is described as, but are not limited to, the following:

- Silt pond inspections fortnightly and cleaning bi-annually.
- Sampling of the silt pond outlet every month.
- Refuelling of machines.
- Unloading of fuel from supplier into a double skinned tank onsite.
- Unloading of oil barrels from a pick-up and depositing into the oils store.
- Other materials being delivered to site by BNM and third parties.
- Idle travel out the bog bringing operators to machines to facilitate welfare breaks.
- Collection of loose polythene out the bog and stockpile at the centre.

- Collection of old unused concrete pipes and transport back to centre.
- Remove old machines from bogs, returning to the centre for cutting and collection by a scrap contractor.
- Lifting and collecting unused sections of rail line along mainline.
- Lifting laid permanent rail line and polythene.
- Decommissioning works including, but not limited to plastic clean up, lifting of rail lines etc.
- Provision of temporary welfare facilities for the Bord na Móna staff.
- Construction of peat dams within existing drains.
- Construction of peat bunds and berms.

4.0 Management & Mitigation Measures

4.1 Site Management

The works shall be managed and supervised by competent and qualified personnel and all works shall be carried out under appropriate supervision, best practice, current health and safety measures and also suitable quality control. Facilities for site employees shall be provided within the site compound.

Implementation of the mitigation measures for the works will be the responsibility of Bord na Móna Operations and supervision of the works will be carried out by this Bord na Móna Department incorporating Site Supervisors and the Project Supervisor Construction Stage (PSCS).

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

4.2 Health & Safety

All works shall be carried out so as to comply with all the requirements of the Safety and Health at Work Act 2005 and any subsequent regulations or amendments and with the requirements of the Health and Welfare at Work (Construction) Regulations, (SI 291 of 2013), any subsequent amendments and any other relevant Health and Safety legislation. All construction staff on site shall have a current Safe Pass card and relevant CSCS card. All works shall be carried out in a safe manner and in accordance with the above legislation and any other guidance notes issued by the Health and Safety Authority. In particular, all excavation works shall be carried out in accordance with the *HSA Publication: A Guide to Safety in Excavations.*

The PSCS will provide a site-specific Construction Stage Safety and Health Plan and will provide risk assessments and method statements for the works. On completion of the works the PSCS shall prepare a detailed safety file.

All site personnel/site visitors will be required to wear Personal Protective Equipment (PPE) and undergo the established site induction process prior to entering the site.

Bord Na Móna Operations should ensure that regular audits are carried out at the site, to ensure that measures and process outlined in the site health and safety plan are adhered to. Dangerous occurrences, incidents, near misses and unsafe acts should be recorded, with recorded action taken to prevent all further occurrences.

4.3 Restricted Activities

Species-specific seasonal restrictions on the proposed activities may be required in line with elements highlighted in the site-specific Rehabilitation Plan & Ecology Construction Package.

The proposed works area and environs is considered likely to contain, as a minimum, breeding bird populations. To avoid committing an offence by disturbing nesting birds, their eggs or young, any vegetation clearance necessary will be carried out in a manner to ensure compliance with Section 40 (i.e. clearance must be carried out from September to February inclusive or where absolutely required under license). Vegetation clearance must be programmed in advance of earthworks. For the avoidance of doubt, it should be noted that birds may nest in margins and low hedging, in addition to trees.

There may also be a requirement to protect other ecological receptors such as colonies of breeding Marsh Fritillary (a butterfly species), the breeding or resting places of Otter and possibly amphibians or reptiles which utilise locations such as drains or other water features.

Where clearance is required during the restricted period, the Department of Agriculture, Food and Marine advise that under Section 37 of the Forestry Act, 1946:

> *It is illegal to uproot any tree over ten years old or to cut down any tress of any age (including trees which form part of a hedgerow) unless a Felling Notice has been lodged at the Garda Station nearest to the trees at least 21 days before felling commences.*

The Closed Period "*40(1) (a) it shall be an offence for a person to cut, grub, burn or otherwise destroy during the period beginning on the 1st day of March and ending on the 31st day of August in any year, any vegetation growing on any land not then cultivated. (b) it shall be an offence for a person to cut, grub, burn or otherwise destroy any vegetation growing in any hedge or ditch during the period mentioned in paragraph (a) of this subsection"*

As per guidance from Inland Fisheries Ireland, any instream works proposed to be undertaken in any rivers streams and watercourses should be undertaken between July and September and in all cases must be agreed in advance with Inland Fisheries Ireland.

Measures to avoid the inadvertent transfer of alien invasive species (aquatic or terrestrial) will be required.

The Project Ecologist or Environmental Manager will advise Bord na Móna Operations on site-specific application of these restrictions to individual sites.

4.4 Archaeology

The discovery of monuments or archaeological objects during the works can constrain the rehabilitation measures proposed for a particular area. If this occurs, rehabilitation measures will be reviewed and adapted where required. An archaeological impact assessment for the site has been carried out and is included in the site-specific Rehabilitation Plan. The recommendations of this assessment have been incorporated into the site-specific Rehabilitation Plan, Engineering Construction Package, Environmental Compliance Construction Package & Ecology Construction Package to minimise impacts on known archaeology.

In addition, Bord na Móna Operations will adhere to the Archaeology Code of Practise relating to management of stray archaeological finds that may arise during the works.

4.5 Ground Water & Surface Water Management

A key component of the works is the potential hydrological impact rehabilitation may have on the bog, surrounding lands and lands downstream which may be hydrologically linked to the bog.

Measures should be taken to protect groundwater and surface water at the site during the works. Drip trays, spill kits and mobile bund systems should be used where required to prevent loss of chemicals/fuels to ground. Plant and equipment should be refilled in a bunded or hardstand area using a drip tray or mobile bund.

Damaged containers should be removed from site and disposed of appropriately to avoid further use. Fuels and oils on site should be stored securely to avoid damage. Relevant staff have received emergency response training for pollution events and be trained in the use of spill kits and handling and refuelling.

Management Activities will comply with Condition 6 of the IPC Licence as follows:

- Intensive sampling of 70% of our bog catchments
- Monthly sampling silt pond outlets
- Fortnightly silt pond inspections
- Bi-annual silt pond maintenance as per procedure

All works should be carried out in line with the site-specific Engineering Construction Package, Environmental Compliance Construction Package & Ecology Construction Package in addition to the *Inland Fisheries "Guidelines on protection of fisheries during construction works in and adjacent to waters".*

4.6 Drainage Management Plan Measures

Drainage Management Plans (DMP) have been developed for each bog to establish the baseline hydrological performance of the bog and the surrounding drainage network. The plan sets out the characterisation of the bog and surrounding lands, the existing performance of the drainage network and the level of flood risk. The plan identifies the potential hydrological zone of influence of the bog and the objectives, risks and opportunities associated with the rehabilitation of the bog.

The plan assesses the potential impact of the various rehabilitation measures which are proposed on the local drainage network and flood risk. It sets out, where necessary, mitigation measures required to reduce impacts to an acceptable level. The plan sets out the measures which are required to be delivered in parallel with the rehabilitation plan as well as the long-term operation and retention of the drainage network and associated infrastructure. The plan assesses the level of residual risk, the potential impact due to climate change and the adaptability of measures in response to these climate change impacts.

The DMP forms the basis of the detailed design drawings, included in the Engineering Construction Package, and should be read in conjunction with this report.

4.7 Traffic & Transport Management

All plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations (SI 359/1996). All machines will be regularly checked and maintained prior to arrival at the site to prevent hydrocarbon leakage. No direct discharges to waters will be made.

4.8 Noise Management

Notwithstanding that there is little likelihood of a significant adverse impact, noise generation is expected as part of the works. It is envisaged that the main noise sources at the site will include earthworks plant and equipment and associated traffic.

Management Activities will comply with Condition 8 of the IPC Licence as follows:

- Activities on-site shall not give rise to noise levels off site at any noise sensitive location which exceed the following sound pressure limits ($L_{eq,30min}$):
  - Day-time: 55 dB(A)
  - Night-time: 45 dB(A)
- There shall be no clearly audible tonal component or impulsive component in the noise emission from the activity at any noise sensitive location.

The works will be restricted to within the footprint of the proposed rehabilitation area. The works will have due regard to noise limits and hours of operation (i.e. dusk and dawn) to minimise any potential disturbance on resident and local fauna that utilise the site and immediate environs. The proposed measures will be restricted to daylight hours and there will be no requirement for artificial lighting.

Bord na Móna Operations will be obliged to take specific noise abatement measures as part of the works and comply with the recommendations of BS5228-1 2009. These measures will typically include:

- No plant used on site will be permitted to cause an ongoing public nuisance due to noise
- The best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on site operations.

4.9 Dust Management

Dust generation is not expected as part of the works. The nature of the proposed works will naturally reduce the production of dust on site, as reprofiling site levels encourages settlement of water on the surface of the bog.

Activities that could give rise dust will be managed under the relevant conditions under Condition 5 of the IPC licence as follows:

- The licensee shall ensure that all operations on-site shall be carried out in a manner such that air emissions and/or dust do not result in significant impairment of, or significant interference with amenities or the environment beyond the site boundary.
- Activities on-site shall not give rise to dust levels off site at any Dust Sensitive Location which exceed an emission limit of 350 mg/m^2/day. [The sampling method to be in accordance with German TA Luft Immission Standards for Particle Deposition (IW1)].

4.10 Fuel Management

Fuels and oils used for plant and equipment on the site shall be stored in a bunded area within the site compound as required. This area shall be inspected regularly, and the bund shall be adequate to contain a minimum of 110% of the volume of the largest container of oil and fuel stored. Spill protection equipment such as absorbent mats, shall be available on site to contain any oil spill that may occur, and procedures shall be in place to deal with any such spillage. All plant shall be provided with drip trays and spill kits. Plant operators shall carry out a visual inspection of their vehicle daily and shall be trained in how to deal with any uncontrolled spillage of oil.

All plant refuelling will take place using mobile fuel bowsers or fixed bunded tanks. Only dedicated trained and competent personnel will carry out refuelling operations. Fuelling and lubrication of equipment shall only be carried out in designated areas away from surface water drainage features and ecologically sensitive areas. Hoses and valves will be checked regularly for signs of wear and will be closed and securely locked when not in use.

Fuel management to ensure no impact on the environment will be managed in accordance with Condition 9 of the IPC Licence as follows:

- No potentially polluting substance or matter shall be permitted to discharge to off-site surface waters, off site storm drains or groundwaters.
- The loading and unloading of fuel oils shall be carried out in designated areas protected against spillage and leachate run-off. While awaiting disposal, all materials shall be collected and stored in designated areas protected against spillage and leachate run-off.
- The licensee shall have in storage an adequate supply of containment booms and/or suitable absorbent material to contain and absorb any spillage.
- The licensee shall maintain a log of bi-annual inspections of all rail and tractor transported fuelling units. These inspections as a minimum should record any damage or leaks or flaws in rolling stock that could result in accidental spillage.

4.11 Waste Management

All waste arising from the works shall be managed and disposed of in a way that ensures the provisions of the Waste Management Act 1996 and associated amendments and regulations are applied.

Waste Management will be conducted in accordance with Condition 7 of the IPC Licence as follows:

- Disposal or recovery of waste shall take place only as specified in Schedule 2(i) Hazardous Wastes for Disposal/Recovery and Schedule 2(ii) Other Wastes for Disposal/Recovery of this licence and in accordance with the appropriate National and European legislation and protocols. No other waste shall be disposed of/recovered either on-site or off-site without prior notice to, and prior written agreement of, the Agency.
- Waste sent off-site for recovery or disposal shall only be conveyed to a waste contractor, as agreed by the Agency, and only transported from the site of the activity to the site of recovery/disposal in a manner which will not adversely affect the environment.
- A full record, which shall be open to inspection by authorised persons of the Agency at all times, shall be kept by the licensee on matters relating to the waste management operations and practices at this site. This record shall as a minimum contain details of the following.
    - The names of the agent and transporter of the waste.
    - The name of the persons responsible for the ultimate disposal/recovery of the waste.
    - The ultimate destination of the waste.
    - Written confirmation of the acceptance and disposal/recovery of any hazardous waste consignments sent off-site.
    - The tonnages and EWC Code for the waste materials listed in Schedule 2(i), Hazardous Wastes for Disposal/Recovery and Schedule 2(ii) Other Wastes for Disposal/Recovery sent off-site for disposal/recovery.
    - Details of any rejected consignments.

4.12 Soil Management

If soil contamination is encountered during the works arising from an accidental fuel spillage, this should be managed in accordance with Conditions 4, 7 & 9 of the IPC Licence as follows:

- The licensee shall notify the Agency by both telephone and email to the Agency's Headquarters, or to such other Agency office as may be specified by the Agency, as soon as practicable after the occurrence of any of the following:
    - Any release to atmosphere resulting in significant impairment of, or significant interference with amenities or the environment.

  - Any emission which does not comply with the requirements of this licence.
  - Any incident with the potential for environmental contamination of surface water or groundwater, or posing an environmental threat to air or land, or requiring an emergency response by a Local Authority.
  - The licensee shall include as part of the notification, date and time of the incident, details of the occurrence, and the steps taken to minimise the emissions and avoid recurrence.
- The licensee shall make a record of any incident as set out in above. The notification given to the Agency shall include details of the circumstances giving rise to the incident and all actions taken to minimise the effect on the environment and minimise wastes generated.
- A summary report of reported incidents shall be submitted to the Agency as part of the AER. The information contained in this report shall be prepared in accordance with any relevant guidelines issued by the Agency.
- In the case of any incident as set out above which relates to discharges to water, the licensee shall notify the appropriate Regional Fisheries Board, as soon as practicable after such an incident.
- In the event of any incident, as set out above having taken place, the licensee shall notify the appropriate Local Authority as soon as practicable, after such an incident.
- In the case of any incident, as set out above, which has the potential to impact the conservation objectives of the Special Areas of Conservation and Natural Heritage Areas identified in Attachment 10.1 of the IPC application having taken place, the licensee shall notify Dúchas of the Department of Arts, Heritage, Gaeltacht and the Islands as soon as practicable after such an incident.
- The licensee shall as part of their AER, or more frequently as may be necessary, notify and supply maps to the Agency of boglands, and discharges from same, intended to be included in the subsequent years' development and operational programmes.

4.13 Fire Safety

The ***Bord na Móna Fire Prevention & Fire Fighting Procedures*** in addition to the ***Bord na Móna Fire and Environmental Plan*** outline requirements for fire prevention and fighting in peat bogs and works locations.

It is the intention of Bord na Móna to identify the potential for and take all practicable measures to prevent the outbreak of fire by means of ensuring:

- Implementation of the above policy and procedures.
- Activities are risk assessed to identify potential fire hazards and allow for implementation of suitable control measures to eliminate or reduce to a minimum associated risk.
- Selection of suitable equipment and machinery which is used appropriately and adequately inspected and maintained by competent personnel.
- Installation of appropriate fire detection and alarm systems, emergency lighting and fire fighting equipment which are adequately inspected and maintained by competent personnel.
- Proper use, storage, and disposal of flammable materials.
- Use of permit to work system, as appropriate, where hot works are to be undertaken.

Bord na Móna Operations must ensure that all fire egress and access points are kept clear and free from obstruction. Emergency access to the various works zones shall be provided and maintained for the duration of the project.

- Unobstructed fire egress during project.

- Adequate fire safety procedures.
- Access/egress for emergency vehicles.

5.0 Maintenance Access Requirements

The site-specific Drainage Management Plan (DMP) indicates that the effectiveness of a hydraulic break depends upon the drain's ability to convey water away.

The hydraulic breaks identified in the site-specific Engineering Construction Package will require routine monitoring by Bord na Móna, following the works, to ensure the drain is functioning as intended.

6.0 Protection of Existing Vegetation

Where peat extraction has ceased on a site several years ago it is typical for pioneer vegetation to have established on site via natural colonisation, which was encouraged by the cessation of disturbance from peat extraction activity. During this period, the field drainage system naturally breaks down in certain areas, accelerating natural colonisation. The development of pioneer habitats reflects the underlying environmental conditions with the key factor being topography and hydrology.

Where clearance is required during the restricted period, the Department of Agriculture, Food and Marine advise that under Section 37 of the Forestry Act, 1946:

> *It is illegal to uproot any tree over ten years old or to cut down any tress of any age (including trees which form part of a hedgerow) unless a Felling Notice has been lodged at the Garda Station nearest to the trees at least 21 days before felling commences.*

The Closed Period "40(1) (a) it shall be an offence for a person to cut, grub, burn or otherwise destroy during the period beginning on the 1st day of March and ending on the 31st day of August in any year, any vegetation growing on any land not then cultivated. (b) it shall be an offence for a person to cut, grub, burn or otherwise destroy any vegetation growing in any hedge or ditch during the period mentioned in paragraph (a) of this subsection"

The site-specific Ecology Construction Package will detail the application of these restrictions to individual sites where required.

7.0 Protected Habitats

Bord na Móna is committed to protecting the diverse habitats in proximity to our estate on which a wide range of Ireland's native animals and plants depend. Sites in proximity to SACs and NHAs have been identified in the site-specific Rehabilitation Plan, Engineering Construction Package, Environmental Compliance Construction Package & Ecology Construction Package for the relevant bog where works are taking place.

Bord na Móna Operations shall incorporate appropriate mitigation measures from the NIS into the CEMP as required to mitigate against adverse impacts on these protected habitats where required, in particular any measures stipulated in Appropriate Assessment reporting.

8.0 Ecology

Measures should be taken by Bord na Móna Operations to protect flora and fauna during the works are outlined in the site-specific Ecology Construction Package. The works should be limited to daylight hours, where they occur in proximity to watercourses, to allow otters, foxes and other wildlife to forage along the watercourses at dawn, dusk and during the night.

Works will take cognisance of any identified Ecological Restriction Zones (ERZ's) to protect sensitive ecological receptors such as birds (breeding or non-breeding), amphibians or reptiles, invertebrates (e.g. Marsh Fritillary) or mammals (such as Otter) and any particularly sensitive habitats.

All materials to be imported to the site will be sourced from a reputable supplier and records of all material / supplies to site will be maintained. In advance of works, all site personnel will receive a toolbox talk with regards to the protection of sensitive receptors onsite, and the prevention of the spread of invasive species.

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

9.0 Peat Dam and Peat Berm Construction

The main objective of peat dam construction, as a rehabilitation measure, is to block drains with peat to raise water levels, re-wetting peat and slowing water movements through the site. Peat berm construction follows a similar principle to create large (e.g. 45m x 60m) cells to retain shallow surface water. The creation of cells helps retain surface water, keeping peat wet and slows water movement through the bog.

Geotechnical failures of peat embankments and dams can occur by the lateral displacement of an intact block of peat material due to reductions in the embankment self-weight following partial drying of the crest material and an increase in the active hydrostatic pressures following an increase in the depth of retained water after an intense rainfall event. These factors must be considered when carrying out horizontal and vertical stability calculations for peat embankments and dams.

It is important to create a 'key' for the dam / berm to mitigate against local failures of the peat material used in the construction when subject to associated hydraulic forces from the water being retained. This technique also improves the overall strength of the dam by creating a foundation and reduces sub-surface flows through the area.

Risk mitigation against dam and berm failure will be employed initially via design, whereby maximum water levels for each site will be specified in the site-specific Engineering Construction Package. Following construction, regular inspections of berms will be carried out.

If a local failure to a peat dam or berm occurs, the water will follow a pathway towards the nearest silt pond allowing any peat sediment from the local failure to be captured in the silt pond prior to discharging from the bog.

Where the risk cannot be mitigated against (in the case where the bog sits on an existing flood plain for example) emergency measures will be outlined in the Bord na Móna Emergency Response Procedure document.

10.0 Biosecurity

The potential for importation or introduction of non-native plant species (such as Japanese Knotweed, Himalayan Balsam, etc.) during the works 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 bogs identified under PCAS. The works will have due regard to the relevant biosecurity measures as follows:

- Records of problematic invasive species identified within the bog units will be marked out with signs to highlight areas of infestation to personnel, including a buffer.
- All plant machinery will be restricted from disturbing known colonies of invasive species.
- All plant machinery will avoid unnecessary crossings to adjoining lands.
- Good site hygiene will be employed to prevent the introduction and spread of problematic invasive alien plant species (i.e. Japanese Knotweed (Fallopia japonica), Himalayan Balsam (Impatiens glandulifera), Himalayan Knotweed (Persicaria wallichii), etc.) by thoroughly washing vehicles prior to entering the work area.
- Plant shall be inspected upon arrival and departure from site.
- All site users shall be made aware of these procedures and appropriate treatment methodologies.

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 order to prevent the introduction and spread of aquatic invasive species, biosecurity will be required for all PPE, equipment, plant and machinery components before entering (or which are likely to enter) drains and watercourses on the site and again before leaving the site:

- Protective gloves should be worn when using any disinfectant solution in any of the procedures listed below.

- Visually inspect all equipment that has come into contact with the water for evidence of attached plant or animal material, or adherent mud or debris. This should be done before leaving the site.
- Remove any attached or adherent material (vegetation and debris) before leaving the site of operation.
- Ensure that all water is drained from any live wells and other water retaining compartments, tanks and other equipment before transportation elsewhere.
- It is recommended to apply disinfectant to the undercarriage and wheels of the vehicle/machine after steam cleaning or power hosing.
- Wet or live wells and other water retaining compartments in survey boats must be cleaned, rinsed or flushed with a 1% solution of Virkon Aquatic or another proprietary disinfection product. Alternatively, a 5% solution (100 ml / 20 litre solution) of chlorine bleach should be used. Rinse thoroughly with clean water.
- Footwear should be dipped in or scrubbed with a disinfectant solution (e.g. 1% solution of Virkon Aquatic or another proprietary disinfection product) and thoroughly dried afterwards.
- All PPE should be visually inspected and any attached vegetation or debris removed. Where appropriate, the gear should be wiped down with a cloth soaked in 1% solution of Virkon Aquatic or another proprietary disinfection product. Alternatively, a 5% solution (100 ml / 20 litre solution) of chlorine bleach should be used. Rubber gloves must be worn when undertaking this procedure.
- Survey equipment should also be sprayed with 1% solution of Virkon Aquatic.

11.0 Emergency Response Procedures

It is the intention of Bord na Móna to identify the potential for and take all practicable measures to prevent the occurrence of an emergency situation. However, in preparation for this possible occurrence, an Emergency Response Procedure will be prepared, implemented, maintained, and periodically reviewed by Bord na Móna Operations to minimise the potential for injury and ensure safe evacuation of persons.

Emergency Response Procedures are outlined for each location in the site-specific safety statement.

12.0 Reporting

Bord na Móna have a defined methodology for delivering the Peatland Climate Action Scheme. This is facilitated via adherence to our robust quality systems and project execution plans that have been developed to apply LEAN project management processes to our design and documentation. Bord na Móna teams adopt these key tools to the benefit of all projects and will adopt a formal reporting mechanism in line with the requirements of the IPC Licence. These reporting mechanisms are outlined in the site-specific Rehabilitation Plan, Engineering Construction Package, Environmental Compliance Construction Package & Ecology Construction Package.

It is Bord na Móna policy to report, and where necessary, investigate workplace incidents. In the event of a dangerous occurrence, procedu*re BnMHS0002* will be implemented.

- All dangerous occurrences must be reported to management so that appropriate measures can be taken to prevent their occurrence.
- In the event of a dangerous occurrence – Bord na Móna Dangerous Occurrence Report Form *BnMHS0005 (Part A)* must be completed as soon as possible following the event and sent to the Health and Safety Team as per procedure.
- Management will then decide if further investigation is required. Where this is necessary, the investigation is carried out by accident investigators using *BnMHS0005 (Part B) & BnMHS0005 (Part C).*
- Where a dangerous occurrence is reportable to the Health and Safety Authority (HSA), as specified under the Safety, Health and Welfare at Work Act 2005, an IR3 form will be completed by management and sent to the HSA as soon as practicable following the event.

Details from Dangerous Occurrence Reports are recorded on Oracle and used to carry out analysis to identify potential trends and implement appropriate measures to prevent further similar occurrences.

APPENDIX A – RISK ASSESSMENT METHOD STATEMENTS (RAMS)

Peatlands Climate Action Scheme
Method & Risk Assessment

Project Title: Peatlands Climate Action Scheme	**Group Project No.:**
Customer: Bord na Mona	
Project Site Address: Bord Na Mona, Castlegar Bog	PCAS-RAMS-001CR Speed Bump peat Dam
Company Name & Address: Bord Na Mona, Boora, Co. Offaly	**Site Contacts & Contact Numbers:** Liam Tansey – Site Supervisor 087 1889272 David Ormond – PSCS/ EHS Lead - 086 0243916
Brief Task Description (Scope):	

Start Date: 01-03-21	**Finish Date:** T.B.C	**Duration**: T.B.C

Risk Assessment Details / Review	
Signed: David Ormond	Signed *David Ormond*
Signed:	Signed
Location of Works (Be Specific): Site wide Castlegar Bog	

1.	**PARTIES TO THE CONTRACT**			
	Client:	Bord na Mona		
	PSCS:	David Ormond (Bord na Mona)		
	Contractor:			
	Sub-Contractor:			
	LOCATION OF WORK:			
	Site wide Castlegar Bog			
3.	**SITE MANAGEMENT**			
	NAME	**COMPANY**	**TITLE**	**CONTACT DETAILS**
4.	**EMERGENCY ARRANGEMENTS:**			
	First Aider:			
	Location of First Aid Box:	Site Office		
	Location of Nearest Hospital:	Ballinasloe Hospital 090 9648200		
	Location of Fire Extinguisher:	Site offices, site container & all Machines		
	Location of Assembly Point:	Car Park as per induction – Muster Point A		
	Additional Arrangements:	All visitors will be Bord Na Mona site inducted and will sign in Daily /visitors sign in book.		
	DATE OF COMMENCEMENT:	**DATE OF COMPLETION:**	**DURATION OF TASK: (days/weeks)**	
	01-03-2021	T.B.C	T.B.C	

6.	Location of Fire Extinguisher: At all fire points, Site offices, site container and on all machines Location of Assembly Point: Car Park as per induction. Muster point A	
	• BNM Site Induction • Safe Pass • Safe Manual Handling in the workplace • Covid 19 Questionnaire • CSCS Machine Tickets	
7.	**EQUIPMENT AND MACHINERY TO BE USED FOR TASK**	
	• 360 Degree • Signage • Bulldozer	
8.	**MATERIALS**	
9.	**ENVIRONMENTAL** *(Controls may include, but not be limited to: Spill Controls – Spill kits, Bunds, Waste Minimisation – Order correct quantities, reuse surplus, Waste Segregation – metal, timber, packaging, Waste Collection – Approved Waste Contractor, Dust Controls, Air/Noise Monitoring, Limits to working hours)*	
	• Keep work areas tidy at all times. • Use bins provided & empty regularly or when full. • Do not allow bins to overflow. • Designated area is to be set aside for the storage of waste. • Use segregation with the waste skips, timber/plastic/metal etc. • Do not cross contaminate a skip that is partially full & never cross contaminate the main site skips. • All waste is to be disposed of by a licensed carrier & taken to a licensed facility. • All refuelling must be double Skinned and properly bunded • Spill kit to be on site	
10.	**COSHH / SDS LIST**	
	N/A	Any or all hazardous substances to be uploaded to Hazmat register.

Yes ☐	Yes ☐	Yes ☐	Yes ☐	Yes ☐	Yes ☐	Yes ☒
Flammable	**Toxic**	**Harmful**	**Irritant**	**Corrosive**	**Oxidising**	**Environment**

12.	**SERVICE IMPACT (i.e. any power/ventilation etc. outage)**	
	• N/A	
13.	**PERMITS REQUIRED (Hot Works, Working at Height, LOTO etc.)**	
	• SPA (Safe Plan of Action) • Dynamic Risk Assessments • Daily Vehicle Checks	
14.	**PEDESTRIAN/TRAFFIC RE-ROUTING ARRANGEMENTS:**	
	• Use Pedestrian Walkways & crossing points. • Keep pedestrians and others away from vehicle movements. • Offloading area to cordoned off / barriered off correctly	• Obey Site Speed Limit 15kph • Spotters in place during offload / transport of loads / materials
15.	**FIRE SAFETY ARRANGEMENTS:**	
	• Use local fire points, raise alarm if fire seen.	
16.	**SECURITY ARRANGEMENTS:**	
	• All personnel will sign in daily with appointed site supervisor. Arrange delivery/ access with supervisor. Compound to be always locked when no work taken place.	
17.	**EMPLOYEES AND TITLE INVOLED IN TASK**	
	• Bord na Mona Site Supervisor & Operatives	

METHOD STATEMENT COMMUNICATION

I confirm that I have carried out the communication of the attached Risk Assessment and Method Statement to the individuals identified below and I will ensure effective monitoring and compliance of the duration of the works.

Description of the Task: PCAS-RAMS-001CR Field Re-Profiling to Re-Wet Measure DPT 3A	
Contractor Company Name: Bord na Mona	
Time & Date:	
Supervisor Name:	**Job Title:** Site Supervisor

BORD NA MÓNA Naturally Driven	Castlegar Bog		
	Field Re-Profiling to Re-Wet Measure		
Document Approved by:	**Revision Date:**	**Doc No.:**	**Revision No.:**
	06/01/2021	PCAS-RAMS-001CR	0
	/Control Location		**Page:**
	Site Office		6 of 15

Purpose

The Purpose of this procedure is to set out a speed bump method for Re-Wet Measure using an excavator & bulldozer in a safe manner.

Scope

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

Pre Requisites	***Reference Documents***
1. Personal carrying out this task are deemed to be competent. 2. Safe Pass and Manuel Handling Trained 3. CSCS Cards for Machine operatives 4. Suitable PPE to be worn as shown below. 5. Safe plan of Action to be filled out	

☑ Task RA	☑ Mandatory	☑ Task RA	☑ Task RA	☑ Mandatory	☑ Task RA
					

Other PPE. ☑	**Other PPE.** ☑ Task RA

Procedure

1. All members of the works crew must attend a Monday whiteboard meeting with their Supervisors.
2. Must complete a Safe Plan of Action (SPA) Form for the scope of the works to be completed.
3. All pre-use checks on plant, equipment, and machinery (i.e. excavator, etc.) must be completed prior to work.
4. Drain blocks are constructed using an Excavator operating at a perpendicular direction to the field drains
5. 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
6. Area behind the machine is to be used as a borrow pit.
7. 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.
8. The peat is firmly compacted using the machine bucket before laying more peat from the borrow pit.
9. 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.
10. A strip of peat is taken from the central camber of the Into Drain And Track Over It field, pushed into the drain and compacted by the bull-dozer tracking over the drain block, to form an approximately 5m Wide 'Speed Bump'.
11. A strip of peat is taken from the central camber of the Into Drain And Track Over It field, pushed into the drain and compacted by the bull-dozer tracking over the drain block, to form an approximately 5m Wide 'Speed Bump'.

12. (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 Dam)

13. Field re-profiling is developed as a technique to slow the surface water loss from the bog and to retain as much water as possible on the site. Each re-profiled field will hold a shallow layer of water. In time, these shallows have been shown to terrestrialise and infill with peatland vegetation. The process tends to be more rapid/successful if the surface water is not too deep (50mm-200mm)..

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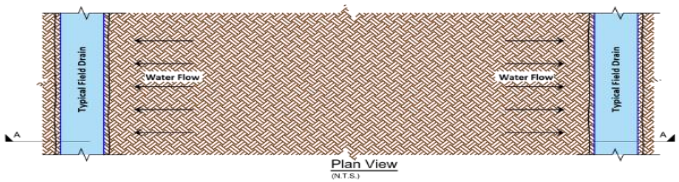
Non routine activities where there is exposure to risk must be risk assessed before commencing work and recommended control measures put in place. The risk assessment will identify any isolation requirements that may be required.

BORD NA MÓNA
Naturally Driven

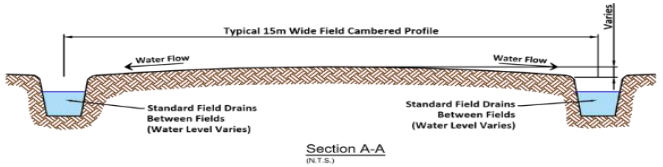
DPT 1: 'Speed Bump' Peat Dams to Re-Wet Measure

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.



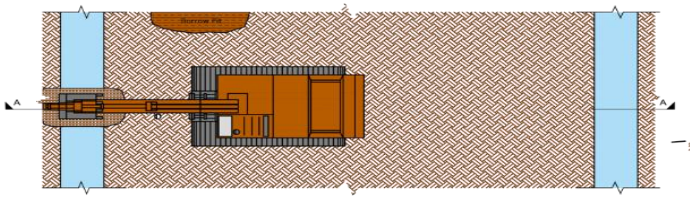
Plan View
(N.T.S.)



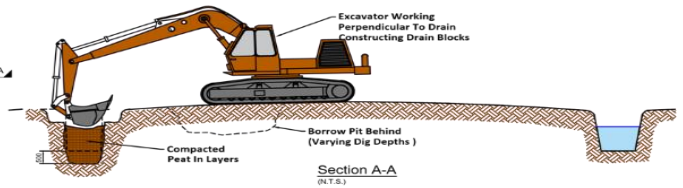
Section A-A
(N.T.S.)

Phase 1
Peat Dam Drain Blocking (3 Per 100m)

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 dam.)



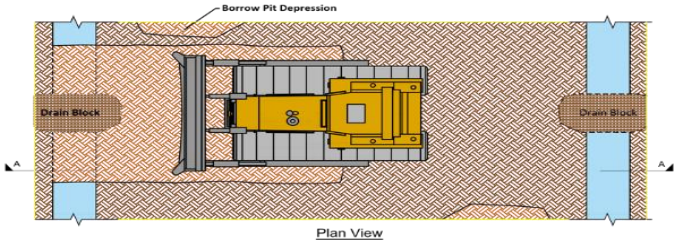
Plan View
(N.T.S.)



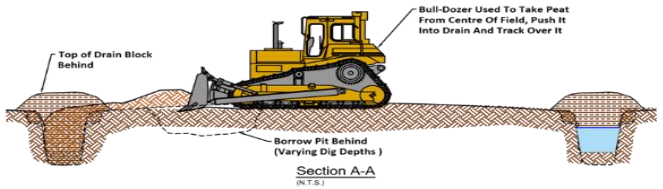
Section A-A
(N.T.S.)

Phase 2
Forming 'Speed Bump'

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'.



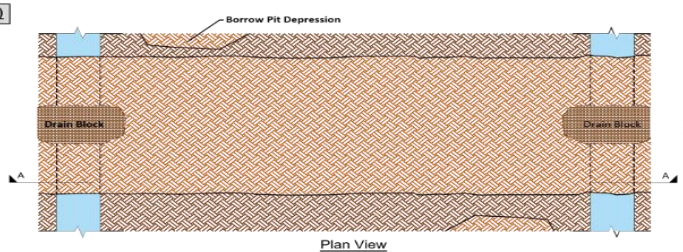
Plan View
(N.T.S.)



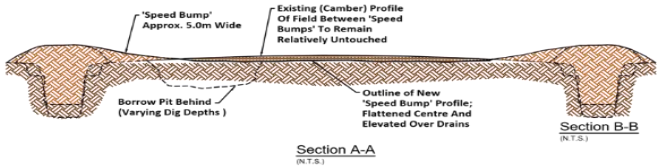
Section A-A
(N.T.S.)

Complete Fields With Speed Bump (3 Per 100m)

'Speed Bumps' are created 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.
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
a	Issued For Information	P.K.	16/12/20

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:
Rehabilitation Method DPT 1
'Speed Bump' Peat Dam

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 Status: Information
Drawing No.: PCAS-0100-001 Rev: a

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Appendix 2 – Risk Assessment

Risk Assessment

Risk Assessment No.:	PCAS-RAMS-001-CR	**Page:**	1 of 6

Task / Area / Description:	**General Risk Assessment** Machinery and Equipment Risk Assessment	**Date:**	04/01/2021	**Rev. No.:**	0

Completed by:	David Ormond	**Responsible Person (R.P):**	1 = Manager 2 = Supervisor 3 = Employee

Person who may be harmed:	All Employee's operating Machinery or Equipment, any employee, visitor, contractor or third party who may be within the vicinity of moving plant/ machinery or equipment.

Risk Rating:	**RF = S x L** S = Severity (1-5) L = Likelihood (RF = 1-25)	RF 1-3 = Low Acceptable Risk RF 4-9 = Medium: Acceptable Risk, further controls required RF 10-25 = High: Unacceptable Risk, immediate action needed, work prohibited.	**Residual Risk (Risk following Control Measures):** RF: 1-3 RR = Low RF: 4-9 RR = Medium RF: 10-25 RR = High

Hazard	Risk	Control Measures	S	L	RF	RR	R.P.
Operating Plant/ Machinery in Machine Compound	Collisions with other vehicles, objects or pedestrians, overturning, unbalanced falling loads.	There is regular movement of vehicles, cars within the Compound, Adequate Signage to be displayed to convey the Arrangements and Controls within the compound -Upon arrival at the site visitors or delivery personnel contact reception and follow the instructions given by Site Supervisor. All operatives plus visitors must sign in with Site Supervisor -Driving, loading, and parking areas are clearly identified and these must be observed. -Employees and visitors follow traffic direction signs and park in designated areas only. -Pedestrian pathways to site entrance are provided where practical. . KEEP WELL CLEAR OF MOVING MACHINES.	4	2	8	L	1,2,3
Access to and Egress from Work Site	Interaction with other site operations and operatives.	- Driver with hi-vis to control his work area while this operation is ongoing - Flashing amber lights and audible alarms when reversing vehicles. - Site management to be made aware of intended works in the area. - All other site operatives to be made aware of proposed works. - Weekly Toolbox Talks - Sufficient signage to be in place to warn non-associated persons of risks.	3	1	3	L	1,2,3
Other personnel on site	Damage to property, injury to persons involved in accident.	- Adequate signage of an appropriate type to be erected around the works by others - Notices to be erected on boundaries of works. - Mobile plant to comply with site vehicle rules and rules of the road	3	1	3	L	1,2,3

		- No Unauthorized persons to be allowed on site and if someone unintentionally enters work area politely ask them to report back to the site supervisor - All plant and equipment to be locked or immobilised when not in use and keys removed.					
Use of Excavators & Bulldozer	- Collapse of sides - Falls into trench - Plant driving into trench - Contaminated ground - Crushing - Plant Overturning	- UNDER NO CIRCUMSTANCES SHOULD PERSONS USE THE BUCKET OF THE MACHINE TO GAIN ACCESS TO HEIGHTS OR USE THEM AS A WORKING PLATFORM. - Must have relevant CSCS card - Toolbox talk to be undertaken highlighting the dangers - Fully Automatic Quick hitches are only to be used on BNM sites - All auxiliary safety devices to be in good work order. The machine is provided with appropriate devices that, where the visibility of any operator is restricted, such devices remedy the hazards arising from inadequate direct vision (1m rule) - Use three points of contact when embarking or disembarking the machine - Passengers must not be carried inside or outside the machine. - Seat belt to be worn always - All plant to be fitted with amber warning beacons. - Communicate with other drivers/ SS when leaving the machine - Allow clearance distance of minimum 600m when slewing – barricade danger areas off if necessary - Do not under any circumstance slew the bucket or load directly over personnel - Slow working cycle down when working on slopes to reduce the bucket reach - Vehicle Banksman to guide driver when large excavator is travelling in compound - High visibility vest, helmet, gloves and glasses to be worn when outside the vehicle - All machines to have fire extinguisher and fire bucket - Maintenance and inspection records must include the quick hitch mechanisms to ensure they are clean and in a fully serviceable condition. - Refuelling to be in designated area only where bunding and spill kit are in place - All work must be supervised and checked and monitored to ensure compliance with Safe Working Procedures by both workers and plant operatives - Ensure statutory and company test, examination and inspection procedures are implemented on forms GA1 & GA2	4	2	8	L	1,2,3
Working With & Alongside other plant	- Coming in contact with the machine.	- A detailed safe plan of action must be completed and co-signed by supervisors of any other works happening in the Bog excavation area. - Operatives will be kept separated from the Machinery.	4	2	8	L	1,2,3

	- Noise. - Unauthorised use.	- No operative to leave Cab until other machinery drivers are notified - Designate storage areas for materials and keep confined to one area. - All equipment and materials that are no longer required must be brought back to compound when task is finished.					
Slips, Trips & Falls	Personal injury	- Site management to make available suitable Access / Egress for the job - Weekly Toolbox talk to inform operatives of the risks involved - Instruction in safe use of Machine & Tools and competent supervision to be provided - Housekeeping - Clean as you go - 3 point of contact when embarking / Disembarking any machine - Any moving or adjustable parts should be kept oiled	3	1	3	L	1,2,3
Fire	Serious personal injury or death, explosive and damage to assets.	- Training to be provided in fire safety and use of firefighting equipment to designate employees. - Suitable firefighting equipment to be provided for each work area. - Signage to be in place - Strict housekeeping to be maintained - Flammable liquids and combustible materials must be removed, segregated, and/or protected and kept in the compound - Working area to be assessed before the work is carried out to ensure work is carried out away from flammable material and members of the public. - Obey no smoking policy. - Ensure employee awareness of emergency and evacuation procedures. - Evacuation and emergency drill to be carried out at regular intervals. - Every machine must have a fire extinguisher and a fire bucket fitted.	4	2	8	L	1,2,3

House Keeping	Contributes to slips, trips and falls, spread of fire, and falls of incorrectly stored materials.	- All employees must follow the site clean as you go policy.
		- Please follow the guidance below for your work area.
		- General work areas
		  - Clean as you go, remove debris from your work area, if you require materials for future use, store them neatly.
		- Access routes
		  - Do not set up work areas impinging on access routes, when this is unavoidable – plan alternative routes, discuss with your supervisor & EHS on the most suitable route available and erect appropriate signage.
			3	1	3	L	1,2,3

		- Bins
		  - Empty bins regularly, overflowing bins are unacceptable; do not leave bins with material protruding. If you do not have sufficient bins report this to your supervisor.
		  - Ensure the bins are labelled with the owner and the waste type. Bins must be labelled and only the waste that is indicated shall be placed in these bins.
		- Lay down areas
		  - Material is stored in a tidy fashion, with clear access
		  - You should be able to access materials without stepping over other materials (Trip hazards)
		- Signage
		  - Ensure the signage in your work area is appropriate; remove all old redundant signage from your area and dispose of correctly. Signage must be obvious and of the correct size / content & colour to describe the conditions that exist inside the designated area.					

Dust	Can cause injury and ill-health including respiratory illness such as silicosis.	- A suitable dust mask (not a nuisance dust mask) must be worn as well as the damping down process. Use either FFP3 filtering face pieces or orinasal respirators with P3 filters for RCS dust. - Training should be given to the workforce regarding the appropriate use and maintenance of their masks. - Check machinery and safety equipment regularly. - Inspect and maintain re-usable masks. - Select correct dust mask for conditions (always seek specialist advice) - Enforce the wearing of masks - Change mask daily or when recommended by the specialist (may be more frequent) - On dry windy days, dust inhibiting measures should be used on haul roads and areas around the site i.e.: damping with water - Always check SDS for the product to see if there is any hazard from dust produced. Seek specialist advice. - Ensure vehicles use their lights when driving in dusty conditions on the bog etc. where visibility is impaired. - Co-workers or others who are in the vicinity of the dust and are affected by it should also wear suitable face	4	2	8	L	1,2,3

Noise	Noise of induced hearing loss or tinnitus.	- Purchase / hire in equipment with noise reduction built in if possible - Limit the number of people working in a noisy area and the length of time they spend there - Upper exposure action valve = 85dBA - - Hearing protection is mandatory and warning signs - Lower exposure action valve = 80dBA - Carry out a risk assessment - Measurement of the noise levels by a competent person at suitable intervals. The sampling shall be representative of an employee's daily personal exposure - The RA is to take account of the level, type and duration of exposure (including impulsive noise) - Try to eliminate noise – by design and layout of workplaces, reducing noise by technical means and / or the organisation of work - Consult with employees and provide information and training - Health surveillance to be provided for those at risk.	4	2	8	L	1,2,3
COVID-19 Risk	Severe respiratory illness caused by the SARS-COV-2 virus.	- Staggering tea/lunch times to allow for minimum contact with others. Canteens have been reconfigured to comply with social distancing requirements. - Considering WHO guidance that you must be within 1m of a person who is infected for more than 15 minutes to be at risk of infection, please remove yourself from anyone displaying symptoms as soon as possible. - WHO and HSE informational signs are posted around the work areas as a reminder to all regarding social distancing, hand and respiratory hygiene. - Develop a plan to facilitate social distancing. Communicate this to all in the workplace and monitor the implementation of the plan. - Personal Hygiene and Travel - Cleaning personal space and work area touch points – door handles, levers, etc. - Ensuring that hands are kept clean by regular handwashing/using hand sanitizers. Ensure the correct handwashing technique is used. It is everyone's obligation to do this at home as well as in the office and on sites. - Practice good respiratory etiquette by using tissues/bent elbow when coughing or sneezing. Used tissues need to be disposed of in a closed pedal bins specifically set aside for this purpose. Wash hands immediately afterwards. Avoid touching eyes, nose and mouth. - If an employee develops symptoms while at work, they must inform their supervisor immediately who will inform HR and the project director. The employee must self-isolate immediately.	4	2	8	L	1,2,3

		- Outside of work: If an employee develops cold or flu-like symptoms such as a fever, dry cough, sore throat and difficulty breathing, they should not come to work. They should seek medical care early. They must self-isolate and contact their GP immediately. Stay at home. They must contact their line manager who is required to inform HR/director. They will need to self-isolate for 14 days. They should only return to work when all their symptoms have gone					

Peatlands Climate Action Scheme
Method & Risk Assessment

Project Title: Peatlands Climate Action Scheme	**Group Project No.:**
Customer: Bord na Mona	
Project Site Address: Bord Na Mona, Castlegar Bog	PCAS-RAMS-002CR Typical Peat Dam Drain Block to Re-Wet Measure DPT 2
Company Name & Address: Bord Na Mona, Boora, Co. Offaly	**Site Contacts & Contact Numbers:** David Ormond – PSCS/ EHS Lead - 086 0243916 Liam Tansey - Site Supervisor - 087 1889272
Brief Task Description (Scope):	

Start Date: 01-03-21	**Finish Date:** T.B.C	**Duration:** T.B.C

Risk Assessment Details / Review	
Signed: David Ormond	Signed *David Ormond*
Signed:	Signed
Location of Works (Be Specific): Site wide Castlegar Bog	

1.	**PARTIES TO THE CONTRACT**			
	Client:	Bord na Mona		
	PSCS:	David Ormond (Bord na Mona)		
	Contractor:			
	Sub-Contractor:			
	LOCATION OF WORK:			
	Site wide Castlegar Bog			
3.	**SITE MANAGEMENT**			
	NAME	**COMPANY**	**TITLE**	**CONTACT DETAILS**
4.	**EMERGENCY ARRANGEMENTS:**			
	First Aider:			
	Location of First Aid Box:	Site Office		
	Location of Nearest Hospital:	Ballinasloe Hospital 090 9648200		
	Location of Fire Extinguisher:	Site offices, site container & all Machines		
	Location of Assembly Point:	Car Park as per induction – Muster Point A		
	Additional Arrangements:	All visitors will be Bord Na Mona site inducted and will sign in Daily /visitors sign in book.		
	DATE OF COMMENCEMENT:	**DATE OF COMPLETION:**	**DURATION OF TASK: (days/weeks)**	
	01-03-2021	T.B.C	T.B.C	

6.	Location of Fire Extinguisher: At all fire points, Site offices, site container and on all machines Location of Assembly Point: Car Park as per induction. Muster point A	
	• BNM Site Induction • Safe Pass • Safe Manual Handling in the workplace • Covid 19 Questionnaire • CSCS Machine Tickets	
7.	**EQUIPMENT AND MACHINERY TO BE USED FOR TASK**	
	• 360 Degree Digger • Signage	
8.	**MATERIALS**	
9.	**ENVIRONMENTAL** *(Controls may include, but not be limited to: Spill Controls – Spill kits, Bunds, Waste Minimisation – Order correct quantities, reuse surplus, Waste Segregation – metal, timber, packaging, Waste Collection – Approved Waste Contractor, Dust Controls, Air/Noise Monitoring, Limits to working hours)*	
	• Keep work areas tidy at all times. • Use bins provided & empty regularly or when full. • Do not allow bins to overflow. • Designated area is to be set aside for the storage of waste. • Use segregation with the waste skips, timber/plastic/metal etc. • Do not cross contaminate a skip that is partially full & never cross contaminate the main site skips. • All waste is to be disposed of by a licensed carrier & taken to a licensed facility. • All refueling must be double Skinned and properly bunded • Spill Kits to be on site	
10.	**COSHH / SDS LIST**	
	N/A	Any or all hazardous substances to be uploaded to Hazmat register.

Yes ☐	Yes ☐	Yes ☐	Yes ☐	Yes ☐	Yes ☐	Yes ☒
Flammable	**Toxic**	**Harmful**	**Irritant**	**Corrosive**	**Oxidising**	**Environment**

12.	**SERVICE IMPACT (i.e. any power/ventilation etc. outage)**	
	• N/A	
13.	**PERMITS REQUIRED (Hot Works, Working at Height, LOTO etc.)**	
	• SPA (Safe Plan of Action) • Dynamic Risk Assessments • Daily Vehicle Checks	
14.	**PEDESTRIAN/TRAFFIC RE-ROUTING ARRANGEMENTS:**	
	• Use Pedestrian Walkways & crossing points. • Keep pedestrians and others away from vehicle movements. • Offloading area to cordoned off / barriered off correctly	• Obey Site Speed Limit 15kph • Spotters in place during offload / transport of loads / materials
15.	**FIRE SAFETY ARRANGEMENTS:**	
	• Use local fire points, raise alarm if fire seen.	
16.	**SECURITY ARRANGEMENTS:**	
	• All personnel will sign in daily with appointed site supervisor. Arrange delivery/ access with supervisor. Compound to be always locked when no work taken place.	
17.	**EMPLOYEES AND TITLE INVOLED IN TASK**	
	• Bord na Mona Site Supervisor & Operatives	

METHOD STATEMENT COMMUNICATION

I confirm that I have carried out the communication of the attached Risk Assessment and Method Statement to the individuals identified below and I will ensure effective monitoring and compliance of the duration of the works.

Description of the Task: PCAS-RAMS-002CR Typical Peat Dam Drain Block to Re-Wet Measure DPT 2	
Contractor Company Name: Bord na Mona	
Time & Date:	
Supervisor Name:	**Job Title:** Site Supervisor

	Castlegar Bog		
	Typical Peat Dam Drain Block to Re-Wet Measure DPT 2		
Document Approved by:	**Revision Date:**	**Doc No.:**	**Revision No.:**
	01/12/2020	PCAS-RAMS-002-CR	0
	/Control Location		**Page:**
	Site Office		6 of 16

Purpose

The Purpose of this procedure is to set out a standard method for Re-Wet Measure using an excavator in a safe manner.

Scope

- 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 site.
- The number of peat dams per 100m is determined by the topography of the site, but an allowance has been estimated at on average 7 blocks per 100m of field drain. The increased number of peat dams (compared with the standard measures) will benefit re-wetting and trapping silt on cutaway with slightly greater slopes and will further slow the movement of water from these sites.
- The creation of cells will help retain surface water, keeping peat wet and will further slow water movement through the cutaway.

Pre Requisites

1. Personal carrying out this task are deemed to be competent.
2. Safe Pass and Manuel Handling Trained
3. CSCS Cards for Machine operatives
4. Suitable PPE to be worn as shown below.

Reference Documents

☑ Task RA	☑ Mandatory	☑ Task RA	☑ Task RA	☑ Mandatory	☑ Task RA
					

Other PPE. ☑	**Other PPE.** ☑ Task RA

Procedure

1. All members of the works crew must attend a Monday whiteboard meeting with their Supervisors.
2. Must complete a Safe Plan of Action (SPA) Form for the scope of the works to be completed.
3. All pre-use checks on plant, equipment, and machinery (i.e. excavator, etc.) must be completed prior to work.
4. Before building of dams, the sides and bottom of the ditch is cleaned using the excavator to remove vegetation and to ensure a peat-to-peat contact. Vegetation is kept for revegetation after the operation.
5. Cut key in either side of the drain approximately 0.5m deep and ensure that it is wider than the actual drain.
6. Remove 500mm of peat from bottom of the drain also and place behind the machine for replacement later.

7. 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 dam.
8. Dig out peat from the borrow pit and place into the drain compacting in 300mm layers.
9. Compact the peat firmly using the excavator bucket before laying more peat from the borrow hole.
10. Build the dam up at least 300mm-500mm above the ground level of the bog to allow for subsequent shrinkage of the peat as it dries.
11. Backfill the borrow hole with the peat extracted from the bottom of the drain in step 2.
12. Press down on the sides of the peat borrow hole with the excavator bucket to smooth the slope into the hole.
13. 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 are constructed with a high level of accuracy.
14. Drainage pipes are incorporated into the berm construction at specific locations to manage overflows and prevent berm erosion.

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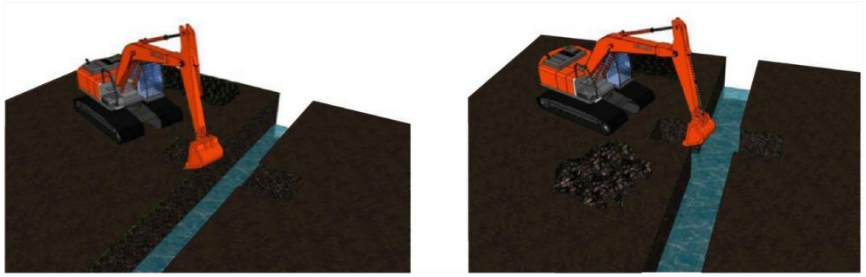
Non routine activities where there is exposure to risk must be risk assessed before commencing work and recommended control measures put in place. The risk assessment will identify any isolation requirements that may be required.

BORD NA MÓNA
Naturally Driven

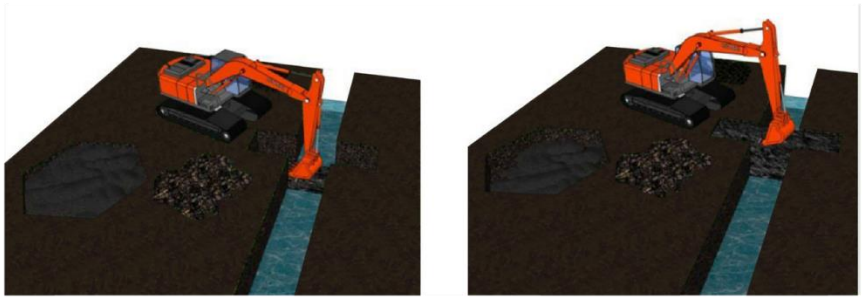
DPT 2: Typical Peat Dam Drain Block to Re-Wet Measure

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 present, it should be carefully removed and left aside for replacement at the end of the process.)



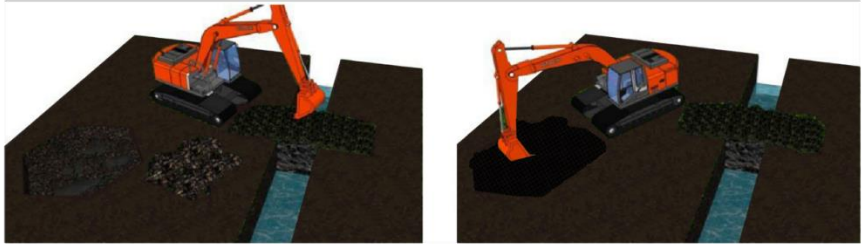
2. Cut key in either side of the drain approximately 500mm deep, and ensure that it is wider than the actual drain.
Remove 500mm of peat from bottom of the drain also and place behind the machine for replacement later.

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 dam.
(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 dam 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 dams 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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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
a	Issued for Information	P.K.	18/12/20

PROJECT: Peatland Climate Action Scheme PCAS

TITLE: Rehabilitation Method DPT 2 Peat Dam 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: Information

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

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BORD NA MÓNA
Naturally Driven

Appendix 2 – Risk Assessment

Risk Assessment

Risk Assessment No.:	PCAS-RAMS-002-CR	**Page:**	1 of 6

Task / Area / Description:	**General Risk Assessment** Machinery and Equipment Risk Assessment	**Date:**	07/01/2021	**Rev. No.:**	0

Completed by:	David Ormond	**Responsible Person (R.P):**	1 = Manager 2 = Supervisor 3 = Employee

Person who may be harmed:	All Employee's operating Machinery or Equipment, any employee, visitor, contractor or third party who may be within the vicinity of moving plant/ machinery or equipment.

Risk Rating:	**RF = S x L** S = Severity (1-5) L = Likelihood (RF = 1-25)	RF 1-3 = Low Acceptable Risk RF 4-9 = Medium: Acceptable Risk, further controls required RF 10-25 = High: Unacceptable Risk, immediate action needed, work prohibited.	**Residual Risk (Risk following Control Measures):** RF: 1-3 RR = Low RF: 4-9 RR = Medium RF: 10-25 RR = High

Hazard	Risk	Control Measures	S	L	RF	RR	R.P.
Operating Plant/ Machinery in Machine Compound	Collisions with other vehicles, objects or pedestrians, overturning, unbalanced falling loads.	There is regular movement of vehicles, cars within the Compound, Adequate Signage to be displayed to convey the Arrangements and Controls within the compound -Upon arrival at the site visitors or delivery personnel contact reception and follow the instructions given by Site Supervisor. All operatives plus visitors must sign in with Site Supervisor -Driving, loading, and parking areas are clearly identified and these must be observed. -Employees and visitors follow traffic direction signs and park in designated areas only. -Pedestrian pathways to site entrance are provided where practical. . KEEP WELL CLEAR OF MOVING MACHINES.	4	2	8	L	1,2,3
Access to and Egress from Work Site	Interaction with other site operations and operatives.	- Driver with hi-vis to control his work area while this operation is ongoing - Flashing amber lights and audible alarms when reversing vehicles. - Site management to be made aware of intended works in the area. - All other site operatives to be made aware of proposed works. - Weekly Toolbox Talks - Sufficient signage to be in place to warn non-associated persons of risks.	3	1	3	L	1,2,3
Other personnel on site	Damage to property, injury to persons involved in accident.	- Adequate signage of an appropriate type to be erected around the works by others - Notices to be erected on boundaries of works. - Mobile plant to comply with site vehicle rules and rules of the road - No Unauthorized persons to be allowed on site and if someone unintentionally enters work area politely ask them to report back to the site supervisor	3	1	3	L	1,2,3

		- All plant and equipment to be locked or immobilised when not in use and keys removed.					
Working With & Alongside other plant	Slips, trips & falls and injury to others.	- A detailed safe plan of action must be completed and co-signed by supervisors of any other works happening in the Bog excavation area. - Operatives will be kept separated from the Machinery. - No operative to leave Cab until other machinery drivers are notified - Designate storage areas for materials and keep confined to one area. - All equipment and materials that are no longer required must be brought back to compound when task is finished	4	2	8	L	1,2,3
Use of Excavators	- Collapse of sides - Falls into trench - Plant driving into trench - Contaminated ground - Crushing	- UNDER NO CIRCUMSTANCES SHOULD PERSONS USE THE BUCKET OF THE MACHINE TO GAIN ACCESS TO HEIGHTS OR USE THEM AS A WORKING PLATFORM. - Must have relevant CSCS card - Toolbox talk to be undertaken highlighting the dangers - Fully Automatic Quick hitches are only to be used on BNM sites - All auxiliary safety devices to be in good work order. The machine is provided with appropriate devices that, where the visibility of any operator is restricted, such devices remedy the hazards arising from inadequate direct vision (1m rule) - Use three points of contact when embarking or disembarking the machine - Passengers must not be carried inside or outside the machine. - Seat belt to be worn always - All plant to be fitted with amber warning beacons. - Communicate with other drivers/ SS when leaving the machine - Allow clearance distance of minimum 600m when slewing – barricade danger areas off if necessary - Do not under any circumstance slew the bucket or load directly over personnel - Slow working cycle down when working on slopes to reduce the bucket reach - Vehicle Banksman to guide driver when large excavator is travelling in compound - High visibility vest, helmet, gloves and glasses to be worn when outside the vehicle - All machines to have fire extinguisher and fire bucket - Maintenance and inspection records must include the quick hitch mechanisms to ensure they are clean and in a fully serviceable condition. - Refuelling to be in designated area only where bunding and spill kit are in place - All work must be supervised and checked and monitored to ensure compliance with Safe Working Procedures by both workers and plant operatives	4	2	8	L	1,2,3

		- Ensure statutory and company test, examination and inspection procedures are implemented on forms GA1 & GA2					
Slips, Trips & Falls	Personal injury	- Site management to make available suitable Access / Egress for the job - Weekly Toolbox talk to inform operatives of the risks involved - Instruction in safe use of Machine & Tools and competent supervision to be provided - Housekeeping - Clean as you go - 3 point of contact when embarking / Disembarking any machine - Any moving or adjustable parts should be kept oiled	3	1	3	L	1,2,3
Fire	Serious personal injury or death, explosive and damage to assets.	- Training to be provided in fire safety and use of firefighting equipment to designate employees. - Suitable firefighting equipment to be provided for each work area. - Strict housekeeping to be maintained - Flammable liquids and combustible materials must be removed, segregated, and/or protected and kept in the compound - Working area to be assessed before the work is carried out to ensure work is carried out away from flammable material and members of the public. - Obey no smoking policy. - Ensure employee awareness of emergency and evacuation procedures. - Evacuation and emergency drill to be carried out at regular intervals. - Every machine must have a fire extinguisher and a fire bucket fitted.	4	2	8	L	1,2,3

House Keeping	Contributes to slips, trips and falls, spread of fire, and falls of incorrectly stored materials.	- All employees must follow the site clean as you go policy.
		- Please follow the guidance below for your work area.
		- General work areas
		  - Clean as you go, remove debris from your work area, if you require materials for future use, store them neatly.
		- Access routes
		  - Do not set up work areas impinging on access routes, when this is unavoidable – plan alternative routes, discuss with your supervisor & EHS on the most suitable route available and erect appropriate signage.
		- Bins
			3	1	3	L	1,2,3

		- Empty bins regularly, overflowing bins are unacceptable; do not leave bins with material protruding. If you do not have sufficient bins report this to your supervisor. - Ensure the bins are labelled with the owner and the waste type. Bins must be labelled and only the waste that is indicated shall be placed in these bins. - Lay down areas - Material is stored in a tidy fashion, with clear access - You should be able to access materials without stepping over other materials (Trip hazards) - Signage - Ensure the signage in your work area is appropriate; remove all old redundant signage from your area and dispose of correctly. Signage must be obvious and of the correct size / content & colour to describe the conditions that exist inside the designated area.					
Dust	Can cause injury and ill-health including respiratory illness such as silicosis.	- A suitable dust mask (not a nuisance dust mask) must be worn as well as the damping down process. Use either FFP3 filtering face pieces or orinasal respirators with P3 filters for RCS dust. - Training should be given to the workforce regarding the appropriate use and maintenance of their masks. - Check machinery and safety equipment regularly. - Inspect and maintain re-usable masks. - Select correct dust mask for conditions (always seek specialist advice) - Enforce the wearing of masks - Change mask daily or when recommended by the specialist (may be more frequent) - On dry windy days, dust inhibiting measures should be used on haul roads and areas around the site i.e.: damping with water - Always check SDS for the product to see if there is any hazard from dust produced. Seek specialist advice. - Ensure vehicles use their lights when driving in dusty conditions on the bog etc. where visibility is impaired. - Co-workers or others who are in the vicinity of the dust and are affected by it should also wear suitable face Protection	4	2	8	L	1,2,3

Noise	Noise of induced hearing loss or tinnitus.	- Purchase / hire in equipment with noise reduction built in if possible - Limit the number of people working in a noisy area and the length of time they spend there - Upper exposure action valve = 85dBA - - Hearing protection is mandatory and warning signs - Lower exposure action valve = 80dBA - Carry out a risk assessment - Measurement of the noise levels by a competent person at suitable intervals. The sampling shall be representative of an employee's daily personal exposure - The RA is to take account of the level, type and duration of exposure (including impulsive noise) - Try to eliminate noise – by design and layout of workplaces, reducing noise by technical means and / or the organisation of work - Consult with employees and provide information and training - Health surveillance to be provided for those at risk.	4	2	8	L	1,2,3
COVID-19 Risk	Severe respiratory illness caused by the SARS-COV-2 virus.	- Staggering tea/lunch times to allow for minimum contact with others. Canteens have been reconfigured to comply with social distancing requirements. - Considering WHO guidance that you must be within 1m of a person who is infected for more than 15 minutes to be at risk of infection, please remove yourself from anyone displaying symptoms as soon as possible. - WHO and HSE informational signs are posted around the work areas as a reminder to all regarding social distancing, hand and respiratory hygiene. - Develop a plan to facilitate social distancing. Communicate this to all in the workplace and monitor the implementation of the plan. - Personal Hygiene and Travel - Cleaning personal space and work area touch points – door handles, levers, etc. - Ensuring that hands are kept clean by regular handwashing/using hand sanitizers. Ensure the correct handwashing technique is used. It is everyone's obligation to do this at home as well as in the office and on sites. - Practice good respiratory etiquette by using tissues/bent elbow when coughing or sneezing. Used tissues need to be disposed of in a closed pedal bins specifically set aside for this purpose. Wash hands immediately afterwards. Avoid touching eyes, nose and mouth. - If an employee develops symptoms while at work, they must inform their supervisor immediately who will inform HR and the project director. The employee must self-isolate immediately.	4	2	8	L	1,2,3

		- Outside of work: If an employee develops cold or flu-like symptoms such as a fever, dry cough, sore throat, and difficulty breathing, they should not come to work. They should seek medical care early. They must self-isolate and contact their GP immediately. Stay at home. They must contact their line manager who is required to inform HR/director. They will need to self-isolate for 14 days. They should only return to work when all their symptoms have gone					

Peatlands Climate Action Scheme
Method & Risk Assessment

Project Title: Peatlands Climate Action	**Group Project No.:**
Customer: Bord na Mona	
Project Site Address: Bord Na Mona, Castlegar Bog	PCAS-RAMS-003-CR Field Re-Profiling to Re-Wet Measure DPT 3A
Company Name & Address: Bord Na Mona, Boora, Co. Offaly	**Site Contacts & Contact Numbers:** Liam Tansey - Site Supervisor 087 1889272 David Ormond – PSCS/ EHS Lead - 086 0243916
Brief Task Description (Scope):	

Start Date: 01-03-21	**Finish Date:** T.B.C	**Duration:** T.B.C

Risk Assessment Details / Review	
Signed: David Ormond	Signed *David Ormond*
Signed:	Signed
Location of Works (Be Specific): Site wide Castlegar Bog	

1.	**PARTIES TO THE CONTRACT**			
	Client:	Bord na Mona		
	PSCS:	David Ormond (Bord na Mona)		
	Contractor:			
	Sub-Contractor:			
	LOCATION OF WORK:			
	Site wide Castlegar Bog			
3.	**SITE MANAGEMENT**			
	NAME	**COMPANY**	**TITLE**	**CONTACT DETAILS**
4.	**EMERGENCY ARRANGEMENTS:**			
	First Aider:			
	Location of First Aid Box:	Site Office		
	Location of Nearest Hospital:	Ballinasloe Hospital 090 9648200		
	Location of Fire Extinguisher:	Site offices, site container & all Machines		
	Location of Assembly Point:	Car Park as per induction – Muster Point A		
	Additional Arrangements:	All visitors will be Bord Na Mona site inducted and will sign in Daily /visitors sign in book.		
	DATE OF COMMENCEMENT:	**DATE OF COMPLETION:**	**DURATION OF TASK: (days/weeks)**	
	01-03-2021	T.B.C	T.B.C	

6.	Location of Fire Extinguisher: At all fire points, Site offices, site container and on all machines Location of Assembly Point: Car Park as per induction. Muster point A	
	• BNM Site Induction • Safe Pass • Safe Manual Handling in the workplace • Covid 19 Questionnaire • CSCS Machine Tickets	

7.	**EQUIPMENT AND MACHINERY TO BE USED FOR TASK**	
	• 360 Degree • Signage • Bulldozer	

8.	**MATERIALS**	

9.	**ENVIRONMENTAL** *(Controls may include, but not be limited to: Spill Controls – Spill kits, Bunds, Waste Minimisation – Order correct quantities, reuse surplus, Waste Segregation – metal, timber, packaging, Waste Collection – Approved Waste Contractor, Dust Controls, Air/Noise Monitoring, Limits to working hours)*
	• Keep work areas tidy at all times. • Use bins provided & empty regularly or when full. • Do not allow bins to overflow. • Designated area is to be set aside for the storage of waste. • Use segregation with the waste skips, timber/plastic/metal etc. • Do not cross contaminate a skip that is partially full & never cross contaminate the main site skips. • All waste is to be disposed of by a licensed carrier & taken to a licensed facility. • All refuelling must be double Skinned and properly bunded • Spill Kits to be on site

10.	**COSHH / SDS LIST**						
	N/A				Any or all hazardous substances to be uploaded to Hazmat register.		
	Yes ☐	Yes ☐	Yes ☐	Yes ☐	Yes ☐	Yes ☐	Yes ☒
	Flammable	**Toxic**	**Harmful**	**Irritant**	**Corrosive**	**Oxidising**	**Environment**

12.	**SERVICE IMPACT (i.e. any power/ventilation etc. outage)**	
	• N/A	
13.	**PERMITS REQUIRED (Hot Works, Working at Height, LOTO etc.)**	
	• SPA (Safe Plan of Action) • Dynamic Risk Assessments • Daily Vehicle Checks	
14.	**PEDESTRIAN/TRAFFIC RE-ROUTING ARRANGEMENTS:**	
	• Use Pedestrian Walkways & crossing points. • Keep pedestrians and others away from vehicle movements. • Offloading area to cordoned off / barriered off correctly	• Obey Site Speed Limit 15kph • Spotters in place during offload / transport of loads / materials
15.	**FIRE SAFETY ARRANGEMENTS:**	
	• Use local fire points, raise alarm if fire seen.	
16.	**SECURITY ARRANGEMENTS:**	
	• All personnel will sign in daily with appointed site supervisor. Arrange delivery/ access with supervisor. Compound to be always locked when no work taken place.	
17.	**EMPLOYEES AND TITLE INVOLED IN TASK**	
	• Bord na Mona Site Supervisor & Operatives	

METHOD STATEMENT COMMUNICATION

I confirm that I have carried out the communication of the attached Risk Assessment and Method Statement to the individuals identified below and I will ensure effective monitoring and compliance of the duration of the works.

Description of the Task: PCAS-RAMS-003CR Field Re-Profiling to Re-Wet Measure DPT 3A	
Contractor Company Name: Bord na Mona	
Time & Date:	
Supervisor Name:	**Job Title:** Site Supervisor

BORD NA MÓNA Naturally Driven	Castlegar Bog		
	Reprofiling to Re-Wet Measure DPT 3A		
Document Approved by:	**Revision Date:**	**Doc No.:**	**Revision No.:**
	01/12/2020	PCAS-RAMS-003CR	0
	/Control Location		**Page:**
	Site Office		6 of 15

Purpose

The Purpose of this procedure is to set out a standard method for Re-Wet Measure using an excavator in a safe manner.

Scope

- The concept of field re-profiling is to level the surface of the individual peat production fields to allow more uniform coverage of water at an ideal depth of between 50mm and 200mm for vegetation colonisation.

Pre Requisites

1. Personal carrying out this task are deemed to be competent.
2. Safe Pass and Manuel Handling Trained
3. CSCS Cards for Machine operatives
4. Suitable PPE to be worn as shown below.

Reference Documents

☑ Task RA 	☑ Mandatory 	☑ Task RA 	☑ Task RA 	☑ Mandatory 	☑ Task RA 
Other PPE. ☑			**Other PPE.** ☑ Task RA		

Procedure

1. All members of the works crew must attend a Monday whiteboard meeting with their Supervisors.
2. Must complete a Safe Plan of Action (SPA) Form for the scope of the works to be completed.
3. All pre-use checks on plant, equipment, and machinery (i.e. excavator, etc.) must be completed prior to work.
4. 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
5. First the Bull-dozer will re-profile the field by making a total of 16 passes, 8 passes up and 8 passes down, flattening the camber on the production field.
6. The next operation is drain blocking. Drain blocks are constructed by an Excavator operating at a perpendicular direction to the field drains.
7. Key is cut in the drain approximately 0.5m 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.
8. 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.
9. The peat is firmly compacted using the machine bucket before laying more peat from the borrow pit.
10. 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.
11. The borrow hole is back filled with the peat extracted from the drain. The sides of the borrow hole are to be pressed down with the bucket to smooth the slope into the hole.
12. (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 Dam)
13. Field re-profiling is developed as a technique to slow the surface water loss from the bog and to retain as much water as possible on the bog, at the required depth.
14. Each re-profiled field will hold a shallow layer of water. In time, these shallows have been shown to terrestrialize and infill with peat land vegetation.
15. The process tends to be more rapid/successful if the surface water is not too deep (50mm-200mm).
16. At the end of shift Machine parked correctly locked with keys taken back to compound.

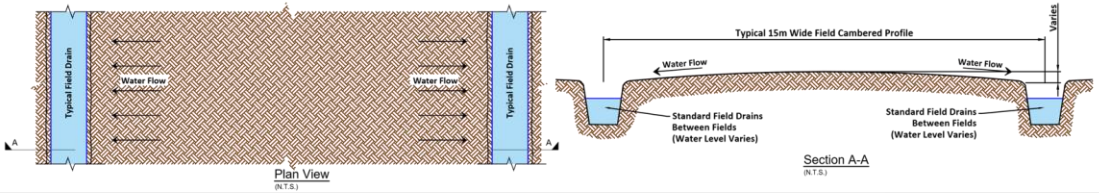
Non routine activities where there is exposure to risk must be risk assessed before commencing work and recommended control measures put in place. The risk assessment will identify any isolation requirements that may be required.

BORD NA MÓNA
Naturally Driven

DPT 3A: Typical Field Re-Profiling to Re-Wet Measure

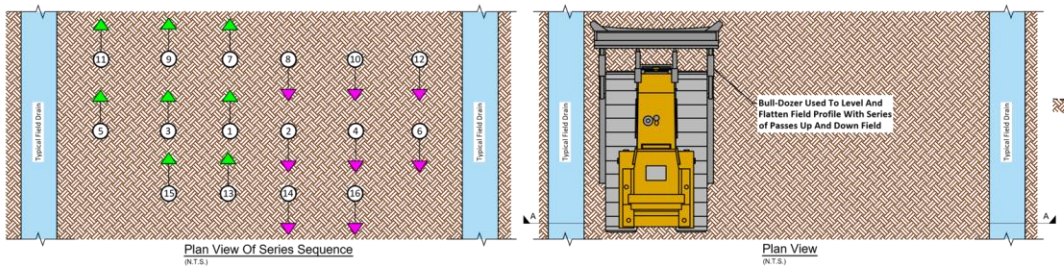
Existing Layout:

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.



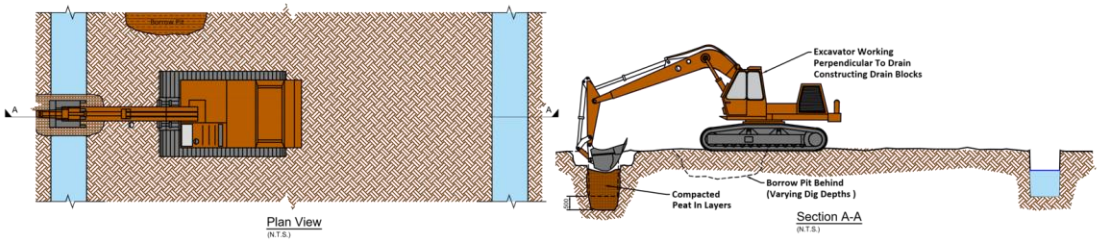
Phase 1
Re-Profiling of Field Surface

Field to be re-profiled using bull-dozer making a total of 16 passes, 8 passes up and 8 passes down, flattening the camber on the production field.
(Sequence of runs shown below)



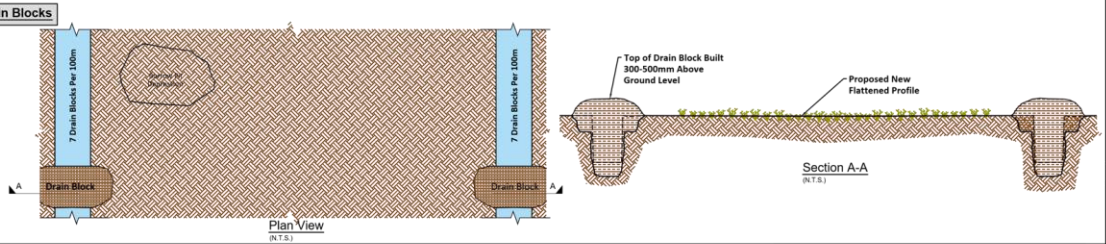
Phase 2
Peat Dam Drain Blocking

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 dam.)



Complete Shallow Field Profile with Regular Drain Blocks

Field re-profiling is developed as a technique to slow the surface water loss from the bog and to retain as much water as possible on the bog, at the required depth.



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
00	Issued For Information	P K	

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:
Rehabilitation Method DPT 3A
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: Information
Drawing No.: PCAS-0100-003 Rev: a

BORD NA MÓNA
Naturally Driven

Appendix 2 – Risk Assessment

Risk Assessment

Risk Assessment No.:	PCAS-RAMS-003-CR	**Page:**	1 of 6

Task / Area / Description:	**General Risk Assessment** Machinery and Equipment Risk Assessment	**Date:**	05/01/2021	**Rev. No.:**	0

Completed by:	David Ormond	**Responsible Person (R.P):**	1 = Manager 2 = Supervisor 3 = Employee

Person who may be harmed:	All Employee's operating Machinery or Equipment, any employee, visitor, contractor or third party who may be within the vicinity of moving plant/ machinery or equipment.

Risk Rating:	**RF = S x L** S = Severity (1-5) L = Likelihood (RF = 1-25)	RF 1-3 = Low Acceptable Risk RF 4-9 = Medium: Acceptable Risk, further controls required RF 10-25 = High: Unacceptable Risk, immediate action needed, work prohibited.	**Residual Risk (Risk following Control Measures):** RF: 1-3 RR = Low RF: 4-9 RR = Medium RF: 10-25 RR = High

Hazard	Risk	Control Measures	S	L	RF	RR	R.P.
Operating Plant/ Machinery in Machine Compound	Collisions with other vehicles, objects or pedestrians, overturning, unbalanced falling loads.	There is regular movement of vehicles, cars within the Compound, Adequate Signage to be displayed to convey the Arrangements and Controls within the compound -Upon arrival at the site visitors or delivery personnel contact reception and follow the instructions given by Site Supervisor. All operatives plus visitors must sign in with Site Supervisor -Driving, loading, and parking areas are clearly identified and these must be observed. -Employees and visitors follow traffic direction signs and park in designated areas only. -Pedestrian pathways to site entrance are provided where practical. . KEEP WELL CLEAR OF MOVING MACHINES.	4	2	8	L	1,2,3
Access to and Egress from Work Site	Interaction with other site operations and operatives.	- Driver with hi-vis to control his work area while this operation is ongoing - Flashing amber lights and audible alarms when reversing vehicles. - Site management to be made aware of intended works in the area. - All other site operatives to be made aware of proposed works. - Weekly Toolbox Talks - Sufficient signage to be in place to warn non-associated persons of risks.	3	1	3	L	1,2,3
Other personnel on site	Damage to property, injury to persons involved in accident.	- Adequate signage of an appropriate type to be erected around the works by others - Notices to be erected on boundaries of works. - Mobile plant to comply with site vehicle rules and rules of the road - No Unauthorized persons to be allowed on site and if someone unintentionally enters work area politely ask them to report back to the site supervisor	3	1	3	L	1,2,3

		- All plant and equipment to be locked or immobilised when not in use and keys removed.					
Use of Excavators & Bulldozers	- Collapse of sides - Falls into trench - Plant driving into trench - Contaminated ground	- UNDER NO CIRCUMSTANCES SHOULD PERSONS USE THE BUCKET OF THE MACHINE TO GAIN ACCESS TO HEIGHTS OR USE THEM AS A WORKING PLATFORM. - Operative Must have relevant CSCS Training card - Toolbox talk to be undertaken highlighting the dangers - Fully Automatic Quick hitches are only to be used on BNM sites - All auxiliary safety devices to be in good work order. The machine is provided with appropriate devices that, where the visibility of any operator is restricted, such devices remedy the hazards arising from inadequate direct vision (1m rule) - Use three points of contact when embarking or disembarking the machine - Passengers must not be carried inside or outside the machine. - Seat belt to be worn always - All plant to be fitted with amber warning beacons. - Communicate with other drivers/ SS when leaving the machine - Allow clearance distance of minimum 600m when slewing – barricade danger areas off if necessary - Do not under any circumstance slew the bucket or load directly over personnel - Slow working cycle down when working on slopes to reduce the bucket reach - Vehicle Banksman to guide driver when large excavator is travelling in compound - High visibility vest, helmet, gloves and glasses to be worn when outside the vehicle - All machines to have fire extinguisher and fire bucket - Maintenance and inspection records must include the quick hitch mechanisms to ensure they are clean and in a fully serviceable condition. - Refuelling to be in designated area only where bunding and spill kit are in place - All work must be supervised and checked and monitored to ensure compliance with Safe Working Procedures by both workers and plant operatives - Ensure statutory and company test, examination and inspection procedures are implemented on forms GA1 & GA2	4	2	8	L	1,2,3
Working With & Alongside other plant	- Coming in contact with the machine. - Noise. - Unauthorised use.	- A detailed safe plan of action must be completed and co-signed by supervisors of any other works happening in the Bog excavation area. - Operatives will be kept separated from the Machinery. - No operative to leave Cab until other machinery drivers are notified - Designate storage areas for materials and keep confined to one area.	4	2	8	L	1,2,3

		- All equipment and materials that are no longer required must be brought back to compound when task is finished.					
Slips, Trips & Falls	Personal injury	- Site management to make available suitable Access / Egress for the job - Weekly Toolbox talk to inform operatives of the risks involved - Instruction in safe use of Machine & Tools and competent supervision to be provided - Housekeeping - Clean as you go - 3 point of contact when embarking / Disembarking any machine - Any moving or adjustable parts should be kept oiled.	3	1	3	L	1,2,3
Fire	Serious personal injury or death, explosive and damage to assets.	- Training to be provided in fire safety and use of firefighting equipment to designate employees. - Suitable firefighting equipment to be provided for each work area. - Strict housekeeping to be maintained - Flammable liquids and combustible materials must be removed, segregated, and/or protected and kept in the compound - Working area to be assessed before the work is carried out to ensure work is carried out away from flammable material and members of the public. - Obey no smoking policy. - Ensure employee awareness of emergency and evacuation procedures. - Evacuation and emergency drill to be carried out at regular intervals. - Every machine must have a fire extinguisher and a fire bucket fitted.	4	2	8	L	1,2,3

House Keeping	Contributes to slips, trips and falls, spread of fire, and falls of incorrectly stored materials.	- All employees must follow the site clean as you go policy.
		- Please follow the guidance below for your work area.
		- General work areas
		  - Clean as you go, remove debris from your work area, if you require materials for future use, store them neatly.
		- Access routes
		  - Do not set up work areas impinging on access routes, when this is unavoidable – plan alternative routes, discuss with your supervisor & EHS on the most suitable route available and erect appropriate signage.
		- Bins
		  - Empty bins regularly, overflowing bins are unacceptable; do not leave bins with material protruding. If you do not have sufficient bins report this to your supervisor.
			3	1	3	L	1,2,3

		- Ensure the bins are labelled with the owner and the waste type. Bins must be labelled and only the waste that is indicated shall be placed in these bins. - Lay down areas - Material is stored in a tidy fashion, with clear access - You should be able to access materials without stepping over other materials (Trip hazards) - Signage - Ensure the signage in your work area is appropriate; remove all old redundant signage from your area and dispose of correctly. Signage must be obvious and of the correct size / content & colour to describe the conditions that exist inside the designated area.					
Dust	Can cause injury and ill-health including respiratory illness such as silicosis.	- A suitable dust mask (not a nuisance dust mask) must be worn as well as the damping down process. Use either FFP3 filtering face pieces or orinasal respirators with P3 filters for RCS dust. - Training should be given to the workforce regarding the appropriate use and maintenance of their masks. - Check machinery and safety equipment regularly. - Inspect and maintain re-usable masks. - Select correct dust mask for conditions (always seek specialist advice) - Enforce the wearing of masks - Change mask daily or when recommended by the specialist (may be more frequent) - On dry windy days, dust inhibiting measures should be used on haul roads and areas around the site i.e.: damping with water - Always check SDS for the product to see if there is any hazard from dust produced. Seek specialist advice. - Ensure vehicles use their lights when driving in dusty conditions on the bog etc. where visibility is impaired. - Co-workers or others who are in the vicinity of the dust and are affected by it should also wear suitable face -	4	2	8	L	1,2,3
Noise	Noise of induced hearing loss or tinnitus.	- Purchase / hire in equipment with noise reduction built in if possible - Limit the number of people working in a noisy area and the length of time they spend there	4	2	8	L	1,2,3

		- Upper exposure action valve = 85dBA - - Hearing protection is mandatory and warning signs - Lower exposure action valve = 80dBA - Carry out a risk assessment - Measurement of the noise levels by a competent person at suitable intervals. The sampling shall be representative of an employee's daily personal exposure - The RA is to take account of the level, type and duration of exposure (including impulsive noise) - Try to eliminate noise – by design and layout of workplaces, reducing noise by technical means and / or the organisation of work - Consult with employees and provide information and training - Health surveillance to be provided for those at risk.					
COVID-19 Risk	Severe respiratory illness caused by the SARS-COV-2 virus.	- Staggering tea/lunch times to allow for minimum contact with others. Canteens have been reconfigured to comply with social distancing requirements. - Considering WHO guidance that you must be within 1m of a person who is infected for more than 15 minutes to be at risk of infection, please remove yourself from anyone displaying symptoms as soon as possible. - WHO and HSE informational signs are posted around the work areas as a reminder to all regarding social distancing, hand, and respiratory hygiene. - Develop a plan to facilitate social distancing. Communicate this to all in the workplace and monitor the implementation of the plan. - Personal Hygiene and Travel - Cleaning personal space and work area touch points – door handles, levers, etc. - Ensuring that hands are kept clean by regular handwashing/using hand sanitizers. Ensure the correct handwashing technique is used. It is everyone's obligation to do this at home as well as in the office and on sites. - Practice good respiratory etiquette by using tissues/bent elbow when coughing or sneezing. Used tissues need to be disposed of in a closed pedal bins specifically set aside for this purpose. Wash hands immediately afterwards. Avoid touching eyes, nose and mouth. - If an employee develops symptoms while at work, they must inform their supervisor immediately who will inform HR and the project director. The employee must self-isolate immediately. - Outside of work: If an employee develops cold or flu-like symptoms such as a fever, dry cough, sore throat, and difficulty breathing, they should not come to work. They should seek medical	4	2	8	L	1,2,3

		care early. They must self-isolate and contact their GP immediately. Stay at home. They must contact their line manager who is required to inform HR/director. They will need to self-isolate for 14 days. They should only return to work when all their symptoms have gone					

Peatlands Climate Action Scheme
Method & Risk Assessment

Project Title: Peatlands Climate Action Scheme	**Group Project No.:**
Customer: Bord na Mona	
Project Site Address: Bord Na Mona, Castlegar Bog	PCAS-RAMS-004CR Field Re-Profiling to Re-Wet Measure DPT 3B
Company Name & Address: Bord Na Mona, Boora, Co. Offaly	**Site Contacts & Contact Numbers:** Liam Tansey – Site Supervisor 087 1889272 David Ormond – PSCS/ EHS Lead - 086 0243916
Brief Task Description (Scope):	

Start Date: 01-03-21	**Finish Date:** T.B.C	**Duration**: T.B.C

Risk Assessment Details / Review	
Signed: David Ormond	Signed *David Ormond*
Signed:	Signed
Location of Works (Be Specific): Site wide Castlegar Bog	

1.	**PARTIES TO THE CONTRACT**			
	Client:	Bord na Mona		
	PSCS:	David Ormond (Bord na Mona)		
	Contractor:			
	Sub-Contractor:			
	LOCATION OF WORK:			
	Site wide Castlegar Bog			
3.	**SITE MANAGEMENT**			
	NAME	**COMPANY**	**TITLE**	**CONTACT DETAILS**
4.	**EMERGENCY ARRANGEMENTS:**			
	First Aider:			
	Location of First Aid Box:	Site Office		
	Location of Nearest Hospital:	Ballinasloe Hospital 090 9648200		
	Location of Fire Extinguisher:	Site offices, site container & all Machines		
	Location of Assembly Point:	Car Park as per induction – Muster Point A		
	Additional Arrangements:	All visitors will be Bord Na Mona site inducted and will sign in Daily /visitors sign in book.		
	DATE OF COMMENCEMENT:	**DATE OF COMPLETION:**	**DURATION OF TASK: (days/weeks)**	
	01-03-2021	T.B.C	T.B.C	

	Location of Fire Extinguisher: At all fire points, Site offices, site container and on all machines Location of Assembly Point: Car Park as per induction. Muster point A	
6.	• BNM Site Induction • Safe Pass • Safe Manual Handling in the workplace • Covid 19 Questionnaire • CSCS Machine Tickets	
7.	**EQUIPMENT AND MACHINERY TO BE USED FOR TASK**	
	• 360 Degree • Signage • Screwleveller • Bulldozer • Tractors	
8.	**MATERIALS**	
9.	**ENVIRONMENTAL** *(Controls may include, but not be limited to: Spill Controls – Spill kits, Bunds, Waste Minimisation – Order correct quantities, reuse surplus, Waste Segregation – metal, timber, packaging, Waste Collection – Approved Waste Contractor, Dust Controls, Air/Noise Monitoring, Limits to working hours)*	
	• Keep work areas tidy at all times. • Use bins provided & empty regularly or when full. • Do not allow bins to overflow. • Designated area is to be set aside for the storage of waste. • Use segregation with the waste skips, timber/plastic/metal etc. • Do not cross contaminate a skip that is partially full & never cross contaminate the main site skips. • All waste is to be disposed of by a licensed carrier & taken to a licensed facility. • All refuelling must be double Skinned and properly bunded • Spill Kits to be on site	
10.	**COSHH / SDS LIST**	
	N/A	Any or all hazardous substances to be uploaded to Hazmat register.

Yes ☐	Yes ☐	Yes ☐	Yes ☐	Yes ☐	Yes ☐	Yes ☒
Flammable	**Toxic**	**Harmful**	**Irritant**	**Corrosive**	**Oxidising**	**Environment**

12.	**SERVICE IMPACT (i.e. any power/ventilation etc. outage)**	
	• N/A	
13.	**PERMITS REQUIRED (Hot Works, Working at Height, LOTO etc.)**	
	• SPA (Safe Plan of Action) • Dynamic Risk Assessments • Daily Vehicle Checks	
14.	**PEDESTRIAN/TRAFFIC RE-ROUTING ARRANGEMENTS:**	
	• Use Pedestrian Walkways & crossing points. • Keep pedestrians and others away from vehicle movements. • Offloading area to cordoned off / barriered off correctly	• Obey Site Speed Limit 15kph • Spotters in place during offload / transport of loads / materials
15.	**FIRE SAFETY ARRANGEMENTS:**	
	• Use local fire points, raise alarm if fire seen.	
16.	**SECURITY ARRANGEMENTS:**	
	• All personnel will sign in daily with appointed site supervisor. Arrange delivery/ access with supervisor. Compound to be always locked when no work taken place.	
17.	**EMPLOYEES AND TITLE INVOLED IN TASK**	
	• Bord na Mona Site Supervisor & Operatives	

METHOD STATEMENT COMMUNICATION

I confirm that I have carried out the communication of the attached Risk Assessment and Method Statement to the individuals identified below and I will ensure effective monitoring and compliance of the duration of the works.

Description of the Task: PCAS-RAMS-004CR Field Re-Profiling to Re-Wet Measure DPT 3A	
Contractor Company Name: Bord na Mona	
Time & Date:	
Supervisor Name:	**Job Title:** Site Supervisor

	Castlegar Bog		
	Field Re-Profiling to Re-Wet Measure DPT 3B		
Document Approved by:	**Revision Date:**	**Doc No.:**	**Revision No.:**
	01/12/2020	PCAS-RAMS-004CR	0
	/Control Location		**Page:**
	Site Office		6 of 17

Purpose

The Purpose of this procedure is to set out a standard method for Re-Wet Measure using an excavator in a safe manner.

Scope

- The concept of field re-profiling is to level the surface of the individual peat production fields to allow more uniform coverage of water at an ideal depth of between 50mm and 200mm for
- vegetation colonization.
- The aim is to create a final profile with a largely flat or slightly concave surface. This will depend on the general topography and slope. On cutaway with increased slopes it will be more advantageous to create shallow depressions. Any depressions will be up to 100-200mm deep across it's 15m width.

Pre Requisites

1. Personal carrying out this task are deemed to be competent.
2. Safe Pass and Manuel Handling Trained
3. CSCS Cards for Machine operatives
4. Suitable PPE to be worn as shown below.
5. Safe plan of action

Reference Documents

☑ Task RA	☑ Mandatory	☑ Task RA	☑ Task RA	☑ Mandatory	☑ Task RA
					

Other PPE. ☑	Other PPE. ☑ Task RA

Procedure

1. All members of the works crew must attend a Monday whiteboard meeting with their Supervisors.
2. Must complete a Safe Plan of Action (SPA) Form for the scope of the works to be completed.
3. All pre-use checks on plant, equipment, and machinery (i.e. excavator, etc.) must be completed prior to work.
4. The production field is re-profiled 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.
5. The Screw-Leveller, with a level axis, will run up one side 1 of the production field and down the other side 2 , sufficiently offset from drain to ensure the peat does not enter the drain but forms a mound beside the drain.
6. Next the Bull-dozer will run up one edge side 1 of the production field and down the other side 2 flattening the loose peat mounds, ensuring a minimal amount of peat enters the drains.
7. The next operation is drain blocking. Drain blocks are constructed by an Excavator operating at a perpendicular direction to the field drains.
8. Key is cut in the drain approximately 0.5m 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.
9. 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.
10. The peat is firmly compacted using the machine bucket before laying more peat from the borrow pit.
11. 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.
12. The borrow hole is back filled with the peat extracted from the drain. The sides of the borrow hole are to be pressed down with the bucket to smooth the slope into the hole.
13. (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 Dam)

14. Field re-profiling is developed as a technique to slow the surface water loss from the bog and to retain as much water as possible on the site. Each re-profiled field will hold a shallow layer of water. In time, these shallows have been shown to terrestrialise and infill with peatland vegetation. The process tends to be more rapid/successful if the surface water is not too deep (50mm-200mm)..

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Non routine activities where there is exposure to risk must be risk assessed before commencing work and recommended control measures put in place. The risk assessment will identify any isolation requirements that may be required.

Appendix 1 - Drawings

BORD NA MÓNA
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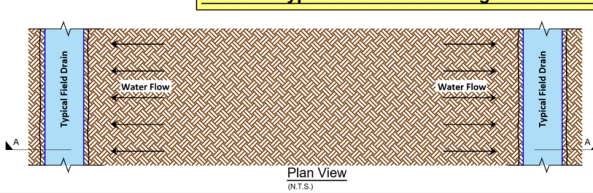
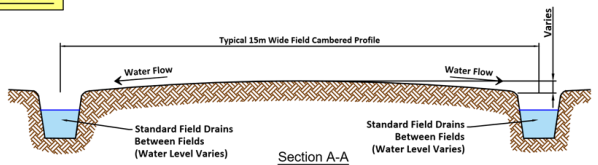
DPT 3B: Typical Field Re-Profiling to Re-Wet Measure

Existing Typical Field 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.



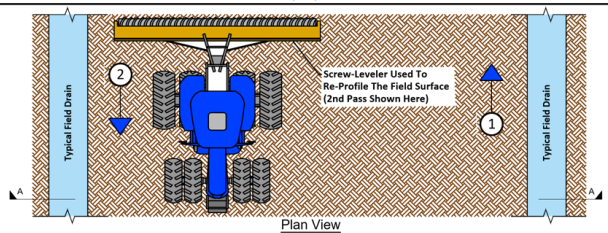
Plan View
(N.T.S.)



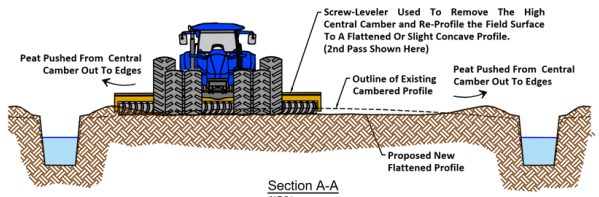
Section A-A
(N.T.S.)

Phase 1
Re-Profiling of Field Surface

The production field is re-profiled 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 is towed using a tractor, with a level axis, will run up one side ① of the production field and down the other side ②, sufficiently offset from drain to ensure the peat does not enter the drain but forms a mound beside the drain.



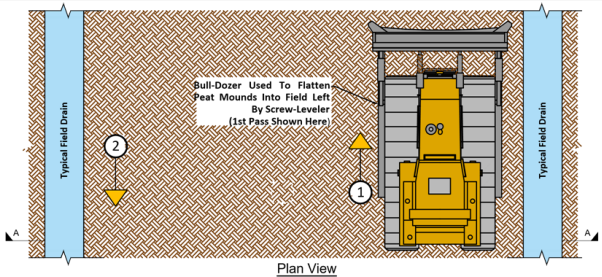
Plan View
(N.T.S.)



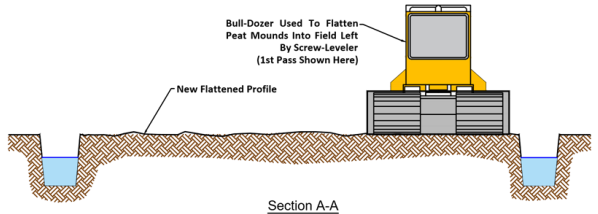
Section A-A
(N.T.S.)

Phase 2
Leveling of Loose Peat

Next the Bull-dozer will run up one edge side ① of the production field and down the other side ② flattening the loose peat mounds, ensuring a minimal amount of peat enters the drains.



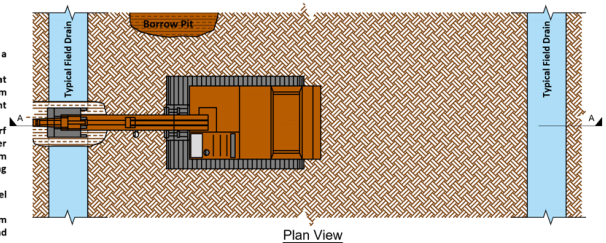
Plan View
(N.T.S.)



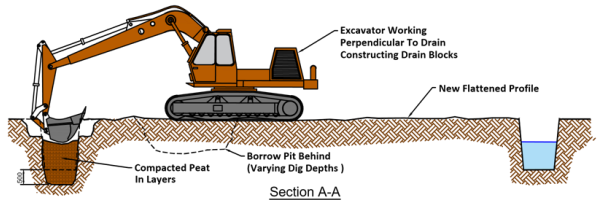
Section A-A
(N.T.S.)

Phase 3
Peat Dam Drain Blocking

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 dam.)



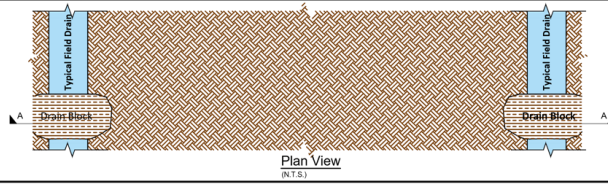
Plan View
(N.T.S.)



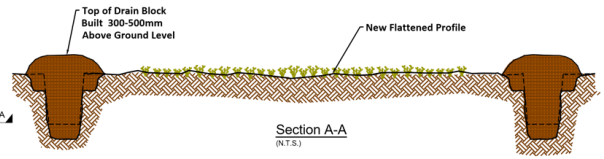
Section A-A
(N.T.S.)

Complete Flattened Field Profile

Field re-profiling is developed as a technique to slow the surface water loss from the bog and to retain as much water as possible on the site. Each re-profiled field will hold a shallow layer of water. In time, these shallows have been shown to quickly infill with peatland vegetation.



Plan View
(N.T.S.)



Section A-A
(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.
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
00	Issued For Information	P.K.	

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:
Rehabilitation Method DPT 3B
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: Information

Drawing No.: PCAS-0100-004 | Rev: a

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BORD NA MÓNA
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Appendix 2 – Risk Assessment

Risk Assessment

Risk Assessment No.:	PCAS-RAMS-004-CR	**Page:**	1 of 7

Task / Area / Description:	**General Risk Assessment** Machinery and Equipment Risk Assessment	**Date:**	04/01/2021	**Rev. No.:**	0

Completed by:	David Ormond	**Responsible Person (R.P):**	1 = Manager 2 = Supervisor 3 = Employee

Person who may be harmed:	All Employee's operating Machinery or Equipment, any employee, visitor, contractor or third party who may be within the vicinity of moving plant/ machinery or equipment.

Risk Rating:	**RF = S x L** S = Severity (1-5) L = Likelihood (RF = 1-25)	RF 1-3 = Low Acceptable Risk RF 4-9 = Medium: Acceptable Risk, further controls required RF 10-25 = High: Unacceptable Risk, immediate action needed, work prohibited.	**Residual Risk (Risk following Control Measures):** RF: 1-3 RR = Low RF: 4-9 RR = Medium RF: 10-25 RR = High

Hazard	Risk	Control Measures	S	L	RF	RR	R.P.
Operating Plant/ Machinery in Machine Compound	Collisions with other vehicles, objects or pedestrians, overturning, unbalanced falling loads.	There is regular movement of vehicles, cars within the Compound, Adequate Signage to be displayed to convey the Arrangements and Controls within the compound -Upon arrival at the site visitors or delivery personnel contact reception and follow the instructions given by Site Supervisor. All operatives plus visitors must sign in with Site Supervisor -Driving, loading, and parking areas are clearly identified and these must be observed. -Employees and visitors follow traffic direction signs and park in designated areas only. -Pedestrian pathways to site entrance are provided where practical. . KEEP WELL CLEAR OF MOVING MACHINES.	4	2	8	L	1,2,3
Access to and Egress from Work Site	Interaction with other site operations and operatives.	- Driver with hi-vis to control his work area while this operation is ongoing - Flashing amber lights and audible alarms when reversing vehicles. - Site management to be made aware of intended works in the area. - All other site operatives to be made aware of proposed works. - Weekly Toolbox Talks - Sufficient signage to be in place to warn non-associated persons of risks.	3	1	3	L	1,2,3
Other personnel on site	Damage to property, injury to persons involved in accident.	- Adequate signage of an appropriate type to be erected around the works by others - Notices to be erected on boundaries of works. - Mobile plant to comply with site vehicle rules and rules of the road - No Unauthorized persons to be allowed on site and if someone unintentionally enters work area politely ask them to report back to the site supervisor	3	1	3	L	1,2,3

		- All plant and equipment to be locked or immobilised when not in use and keys removed.					
Working With & Alongside other plant	Slips, trips & falls and injury to others.	- A detailed safe plan of action must be completed and co-signed by supervisors of any other works happening in the Bog excavation area. - Operatives will be kept separated from the Machinery. - No operative to leave Cab until other machinery drivers are notified - Designate storage areas for materials and keep confined to one area. - All equipment and materials that are no longer required must be brought back to compound when task is finished.	4	2	8	L	1,2,3
Use of Excavators & Bulldozer	- Collapse of sides - Falls into trench - Plant driving into trench - Contaminated ground - Crushing - Plant Overturning	- UNDER NO CIRCUMSTANCES SHOULD PERSONS USE THE BUCKET OF THE MACHINE TO GAIN ACCESS TO HEIGHTS OR USE THEM AS A WORKING PLATFORM. - Must have relevant CSCS card - Toolbox talk to be undertaken highlighting the dangers - Fully Automatic Quick hitches are only to be used on BNM sites - All auxiliary safety devices to be in good work order. The machine is provided with appropriate devices that, where the visibility of any operator is restricted, such devices remedy the hazards arising from inadequate direct vision (1m rule) - Use three points of contact when embarking or disembarking the machine - Passengers must not be carried inside or outside the machine. - Seat belt to be worn always - All plant to be fitted with amber warning beacons. - Communicate with other drivers/ SS when leaving the machine - Allow clearance distance of minimum 600m when slewing – barricade danger areas off if necessary - Do not under any circumstance slew the bucket or load directly over personnel - Slow working cycle down when working on slopes to reduce the bucket reach - Vehicle Banksman to guide driver when large excavator is travelling in compound - High visibility vest, helmet, gloves and glasses to be worn when outside the vehicle - All machines to have fire extinguisher and fire bucket - Maintenance and inspection records must include the quick hitch mechanisms to ensure they are clean and in a fully serviceable condition. - Refuelling to be in designated area only where bunding and spill kit are in place - All work must be supervised and checked and monitored to ensure compliance with Safe Working Procedures by both workers and plant operatives	4	2	8	L	1,2,3

		- Ensure statutory and company test, examination and inspection procedures are implemented on forms GA1 & GA2 - Manufacturers manuals, certification, training, and risk assessment must be completed for any attachments to the excavator (E.g. fork attachment etc)					
Tractor	- Brake failure leading to collision or overturning - Overturning due to excessive speed bad ground, sudden braking &operating on slopes, environmental factors - Slips/ falls when climbing into or out of a cab - Heat, noise, vibration, high pressure fluid, electrical hazards from power transmission.	- Seat belts to be worn when operating plant - Ensure vehicles are designed for such work - Only trained competent operators should be permitted to carry out such work - Ensure rollover protection is provided (ROPS) - Use Three points of contact when embarking and Disembarking machine - All equipment to have auxiliary safety devices. Ensure that the machine is provided with appropriate devices that, where the visibility of any operator is restricted, such devices remedy the hazards arising from inadequate direct vision (1m rule) - Ensure Plant / People segregation - Refuelling to be designated area only where Bunding and spill kit are in place - P.P.E i.e. hi-vis vest, steel toe-cap boots, helmet, safety glasses & gloves must be worn by all employees and operators once they step outside their cab - Remove ignition keys or otherwise immobilise when not in use - Keep personnel clear of the machines - Check around machine before entering cab for any hazards and for parked or moving plant in the vicinity - Never use mobile phone when operating machine - Drivers to keep alert regarding other plant behind them - Weekly toolbox talk to inform operatives of the risks involved - All operatives involved in works to participate in weekly Safe Plans of Action and are well instructed & warned of the hazards involved - PTO shaft is properly covered to manufacturers specifications - When Screwleveller attached make sure it is correctly attached before starting work.	4	2	8	L	1,2,3
Use of screw leveller to level ground	- Collision with other Worker/pedestrians in contact with site plant or vehicle on road.	- All personnel must wear appropriate personal protective equipment (PPE) such as high-visibility reflective vests, safety footwear, hard hats, and glasses. Keep unauthorised persons out of the work area and segregate plant & pedestrians.	3	1	3	L	1,2,3

		- Ensure that machines are not operated on grades steeper than those specified by the manufacturer. - Ensure that operators' manuals and vibration information are present on all machinery or available to the operator. - Make sure that all the safety features are operational. - Ensure that all site workers comply with all applicable requirements of machine warning labels and operator manuals. - Weekly toolbox talk to inform operatives of the risks involved					
Slips, Trips & Falls	Personal injury	- Site management to make available suitable Access / Egress for the job - Weekly Toolbox talk to inform operatives of the risks involved - Instruction in safe use of Machine & Tools and competent supervision to be provided - Housekeeping - Clean as you go - 3 point of contact when embarking / Disembarking any machine - Any moving or adjustable parts should be kept oiled.	3	1	3	L	1,2,3
Fire	Serious personal injury or death, explosive and damage to assets.	- Training to be provided in fire safety and use of firefighting equipment to designate employees. - Suitable firefighting equipment to be provided for each work area. - Strict housekeeping to be maintained - Flammable liquids and combustible materials must be removed, segregated, and/or protected and kept in the compound - Working area to be assessed before the work is carried out to ensure work is carried out away from flammable material and members of the public. - Obey no smoking policy. - Ensure employee awareness of emergency and evacuation procedures. - Evacuation and emergency drill to be carried out at regular intervals. - Every machine must have a fire extinguisher and a fire bucket fitted.	4	2	8	L	1,2,3
House Keeping	Contributes to slips, trips and falls, spread of fire, and falls of incorrectly stored materials.	- All employees must follow the site clean as you go policy. - Please follow the guidance below for your work area. - General work areas - Clean as you go, remove debris from your work area, if you require materials for future use, store them neatly.	3	1	3	L	1,2,3

		- Access routes
		  - Do not set up work areas impinging on access routes, when this is unavoidable – plan alternative routes, discuss with your supervisor & EHS on the most suitable route available and erect appropriate signage.
		- Bins
		  - Empty bins regularly, overflowing bins are unacceptable; do not leave bins with material protruding. If you do not have sufficient bins report this to your supervisor.
		  - Ensure the bins are labelled with the owner and the waste type. Bins must be labelled and only the waste that is indicated shall be placed in these bins.
		- Lay down areas
		  - Material is stored in a tidy fashion, with clear access
		  - You should be able to access materials without stepping over other materials (Trip hazards)
		- Signage
		  - Ensure the signage in your work area is appropriate; remove all old redundant signage from your area and dispose of correctly. Signage must be obvious and of the correct size / content & colour to describe the conditions that exist inside the designated area.					

Dust	Can cause injury and ill-health including respiratory illness such as silicosis.	- A suitable dust mask (not a nuisance dust mask) must be worn as well as the damping down process. Use either FFP3 filtering face pieces or orinasal respirators with P3 filters for RCS dust. - Training should be given to the workforce regarding the appropriate use and maintenance of their masks. - Check machinery and safety equipment regularly. - Inspect and maintain re-usable masks. - Select correct dust mask for conditions (always seek specialist advice) - Enforce the wearing of masks - Change mask daily or when recommended by the specialist (may be more frequent) - On dry windy days, dust inhibiting measures should be used on haul roads and areas around the site i.e.: damping with water - Always check SDS for the product to see if there is any hazard from dust produced. Seek specialist advice.	4	2	8	L	1,2,3

		- Ensure vehicles use their lights when driving in dusty conditions on the bog etc. where visibility is impaired. - Co-workers or others who are in the vicinity of the dust and are affected by it should also wear suitable face					
Noise	Noise of induced hearing loss or tinnitus.	- Purchase / hire in equipment with noise reduction built in if possible - Limit the number of people working in a noisy area and the length of time they spend there - Upper exposure action valve = 85dBA - - Hearing protection is mandatory and warning signs - Lower exposure action valve = 80dBA - Carry out a risk assessment - Measurement of the noise levels by a competent person at suitable intervals. The sampling shall be representative of an employee's daily personal exposure - The RA is to take account of the level, type and duration of exposure (including impulsive noise) - Try to eliminate noise – by design and layout of workplaces, reducing noise by technical means and / or the organisation of work - Consult with employees and provide information and training - Health surveillance to be provided for those at risk.	4	2	8	L	1,2,3
COVID-19 Risk	Severe respiratory illness caused by the SARS-COV-2 virus.	- Staggering tea/lunch times to allow for minimum contact with others. Canteens have been reconfigured to comply with social distancing requirements. - Considering WHO guidance that you must be within 1m of a person who is infected for more than 15 minutes to be at risk of infection, please remove yourself from anyone displaying symptoms as soon as possible. - WHO and HSE informational signs are posted around the work areas as a reminder to all regarding social distancing, hand and respiratory hygiene. - Develop a plan to facilitate social distancing. Communicate this to all in the workplace and monitor the implementation of the plan. - Personal Hygiene and Travel - Cleaning personal space and work area touch points – door handles, levers, etc. - Ensuring that hands are kept clean by regular handwashing/using hand sanitizers. Ensure the correct handwashing technique is used. It is everyone's obligation to do this at home as well as in the office and on sites.	4	2	8	L	1,2,3

		- Practice good respiratory etiquette by using tissues/bent elbow when coughing or sneezing. Used tissues need to be disposed of in a closed pedal bins specifically set aside for this purpose. Wash hands immediately afterwards. Avoid touching eyes, nose and mouth. - If an employee develops symptoms while at work, they must inform their supervisor immediately who will inform HR and the project director. The employee must self-isolate immediately. - Outside of work: If an employee develops cold or flu-like symptoms such as a fever, dry cough, sore throat and difficulty breathing, they should not come to work. They should seek medical care early. They must self-isolate and contact their GP immediately. Stay at home. They must contact their line manager who is required to inform HR/director. They will need to self-isolate for 14 days. They should only return to work when all their symptoms have gone					

Peatlands Climate Action Scheme
Method & Risk Assessment

Project Title: Peatlands Climate Action Scheme	**Group Project No.:**
Customer: Bord na Mona	
Project Site Address: Bord Na Mona, Castlegar Bog Galway	PCAS-RAMS-005CR Field Re-Profiling to Re-Wet Measure DPT 3C
Company Name & Address: Bord Na Mona, Boora, Co. Offaly	**Site Contacts & Contact Numbers:** David Ormond – PSCS/ EHS Lead - 086 0243916 Liam Tansey – Site Supervisor - 087 1889272
Brief Task Description (Scope):	

Start Date: 01-03-21	**Finish Date:** T.B.C	**Duration**: T.B.C

Risk Assessment Details / Review	
Signed: David Ormond	Signed *David Ormond*
Signed:	Signed
Location of Works (Be Specific): Site wide Castlegar Bog	

1.	**PARTIES TO THE CONTRACT**			
	Client:	Bord na Mona		
	PSCS:	David Ormond (Bord na Mona)		
	Contractor:			
	Sub-Contractor:			
	LOCATION OF WORK:			
	Site wide Castlegar Bog			
3.	**SITE MANAGEMENT**			
	NAME	**COMPANY**	**TITLE**	**CONTACT DETAILS**
4.	**EMERGENCY ARRANGEMENTS:**			
	First Aider:			
	Location of First Aid Box:	Site Office		
	Location of Nearest Hospital:	Ballinasloe Hospital 090 9648200		
	Location of Fire Extinguisher:	Site offices, site container & all Machines		
	Location of Assembly Point:	Car Park as per induction – Muster Point A		
	Additional Arrangements:	All visitors will be Bord Na Mona site inducted and will sign in Daily /visitors sign in book.		
	DATE OF COMMENCEMENT:	**DATE OF COMPLETION:**	**DURATION OF TASK: (days/weeks)**	
	01-03-2021	T.B.C	T.B.C	

6.	Location of Fire Extinguisher: At all fire points, Site offices, site container and on all machines Location of Assembly Point: Car Park as per induction. Muster point A	
	• BNM Site Induction • Safe Pass • Safe Manual Handling in the workplace • Covid 19 Questionnaire • CSCS Machine Tickets	
7.	**EQUIPMENT AND MACHINERY TO BE USED FOR TASK**	
	• 360 Degree • Bulldozer • Tractor • Signage • Screwleveller	
8.	**MATERIALS**	
9.	**ENVIRONMENTAL** *(Controls may include, but not be limited to: Spill Controls – Spill kits, Bunds, Waste Minimisation – Order correct quantities, reuse surplus, Waste Segregation – metal, timber, packaging, Waste Collection – Approved Waste Contractor, Dust Controls, Air/Noise Monitoring, Limits to working hours)*	
	• Keep work areas tidy at all times. • Use bins provided & empty regularly or when full. • Do not allow bins to overflow. • Designated area is to be set aside for the storage of waste. • Use segregation with the waste skips, timber/plastic/metal etc. • Do not cross contaminate a skip that is partially full & never cross contaminate the main site skips. • All waste is to be disposed of by a licensed carrier & taken to a licensed facility. • All refuelling must be double Skinned and properly bunded • Spill kits to be on site	
10.	**COSHH / SDS LIST**	
	N/A	Any or all hazardous substances to be uploaded to Hazmat register.

Yes ☐	Yes ☐	Yes ☐	Yes ☐	Yes ☐	Yes ☐	Yes ☒
Flammable	**Toxic**	**Harmful**	**Irritant**	**Corrosive**	**Oxidising**	**Environment**

12.	**SERVICE IMPACT (i.e. any power/ventilation etc. outage)**	
	• N/A	
13.	**PERMITS REQUIRED (Hot Works, Working at Height, LOTO etc.)**	
	• SPA (Safe Plan of Action) • Dynamic Risk Assessments • Daily Vehicle Checks	
14.	**PEDESTRIAN/TRAFFIC RE-ROUTING ARRANGEMENTS:**	
	• Use Pedestrian Walkways & crossing points. • Keep pedestrians and others away from vehicle movements. • Offloading area to cordoned off / barriered off correctly	• Obey Site Speed Limit 15kph • Spotters in place during offload / transport of loads / machines
15.	**FIRE SAFETY ARRANGEMENTS:**	
	• Use local fire points, raise alarm if fire seen.	
16.	**SECURITY ARRANGEMENTS:**	
	• All personnel will sign in daily with appointed site supervisor. Arrange delivery/ access with supervisor. Compound to be always locked when no work taken place.	
17.	**EMPLOYEES AND TITLE INVOLED IN TASK**	
	• Bord na Mona Site Supervisor & Operatives	

METHOD STATEMENT COMMUNICATION

I confirm that I have carried out the communication of the attached Risk Assessment and Method Statement to the individuals identified below and I will ensure effective monitoring and compliance of the duration of the works.

Description of the Task: PCAS-RAMS-005CR Field Re-Profiling to Re-Wet Measure DPT 3C	
Contractor Company Name: Bord na Mona	
Time & Date:	
Supervisor Name:	**Job Title:** Site Supervisor

BORD NA MÓNA Naturally Driven	Castlegar Bog		
	Peat Dam Drain Block Using Excavator		
Document Approved by:	**Revision Date:**	**Doc No.:**	**Revision No.:**
	01/12/2020	PCAS-RAMS-005CR	0
	/Control Location		**Page:**
	Site Office		6 of 15

Purpose

The Purpose of this procedure is to set out a standard method for Peat Dam Drain Block to Re-Wet Measure using an excavator in a safe manner.

Scope

- 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 scope of is to create a final profile with a largely flat or slightly concave surface, to allow more uniform coverage of water at an ideal depth of between 50mm and 200mm, for vegetation colonization. This will depend on the general topography and slope.
- On cutaway with increased slopes it will be more advantageous to create shallow depressions. Any depressions will be up to 100-200mm deep across it's 15m width.

Pre Requisites

1. Personal carrying out this task are deemed to be competent.
2. Safe Pass and Manuel Handling Trained
3. CSCS Cards for Machine operatives
4. Suitable PPE to be worn as shown below.
5. Safe Plan of Action

Reference Documents

☑ Task RA

☑ Mandatory

☑ Task RA

☑ Task RA

☑ Mandatory

☑ Task RA

Other PPE. ☑

Other PPE. ☑ Task RA

Procedure

1. All members of the works crew must attend a Monday whiteboard meeting with their Supervisors.
2. Must complete a Safe Plan of Action (SPA) Form for the scope of the works to be completed.
3. All pre-use checks on plant, equipment, and machinery (i.e. excavator, etc.) must be completed prior to work.
4. 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.
5. 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 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.
6. 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.
7. Next the Bull-dozer will track over the first of the infilled drains 1 and then back down the other drain 2 compacting and levelling the peat. It will also make a pass down the middle of field 3 flattening peat mounds left between Screw Leveler and Bulldozer runs.
8. 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 dam.)

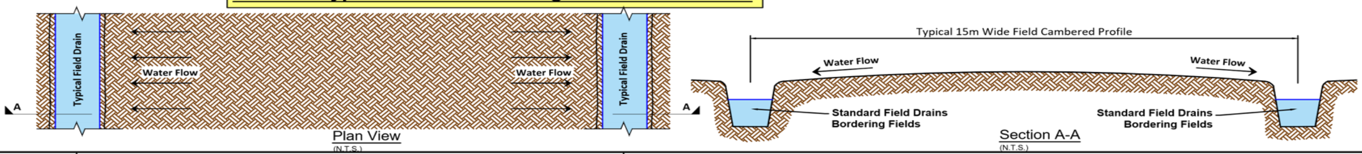
Non routine activities where there is exposure to risk must be risk assessed before commencing work and recommended control measures put in place. The risk assessment will identify any isolation requirements that may be required.

Bord na Móna
Naturally Driven

DPT 3C: Typical Field Re-Profiling to Re-Wet Measure

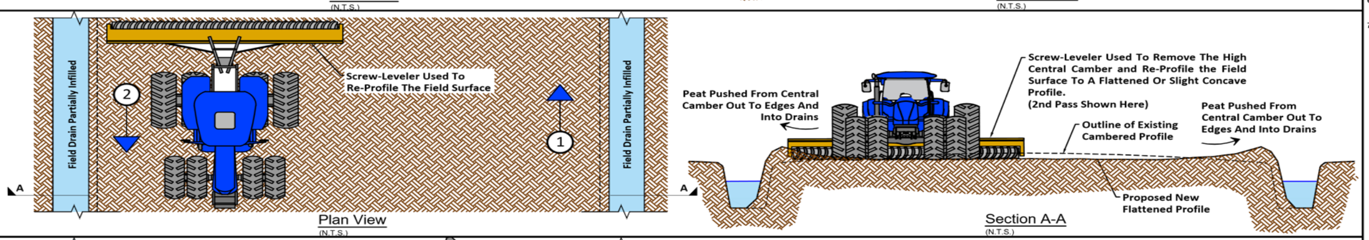
Existing Layout:

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.



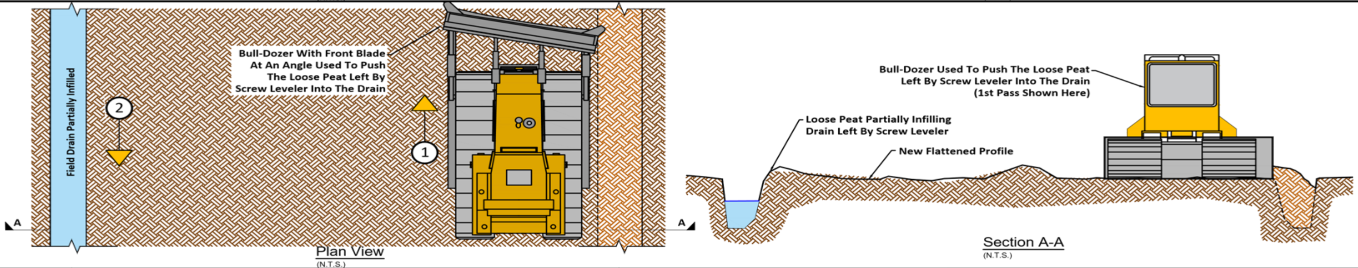
Phase 1
Re-Profiling of Field Surface

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.



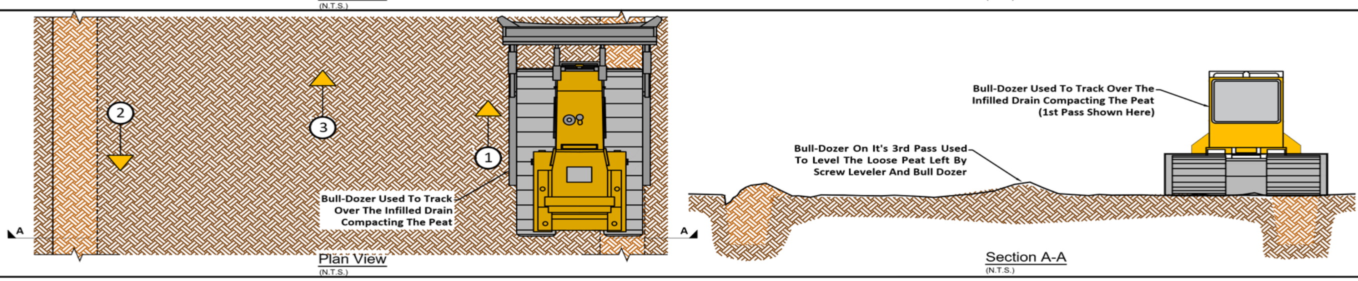
Phase 2
Infilling Of Drains

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.



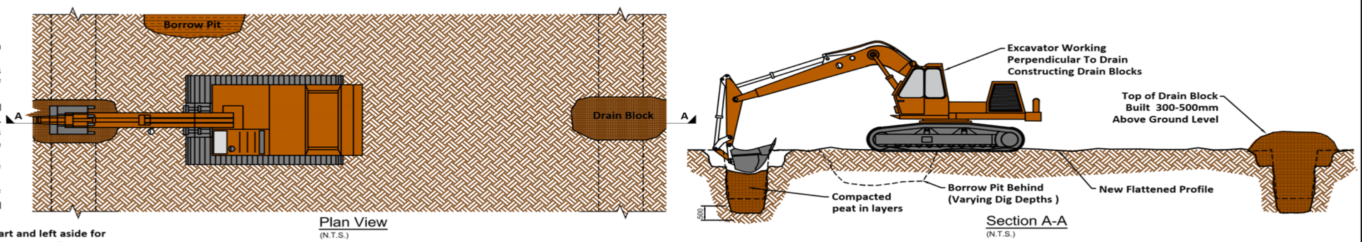
Phase 3
Final Leveling Of Drains & Field

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.



Phase 4
Drain Blocking

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 dam.)

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
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00	Issued For Information	P.K.	

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 3C
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: Information
Drawing No.: PCAS-0100-005				Rev: a

BORD NA MÓNA
Naturally Driven

Appendix 2 – Risk Assessment

Risk Assessment

Risk Assessment No.:	PCAS-RAMS-005-CR	Page:	1 of 7

Task / Area / Description:	**General Risk Assessment** Machinery and Equipment Risk Assessment	Date:	06/01/2021	Rev. No.:	0

Completed by:	David Ormond	Responsible Person (R.P):	1 = Manager 2 = Supervisor 3 = Employee

Person who may be harmed:	All Employee's operating Machinery or Equipment, any employee, visitor, contractor or third party who may be within the vicinity of moving plant/ machinery or equipment.

Risk Rating:	**RF = S x L** S = Severity (1-5) L = Likelihood (RF = 1-25)	RF 1-3 = Low Acceptable Risk RF 4-9 = Medium: Acceptable Risk, further controls required RF 10-25 = High: Unacceptable Risk, immediate action needed, work prohibited.	**Residual Risk (Risk following Control Measures):** RF: 1-3 RR = Low RF: 4-9 RR = Medium RF: 10-25 RR = High

Hazard	Risk	Control Measures	S	L	RF	RR	R.P.
Operating Plant/ Machinery in Machine Compound	Collisions with other vehicles, objects or pedestrians, overturning, unbalanced falling loads.	There is regular movement of vehicles, cars within the Compound, Adequate Signage to be displayed to convey the Arrangements and Controls within the compound -Upon arrival at the site visitors or delivery personnel contact Site Supervisor and follow the instructions given by Site Supervisor. All operatives plus visitors must sign in with Site Supervisor -Driving, loading, and parking areas are clearly identified and these must be observed. -Employees and visitors follow traffic direction signs and park in designated areas only. -Pedestrian pathways to site entrance are provided where practical. . KEEP WELL CLEAR OF MOVING MACHINES.	4	2	8	L	1,2,3
Access to and Egress from Work Site	Interaction with other site operations and operatives.	- Driver with hi-vis to control his work area while this operation is ongoing - Flashing amber lights and audible alarms when reversing vehicles. - Site management to be made aware of intended works in the area. - All other site operatives to be made aware of proposed works. - Weekly Toolbox Talks - Sufficient signage to be in place to warn non-associated persons of risks.	3	1	3	L	1,2,3
Other personnel on site	Damage to property, injury to persons involved in accident.	- Adequate signage of an appropriate type to be erected around the works by others - Notices to be erected on boundaries of works. - Mobile plant to comply with site vehicle rules and rules of the road - No Unauthorized persons to be allowed on site and if someone unintentionally enters work area	3	1	3	L	1,2,3

		politely ask them to report back to the site supervisor - All plant and equipment to be locked or immobilised when not in use and keys removed.					
Use of Excavators & Bulldozer	- Collapse of sides - Falls into trench - Plant driving into trench - Contaminated ground	- UNDER NO CIRCUMSTANCES SHOULD PERSONS USE THE BUCKET OF THE MACHINE TO GAIN ACCESS TO HEIGHTS OR USE THEM AS A WORKING PLATFORM. - Must have relevant CSCS card - Fully Automatic Quick hitches are only to be used on BNM sites - All auxiliary safety devices to be in good work order. The machine is provided with appropriate devices that, where the visibility of any operator is restricted, such devices remedy the hazards arising from inadequate direct vision (1m rule) - Passengers must not be carried inside or outside the machine. - All plant to be fitted with amber warning beacons. - Allow clearance distance of minimum 600m when slewing – barricade danger areas off if necessary - Do not under any circumstance slew the bucket or load directly over personnel - Slow working cycle down when working on slopes to reduce the bucket reach - Vehicle Banksman to guide driver when large excavator is travelling in compound - High visibility vest, helmet, gloves and glasses to be worn when outside the vehicle - If leaving cab notify other machine drivers - Maintenance and inspection records must include the quick hitch mechanisms to ensure they are clean and in a fully serviceable condition. - All work must be supervised and checked and monitored to ensure compliance with Safe Working Procedures by both workers and plant operatives - If the machine is to be used to lift, then a Lift Plan must be completed by a Lifting Operations Coordinator - Ensure statutory and company test, examination and inspection procedures are implemented on forms GA1 & GA2 - Ensure that excavators are used only by certified trained persons (CSCS or equivalent) - Manufacturers manuals, certification, training and risk assessment must be completed for any attachments to the excavator (E.g. fork attachment etc)	4	2	8	L	1,2,3
Working With & Alongside other plant	- Coming in contact with the machine. - Noise.	- A detailed safe plan of action must be completed and co-signed by supervisors of any other works happening in the Bog excavation area. - Operatives will be kept separated from the Machinery. - No operative to leave Cab until other machinery drivers are notified - Designate storage areas for materials and keep confined to one area.	4	2	8	L	1,2,3

	- Unauthorised use.	- All equipment and materials that are no longer required must be brought back to compound when task is finished.					
Tractor	- Brake failure leading to collision or overturning - Overturning due to excessive speed bad ground, sudden braking &operating on slopes, environmental factors - Slips/ falls when climbing into or out of a cab - Heat, noise, vibration, high pressure fluid, electrical hazards from power transmission.	- Seat belts to be worn when operating plant - Ensure vehicles are designed for such work - Only trained competent operators should be permitted to carry out such work - Ensure rollover protection is provided (ROPS) - Immobilise equipment when not in use. - All equipment to have auxiliary safety devices. Ensure that the machine is provided with appropriate devices that, where the visibility of any operator is restricted, such devices remedy the hazards arising from inadequate direct vision (1m rule) - Ensure Plant / People segregation - All equipment to have auxiliary safety devices - P.P.E i.e. hi-vis vest, steel toe-cap boots, helmet, safety glasses & gloves must be worn by all employees and operators once they step outside their cab - Remove ignition keys or otherwise immobilise when not in use - Keep personnel clear of the machines - Check around machine before entering cab for any hazards and for parked or moving plant in the vicinity - Never use mobile phone when operating machine - Drivers to keep alert regarding other plant behind them - Weekly toolbox talk to inform operatives of the risks involved - All operatives involved in works to participate in weekly Safe Plans of Action and are well instructed & warned of the hazards involved - PTO shaft is properly covered to manufacturers specifications - When Screwleveller attached make sure it is correct before starting work.	4	2	8	L	1,2,3
Use of screw leveller to level ground	- Collision with other Worker/pedestrians in contact with site plant or vehicle on road.	- All personnel must wear appropriate personal protective equipment (PPE) such as high-visibility reflective vests, safety footwear, hard hats, and glasses. Keep unauthorised persons out of the work area and segregate plant & pedestrians. - Ensure that machines are not operated on grades steeper than those specified by the manufacturer. - Ensure that operators' manuals and vibration information are present on all machinery or available to the operator.	3	1	3	L	1,2,3

		- Make sure that all the safety features are operational. - Ensure that all site workers comply with all applicable requirements of machine warning labels and operator manuals. - Weekly toolbox talk to inform operatives of the risks involved -					
Slips, Trips & Falls	Personal injury	- Site management to make available suitable Access / Egress for the job - Weekly Toolbox talk to inform operatives of the risks involved - Instruction in safe use of Machine & Tools and competent supervision to be provided - Housekeeping - Clean as you go - 3 point of contact when embarking / Disembarking any machine - Any moving or adjustable parts should be kept oiled.	3	1	3	L	1,2,3
Fire	Serious personal injury or death, explosive and damage to assets.	- Training to be provided in fire safety and use of firefighting equipment to designate employees. - Suitable firefighting equipment to be provided for each work area. - Strict housekeeping to be maintained - Flammable liquids and combustible materials must be removed, segregated, and/or protected and kept in the compound - Working area to be assessed before the work is carried out to ensure work is carried out away from flammable material and members of the public. - Obey no smoking policy. - Ensure employee awareness of emergency and evacuation procedures. - Evacuation and emergency drill to be carried out at regular intervals. - Every machine must have a fire extinguisher and a fire bucket fitted.	4	2	8	L	1,2,3
House Keeping	Contributes to slips, trips and falls, spread of fire, and falls of incorrectly stored materials.	- All employees must follow the site clean as you go policy. - Please follow the guidance below for your work area. - General work areas - Clean as you go, remove debris from your work area, if you require materials for future use, store them neatly. - Access routes	3	1	3	L	1,2,3

		- Do not set up work areas impinging on access routes, when this is unavoidable – plan alternative routes, discuss with your supervisor & EHS on the most suitable route available and erect appropriate signage.
		- Bins
		  - Empty bins regularly, overflowing bins are unacceptable; do not leave bins with material protruding. If you do not have sufficient bins report this to your supervisor.
		  - Ensure the bins are labelled with the owner and the waste type. Bins must be labelled and only the waste that is indicated shall be placed in these bins.
		- Lay down areas
		  - Material is stored in a tidy fashion, with clear access
		  - You should be able to access materials without stepping over other materials (Trip hazards)
		- Signage
		  - Ensure the signage in your work area is appropriate; remove all old redundant signage from your area and dispose of correctly. Signage must be obvious and of the correct size / content & colour to describe the conditions that exist inside the designated area.					

Dust	Can cause injury and ill-health including respiratory illness such as silicosis.	- A suitable dust mask (not a nuisance dust mask) must be worn as well as the damping down process. Use either FFP3 filtering face pieces or orinasal respirators with P3 filters for RCS dust. - Training should be given to the workforce regarding the appropriate use and maintenance of their masks. - Check machinery and safety equipment regularly. - Inspect and maintain re-usable masks. - Select correct dust mask for conditions (always seek specialist advice) - Enforce the wearing of masks - Change mask daily or when recommended by the specialist (may be more frequent) - On dry windy days, dust inhibiting measures should be used on haul roads and areas around the site i.e.: damping with water - Always check SDS for the product to see if there is any hazard from dust produced. Seek specialist advice. - Ensure vehicles use their lights when driving in dusty conditions on the bog etc. where visibility is impaired.	4	2	8	L	1,2,3

		- Co-workers or others who are in the vicinity of the dust and are affected by it should also wear suitable face -					
Noise	Noise of induced hearing loss or tinnitus.	- Purchase / hire in equipment with noise reduction built in if possible - Limit the number of people working in a noisy area and the length of time they spend there - Upper exposure action valve = 85dBA - - Hearing protection is mandatory and warning signs - Lower exposure action valve = 80dBA - Carry out a risk assessment - Measurement of the noise levels by a competent person at suitable intervals. The sampling shall be representative of an employee's daily personal exposure - The RA is to take account of the level, type and duration of exposure (including impulsive noise) - Try to eliminate noise – by design and layout of workplaces, reducing noise by technical means and / or the organisation of work - Consult with employees and provide information and training - Health surveillance to be provided for those at risk.	4	2	8	L	1,2,3
COVID-19 Risk	Severe respiratory illness caused by the SARS-COV-2 virus.	- Staggering tea/lunch times to allow for minimum contact with others. Canteens have been reconfigured to comply with social distancing requirements. - Considering WHO guidance that you must be within 1m of a person who is infected for more than 15 minutes to be at risk of infection, please remove yourself from anyone displaying symptoms as soon as possible. - WHO and HSE informational signs are posted around the work areas as a reminder to all regarding social distancing, hand and respiratory hygiene. - Develop a plan to facilitate social distancing. Communicate this to all in the workplace and monitor the implementation of the plan. - Personal Hygiene and Travel - Cleaning personal space and work area touch points – door handles, levers, etc. - Ensuring that hands are kept clean by regular handwashing/using hand sanitizers. Ensure the correct handwashing technique is used. It is everyone's obligation to do this at home as well as in the office and on sites.	4	2	8	L	1,2,3

		- Practice good respiratory etiquette by using tissues/bent elbow when coughing or sneezing. Used tissues need to be disposed of in a closed pedal bins specifically set aside for this purpose. Wash hands immediately afterwards. Avoid touching eyes, nose and mouth. - If an employee develops symptoms while at work, they must inform their supervisor immediately who will inform HR and the project director. The employee must self-isolate immediately. - Outside of work: If an employee develops cold or flu-like symptoms such as a fever, dry cough, sore throat and difficulty breathing, they should not come to work. They should seek medical care early. They must self-isolate and contact their GP immediately. Stay at home. They must contact their line manager who is required to inform HR/director. They will need to self-isolate for 14 days. They should only return to work when all their symptoms have gone					

Peatlands Climate Action Scheme
Method & Risk Assessment

Project Title: Peatlands Climate Action Scheme	**Group Project No.:**
Customer: Bord na Mona	
Project Site Address: Bord Na Mona, Castlegar Bog	PCAS-RAMS-006CR Multiple field reprofiling with edge burns to create 45x60 cell
Company Name & Address: Bord Na Mona, Boora, Co. Offaly	**Site Contacts & Contact Numbers:** David Ormond – PSCS/ EHS Lead - 086 0243916 Liam Tansey – Site Supervisor – 087 1889272
Brief Task Description (Scope):	

Start Date: 01-03-21	**Finish Date:** T.B.C	**Duration**: T.B.C

Risk Assessment Details / Review	
Signed: David Ormond	Signed *David Ormond*
Signed:	Signed
Location of Works (Be Specific): Site wide Castlegar Bog	

1.	**PARTIES TO THE CONTRACT**			
	Client:	Bord na Mona		
	PSCS:	David Ormond (Bord na Mona)		
	Contractor:			
	Sub-Contractor:			
	LOCATION OF WORK:			
	Site wide Castlegar Bog			
3.	**SITE MANAGEMENT**			
	NAME	**COMPANY**	**TITLE**	**CONTACT DETAILS**
4.	**EMERGENCY ARRANGEMENTS:**			
	First Aider:			
	Location of First Aid Box:	Site Office		
	Location of Nearest Hospital:	Ballinasloe Hospital 090 9648200		
	Location of Fire Extinguisher:	Site offices, site container & all Machines		
	Location of Assembly Point:	Car Park as per induction – Muster Point A		
	Additional Arrangements:	All visitors will be Bord Na Mona site inducted and will sign in Daily /visitors sign in book.		
	DATE OF COMMENCEMENT:	**DATE OF COMPLETION:**	**DURATION OF TASK: (days/weeks)**	
	01-03-2021	T.B.C	T.B.C	

6.	Location of Fire Extinguisher: At all fire points, Site offices, site container and on all machines Location of Assembly Point: Car Park as per induction. Muster point A	
	• BNM Site Induction • Safe Pass • Safe Manual Handling in the workplace • Covid 19 Questionnaire • CSCS Machine Tickets	
7.	**EQUIPMENT AND MACHINERY TO BE USED FOR TASK**	
	• 360 Degree • Signage • Bulldozer	
8.	**MATERIALS**	
9.	**ENVIRONMENTAL** *(Controls may include, but not be limited to: Spill Controls – Spill kits, Bunds, Waste Minimisation – Order correct quantities, reuse surplus, Waste Segregation – metal, timber, packaging, Waste Collection – Approved Waste Contractor, Dust Controls, Air/Noise Monitoring, Limits to working hours)*	
	• Keep work areas tidy at all times. • Use bins provided & empty regularly or when full. • Do not allow bins to overflow. • Designated area is to be set aside for the storage of waste. • Use segregation with the waste skips, timber/plastic/metal etc. • Do not cross contaminate a skip that is partially full & never cross contaminate the main site skips. • All waste is to be disposed of by a licensed carrier & taken to a licensed facility. • All refuelling must be double Skinned and properly bunded • Spill kits are on site	
10.	**COSHH / SDS LIST**	
	N/A	Any or all hazardous substances to be uploaded to Hazmat register.

Yes ☐	Yes ☐	Yes ☐	Yes ☐	Yes ☐	Yes ☐	Yes ☒
Flammable	**Toxic**	**Harmful**	**Irritant**	**Corrosive**	**Oxidising**	**Environment**

12.	**SERVICE IMPACT (i.e. any power/ventilation etc. outage)**	
	• N/A	
13.	**PERMITS REQUIRED (Hot Works, Working at Height, LOTO etc.)**	
	• SPA (Safe Plan of Action) • Dynamic Risk Assessments • Daily Vehicle Checks	
14.	**PEDESTRIAN/TRAFFIC RE-ROUTING ARRANGEMENTS:**	
	• Use Pedestrian Walkways & crossing points. • Keep pedestrians and others away from vehicle movements. • Offloading area to cordoned off / barriered off correctly	• Obey Site Speed Limit 15kph • Spotters in place during offload / transport of loads / materials
15.	**FIRE SAFETY ARRANGEMENTS:**	
	• Use local fire points, raise alarm if fire seen.	
16.	**SECURITY ARRANGEMENTS:**	
	• All personnel will sign in daily with appointed site supervisor. Arrange delivery/ access with supervisor. Compound to be always locked when no work taken place.	
17.	**EMPLOYEES AND TITLE INVOLED IN TASK**	
	• Bord na Mona Site Supervisor & Operatives	

METHOD STATEMENT COMMUNICATION

I confirm that I have carried out the communication of the attached Risk Assessment and Method Statement to the individuals identified below and I will ensure effective monitoring and compliance of the duration of the works.

Description of the Task: PCAS-RAMS-006CR Field Re-Profiling With Edge Berms To Create 45mx60m Cell	
Contractor Company Name: Bord na Mona	
Time & Date:	
Supervisor Name:	**Job Title:** Site Supervisor

	Castlegar Bog		
	Field Re-Profiling with Edge Berms To Create 45mx60m Cell		
Document Approved by:	**Revision Date:**	**Doc No.:**	**Revision No.:**
	08/01/2021	PCAS-RAMS-006-CR	0
	/Control Location		**Page:**
	Site Office		6 of 14

Purpose

The Purpose of this procedure is to set out a standard method for Re-Wet Measure using an excavator in a safe manner.

Scope

- This enhanced measure seeks to create large 45m x 60m flat areas or cells on bare peat, across 2 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 cutaway.

Pre Requisites

1. Personal carrying out this task are deemed to be competent.
2. Safe Pass and Manuel Handling Trained
3. CSCS Cards for Machine operatives
4. Suitable PPE to be worn as shown below.
5. Safe Plan of Action

Reference Documents

☑ Task RA

☑ Mandatory

☑ Task RA

☑ Task RA

☑ Mandatory

☑ Task RA

Other PPE. ☑

Other PPE. ☑ Task RA

Procedure

1. All members of the works crew must attend a Monday whiteboard meeting with their Supervisors.
2. Must complete a Safe Plan of Action (SPA) Form for the scope of the works to be completed.
3. All pre-use checks on plant, equipment, and machinery (i.e. excavator, etc.) must be completed prior to work.
4. Drain blocks are constructed using an Excavator operating at a perpendicular direction to the field drains.
5. Key is cut in the drain approximately 0.5m 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.
6. Area behind the machine is to be used as a borrow pit.
7. 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.
8. The peat is firmly compacted using the machine bucket before laying more peat from the borrow hole.
9. The drain block is built up at least 30-50cm above the ground level of the bog to allow for subsequent shrinkage of the peat as it dries.
10. The borrow hole 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.
11. (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 dam.)
12. The centre of the cambered field is used as one side of the cell.
13. 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.
14. Berms are formed 30m in length and 30m across 3 fields to create an enclosed cell. The berms are relatively shallow (300mm high) and are 5.0 m wide.

15. 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.
16. Drainage pipes are incorporated into the berm construction at specific locations to manage overflows and prevent berm erosion.

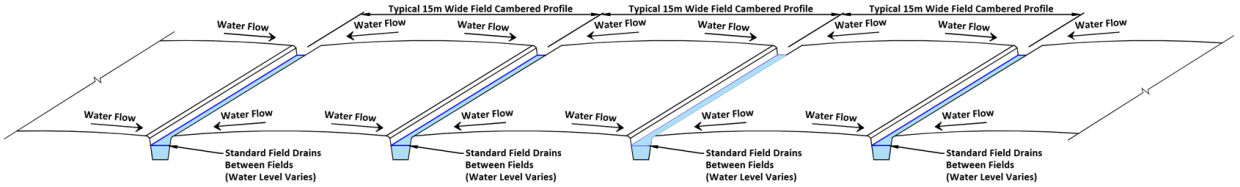
Non routine activities where there is exposure to risk must be risk assessed before commencing work and recommended control measures put in place. The risk assessment will identify any isolation requirements that may be required.

BORD NA MÓNA
Naturally Driven

DPT 4: Multiple Field Re-Profiling With Edge Berms To Create 45mx60m Cell

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.



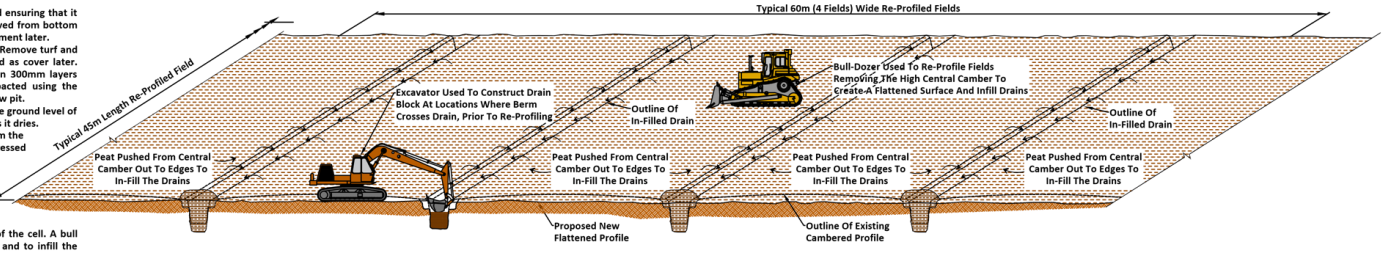
NOTES:

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.

Phase 1
Drain Blocking And Re-Profiling of Fields Surface

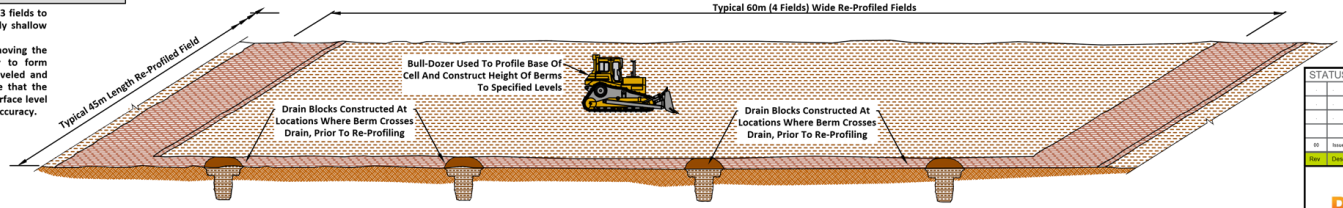
Drain blocks are constructed using an Excavator operating at a perpendicular direction to the field drains.
Key is cut in the drain approximately 500mm deep, and ensuring that it is wider than the actual drain. 500mm of peat is removed from bottom of drain also and placed behind the machine for replacement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

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

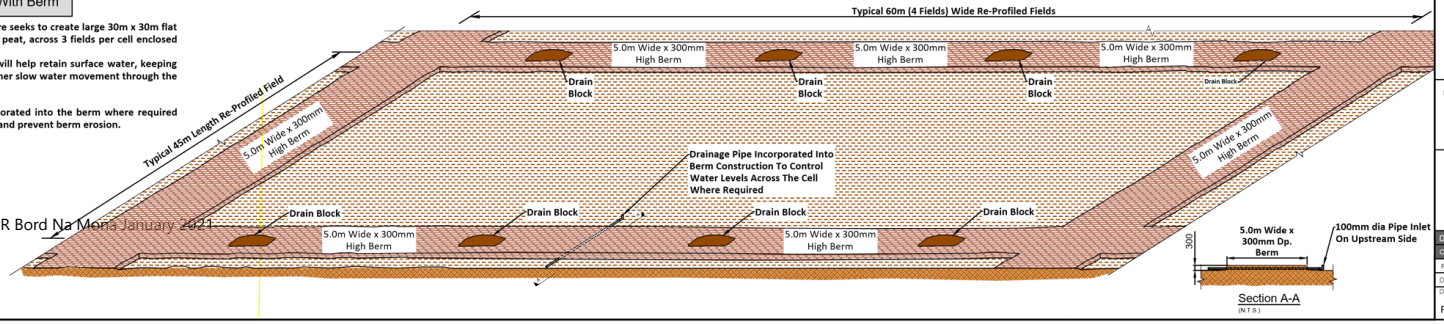
Berms are formed 30m in length and 30m across 3 fields to create an enclosed cell. The berms are relatively shallow (300mm high) and are 5.0 m wide.
The berms are constructed using a bull-dozer moving the peat obtained from the original field camber to form mounds. The mounds of loose peat are then leveled 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 are constructed with a high level of accuracy.



Final Profile:
30m x 30m Cell With Berm

This enhanced measure seeks to create large 30m x 30m flat areas or cells on bare peat, across 3 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

Rev	Description	Issued By	Date
00	Issued For Information	P.K.	

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:
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: Information

Drawing No.: PCAS-0100-006 | Rev: a

C:\Users\KiernanP\Desktop\Castlegar\DR\PCAS-0100-006a_DPT_4_45x60Cell_With_Berm.dwg

BORD NA MÓNA
Naturally Driven

Appendix 2 – Risk Assessment

Risk Assessment

Risk Assessment No.:	PCAS-RAMS-006-CR	**Page:**	1 of 6

Task / Area / Description:	**General Risk Assessment** Machinery and Equipment Risk Assessment	**Date:**	08/01/2021	**Rev. No.:**	0

Completed by:	David Ormond	**Responsible Person (R.P):**	1 = Manager 2 = Supervisor 3 = Employee

Person who may be harmed:	All Employee's operating Machinery or Equipment, any employee, visitor, contractor or third party who may be within the vicinity of moving plant/ machinery or equipment.

Risk Rating:	**RF = S x L** S = Severity (1-5) L = Likelihood (RF = 1-25)	RF 1-3 = Low Acceptable Risk RF 4-9 = Medium: Acceptable Risk, further controls required RF 10-25 = High: Unacceptable Risk, immediate action needed, work prohibited.	**Residual Risk (Risk following Control Measures):** RF: 1-3 RR = Low RF: 4-9 RR = Medium RF: 10-25 RR = High

Hazard	Risk	Control Measures	S	L	RF	RR	R.P.
Operating Plant/ Machinery in Machine Compound	Collisions with other vehicles, objects or pedestrians, overturning, unbalanced falling loads.	There is regular movement of vehicles, cars within the Compound, Adequate Signage to be displayed to convey the Arrangements and Controls within the compound -Upon arrival at the site visitors or delivery personnel contact reception and follow the instructions given by Site Supervisor. All operatives plus visitors must sign in with Site Supervisor -Driving, loading, and parking areas are clearly identified and these must be observed. -Employees and visitors follow traffic direction signs and park in designated areas only. -Pedestrian pathways to site entrance are provided where practical. . KEEP WELL CLEAR OF MOVING MACHINES.	4	2	8	L	1,2,3
Access to and Egress from Work Site	Interaction with other site operations and operatives.	- Driver with hi-vis to control his work area while this operation is ongoing - Flashing amber lights and audible alarms when reversing vehicles. - Site management to be made aware of intended works in the area. - All other site operatives to be made aware of proposed works. - Weekly Toolbox Talks - Sufficient signage to be in place to warn non-associated persons of risks.	3	1	3	L	1,2,3
Other personnel on site	Damage to property, injury to persons involved in accident.	- Adequate signage of an appropriate type to be erected around the works by others - Notices to be erected on boundaries of works. - Mobile plant to comply with site vehicle rules and rules of the road - No Unauthorized persons to be allowed on site and if someone unintentionally enters work area politely ask them to report back to the site supervisor	3	1	3	L	1,2,3

		- All plant and equipment to be locked or immobilised when not in use and keys removed.					
Working With & Alongside other plant	Slips, trips & falls and injury to others.	- A detailed safe plan of action must be completed and co-signed by supervisors of any other works happening in the Bog excavation area. - Operatives will be kept separated from the Machinery. - No operative to leave Cab until other machinery drivers are notified - Designate storage areas for materials and keep confined to one area. - All equipment and materials that are no longer required must be brought back to compound when task is finished	4	2	8	L	1,2,3
Use of Excavators & Bulldozers	- Collapse of sides - Falls into trench - Plant driving into trench - Contaminated ground - Crushing - Plant Overturning	- UNDER NO CIRCUMSTANCES SHOULD PERSONS USE THE BUCKET OF THE MACHINE TO GAIN ACCESS TO HEIGHTS OR USE THEM AS A WORKING PLATFORM. - Must have relevant CSCS card - Toolbox talk to be undertaken highlighting the dangers - Fully Automatic Quick hitches are only to be used on BNM sites - All auxiliary safety devices to be in good work order. The machine is provided with appropriate devices that, where the visibility of any operator is restricted, such devices remedy the hazards arising from inadequate direct vision (1m rule) - Use three points of contact when embarking or disembarking the machine - Passengers must not be carried inside or outside the machine. - Seat belt to be worn always - All plant to be fitted with amber warning beacons. - Communicate with other drivers/ SS when leaving the machine - Allow clearance distance of minimum 600m when slewing – barricade danger areas off if necessary - Do not under any circumstance slew the bucket or load directly over personnel - Slow working cycle down when working on slopes to reduce the bucket reach - Vehicle Banksman to guide driver when large excavator is travelling in compound - High visibility vest, helmet, gloves and glasses to be worn when outside the vehicle - All machines to have fire extinguisher and fire bucket - Maintenance and inspection records must include the quick hitch mechanisms to ensure they are clean and in a fully serviceable condition. - Refuelling to be in designated area only where bunding and spill kit are in place - All work must be supervised and checked and monitored to ensure compliance with Safe Working Procedures by both workers and plant operatives	4	2	8	L	1,2,3

		- Ensure statutory and company test, examination and inspection procedures are implemented on forms GA1 & GA2					
Slips, Trips & Falls	Personal injury	- Site management to make available suitable Access / Egress for the job - Weekly Toolbox talk to inform operatives of the risks involved - Instruction in safe use of Machine & Tools and competent supervision to be provided - Housekeeping - Clean as you go - 3 point of contact when embarking / Disembarking any machine - Any moving or adjustable parts should be kept oiled.	3	1	3	L	1,2,3
Fire	Serious personal injury or death, explosive and damage to assets.	- Training to be provided in fire safety and use of firefighting equipment to designate employees. - Suitable firefighting equipment to be provided for each work area. - Strict housekeeping to be maintained - Flammable liquids and combustible materials must be removed, segregated, and/or protected and kept in the compound - Working area to be assessed before the work is carried out to ensure work is carried out away from flammable material and members of the public. - Obey no smoking policy. - Ensure employee awareness of emergency and evacuation procedures. - Evacuation and emergency drill to be carried out at regular intervals. - Every machine must have a fire extinguisher and a fire bucket fitted.	4	2	8	L	1,2,3

House Keeping	Contributes to slips, trips and falls, spread of fire, and falls of incorrectly stored materials.	- All employees must follow the site clean as you go policy.
		- Please follow the guidance below for your work area.
		- General work areas
		  - Clean as you go, remove debris from your work area, if you require materials for future use, store them neatly.
		- Access routes
		  - Do not set up work areas impinging on access routes, when this is unavoidable – plan alternative routes, discuss with your supervisor & EHS on the most suitable route available and erect appropriate signage.
		- Bins
			3	1	3	L	1,2,3

		- Empty bins regularly, overflowing bins are unacceptable; do not leave bins with material protruding. If you do not have sufficient bins report this to your supervisor. - Ensure the bins are labelled with the owner and the waste type. Bins must be labelled and only the waste that is indicated shall be placed in these bins. - Lay down areas - Material is stored in a tidy fashion, with clear access - You should be able to access materials without stepping over other materials (Trip hazards) - Signage - Ensure the signage in your work area is appropriate; remove all old redundant signage from your area and dispose of correctly. Signage must be obvious and of the correct size / content & colour to describe the conditions that exist inside the designated area.					
Dust	Can cause injury and ill-health including respiratory illness such as silicosis.	- A suitable dust mask (not a nuisance dust mask) must be worn as well as the damping down process. Use either FFP3 filtering face pieces or orinasal respirators with P3 filters for RCS dust. - Training should be given to the workforce regarding the appropriate use and maintenance of their masks. - Check machinery and safety equipment regularly. - Inspect and maintain re-usable masks. - Select correct dust mask for conditions (always seek specialist advice) - Enforce the wearing of masks - Change mask daily or when recommended by the specialist (may be more frequent) - On dry windy days, dust inhibiting measures should be used on haul roads and areas around the site i.e.: damping with water - Always check SDS for the product to see if there is any hazard from dust produced. Seek specialist advice. - Ensure vehicles use their lights when driving in dusty conditions on the bog etc. where visibility is impaired. - Co-workers or others who are in the vicinity of the dust and are affected by it should also wear suitable face -	4	2	8	L	1,2,3

Noise	Noise of induced hearing loss or tinnitus.	- Purchase / hire in equipment with noise reduction built in if possible - Limit the number of people working in a noisy area and the length of time they spend there - Upper exposure action valve = 85dBA - - Hearing protection is mandatory and warning signs - Lower exposure action valve = 80dBA - Carry out a risk assessment - Measurement of the noise levels by a competent person at suitable intervals. The sampling shall be representative of an employee's daily personal exposure - The RA is to take account of the level, type and duration of exposure (including impulsive noise) - Try to eliminate noise – by design and layout of workplaces, reducing noise by technical means and / or the organisation of work - Consult with employees and provide information and training - Health surveillance to be provided for those at risk.	4	2	8	L	1,2,3
COVID-19 Risk	Severe respiratory illness caused by the SARS-COV-2 virus.	- Staggering tea/lunch times to allow for minimum contact with others. Canteens have been reconfigured to comply with social distancing requirements. - Considering WHO guidance that you must be within 1m of a person who is infected for more than 15 minutes to be at risk of infection, please remove yourself from anyone displaying symptoms as soon as possible. - WHO and HSE informational signs are posted around the work areas as a reminder to all regarding social distancing, hand and respiratory hygiene. - Develop a plan to facilitate social distancing. Communicate this to all in the workplace and monitor the implementation of the plan. - Personal Hygiene and Travel - Cleaning personal space and work area touch points – door handles, levers, etc. - Ensuring that hands are kept clean by regular handwashing/using hand sanitizers. Ensure the correct handwashing technique is used. It is everyone's obligation to do this at home as well as in the office and on sites. - Practice good respiratory etiquette by using tissues/bent elbow when coughing or sneezing. Used tissues need to be disposed of in a closed pedal bins specifically set aside for this purpose. Wash hands immediately afterwards. Avoid touching eyes, nose and mouth. - If an employee develops symptoms while at work, they must inform their supervisor immediately who will inform HR and the project director. The employee must self-isolate immediately.	4	2	8	L	1,2,3

		- Outside of work: If an employee develops cold or flu-like symptoms such as a fever, dry cough, sore throat and difficulty breathing, they should not come to work. They should seek medical care early. They must self-isolate and contact their GP immediately. Stay at home. They must contact their line manager who is required to inform HR/director. They will need to self-isolate for 14 days. They should only return to work when all their symptoms have gone					

Peatlands Climate Action Scheme
Method & Risk Assessment

Project Title: Peatlands Climate Action Scheme	**Group Project No.:**
Customer: Bord na Mona	
Project Site Address: Bord Na Mona, Castlegar Bog	PCAS-RAMS-007CR Multiple field reprofiling with edge burns to create 30x30 cell
Company Name & Address: Bord Na Mona, Boora, Co. Offaly	**Site Contacts & Contact Numbers:** David Ormond – PSCS/ EHS Lead - 086 0243916 Liam Tansey – Site Supervisor – 087 1889272
Brief Task Description (Scope):	

Start Date: 01-03-21	**Finish Date:** T.B.C	**Duration:** T.B.C

Risk Assessment Details / Review	
Signed: David Ormond	Signed *David Ormond*
Signed:	Signed
Location of Works (Be Specific): Site wide Castlegar Bog	

1.	**PARTIES TO THE CONTRACT**			
	Client:	Bord na Mona		
	PSCS:	David Ormond (Bord na Mona)		
	Contractor:			
	Sub-Contractor:			
	LOCATION OF WORK:			
	Site wide Castlegar Bog			
3.	**SITE MANAGEMENT**			
	NAME	**COMPANY**	**TITLE**	**CONTACT DETAILS**
4.	**EMERGENCY ARRANGEMENTS:**			
	First Aider:			
	Location of First Aid Box:	Site Office		
	Location of Nearest Hospital:	Ballinasloe Hospital 090 9648200		
	Location of Fire Extinguisher:	Site offices, site container & all Machines		
	Location of Assembly Point:	Car Park as per induction – Muster Point A		
	Additional Arrangements:	All visitors will be Bord Na Mona site inducted and will sign in Daily /visitors sign in book.		
	DATE OF COMMENCEMENT:	**DATE OF COMPLETION:**	**DURATION OF TASK: (days/weeks)**	
	01-03-2021	T.B.C	T.B.C	

6.	Location of Fire Extinguisher: At all fire points, Site offices, site container and on all machines Location of Assembly Point: Car Park as per induction. Muster point A	
	• BNM Site Induction • Safe Pass • Safe Manual Handling in the workplace • Covid 19 Questionnaire • CSCS Machine Tickets	
7.	**EQUIPMENT AND MACHINERY TO BE USED FOR TASK**	
	• 360 Degree • Signage • Bulldozer	
8.	**MATERIALS**	
9.	**ENVIRONMENTAL** *(Controls may include, but not be limited to: Spill Controls – Spill kits, Bunds, Waste Minimisation – Order correct quantities, reuse surplus, Waste Segregation – metal, timber, packaging, Waste Collection – Approved Waste Contractor, Dust Controls, Air/Noise Monitoring, Limits to working hours)*	
	• Keep work areas tidy at all times. • Use bins provided & empty regularly or when full. • Do not allow bins to overflow. • Designated area is to be set aside for the storage of waste. • Use segregation with the waste skips, timber/plastic/metal etc. • Do not cross contaminate a skip that is partially full & never cross contaminate the main site skips. • All waste is to be disposed of by a licensed carrier & taken to a licensed facility. • All refuelling must be double Skinned and properly bunded • Spill Kits to be on site	
10.	**COSHH / SDS LIST**	
	N/A	Any or all hazardous substances to be uploaded to Hazmat register.

Yes ☐	Yes ☐	Yes ☐	Yes ☐	Yes ☐	Yes ☐	Yes ☒
Flammable	**Toxic**	**Harmful**	**Irritant**	**Corrosive**	**Oxidising**	**Environment**

12.	**SERVICE IMPACT (i.e. any power/ventilation etc. outage)**	
	• N/A	
13.	**PERMITS REQUIRED (Hot Works, Working at Height, LOTO etc.)**	
	• SPA (Safe Plan of Action) • Dynamic Risk Assessments • Daily Vehicle Checks	
14.	**PEDESTRIAN/TRAFFIC RE-ROUTING ARRANGEMENTS:**	
	• Use Pedestrian Walkways & crossing points. • Keep pedestrians and others away from vehicle movements. • Offloading area to cordoned off / barriered off correctly	• Obey Site Speed Limit 15kph • Spotters in place during offload / transport of loads / materials
15.	**FIRE SAFETY ARRANGEMENTS:**	
	• Use local fire points, raise alarm if fire seen.	
16.	**SECURITY ARRANGEMENTS:**	
	• All personnel will sign in daily with appointed site supervisor. Arrange delivery/ access with supervisor. Compound to be always locked when no work taken place.	
17.	**EMPLOYEES AND TITLE INVOLED IN TASK**	
	• Bord na Mona Site Supervisor & Operatives	

METHOD STATEMENT COMMUNICATION

I confirm that I have carried out the communication of the attached Risk Assessment and Method Statement to the individuals identified below and I will ensure effective monitoring and compliance of the duration of the works.

Description of the Task: PCAS-RAMS-007CR Field Re-Profiling With Edge Berms To Create 30mx30m Cell DPT 5	
Contractor Company Name: Bord na Mona	
Time & Date:	
Supervisor Name:	**Job Title:** Site Supervisor

	Castlegar Bog		
	Field Re-Profiling With Edge Berms To Create 30mx30m Cell DPT 5		
Document Approved by:	**Revision Date:**	**Doc No.:**	**Revision No.:**
	06/01/2021	PCAS-RAMS-007-CR	0
	/Control Location		**Page:**
	Site Office		6 of 14

Purpose

The Purpose of this procedure is to set out a standard method for Re-Wet Measure using an excavator in a safe manner.

Scope

- This enhanced measure seeks to create large 30m x 30m flat areas or cells on bare peat, across 2 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 cutaway.

Pre Requisites	*Reference Documents*
1. Personal carrying out this task are deemed to be competent. 2. Safe Pass and Manuel Handling Trained 3. CSCS Cards for Machine operatives 4. Suitable PPE to be worn as shown below. 5. Safe plan of action	

☑ Task RA	☑ Mandatory	☑ Task RA	☑ Task RA	☑ Mandatory	☑ Task RA
					

Other PPE. ☑

Other PPE. ☑ Task RA

Procedure

1. All members of the works crew must attend a Monday whiteboard meeting with their Supervisors.
2. Must complete a Safe Plan of Action (SPA) Form for the scope of the works to be completed.
3. All pre-use checks on plant, equipment, and machinery (i.e. excavator, etc.) must be completed prior to work.
4. Drain blocks are constructed using an Excavator operating at a perpendicular direction to the field drains.
5. Key is cut in the drain approximately 0.5m 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.
6. Area behind the machine is to be used as a borrow pit.
7. 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.
8. The peat is firmly compacted using the machine bucket before laying more peat from the borrow hole.
9. The drain block is built up at least 30-50cm above the ground level of the bog to allow for subsequent shrinkage of the peat as it dries.
10. The borrow hole 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.
11. (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 dam.)
12. The centre of the cambered field is used as one side of the cell.
13. 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.
14. Berms are constructed across and perpendicular to the fields. These berms are relatively shallow (200mm high) and will be 5 m wide.
15. 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.
16. Drainage pipes are incorporated into the berm construction at specific locations to manage overflows and prevent berm erosion.

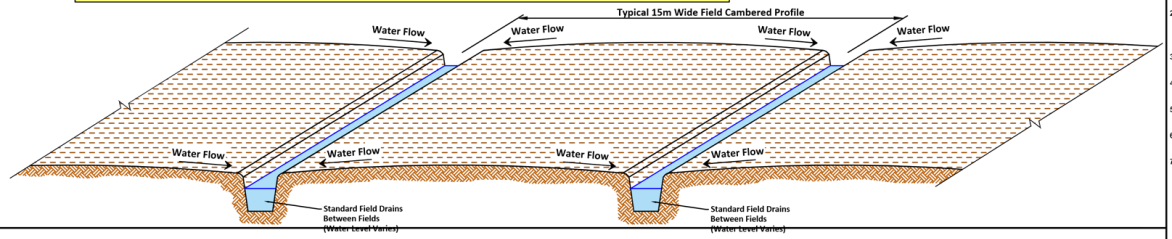
Non routine activities where there is exposure to risk must be risk assessed before commencing work and recommended control measures put in place. The risk assessment will identify any isolation requirements that may be required.

BORD NA MÓNA
Naturally Driven

DPT 5: Multiple Field Re-Profiling With Edge Berms To Create 30mx30m Cell

Existing Layout:

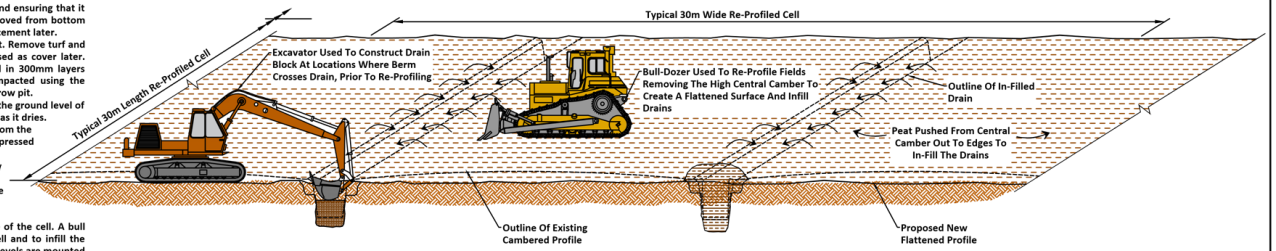
Typical existing bare peat fields are cambered (higher) in the centre and lower towards the drains, helping drainage of the fields but limiting the re-wetting of the central area.



Phase 1
Drain Blocking And Re-Profiling of Fields Surface

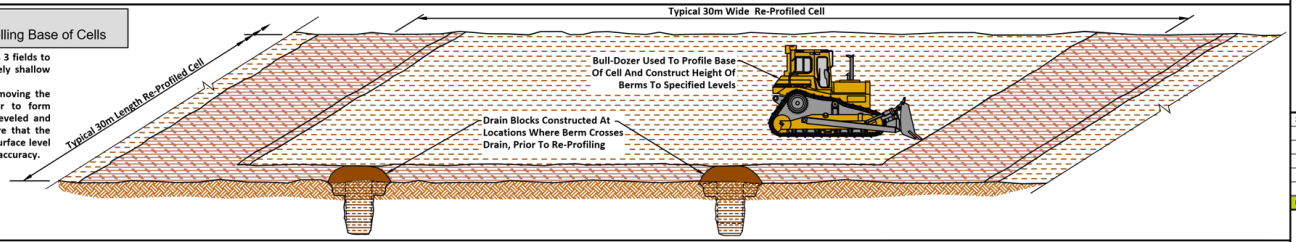
Drain blocks are constructed using an Excavator operating at a perpendicular direction to the field drains.
Key is cut in the drain approximately 500mm deep, and ensuring that it is wider than the actual drain. 500mm of peat is removed from bottom of drain also and placed behind the machine for replacement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

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

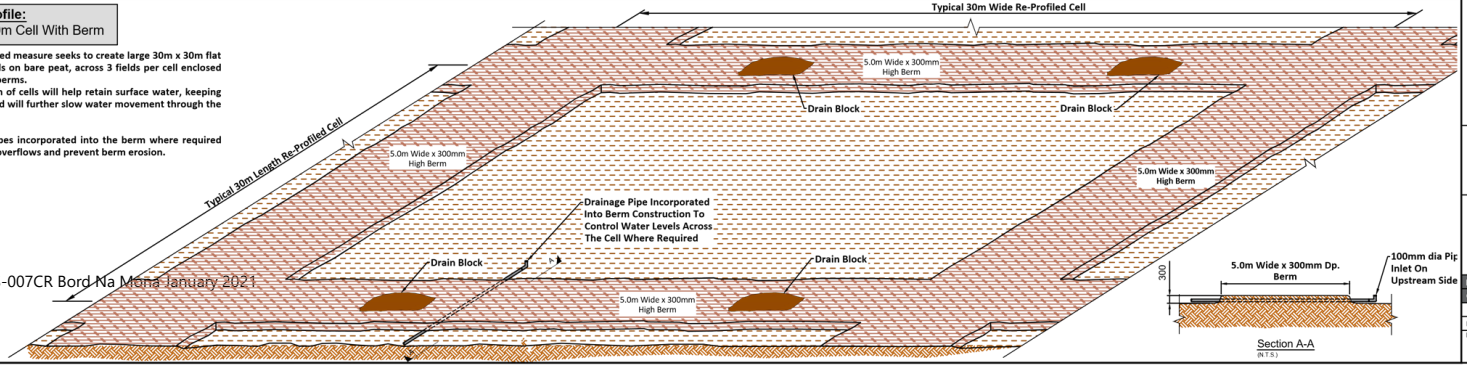
Berms are formed 30m in length and 30m across 3 fields to create an enclosed cell. The berms are relatively shallow (300mm high) and are 5.0 m wide.
The berms are constructed using a bull-dozer moving the peat obtained from the original field camber to form mounds. The mounds of loose peat are then leveled 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 are constructed with a high level of accuracy.



Final Profile:
30m x 30m Cell With Berm

This enhanced measure seeks to create large 30m x 30m flat areas or cells on bare peat, across 3 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.



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
00	Issued For Information	P.K.	

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:
Rehabilitation Method DPT 5
30m x 30m 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: 18/12/20 | Scale : Not to Scale | A3 | Stage: Information
Drawing No.: PCAS-0100-007 | Rev: a

C:\Users\KiernanP\Desktop\Castlegar\DRP\PCAS-0100-007a_DPT_5_30x30CellWithBerms.dwg

BORD NA MÓNA
Naturally Driven

Appendix 2 – Risk Assessment

Risk Assessment

Risk Assessment No.:	PCAS-RAMS-007-CR	**Page:**	1 of 6

Task / Area / Description:	**General Risk Assessment** Machinery and Equipment Risk Assessment	**Date:**	06/01/2021	**Rev. No.:**	0

Completed by:	David Ormond	**Responsible Person (R.P):**	1 = Manager 2 = Supervisor 3 = Employee

Person who may be harmed:	All Employee's operating Machinery or Equipment, any employee, visitor, contractor or third party who may be within the vicinity of moving plant/ machinery or equipment.

Risk Rating:	**RF = S x L** S = Severity (1-5) L = Likelihood (RF = 1-25)	RF 1-3 = Low Acceptable Risk RF 4-9 = Medium: Acceptable Risk, further controls required RF 10-25 = High: Unacceptable Risk, immediate action needed, work prohibited.	**Residual Risk (Risk following Control Measures):** RF: 1-3 RR = Low RF: 4-9 RR = Medium RF: 10-25 RR = High

Hazard	Risk	Control Measures	S	L	RF	RR	R.P.
Operating Plant/ Machinery in Machine Compound	Collisions with other vehicles, objects or pedestrians, overturning, unbalanced falling loads.	There is regular movement of vehicles, cars within the Compound,, Adequate Signage to be displayed to convey the Arrangements and Controls within the compound -Upon arrival at the site visitors or delivery personnel contact reception and follow the instructions given by Site Supervisor. All operatives plus visitors must sign in with Site Supervisor -Driving, loading, and parking areas are clearly identified and these must be observed. -Employees and visitors follow traffic direction signs and park in designated areas only. -Pedestrian pathways to site entrance are provided where practical. . KEEP WELL CLEAR OF MOVING MACHINES.	4	2	8	L	1,2,3
Access to and Egress from Work Site	Interaction with other site operations and operatives.	- Driver with hi-vis to control his work area while this operation is ongoing - Flashing amber lights and audible alarms when reversing vehicles. - Site management to be made aware of intended works in the area. - All other site operatives to be made aware of proposed works. - Weekly Toolbox Talks - Sufficient signage to be in place to warn non-associated persons of risks.	3	1	3	L	1,2,3
Other personnel on site	Damage to property, injury to persons involved in accident.	- Adequate signage of an appropriate type to be erected around the works by others - Notices to be erected on boundaries of works. - Mobile plant to comply with site vehicle rules and rules of the road - No Unauthorized persons to be allowed on site and if someone unintentionally enters work area politely ask them to report back to the site supervisor	3	1	3	L	1,2,3

		- All plant and equipment to be locked or immobilised when not in use and keys removed.					
Working With & Alongside other plant	Slips, trips & falls and injury to others.	- A detailed safe plan of action must be completed and co-signed by supervisors of any other works happening in the Bog excavation area. - Operatives will be kept separated from the Machinery. - No operative to leave Cab until other machinery drivers are notified - Designate storage areas for materials and keep confined to one area. - All equipment and materials that are no longer required must be brought back to compound when task is finished.	4	2	8	L	1,2,3
Use of Excavators & Bulldozers	- Collapse of sides - Falls into trench - Plant driving into trench - Contaminated ground - Crushing - Plant Overturning	- UNDER NO CIRCUMSTANCES SHOULD PERSONS USE THE BUCKET OF THE MACHINE TO GAIN ACCESS TO HEIGHTS OR USE THEM AS A WORKING PLATFORM. - Must have relevant CSCS card - Toolbox talk to be undertaken highlighting the dangers - Fully Automatic Quick hitches are only to be used on BNM sites - All auxiliary safety devices to be in good work order. The machine is provided with appropriate devices that, where the visibility of any operator is restricted, such devices remedy the hazards arising from inadequate direct vision (1m rule) - Use three points of contact when embarking or disembarking the machine - Passengers must not be carried inside or outside the machine. - Seat belt to be worn always - All plant to be fitted with amber warning beacons. - Communicate with other drivers/ SS when leaving the machine - Allow clearance distance of minimum 600m when slewing – barricade danger areas off if necessary - Do not under any circumstance slew the bucket or load directly over personnel - Slow working cycle down when working on slopes to reduce the bucket reach - Vehicle Banksman to guide driver when large excavator is travelling in compound - High visibility vest, helmet, gloves and glasses to be worn when outside the vehicle - All machines to have fire extinguisher and fire bucket - Maintenance and inspection records must include the quick hitch mechanisms to ensure they are clean and in a fully serviceable condition. - Refuelling to be in designated area only where bunding and spill kit are in place - All work must be supervised and checked and monitored to ensure compliance with Safe Working Procedures by both workers and plant operatives	4	2	8	L	1,2,3

		- Ensure statutory and company test, examination and inspection procedures are implemented on forms GA1 & GA2					
Slips, Trips & Falls	Personal injury	- Site management to make available suitable tools for the job - Instruction in safe use of tool and competent supervision to be provided - Purchase good quality tools - Replace blunt cutting edges - Handles should be free from splits, cracks and splinters and wedged where necessary to keep them tight - Any moving or adjustable parts should be kept oiled - Tools should be stored indoors and should be kept clear of gangways - Management to indicate presence of electrical wires in advance of work	3	1	3	L	1,2,3
Fire	Serious personal injury or death, explosive and damage to assets.	- Training to be provided in fire safety and use of firefighting equipment to designate employees. - Suitable firefighting equipment to be provided for each work area. - Strict housekeeping to be maintained - Flammable liquids and combustible materials must be removed, segregated, and/or protected and kept in the compound - Working area to be assessed before the work is carried out to ensure work is carried out away from flammable material and members of the public. - Obey no smoking policy. - Ensure employee awareness of emergency and evacuation procedures. - Evacuation and emergency drill to be carried out at regular intervals. - Every machine must have a fire extinguisher and a fire bucket fitted.	4	2	8	L	1,2,3
House Keeping	Contributes to slips, trips and falls, spread of fire, and falls of incorrectly stored materials.	- All employees must follow the site clean as you go policy. - Please follow the guidance below for your work area. - General work areas - Clean as you go, remove debris from your work area, if you require materials for future use, store them neatly. - Access routes	3	1	3	L	1,2,3

		- Do not set up work areas impinging on access routes, when this is unavoidable – plan alternative routes, discuss with your supervisor & EHS on the most suitable route available and erect appropriate signage.
		- Bins
		  - Empty bins regularly, overflowing bins are unacceptable; do not leave bins with material protruding. If you do not have sufficient bins report this to your supervisor.
		  - Ensure the bins are labelled with the owner and the waste type. Bins must be labelled and only the waste that is indicated shall be placed in these bins.
		- Lay down areas
		  - Material is stored in a tidy fashion, with clear access
		  - You should be able to access materials without stepping over other materials (Trip hazards)
		- Signage
		  - Ensure the signage in your work area is appropriate; remove all old redundant signage from your area and dispose of correctly. Signage must be obvious and of the correct size / content & colour to describe the conditions that exist inside the designated area.					

Dust	Can cause injury and ill-health including respiratory illness such as silicosis.	- A suitable dust mask (not a nuisance dust mask) must be worn as well as the damping down process. Use either FFP3 filtering face pieces or orinasal respirators with P3 filters for RCS dust. - Training should be given to the workforce regarding the appropriate use and maintenance of their masks. - Check machinery and safety equipment regularly. - Inspect and maintain re-usable masks. - Select correct dust mask for conditions (always seek specialist advice) - Enforce the wearing of masks - Change mask daily or when recommended by the specialist (may be more frequent) - On dry windy days, dust inhibiting measures should be used on haul roads and areas around the site i.e.: damping with water - Always check SDS for the product to see if there is any hazard from dust produced. Seek specialist advice. - Ensure vehicles use their lights when driving in dusty conditions on the bog etc. where visibility is impaired.	4	2	8	L	1,2,3

		- Co-workers or others who are in the vicinity of the dust and are affected by it should also wear suitable face -					
Noise	Noise of induced hearing loss or tinnitus.	- Purchase / hire in equipment with noise reduction built in if possible - Limit the number of people working in a noisy area and the length of time they spend there - Upper exposure action valve = 85dBA - - Hearing protection is mandatory and warning signs - Lower exposure action valve = 80dBA - Carry out a risk assessment - Measurement of the noise levels by a competent person at suitable intervals. The sampling shall be representative of an employee's daily personal exposure - The RA is to take account of the level, type and duration of exposure (including impulsive noise) - Try to eliminate noise – by design and layout of workplaces, reducing noise by technical means and / or the organisation of work - Consult with employees and provide information and training - Health surveillance to be provided for those at risk.	4	2	8	L	1,2,3
COVID-19 Risk	Severe respiratory illness caused by the SARS-COV-2 virus.	- Staggering tea/lunch times to allow for minimum contact with others. Canteens have been reconfigured to comply with social distancing requirements. - Considering WHO guidance that you must be within 1m of a person who is infected for more than 15 minutes to be at risk of infection, please remove yourself from anyone displaying symptoms as soon as possible. - WHO and HSE informational signs are posted around the work areas as a reminder to all regarding social distancing, hand and respiratory hygiene. - Develop a plan to facilitate social distancing. Communicate this to all in the workplace and monitor the implementation of the plan. - Personal Hygiene and Travel - Cleaning personal space and work area touch points – door handles, levers, etc. - Ensuring that hands are kept clean by regular handwashing/using hand sanitizers. Ensure the correct handwashing technique is used. It is everyone's obligation to do this at home as well as in the office and on sites.	4	2	8	L	1,2,3

		- Practice good respiratory etiquette by using tissues/bent elbow when coughing or sneezing. Used tissues need to be disposed of in a closed pedal bins specifically set aside for this purpose. Wash hands immediately afterwards. Avoid touching eyes, nose and mouth. - If an employee develops symptoms while at work, they must inform their supervisor immediately who will inform HR and the project director. The employee must self-isolate immediately. - Outside of work: If an employee develops cold or flu-like symptoms such as a fever, dry cough, sore throat and difficulty breathing, they should not come to work. They should seek medical care early. They must self-isolate and contact their GP immediately. Stay at home. They must contact their line manager who is required to inform HR/director. They will need to self-isolate for 14 days. They should only return to work when all their symptoms have gone					

APPENDIX B – STANDARD OPERATING PROCEDURES (SOPs)

Bord na Móna Standard Operating Procedures with respect to Environmental & Biodiversity activities should be followed including, but not limited to, the documents listed in Table B-1 and Table B-2.

Table B-1 – Schedule of Biodiversity Standard Operating Procedures (SOP)

Code	Description
ECO 0001	Protection of Otter
ECO 0002	Prevention of disturbance (Birds)
ECO 0003	Protection of Marsh Fritillary
ECO 0004	Vegetation Clearance
ECO 0005	Protection of Amphibians and Reptiles
ECO 0006	Invasive Species – Terrestrial Flora

Table B-2 – Schedule of Environmental Standard Operating Procedures (SOP)

Code	Description
ENV017	Archaeological Findings
EP 5.0	General Emergency Preparedness & Response
SPIP	Silt Pond Inspection Procedure
SPMP	Silt Pond Maintenance Procedure
	Waste Management Procedure
	Gas Oil Loading Procedure

BORD NA MÓNA Naturally Driven	**Procedure: ENV017**	**Rev: 1**
Title: Archaeological Findings	**Approved: EM**	**Date: 13/10/2020**

1) Purpose

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

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

2) Procedure

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

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

Your Archaeological Liaison Officer is ……

3) Records

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

EP 5.0 General Emergency Preparedness & Response

Has an Emergency Situation Occurred?

Yes

Refer to :
ERP 02 Spill Clean-up Procedure
ERP 03 Fire / Explosion Procedure
ERP 04 Unforeseen Emergencies

The Licence Holder assumes role of Site Incident Controller

Assess Scale of Incident

Inform Emergency Services

Direct rescue and fire-fighting operations

In absence of Licence Holder – deputy shall assume this role

Site Incident Controller records details of incident

Environmental Incident?

Yes

Refer to Environmental Communications Procedure

Complete EPA Incident Notification Form on Alder Webportal (https://alder.edenireland.ie/Login.aspx)

Emergency Contact List for AES Rosslare

EPA Headquarters, PO Box 3000, Johnstown Castle Estate, Co. Wexford. Tel. 053 916 0600/1890 335599, Fax. 053 916 0699
Email: https://alder.edenireland.ie/Login.aspx

Wexford Co.Co., County Hall, Spawell Road, Wexford
Tel. 053-9176500, Fax. 053-9143406
Email: postmaster@wexfordcoco.ie

Inland Fisheries Ireland
Citywest Business park, 3044 Lake Drive, Dublin 24
Tel. 01 8842600, Fax. +353 (0)1 278 7025
Email: blackrock@fisheriesireland.ie

Environmental Non-Conformance

Yes

No

Refer to Environmental Non-Conformance Procedure

Refer to Environmental Corrective/Preventive Action Procedure

Ref. EPA Incident Notification Form on Alder Webportal (https://alder.edenireland.ie/Login.aspx)

Complete Compliance Log with details

Discharge to Water?

Yes

Notify Local Authorities & Inland Fisheries Ireland

All emergency response equipment should be checked on a weekly basis

Out of Hours Emergency?

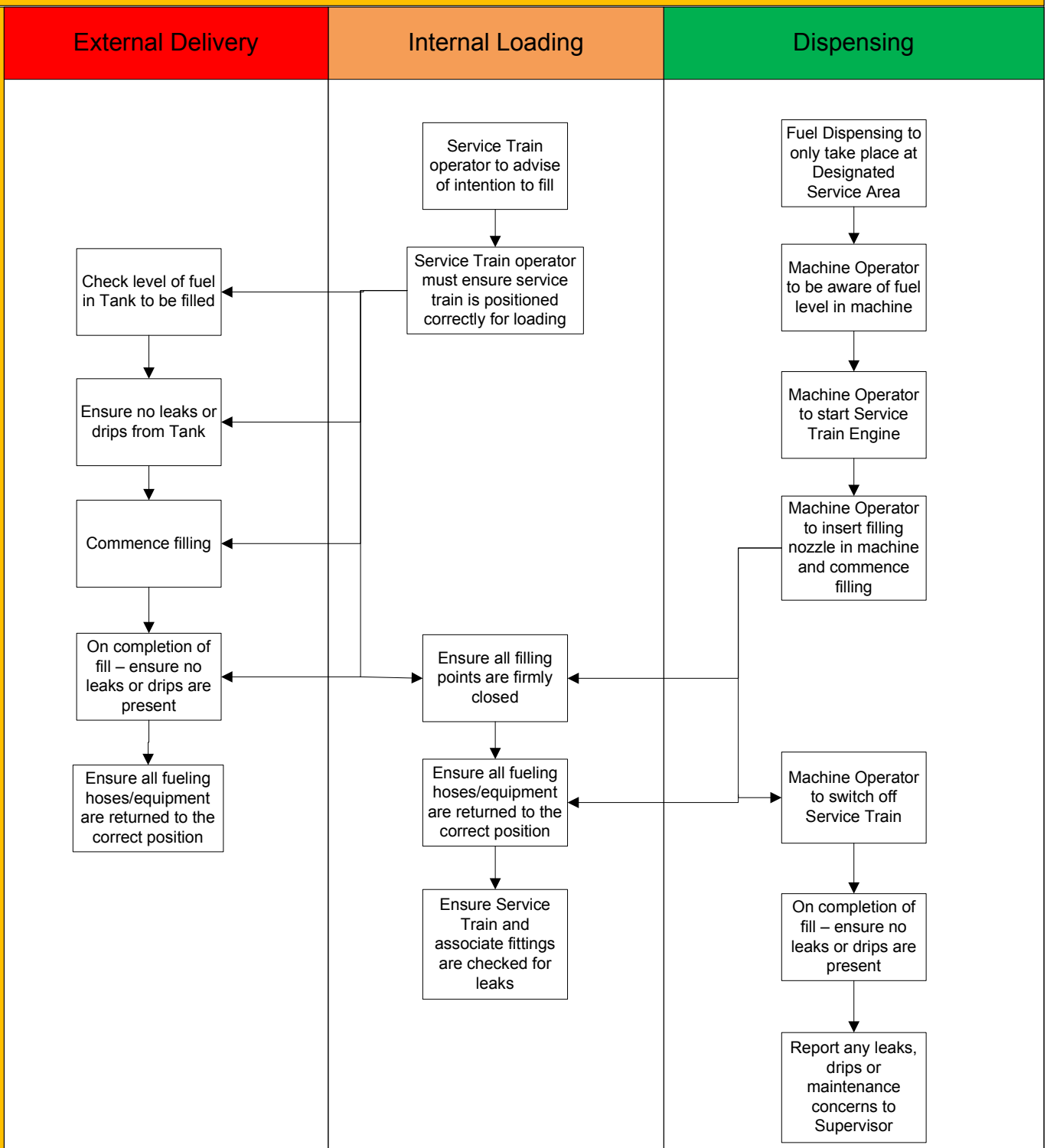
Yes

Contact Designated On-Call Person

BORD NA MÓNA
Naturally Driven

Gas Oil Loading Procedure – Rev.1

PROCEDURE



Notes:

1. Drivers must have correct permits.
2. Lorry must contain a spill kit.
3. Delivery driver to remain present at all times during filling operation.
4. Bord na Mona employees to remain present at all times during filling operation. and be aware of the location of BnM Spill Kits.
5. Bord na Mona employees must be aware of BnM Emergency Response Procedures.
6. Where Fuel Management System in place – correct user key to be used.
7. Service Trains must display Emergency Response Procedure – Spills.

BORD NA MÓNA

BORD NA MÓNA ENERGY LIMITED

Procedure: SPIP

Operations Manager _____

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Rev: 3

Silt Pond
Inspection Procedure

1. Purpose

The purpose of this procedure is to provide for visual inspection of all silt ponds on a fortnightly basis in accordance with Condition 6.7 of the Bord na Mona Energy Ltd IPC Licence's P0499-01 to P0507-01. This will be used for determining the silt pond de-silting roster.

2. Scope

The scope of this procedure covers all silt ponds treating drainage water from production bogs across the licence areas P0499-01 to P0507-01. .

3. Responsibility

It is the responsibility of the Operations Leader and the Team Leader to ensure all silt ponds are inspected on a fortnightly basis and that these inspections are returned to the Environmental Co-ordinator for filing at the facility office.

4. Procedure

4.1 Record the Silt Pond identification number on the Inspection Log.

4.2 Inspect the full length of the Silt Pond including inlets and outlet, noting the location of peat silt visible on the surface.

4.3 Tick the appropriate box on the Inspection Log to indicate the condition of the pond and record the date and time.

4.4 For ponds in series, the final pond should be clean at all times.

4.5 If a pond is observed as being 3/4 full during the fortnightly inspection, or at any other time arrangements should be made for the de-silting of the pond immediately.

4.6 Inspect the Outfall from the silt pond to the receiving water (River) and record any observations.

4.7 Once the silt pond has been cleaned, the date of de-silting should be logged on the Inspection Log and recorded on the Silt Pond Wall Chart.

Procedure:SPMP

Operations Manager

Page: 1 of 2

Date: _____ **Rev: 3**

Silt Pond
Maintenance Procedure

1. Purpose.

The purpose of this procedure is to provide for a maintenance procedure of all silt ponds associated with IPC Licence's P0499-01 to P0507-01. Pond cleaning will be determined by the silt pond inspection procedure.

2. Scope.

The scope of this procedure covers all silt ponds treating drainage water from the Licence areas P0499-01 to P0507-01.

3. Responsibility.

It is the responsibility of the Operations Manager to ensure ponds are cleaned as required by the silt pond inspection procedure.

4. Procedure

4.1 If the silt pond system has a by-pass channel or a stand-by pond then the drainage should be diverted through these. If not, then the inlet to the pond should be blocked using a gate valve or by switching off any applicable pumps, for the duration of the maintenance activity.

4.2 If the outlet from the pond has a weir then the level should be lowered so as to de-water the silt. If not, then the outlet pipe should be blocked.

4.3 The pond should be cleaned from the inlet to the outlet either from one side, if the width allows, or from both sides, if not.

4.4 The silt should be deposited as far back from the silt pond as possible on top of the existing silt pond or retained in a peat berm, if sludge is at risk of leaking back into the silt pond.

4.5 When the pond has been cleaned the inlet should be opened and the pond allowed to fill before lowering the outlet weir.

4.6 If the drainage was diverted during the maintenance, then it should be redirected back into the pond.

4.7 If there are signs of peat silt deposited upstream or downstream of the pond, within the site boundary, then they should also be cleaned, starting up-stream. This should occur once the pond has been cleaned and before the outlet weir has been lowered.

4.8 Once cleaned, the date should be entered on to the inspection log.

4.9 All machine operators must be fully versed with the above procedure with a copy posted in the machine.

Waste Management Procedure

1. Purpose

To define the correct procedure to be followed when removing and disposing of wastes from sites across all licenced bogs.

2. Scope

The scope of this procedure covers all bogs in the Licence areas P0499-01 to P0507-01, and Waste Facilities WL0049-02 and WL0199-02. It also covers the requirements of Condition 7 of these IPC licences and is detailed in Bord na Mona Peat/AES Service Level Agreement (SLA).

3. Responsibility

The implementation of this Procedure is the responsibility of the Resource Manager or his/her deputy.

4. Reporting

- Prior to the recovery and handling of waste, please liaise with your Environmental Coordinator and/or Compliance Operations Lead to schedule and coordinate its disposal.
- Ensure that a record of all waste receipts is maintained and a copy provided to the relevant Environmental Coordinator.
- On a monthly basis, stores shall provide the relevant IPC Licence Coordinator with a copy of all waste receipts for the Waste Management file.
- On a quarterly basis, AES shall provide each store and the IPC Licence Coordinator with a quarterly report as per the SLA.

5. Waste Collection Procedure

Table 1 outlines the procedures for the handing of waste and subsequent disposal routes.

6. Reference Documents

Attachment 1: AES Service Level Agreement (SLA).

Litter Action Plan: Prevention and control of litter arising from Bord na Mona's activities and from unauthorised dumping on and around its property.

Table 1: Waste Management Plan		
Waste Type	**Waste Handling Procedure**	**Disposal Route**
Plant & Equipment	• All production equipment shall be transferred to tea centers/workshops for assessment for retention, sale or scrapping.	-
	• Tractors, trailers, excavators, dozers identified for D&R work, peat sales or drainage/silt pond maintenance shall be retained at the main works.	
Hazardous Waste	• Hazardous materials/liquids/batteries shall be removed from all machinery identified for scrap.	-
	• All waste or unused fuels, oils, greases, batteries etc shall be brought into the main works and deposited into existing hazardous waste receptacles i.e. barrels, waste oils tanks, battery boxes etc.	AES/ENVA
Transformers	• Redundant transformers shall be transported to workshops. Prior to disposal, transformer oils shall be testing for the presence of PCB's. Only third part contractors ENVA ltd shall be permitted to pump and disposed of transformer oils. • Transformer shall be then send for metals recycling	AES/ENVA/ (Subcontractor - metals recycling)
Scrap Metal	• All scrap metal collected shall be stored in short to medium term designated areas with adequate hard standing, space and access for collection by AES contractors using heavy equipment (scissors, grab, articulated trucks). **Note:** to maximise the potential scrap value, store scrap loose and do not deposited into skips	AES (Subcontractor - metals recycling)
Polythene	• All waste polythene, rolled and loose shall be gathered and stored at designated areas with adequate hard standing, access and easy reach for collection. In order of preference, polythene shall be disposed of as follows: 1. **Rolled Polythene** – collected by ADN Ltd for recovery/recycling - **qualifies for a financial rebate.** 2. **Loose Polythene** - collected by ADN Ltd for recovery/recycling - no financial rebate due to transportation costs. 3. **Contaminated Polythene** – polythene rejected by ADN Ltd shall be disposed of to landfill via AES ltd.	ADN Ltd / AES
Polybrane	• All waste polybrane recovered from both permanent and temporary rail shall be stored separately to polythene and assessed for reuse/ disposal. Polybrane designated for disposal shall be directly transferred to Drehid landfill.	Reuse – to be determined Disposal - Drehid Landfill
Tyres	• All used tyres shall be gathered and stored in a suitable hard standing area for collection	AES

Concrete Pipes	• Redundant concrete pipes shall be:
	  • collected and transported to the nearest compound for reuse (D&R projects/Drainage/neighboring farm use).
	  • Crushed in-situ.
		-

Asbestos	• Removal and disposal of asbestos carried out by specialist's waste contractors only. If found, do not handle or disturbed and ensure Health & safety guidelines are adhered to.	Specialist's waste contractors

C&D Waste	• All C&D waste shall be segregated to ensure disposal costs are minimised as follows:
	  • Remove of all internal appliances, furniture, windows, roof felt, guttering etc to general waste skip.
	  • Segregate timber from concrete and place in separate skips
	  • Segregate metals and transport to nearest loose metals storage compound
		AES (Subcontractor - metals recycling)

Peat Stockpiles	• Unsalable stockpiles shall be leveled/decommissioned as per SOP FS-BM-02 "Bog Maintenance Plan"	Operations
Illegal fly tipping	• The locations of illegal dumping and fly tipping sites shall be documented and reported to local BnM environmental officers. Note: The local county council should be notified of the dumping and a landfill levy exemption letter requested prior to the removal or disposal of waste.	AES

Appendix G Standard Operating Procedure for Otter

Bord na Móna Naturally Driven	**Procedure: ECO-001**	**Rev: 1**
Title: Protection of Otter	**Approved:**	**Date: 16/03/21**

1) Purpose

To describe the environmental measures required to protect Otter across all Bord na Móna activities.

2) Scope

To avoid likely significant effects of disturbance, displacement or physical injury to Otter which occur or are likely to occur at any locations where Bord na Móna may be carrying out activities with the potential for effects.

The potential for negative effects will be avoided through adherence to Best Practice measures and the use of confirmatory surveys to establish any requirements such as derogations and/or restriction zones around confirmed breeding or resting sites as appropriate.

This Procedure should be read in association with any other pertinent procedures, in particular around vegetation clearance and working near water.

3) Related Documents

Bord na Mona Silt Pond Maintenance Procedure

Bord na Mona Silt Pond Inspection Procedure

National Roads Authority (2006). Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes. The National Roads Authority, Dublin.

National Roads Authority (2008.) Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes. The National Roads Authority, Dublin.

Highways Agency (1999). Design Manual for Roads and Bridges - Nature Conservation Advice in Relation to Otters HA81/99. The Highways Agency, London.

4) Procedure

<u>Environmental Controls</u>

1. Each project, scheduled activity or proposed works will liaise with the Bord na Móna ecology team who will approve and provide guidance on all on site activities which could have an ecological impact.
2. All staff will receive environmental training and/or an Environmental site induction/Toolbox talk before being allowed to work on a Bord na Móna bog.
3. Work will only be able to take place once the Bord na Móna ecology team has signed off on the installation of any required mitigation measures.
4. Adherence to any specified mitigation measures are to be subject to audit by the Bord na Móna ecology team and/or Site Supervisor/Environmental Officer or PSCS as appropriate.
5. Where non-compliance is detected, a system of follow up and corrective action will be implemented.

<u>Preparation</u>

1. Confirmatory surveys will be carried out 150m upstream and downstream of suitable Otter habitat where relevant activities are programmed to occur. This will include silt ponds (cleaning and maintenance), channelized sections of watercourses and bog drainage channels with connectivity to suitable habitat. These confirmatory Otter surveys will be undertaken no more than 12 months in advance of proposed activities, during the period November and April when vegetation cover is reduced. For silt ponds surveys will include an area comprising the pond plus a 50m buffer.
2. Confirmatory surveys will be undertaken by a suitably qualified ecologist.
3. The results of surveys will be communicated to the site manager responsible for scheduling activities on a need to know basis.
4. Zones or locations containing confirmed breeding or resting locations (holts/couches) are to be delineated with signage at an appropriate distance (150m) to prevent disturbance.
5. In addition, any restriction zones are to be digitised and provided in shapefile format for upload to machine PDA's where this facility is available.
6. These Ecological Restriction Zones will be marked out at regular intervals using a combination of appropriate signage or visual markers as appropriate, prior to works or activities commencing during the identified sensitive period.
7. The above will be carried out by a suitably qualified Ecologist/ Bord na Móna ecology team.
8. Surveys results will be confirmed no less than 3 days prior to scheduled activities commencing.
9. If required any derogation applications will be made by the Bord na Móna ecology team/designated project manager.

<u>Operator Training</u>

1. All operators will receive a toolbox talk by a suitably qualified Ecologist/ Bord na Móna ecology team, to educate them on any relevant restrictions prior to the commencement of activities.
2. This will include any restricted areas, the requirement for same, the location of reference documentation such as the schedule of mitigation measures, and the procedure to follow if in doubt as to the locations of activities in respect of any restricted areas.
3. A copy or map illustrating the restriction zones's per bog, and periods wherein activities can be undertaken will be available at all times at the site office.
4. Where pertinent, a schedule of Mitigation Measures per bog will also be available at all times in the site office.

<u>Responsibilities</u>

1. The appointed site manager/PSCS as appropriate will be responsible for recording attendance at toolbox talks and making sure all operators have access to the required reference material, including drawings of restricted areas/ ERZ's.
2. The appointed site manager/PSCS as appropriate as will be responsible for the scheduling of activities
3. The appointed site manager/PSCS as appropriate must be aware of any other site specific mitigation around Otter
4. The Bord na Móna ecology team or Project Ecologist is responsible for conformance auditing

5. If a derogation is required, any activities under same will be overseen by the Bord na Móna ecology team or appointed Project Ecologist.
6. Local NPWS will be made aware of any derogated works/activities before commencement.

Carrying out Activities

1. No works or activities are to be carried out in restricted areas or identified ERZ's during the relevant period as specified by the project ecologist. No works will be carried out within 150m of an active holt.
2. NPWS will be notified of any confirmed active holts.
3. As per NRA (2006) guidelines, following consultation with NPWS, works or activities closer to such breeding holts may take place – provided appropriate mitigation measures are in place, e.g. screening and/or restricted working hours on site;
4. No wheeled or tracked vehicles (of any kind) will be used within 20m of active, but non-breeding, otter holts. Light work, such as digging by hand or scrub clearance will not take place within 15m of such holts, except under licence (NRA, 2006);
5. Where holts are present in close proximity to invasive activities, but are determined not to require destruction, such activities may commence once recommended alternative mitigation measures to address otters have been complied with (NRA, 2006);
6. Only operators who have received the required training and toolbox talks are to be assigned duties within the above period.
7. Conformance will be audited through compliance checks by the Bord na Móna ecology team /Project Ecologist with 'stop-works' authority.
8. Activities will only be carried out between 08.00 and 17.30 to minimise the potential for disturbance.

5) Records

Evidence of approval (electronic)
Archive files

Revision Index			
Revision	Date	Description of change	Approved