

Article 6(3) Appropriate Assessment Screening Report

Turraun Bog, Co Offaly
Decommissioning and
Rehabilitation 2021





DOCUMENT DETAILS

Client: **Bord na Móna**

Project Title: **Turraun Bog, Co Offaly Decommissioning and Rehabilitation 2021**

Project Number: **201008**

Document Title: **Article 6(3) Appropriate Assessment Screening Report**

Document File Name: **AASR F02 – 2021.06.15- 201008**

Prepared By: **MKO
Tuam Road
Galway
Ireland
H91 VW84**



Rev	Status	Date	Author(s)	Approved By
01	Draft	06/04/2021	IR	PR
01	Final	10/06/2021	IR	PR
02	Final	15/06/2021	IR	PR

Table of Contents

1.INTRODUCTION	1
1.1 Background.....	1
1.2 Appropriate Assessment	1
1.2.1 Screening for Appropriate Assessment	1
1.2.2 Appropriate Assessment (Natura Impact Statement).....	2
1.2.3 Statement of authority.....	2
2.DESRIPTION OF THE PROJECT AND BASELINE ENVIRONMENT	3
2.1 Site details	3
2.1.1 Site location.....	3
2.1.2 Site description.....	3
2.2 Characteristics of the Peatland Climate Action Scheme.....	5
2.2.1 Overview	5
2.2.2 Decommissioning and rehabilitation stage	5
2.2.3 Operational stage	13
2.3 Description of the baseline ecological environment	15
2.3.1 Consequences of proposed rehabilitation for current habitats	17
3.IDENTIFICATION OF RELEVANT EUROPEAN SITES.....	19
3.1 Identification of the European Sites within the Likely Zone of Impact.....	19
3.2 European Sites with the potential to be significantly affected by the PCAS activities	31
3.3 Likely cumulative impact of the PCAS activities on European Sites, in-combination with other plans and projects.....	31
3.3.1 Review of other plans and projects.....	31
3.3.2 Conclusion of in-combination/cumulative assessment.....	31
4.ARTICLE 6(3) APPROPRIATE ASSESSMENT SCREENING STATEMENT AND CONCLUSIONS	32
4.1 Data collected to carry out assessment.....	32
4.2 Concluding statement	32
BIBLIOGRAPHY	33

TABLE OF TABLES

Table 2-1 Extent of dry cutaway rehabilitation proposed at Turraun Bog.....	9
Table 2-2 Extent of wetland cutaway rehabilitation proposed at Turraun Bog.....	11
Table 3-1 Identification of European Sites within Likely Zone of Impact.....	21

TABLE OF PLATES

Plate 2-1 Indicative Enhanced Rehabilitation Plan for Turraun Bog (extracted from Appendix 1).....	8
Plate 2-2 Examples of installed overflow pipes	10
Plate 2-3 View of bare peat fields interspersed with revegetating peat surfaces typical for the central and eastern parts of Turraun Bog (January 2021)	16
Plate 2-4 Birch scrub and small wetland area in the north of Turraun Bog (January 2021)	16

APPENDICES

Appendix 1.....Turraun Bog Cutaway Bog Decommissioning and Rehabilitation Plan 2021	
Appendix 2	Rehabilitation Methods

1. INTRODUCTION

1.1 Background

McCarthy Keville O'Sullivan Ltd. (MKO) has been appointed to provide the information necessary to provide the information necessary to allow the undertaking of an Article 6(3) Screening for Appropriate Assessment for the decommissioning and rehabilitation of Turraun Bog, Co Offaly.

The current project is not directly connected with, or necessary for the management of any European Site, consequently the project has been subject to the Appropriate Assessment Screening process.

The assessment in this report is based on a desk study and field surveys between 2011 and 2020 by Bord na Móna and on a site visit on the 11th of January 2021 by Inga Reich of MKO. It specifically assesses whether the proposed rehabilitation works will have any impact upon European Sites.

This report has been prepared in accordance with the European Commission guidance document 'Assessment of Plans and Projects Significantly affecting Natura 2000 Sites: Methodological Guidance on the provisions of Article 6(3) and 6(4) of the Habitats Directive 92/43/EEC' (EC, 2001) and the Department of the Environment's Guidance on the Appropriate Assessment of Plans and Projects in Ireland (December 2009, amended February 2010).

In addition to the guidelines referenced above, the following relevant guidance was considered in preparation of this report:

1. *DoEHLG (2010) Appropriate Assessment of Plans and Projects in Ireland Guidance for Planning Authorities. Department of the Environment, Heritage and Local Government,*
2. *European Communities (2018) 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. European Commission,*
3. *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. European Commission,*
4. *Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg. European Commission,*
5. *EC (2007) Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC - Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the commission. European Commission,*
6. *EC (2013) Interpretation Manual of European Union Habitats. Version EUR 28. European Commission.*

1.2 Appropriate Assessment

1.2.1 Screening for Appropriate Assessment

Screening is the process of determining whether an Appropriate Assessment is required for a plan or project. Consultants or project proponents may undertake a form of screening to establish if an Appropriate Assessment is required and provide advice or may submit the information necessary to allow the Screening to be undertaken. Where it cannot be excluded beyond reasonable scientific doubt, that a proposed plan or project, individually or in combination with other plans and projects, would have a significant effect on the conservation objectives of a European Site, an Appropriate Assessment (Natura Impact Statement) of the plan or project is required.

1.2.2 Appropriate Assessment (Natura Impact Statement)

The term Natura Impact Statement (NIS) is defined in legislation¹. An NIS, where required, should present the data, information and analysis necessary to reach a definitive determination as to 1) the implications of the plan or project, alone or in combination with other plans and projects, for a European Site in view of its conservation objectives, and 2) whether there will be adverse effects on the integrity of a European Site. The NIS should be underpinned by best scientific knowledge, objective information and by the precautionary principle.

1.2.3 Statement of authority

The site visit was undertaken by Inga Reich (Honours degree in Biology, Ph.D. in Applied Ecology) who also wrote the report. The report was reviewed by Pat Roberts (B.Sc. (Env.) MCIEEM) who has over 15 years post graduate experience in ecological consultancy and impact assessment.

¹As defined in Section 177T of the Planning and Development Act, 2000 as amended, an NIS means a statement, for the purposes of Article 6 of the Habitats Directive, of the implications of a proposed development, on its own and in combination with other plans and projects, for a European site in view of its conservation objectives. It is required to include a report of a scientific examination of evidence and data, carried out by competent persons to identify and classify any implications for the European site in view of its conservation objectives

2. DESCRIPTION OF THE PROJECT AND BASELINE ENVIRONMENT

2.1 Site details

2.1.1 Site location

Turraun Bog is located approximately 5km north of Blueball and 5.5km south-east of Ferbane in Co Offaly (Grid Ref. E 218526 N 223410) The R357 runs just to the south of the site and the bog can be accessed via a local road from the east in Island Lower. The site location is shown in Figure 2-1.

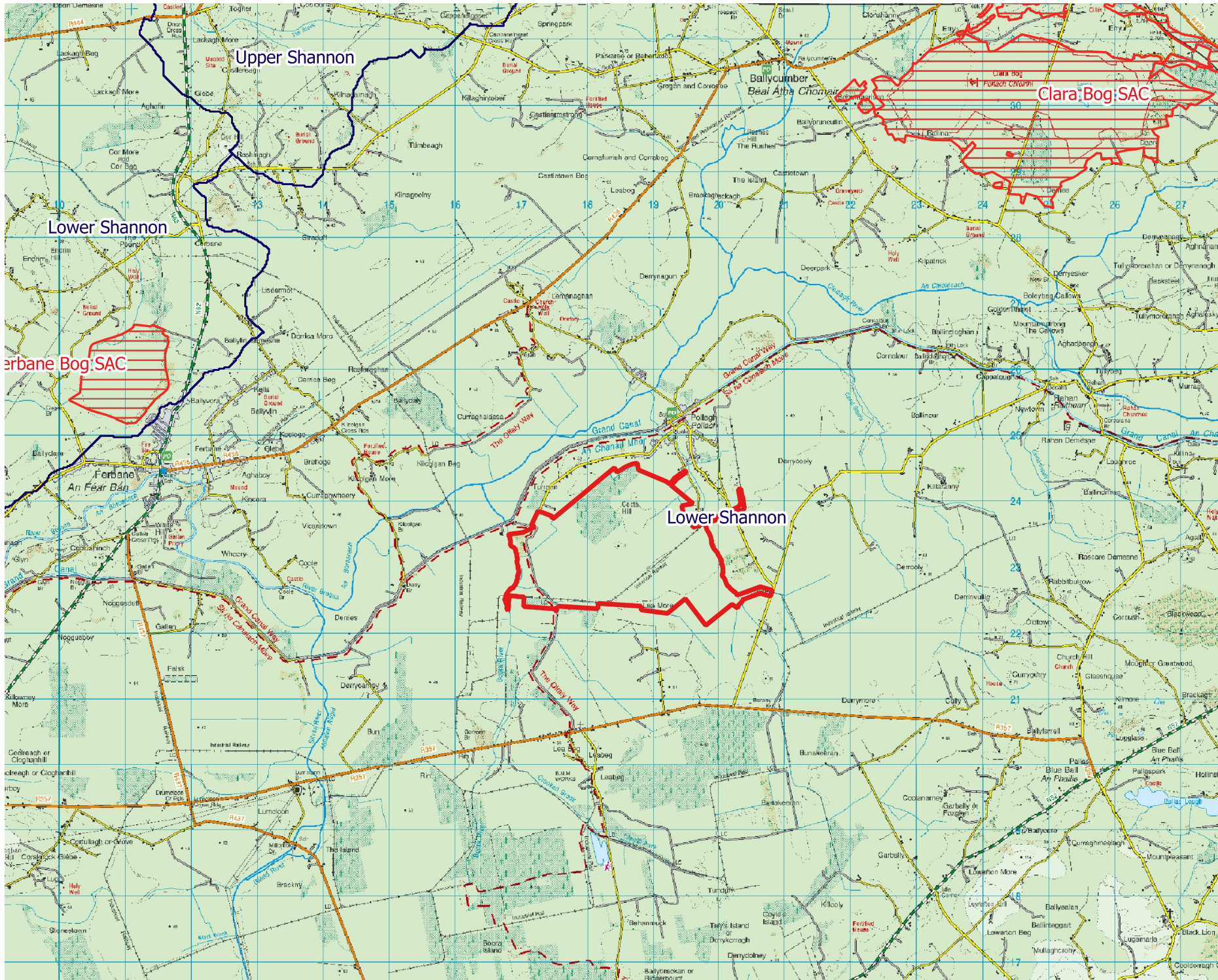
2.1.2 Site description

The Boora River flows along the western boundary of Turraun Bog, while the Pollagh Stream flows along the eastern boundary, both drain into the River Brosna, which flows about 700m north-west of the site into the Shannon. The Grand Canal is located about 200m north-west of Turraun Bog at its closest point. Turraun Bog is surrounded by a mosaic primarily consisting of low-lying agricultural land (pasture) interspersed with other raised bogs, many of which have also been managed by Bord na Móna for peat production with some areas utilised for domestic turf cutting. Turraun is linked to The Derries Bog to the west (also owned by Bord na Móna) by railway line and a machinery travel path. Railway lines and infrastructure also link Turraun to Pollagh Bog and Oughter Bog to the east. Parts of the western and northern sections are considered a biodiversity area and are part of the Lough Boora Discovery Park. The Turraun Lagoon is located in this area. There is a small area west of the track through the site containing two small lakes, commercial forestry and woodland. A small portion of the original extent of the bog in the south west of the site has been taken up with a forestry plantation managed by Coillte.

Turraun Bog comprises 535.16 Ha in total. Commercial peat extraction has been undertaken at the site until 2018 and the peat on site was used as fuel peat supplying Ferbane Power Station and, later on, West Offaly Powerstation in Shannonsbridge. As a result of the harvesting programme in place at Turraun, peat depths are varied across the site. Most of the site contains shallow peat reserves with peat depths of less than 1m but some deeper peat deposits persist in the southern section of the site with up to 2.5m in depth. Turraun Bog was one of the first bogs managed by the Turf Development board (now Bord na Móna) and contains some of the oldest cutaway habitat within the BnM estate. The cutaway habitat was developed as part of the Lough Boora Discovery Park and rehabilitation and amenity measures such as drain blocking and bunding were carried out in the western section of the site in the 1990s to create lakes and wetlands.


The underlying geology at Turraun Bog is mainly composed of Waulsortian limestone². There is a small area of Fossiliferous dark-grey muddy limestone situated in the north of the site. The underlying soils and sub-soils are classed as 'Cutover/Cutaway Peat'.

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



- ### Map Legend
- Site outline
 - Special Area of Conservation
 - Special Protection Area
 - Water Framework Directive Catchment



Drawing Title	
Site Location Turraun Bog	
Project Title	
Turraun Bog, Co. Offaly	
D & R 2021	
Drawn By	Checked By
IR	PR
Project No.	Drawing No.
201008	Figure 2.1
Scale	Date
1:75000	18.01.2021
<div><div>MKO Planning and Environmental Consultants Tuam Road, Galway Ireland, H91 VW84 +353 (0) 91 735611 email: info@mkofireland.ie Website: www.mkofireland.ie</div></div>	

2.2 Characteristics of the Peatland Climate Action Scheme

2.2.1 Overview

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Boora bog group (Ref. P0500-01), of which Turraun Bog is part of. As part of Conditions 10.1 and 10.2 of this license, respectively, decommissioning and rehabilitation (D & R) must be undertaken to ensure the permanent rehabilitation of the cutaway bog lands within the licensed area.

A document titled ‘*Turraun Bog Cutaway Bog Decommissioning and Rehabilitation Plan 2021*’ has been prepared specifically to describe the proposed D & R measures at Turraun Bog and is appended to this document as Appendix 1.

It is proposed by Government that Bord na Móna (BnM) carry out a Peatland Climate Action 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 Turraun 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. P0500-01, 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 dependent 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. P0500-01 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. P0500-01:

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

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.

2.2.2 Decommissioning and rehabilitation stage

The proposed **decommissioning** at Turraun Bog includes:

- clean-up of bog,
- cleaning of silt ponds,
- peat stockpile management via levelling,
- decommissioning and removal of porto-cabin tea centre and materials stove,
- decommissioning and de-gassing of mobile fuel tanks,
- de-sludging of septic tanks.

Enhanced measures include:

- lifting of the existing rail line,
- decommissioning of existing level crossings,
- measures to restrict access to areas of the bog (where level crossings are to be removed and around silt ponds).

Of the 535.16 Ha, 319.41 Ha or 59.7% of the present landcover (2020) will be subject to **rehabilitation** measures. These are bespoke interventions designed to stabilise the existing baseline and meet compliance with the requirements of the existing EPA, IPC License and the proposed PCAS (Plate 2-1). Prescriptive measures are unique to the existing baseline habitats and comprise 2 no. broad categories, 1) those associated with dry cutaway (Table 2-1) and those associated with wetland cutaway (Table 2-2). 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).

The proposed Turraun 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 BnM cutaway bogs (Clarke & Rieley 2010), including examples such as the BnM Raised Bog Restoration Project (Bord na Móna 2014).

Access during the D & R phase will be through the existing entrance close to Island Lower, where existing infrastructure is already in place via access tracks to facilitate the previous peat extraction.

In terms of rehabilitation, the ecological and site information collected during BnM ecological baseline surveys, additional site visits, stakeholder input, and monitoring and desktop analysis forms the basis for the planning of peatland rehabilitation at Turraun 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);
- Consultation and engagement with internal and external stakeholders;
- GIS Mapping;
- BnM drainage surveys;
- Bog topography;
- Hydrological modelling.

Methodology

Decommissioning

Decommissioning at Turraun 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. P0500-01. 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 Turraun. 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 Turraun 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, BnM will utilize the appropriate waste hierarchy to identify waste that can be 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 an 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.

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.

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.

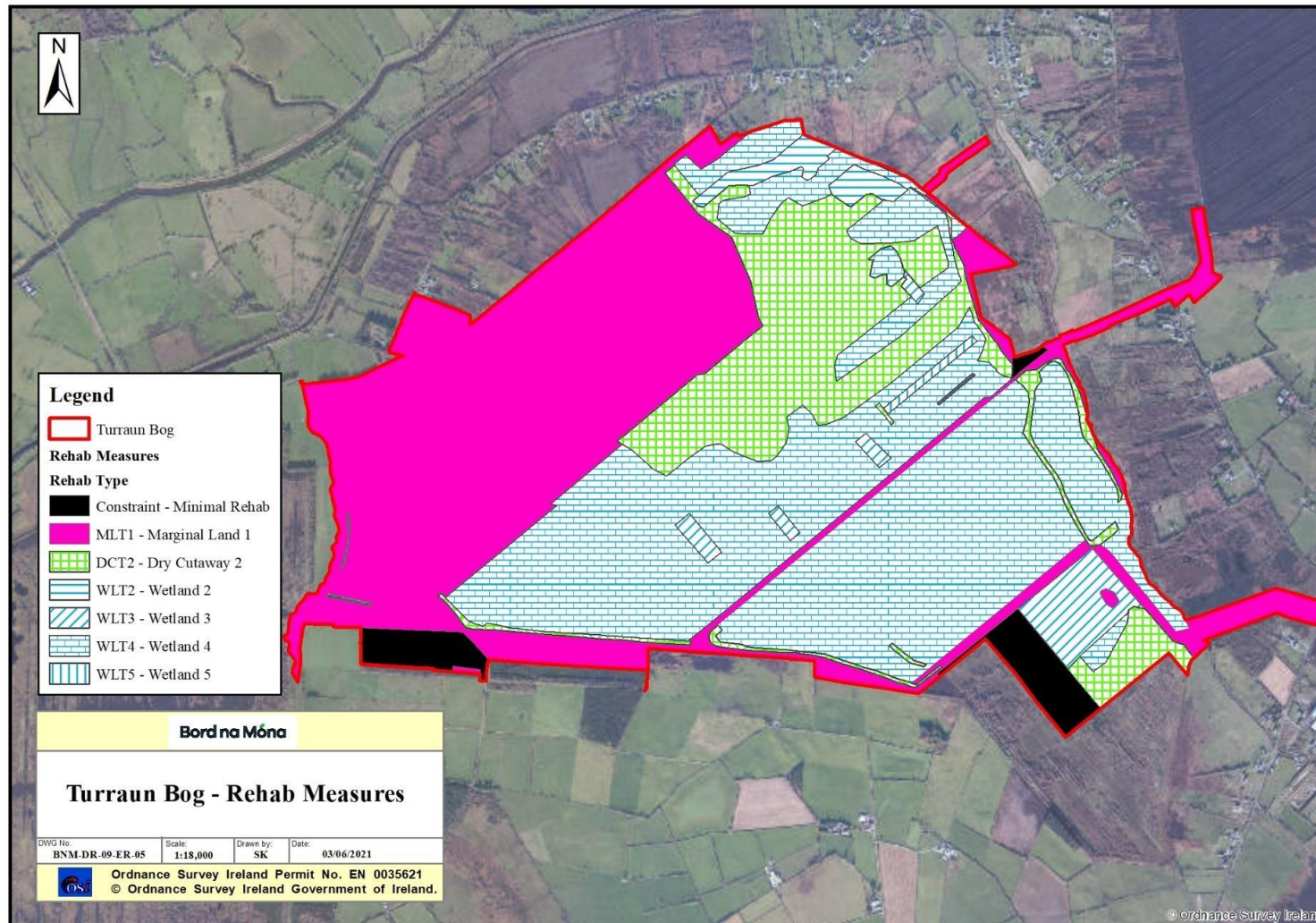


Plate 2-1 Indicative Enhanced Rehabilitation Plan for Turraun Bog (extracted from Appendix 1)

Rehabilitation

Dry cutaway rehabilitation packages

The key intervention to be applied to dry cutaway is re-wetting of peat to encourage natural colonisation of typical vegetation and the development of *Sphagnum*-rich peat-forming vegetation communities. This requires managing water-levels close to the surface of the peat for most of the year ($10\text{cm} \pm 5\text{cm}$). Several different approaches can be taken to this type of restoration/rehabilitation, and three rehabilitation packages with different intensities to managing suitable hydrological conditions are proposed (Table 2-1).

Table 2-1: Extent of dry cutaway rehabilitation proposed at Turraun.

Dry cutaway		Extent (Ha)
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	82.65
DCT3	More intensive drain blocking (max 7/100 m) + blocking outfalls and managing overflows + targeted fertiliser treatment	

The constituent prescriptions which combine to form the dry cutaway rehabilitation package DCT2 at Turraun Bog are further described, namely:

1. Regular drain blocking (3/100m)
2. Blocking outfalls
3. Managing water levels with overflow pipes
4. Targeted fertiliser treatment

1. Regular drain blocking (3/100m) (Appendix 2, PCAS-0100-008)

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.*, 2017³) and in line with methodologies originally developed by McDonagh (1997).

Peat blocks are constructed efficiently by excavator and bulldozer generally operating at a perpendicular direction to the field drains. The process involves clearing the drain by removing dry degraded peat/vegetation and creating a 'key' (wider than the drain and approximately 0.5m deep) in the drain sides to ensure a tight seal is maintained. The drain is subsequently blocked with peat taken from a nearby 'borrow pit' (avoiding the top 0.1-0.2m) and involves placing layer after layer (about 0.3m each) of peat which are compacted in the drain using the bucket of the excavator. The blockage will be built up at least 0.3-0.5m above the ground level of the bog to allow for subsequent shrinkage that occurs during peat drying. If vegetation was removed from the drain before clearing it, this should be placed on top of the blockage. The 'borrow pit' will be filled in with the peat that was extracted from the bottom of the drain and the sides of the pit should be pressed down and graded. A 'speed bump' peat block (approx. 5m wide) is created to allow for peat subsidence and to prevent water from flowing over the peat dam and eroding it before it becomes stabilised. This is done using a bulldozer, by taking a strip of peat from the central camber of the field, pushing it into the drain and compacting it by tracking over the drain block.

³https://www.npws.ie/sites/default/files/publications/pdf/TWM99_RB_Restoration_Best%20Practice%20Guidance.pdf

2. Blocking outfalls (Appendix 2, PCAS-0100-014).

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.

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

3. Managing water levels with overflow pipes (Plate 2-2; Appendix 2, PCAS-0100-014).

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.

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



Plate 2-2 Examples of installed overflow pipes

4. Targeted fertiliser treatment

Rock phosphate will be applied to headlands, high fields and other areas to accelerate establishment of vegetation either by hand or using a tractor. The application rate will be kept to a minimum.

Wetland cutaway rehabilitation packages

The key intervention to be applied to wetland cutaway is re-wetting of peat and maximisation of water retention to aid the development of wetland habitats comprising e.g., reed beds. This requires managing water-levels to reach depths of <0.5m during the summer so wetland vegetation can develop. Several different approaches can be taken to this type of restoration/rehabilitation, and five rehabilitation packages with different intensities to managing suitable hydrological conditions are proposed (Table 2-2).

Table 2-2: Extent of wetland cutaway rehabilitation proposed at Turraun.

Wetland cutaway		Extent (Ha)
WLT1	Blocking outfalls and managing water levels with overflow pipes	
WLT2	Blocking outfalls and managing water levels with overflow pipes + targeted blocking of outfalls within a site	7.17
WLT3	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	14.3
WLT4	More intensive drain blocking (max 7/100 m), + blocking outfalls and managing overflows + transplanting reeds and other rhizomes	213.92
WLT5	More intensive drain blocking (max 7/100 m), + field reprofiling + blocking outfalls and managing overflows + transplanting reeds and other rhizomes	1.37

The constituent prescriptions which combine to form the wetland cutaway rehabilitation packages WLT2, WLT3, WLT4 and WLT5 at Turraun Bog are further described, namely:

1. Blocking outfalls (see *dry cutaway rehabilitation* for details)
2. Managing water levels with overflow pipes (see *dry cutaway rehabilitation* for details)
3. Blocking outfalls (targeted) (see *dry cutaway rehabilitation* and 'blocking outfalls' for details)
4. Constructing larger berms to re-wet cutaway
5. Transplanting reeds and other rhizomes
6. More intensive drain blocking (max 7/100m)
7. Field reprofiling

4. Constructing larger berms to re-wet cutaway (Appendix 2, PCAS-0100-015)

Typical existing production 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 berms is to slow the water movement through the bog and promote the creation of enclosed areas of wetland habitat with shallow water levels – in particular in areas where shallow peat depths remain.

First, 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 a bulldozer tracking over the drain block from the opposite side of the drain to the excavator. A 'key' is also formed similarly on the opposite side of the production field at the end of the proposed berm. Next the bulldozer is used to complete the central cross section of the 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.

5. Transplanting reeds and other rhizomes

Rhizomes will be collected from a donor area and transported to the site where they will be distributed throughout the respected area and replanted using an excavator. Through the other measures in this package, water levels will be kept high enough to encourage the development of reedbeds.

6. More intensive drain blocking (max 7/100m) (Appendix 2, PCAS-0100-002)

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.

Peat blocks are constructed efficiently by excavator and bulldozer generally operating at a perpendicular direction to the field drains. The process involves clearing the drain by removing dry degraded peat/vegetation and creating a 'key' (wider than the drain and approximately 0.5m deep) 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' (avoiding the top 0.1-0.2m) and involves placing layer after layer (about 0.3m each) of peat which are compacted in the drain using the bucket of the excavator. The blockage will be built up at least 0.3-0.5m above the ground level of the bog to allow for subsequent shrinkage that occurs during peat drying. If vegetation was removed from the drain before clearing it, this should be placed on top of the blockage. The 'borrow pit' will be filled in with the peat that was extracted from the bottom of the drain and the sides of the pit should be pressed down and graded.

7. Field reprofiling (Appendix 2, PCAS-0100-012)

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.

The field will be re-profiled using a bulldozer making a total of 16 passes (8 passes up and 8 passes down), flattening the camber on the production field.

In the next step, drain blocks are constructed using an excavator operating at a perpendicular direction to the field drains. The process involves clearing the drain by removing dry degraded peat/vegetation and creating a 'key' (wider than the drain and approximately 0.5m deep) 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' (avoiding the top 0.1-0.2m) and involves placing layer after layer (about 0.3m each) of peat which are compacted in the drain using the bucket of the excavator. The blockage will be built up at least 0.3-0.5m above the ground level of the bog to allow for subsequent shrinkage that occurs during peat drying. If vegetation was removed from the drain before clearing it, this should be placed on top of the blockage. The 'borrow pit' will be filled in with the peat that was extracted from the bottom of the drain and the sides of the pit should be pressed down and graded.

Timescale

- Decommissioning activities will be completed within a period of 12 months but may be phased across 2 calendar years and are scheduled to be completed before the end of 2022.
- Rehabilitation activities will be completed within a period of approximately 7 months. In general, activities will be carried out between the months of April and October inclusive.
- The decommissioning stage may overlap rehabilitation activities.
- 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 any case, the rehabilitation period will not be longer than 1 year.
- Normal working times will be daylight hours between 08.00 and 17.30hrs Monday to Friday.

Use of natural resources

- There is no land requirement in respect of decommissioning. In total, rehabilitation activities will take place on 324.8 Ha of land. 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'.
- No additional water is required for either decommissioning or rehabilitation.
- 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 dams. 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 dependent 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' across existing drainage channels adjacent to re-profiled areas, by dozing peat displaced in re-profiling into place at pre-defined blockage 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 blockages; 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.
- Reeds and other rhizomes will be transplanted into wetland cutaway.
- Hydrocarbons will be used on-site during rehabilitation activities and will be limited to the diesel or petrol fuel and mechanical oils used by any onsite site machinery and equipment.
- Fertilisers may be used to treat high fields and headlands to encourage natural colonisation.

Emissions and wastes

- 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 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.
- Fuel and some pipes may require to be delivered. No blasting or piling is required.
- 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.
- A porto-cabin tea center is available at Turraun Bog.

2.2.3 Operational stage

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 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.
- Access will be through the existing entrance close to Island Lower, where existing infrastructure is already in place via access tracks to facilitate the previous peat extraction.

Timing and duration 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.
- Once constructed and commissioned, the proposed decommissioning and rehabilitation will remain permanently in place.

Use of natural resources

- 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 and wastes

- 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.
- Collectively, 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.
- Following rehabilitation and into the early operational stage Turraun 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.

Description of the baseline ecological environment

Assessing the impacts of any project and associated activities requires an understanding of the ecological baseline conditions prior to and at the time of the project proceeding. Ecological Baseline conditions are those existing in the absence of proposed activities (CIEEM, 2018).

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, Turraun Bog was surveyed in December 2009. Additional ecological walkover surveys and visits have taken place at Turraun Bog between 2009-2020 to inform rehabilitation planning and habitat maps have been updated, where required. The latest visit by BnM took place in November 2020. The rehabilitation plan is informed by the original baseline survey as well as subsequent site walk-over surveys and visits, and updates to baseline data.

Habitat mapping followed best-practise guidance from Smith *et al.* (2011). 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 Atherton *et al.* (2010). A more detailed BnM classification system was previously developed for classifying pioneer cutaway habitats as Fossitt categories were deemed not to be detailed enough for cutaway bog (much of cutaway bog could be classified as Cutover Bog - PB4). Much of the pioneer cutaway vegetation is still at an early stage of its development and cannot be assigned to Fossitt Level 3 categories yet.

A detailed ecological survey report for Turraun Bog is contained in Appendix III of Appendix 1.

A walkover survey was conducted on the 11th of January 2021 by Inga Reich to confirm the ecological baseline as identified by Bord na Móna in the preceding surveys and as shown in the habitat map (Figure 2-2).

A significant area of Turraun Bog is covered by the large lake in Turraun lagoon at the north-western part of the site and the smaller lakes to the west of the Offaly Way National walking trail which bisects the site. These lakes have associated emergent and marginal wetland habitats such as **reedbeds (FS1)** and some **poor fen (PF2)** and willow (*Salix* spp.)-dominated **scrub (WS1)** vegetation. One of the smaller lakes is almost entirely infilled with **reedbeds (FS1)**. The biodiversity area in the north-west of the site contains a significant amount of maturing **bog woodland (WN7)** and associated birch (*Betula* spp.)-dominated **scrub (WS1)**. Associated with the birch scrub are pioneer poor fen communities and **dry grassland (GS1)**. The area around Cocta Hill, which is located near the center of the site, is dominated by a mosaic of **dry heath (HH3/4)**, **dense bracken (HD1)**, **dry grassland (GS1)** dominated by purple moorgrass (*Molinia caerulea*) or cocksfoot (*Dactylis glomerata*) and birch-dominated **scrub (WS1)** with a significant amount of pine. There is also some bare, exposed glacial till and bare un-colonised fields in this area. A large area around the central and eastern parts of the site is still bare peat with small amounts of pioneer poor fen communities and birch-dominated **scrub (WS1)**. A small, Coillte managed **conifer plantation (WD4)** is situated in the south-west corner of the site and the area in the south-east of the site is a private native **woodland plantation (WD2)**.



Plate 2-3 View of bare peat fields interspersed with revegetating peat surfaces typical for the central and eastern parts of Turraun Bog (January 2021).

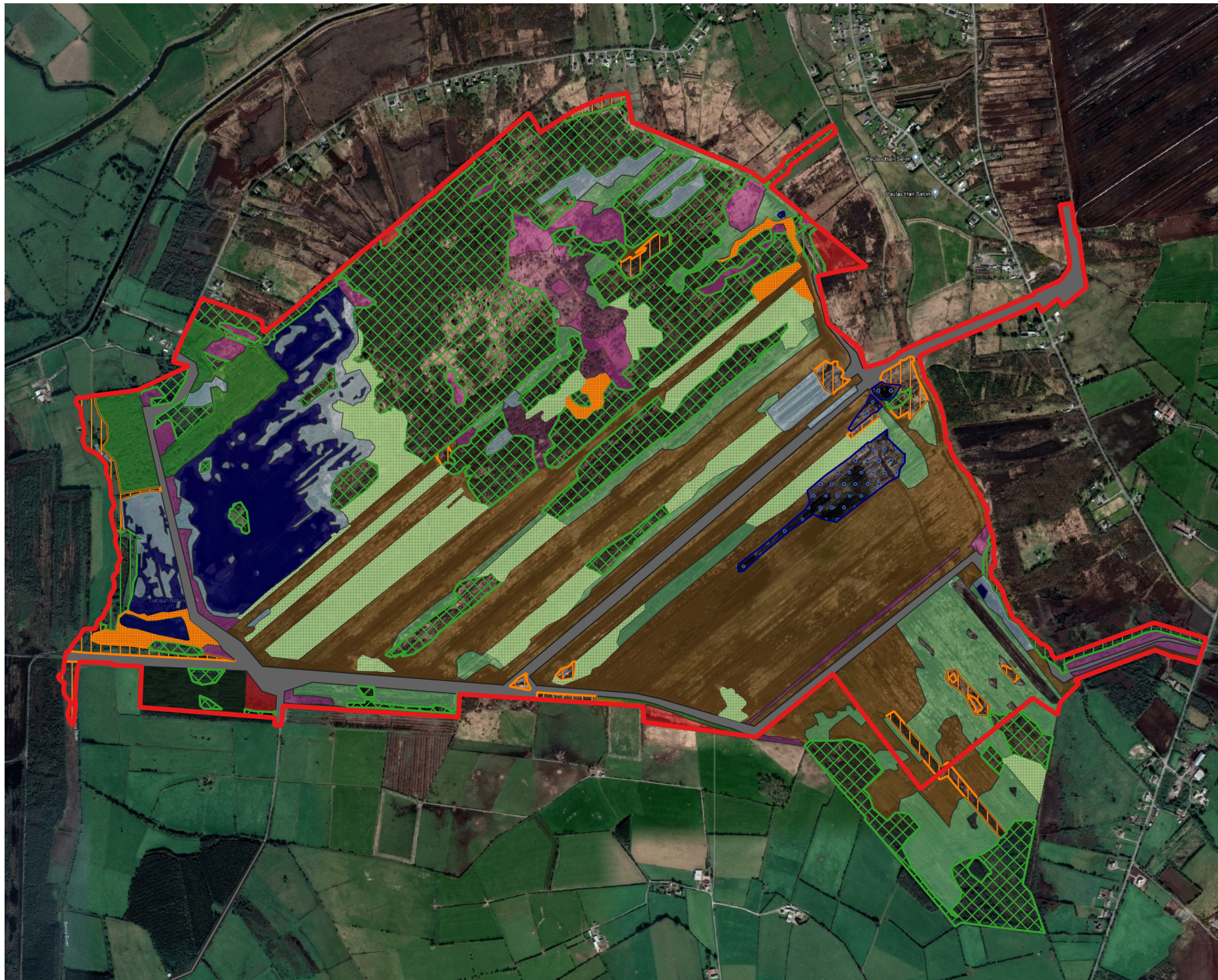


Plate 2-4 Birch scrub and small wetland area in the north of Turraun Bog (January 2021).

2.3.1

Consequences of proposed rehabilitation for current habitats

Much of Turraun Bog is expected to develop bog woodland while fen development will be encouraged in lower lying areas. Habitats currently evaluated as not requiring rehabilitation (i.e., the private native woodland scheme and Coillte conifer plantation, biodiversity area and associated birch forestry, ponds, railway line) will remain in line with existing baseline trends for these habitats.



Map Legend

- Site outline
- Bare peat
- Built
- Conifer plantation
- Cutover bog
- Grassland or agriculture
- Heath
- Heath & scrub
- Open water
- Pioneer open cutaway habitats
- Riparian
- Scrub
- Scrub & grassland
- Scrub & pioneer open cutaway habitats
- Temporary flooded areas
- Wetlands
- Woodland



Drawing Title

Current habitats

Project Title

Turraun Bog, Co. Offaly
D & R 2021

Drawn By

IR

Checked By

PR

Project No.

201008

Drawing No.

Figure 2-2

Scale

1:17500

Date

06.01.2021



MKO
Planning and
Environmental
Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email: info@mkofireland.ie
Website: www.mkofireland.ie

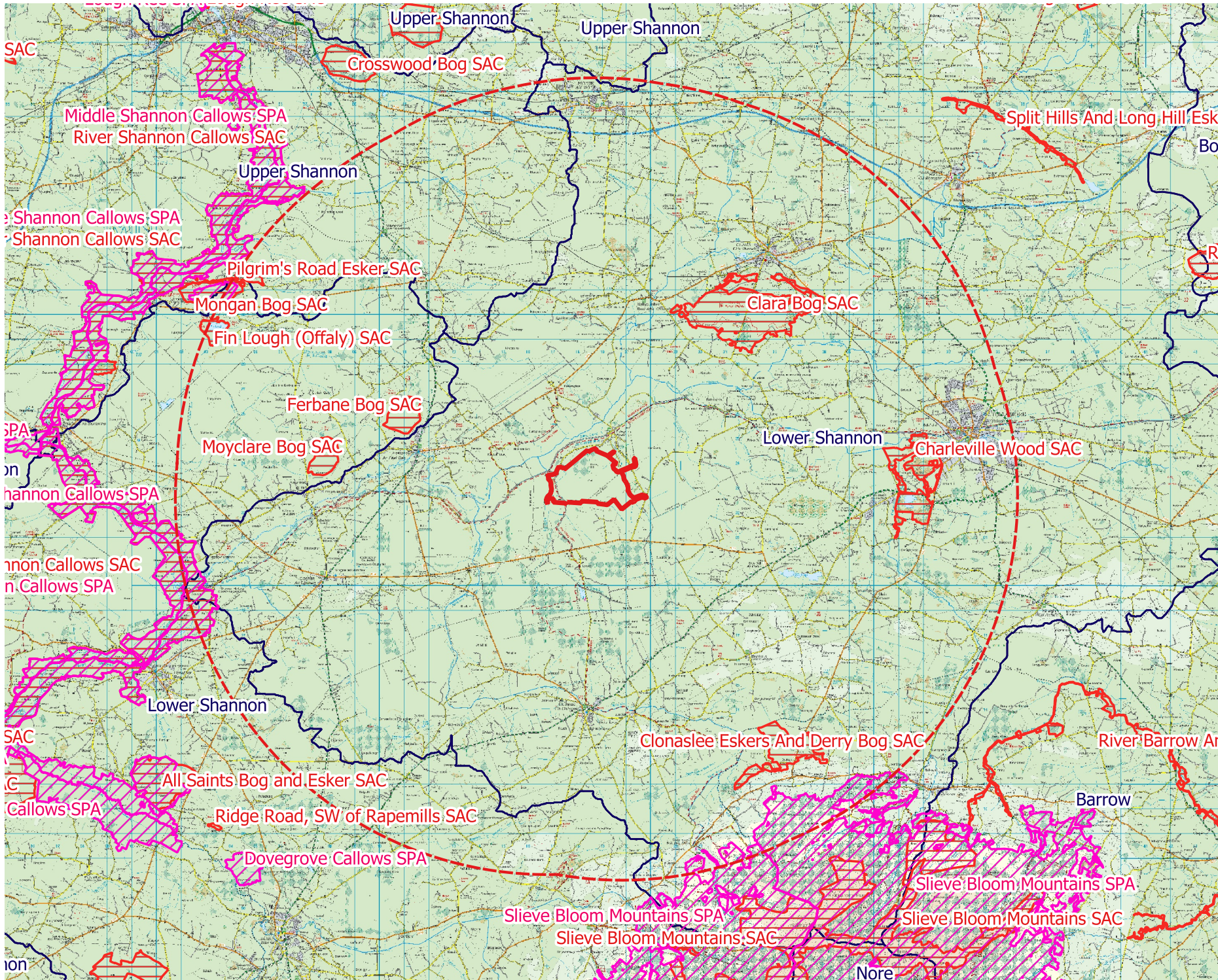
Ordnance Survey Ireland Licence No. AR
0021820 © Ordnance Survey Ireland/Government of Ireland

3. IDENTIFICATION OF RELEVANT EUROPEAN SITES

3.1 Identification of the European Sites within the Likely Zone of Impact

The following methodology was used to establish which European Sites are within the Likely Zone of Impact of the proposed development:

- Initially the most up to date GIS spatial datasets for European designated sites and water catchments were downloaded from the NPWS website (www.npws.ie) and the EPA website (www.epa.ie) on the 13/01/2021. The datasets were utilized to identify European Sites which could feasibly be affected by the proposed development.
- All European Sites within a distance of 15km surrounding Turraun Bog were identified and are shown on Figure 3.1. In addition, the potential for connectivity with European Sites at distances of greater than 15km from the site was also considered in this initial assessment. In this case, no potential for the proposed works to result in significant effects on sites located at a distance of over 15km from Turraun Bog was identified.
- The catchment mapping was used to establish or discount potential hydrological connectivity between Turraun Bog and any European Sites. The hydrological catchments are also shown in Figure 3.1.
- In relation to Special Protection Areas, in the absence of any specific European or Irish guidance in relation to such sites, the Scottish Natural Heritage (SNH) Guidance, *'Assessing Connectivity with Special Protection Areas (SPA)'* (2016) was consulted. This document provides guidance in relation to the identification of connectivity between proposed development and Special Protection Areas. The guidance takes into consideration the distances species may travel beyond the boundary of their SPAs and provides information on dispersal and foraging ranges of bird species which are frequently encountered when considering plans and projects.
- Table 3-1 provides details of all relevant European Sites as identified in the preceding steps and assesses which are within the likely Zone of Impact. The assessment considers any likely direct or indirect impacts of the rehabilitation works, both alone and in combination with other plans and projects, on European Sites by virtue of the following criteria: size and scale, land-take, distance from the European Site or key features of the site, resource requirements, emissions, excavation requirements, transportation requirements and duration of the works were considered in this screening assessment.
- The site synopses and conservation objectives of these sites, as per the NPWS website (www.npws.ie), were consulted and reviewed at the time of preparing this report 13/01/2021.
- Where potential pathways for Significant Effect are identified, the site is included within the Likely Zone of Impact and considered in the Screening Assessment.



Map Legend

- Site outline
- Special Area of Conservation
- Special Protection Area
- Water Framework Directive Catchments

Ordnance Survey Ireland Licence No. AR 0021820 © Ordnance Survey Ireland/Government of Ireland

Drawing Title
European Sites within 15km of Turraun Bog

Project Title
Turraun Bog, Co. Offaly
D & R 2021

Drawn By IR	Checked By PR
Project No. 201008	Drawing No. Figure 3-1
Scale 1:200000	Date 09.02.2021

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email: info@mkofireland.ie
Website: www.mkofireland.ie

Table 3-1 Identification of European Sites within Likely Zone of Impact

European Sites and distance from Turraun Bog	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 13/01/2021)	Conservation Objectives	Likely Zone of Impact Determination
Special Area of Conservation			
<p>Ferbane Bog SAC [000575]</p> <p>Distance: 5.6km</p>	<ul style="list-style-type: none"> ➤ [7110] Active raised bogs ➤ [7120] Degraded raised bogs still capable of natural regeneration ➤ [7150] Depressions on peat substrates of the Rhynchosporion 	<p>Detailed conservation objectives for this site (Version 1, November 2015), were reviewed as part of the assessment and are available at www.npws.ie</p>	<p>There will be no direct effects on this SAC as the project footprint is located entirely outside the designated site.</p> <p>Due to the terrestrial nature of the QI habitats and the distance from the site, no complete source-impact-pathway was identified. As such, there is no potential for indirect effects to occur.</p> <p>This site is not in the Likely Zone of Impact and no further assessment is required.</p>
<p>Clara Bog [000572]</p> <p>Distance: 5.8km</p>	<ul style="list-style-type: none"> ➤ [6210] Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) ➤ [7110] Active raised bogs ➤ [7120] Degraded raised bogs still capable of natural regeneration ➤ [7150] Depressions on peat substrates of the Rhynchosporion ➤ [91D0] Bog woodland 	<p>Detailed conservation objectives for this site (Version 1, August 2016), were reviewed as part of the assessment and are available at www.npws.ie</p>	<p>There will be no direct effects on this SAC as the project footprint is located entirely outside the designated site.</p> <p>Due to the terrestrial nature of the QI habitats and the distance from the site, no complete source-impact-pathway was identified. As such, there is no potential for indirect effects to occur.</p> <p>This site is not in the Likely Zone of Impact and no further assessment is required.</p>

European Sites and distance from Turraun Bog	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 13/01/2021)	Conservation Objectives	Likely Zone of Impact Determination
<p>Moyclare Bog SAC [000581] Distance: 9.8km</p>	<ul style="list-style-type: none"> ➤ [7110] Active raised bogs ➤ [7120] Degraded raised bogs still capable of natural regeneration ➤ [7150] Depressions on peat substrates of the Rhynchosporion 	<p>Detailed conservation objectives for this site (Version 1, November 2015) were reviewed as part of the assessment and are available at www.npws.ie</p>	<p>There will be no direct effects on this SAC as the project footprint is located entirely outside the designated site.</p> <p>Due to the terrestrial nature of the QI habitats and the distance from the site, no complete source-impact-pathway was identified. As such, there is no potential for indirect effects to occur.</p> <p>This site is not in the Likely Zone of Impact and no further assessment is required.</p>
<p>Charleville Wood SAC [000571] Distance: 9.7km</p>	<ul style="list-style-type: none"> ➤ [1016] Desmoulin's whorl snail (<i>Vertigo moulinsiana</i>) ➤ [91E0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) 	<p>This site has the generic conservation objective:</p> <p><i>'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.'</i></p> <p>(NPWS (2020) Conservation objectives for Charleville Woods SAC [000571] Generic Version 7.0. Department</p>	<p>There will be no direct effects on this SAC as the project footprint is located entirely outside the designated site.</p> <p>Due to the absence of a hydrological connection and the distance from the site, no complete source-impact-pathway was identified for the QI habitat and species. As such, there is no potential for indirect effects to occur.</p> <p>This site is not in the Likely Zone of Impact and no further assessment is required.</p>

European Sites and distance from Turraun Bog	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 13/01/2021)	Conservation Objectives	Likely Zone of Impact Determination
		of Culture, Heritage and the Gaeltacht.)	
<p>Clonaslee Eskers and Derry Bog SAC [0008.59]</p> <p>Distance: 10.3km</p>	<ul style="list-style-type: none"> ➤ [1013] Geyer's whorl snail (<i>Vertigo geyeri</i>) ➤ [7230] Alkaline fens 	<p>Detailed conservation objectives for this site (Version 1, February 2019), were reviewed as part of the assessment and are available at www.npws.ie</p>	<p>There will be no direct effects on this SAC as the project footprint is located entirely outside the designated site.</p> <p>Due to the absence of a hydrological connection and the distance from the site, no complete source-impact-pathway was identified for the QI habitat and species. As such, there is no potential for indirect effects to occur.</p> <p>This site is not in the Likely Zone of Impact and no further assessment is required.</p>
<p>Pilgrim's Road Esker SAC [001776]</p> <p>Distance: 13.8km</p>	<ul style="list-style-type: none"> ➤ [6210] Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites 	<p>Detailed conservation objectives for this site (Version 1, July 2018), were reviewed as part of the assessment and are available at www.npws.ie</p>	<p>There will be no direct effects on this SAC as the project footprint is located entirely outside the designated site.</p> <p>Due to the terrestrial nature of the QI habitat and the distance from the site, no complete source-impact-pathway was identified. As such, there is no potential for indirect effects to occur.</p> <p>This site is not in the Likely Zone of Impact and no further assessment is required.</p>

European Sites and distance from Turraun Bog	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 13/01/2021)	Conservation Objectives	Likely Zone of Impact Determination
<p>River Shannon Callows SAC [000216]</p> <p>Distance: 13.9km</p>	<ul style="list-style-type: none"> ➤ [1355] Otter (<i>Lutra lutra</i>) ➤ [6410] <i>Molinia</i> meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinia caerulea</i>) ➤ [6510] Lowland hay meadows (<i>Alopecurus pratensis</i>, <i>Sanguisorba officinalis</i>) ➤ [8240] Limestone pavements ➤ [91E0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) 	<p>This site has the generic conservation objective:</p> <p><i>‘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.’</i></p> <p>(NPWS (2020) Conservation objectives for River Shannon Callows SAC [000216] Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.)</p>	<p>There will be no direct effects on this SAC as the project footprint is located entirely outside the designated site.</p> <p>There is no complete source-impact-pathway for the following habitats due to their terrestrial nature and distance from the site:</p> <ul style="list-style-type: none"> ➤ [6410] <i>Molinia</i> meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinia caerulea</i>) ➤ [6510] Lowland hay meadows (<i>Alopecurus pratensis</i>, <i>Sanguisorba officinalis</i>) ➤ [8240] Limestone pavements <p>As such, there is no potential for indirect effects on these habitats.</p> <p>Following the precautionary principle, a potential pathway for effect on the following QI habitat and species was identified through surface water connectivity:</p> <ul style="list-style-type: none"> ➤ [91E0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) ➤ [1355] Otter (<i>Lutra lutra</i>)

European Sites and distance from Turraun Bog	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 13/01/2021)	Conservation Objectives	Likely Zone of Impact Determination
			<p>However, the objective of the works involved in the D & R is to stabilise the bog. These works are specifically designed to reverse the drainage of the bog and to minimise the run off of waters from it. The works will be similar in intensity to the active production that was undertaken until recently, but will be less invasive, short term and will involve an estimated six machines/crews working at any one time on the bog for an expected period of 2-3 years. There is no potential for these works to result in significant effects on downstream watercourses and ecological receptors as the works primarily involve the blocking of drainage pathways from the bog. Following the implementation of the PCAS, there will be no possibility of further effects. The likelihood of berm failure is extremely low and the site is not subject to flooding. As such, in the absence of any mitigation, there is no potential for any significant effect on these QI receptors as a result of water pollution or change to the hydrological regime within the SAC.</p> <p>The potential for disturbance to otter, where it occurs outside the SAC was also assessed. As Turraun Bog is located more than 13km away, it is highly unlikely that otter associated with this SAC will occur here. In addition, the works will not result in any loss of habitat, are short term and will not be occurring over the entire bog at any one time, leaving much of the bog completely undisturbed. Hence, there is no potential</p>

European Sites and distance from Turraun Bog	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 13/01/2021)	Conservation Objectives	Likely Zone of Impact Determination
			for the works, in the absence of any mitigation, to result in significant disturbance to otter. There is no potential for significant effects on this SAC and no further assessment is required.
Fin Lough (Offaly) SAC [000576] Distance: 14.2km	<ul style="list-style-type: none"> ➤ [1013] Geyer's whorl snail (<i>Vertigo geyeri</i>) ➤ [7230] Alkaline fens 	Detailed conservation objectives for this site (Version 1, February 2019) were reviewed as part of the assessment and are available at www.npws.ie	<p>There will be no direct effects on this SAC as the project footprint is located entirely outside the designated site.</p> <p>Due to the absence of a hydrological connection and the distance from the site, no complete source-impact-pathway was identified for the QI habitat and species. As such, there is no potential for indirect effects to occur.</p> <p>This site is not in the Likely Zone of Impact and no further assessment is required.</p>
Mongan Bog SAC [000580] Distance: 14.4km	<ul style="list-style-type: none"> ➤ [7110] Active raised bogs ➤ [7120] Degraded raised bogs still capable of natural regeneration ➤ [7150] Depressions on peat substrates of the Rhynchosporion ➤ 	Detailed conservation objectives for this site (Version 1, April 2016), were reviewed as part of the assessment and are available at www.npws.ie	<p>There will be no direct effects on this SAC as the project footprint is located entirely outside the designated site.</p> <p>Due to the terrestrial nature of the QI habitats and the distance from the site, no complete source-impact-pathway was identified. As such, there is no potential for indirect effects to occur.</p>

European Sites and distance from Turraun Bog	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 13/01/2021)	Conservation Objectives	Likely Zone of Impact Determination
			This site is not in the Likely Zone of Impact and no further assessment is required.
Special Protection Area			
<p>Slieve Bloom Mountains SPA [004160]</p> <p>Distance: 12.7km</p>	<p>➤ [A082] Hen harrier (<i>Circus cyaneus</i>)</p>	<p>This site has the generic conservation objective:</p> <p><i>‘To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA’</i> (NPWS (2020))</p> <p>Conservation objectives for Slieve Blooms Mountains SPA [004160] Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.)</p>	<p>There will be no direct effects on this SPA as the project footprint is located entirely outside the designated site.</p> <p>Due to the terrestrial nature of this SPA and the SCI species, no complete source-impact-pathway was identified. As such, there is no potential for indirect effects to occur.</p> <p>While hen harriers have been recorded from the site in winter and a hen harrier roost was noted at Turraun Bog, this is located in an area where no PCAS activities are going to be carried out. In addition, the site is well outside the core (2km) and maximum (10km) foraging range of the species during the breeding season. Effects on foraging or roosting birds during the winter, if any, would be negligible in magnitude, short-term and reversible.</p> <p>This site is not in the Likely Zone of Impact and no further assessment is required.</p>

European Sites and distance from Turraun Bog	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 13/01/2021)	Conservation Objectives	Likely Zone of Impact Determination
<p>Mongan Bog SPA [004017] Distance: 14.7km</p>	<p>➤ [A395] Greenland white-fronted goose (<i>Anser albifrons flavirostris</i>)</p>	<p>This site has the generic conservation objective:</p> <p><i>‘To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA’</i></p> <p>(NPWS (2020) Conservation objectives for Mongan Bog SPA [004017] Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.)</p>	<p>There will be no direct effects on this SPA as the project footprint is located entirely outside the designated site.</p> <p>Due to the absence of a hydrological connection and the distance from the site, no complete source-impact-pathway was identified for the SCI species and its associated habitats. As such, there is no potential for indirect effects to occur.</p> <p>The potential for disturbance to the SCI species, where it occurs outside the SPA was also assessed.</p> <p>Turraun Bog is located well outside the core foraging range of Greenland white-fronted goose (5-8km) and possible pathways for effects can therefore be excluded.</p> <p>This site is not in the Likely Zone of Impact and no further assessment is required.</p>
<p>Middle Shannon Callows SPA [004096] Distance: 14.8km</p>	<p>➤ [A038] Whooper swan (<i>Cygnus cygnus</i>)</p> <p>➤ [A050] Wigeon (<i>Anas penelope</i>)</p> <p>➤ [A122] Corncrake (<i>Crex crex</i>)</p> <p>➤ [A140] Golden plover (<i>Pluvialis apricaria</i>)</p>	<p>This site has the generic conservation objective:</p> <p><i>‘To maintain or restore the favourable conservation condition of the bird species listed as</i></p>	<p>There will be no direct effects on this SPA as the project footprint is located entirely outside the designated site.</p> <p>Following the precautionary principle, a potential pathway for effect on all SCI species and their habitats was identified through surface water connectivity.</p>

European Sites and distance from Turraun Bog	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 13/01/2021)	Conservation Objectives	Likely Zone of Impact Determination
	<ul style="list-style-type: none"> ➤ [A142] Lapwing (<i>Vanellus vanellus</i>) ➤ [A156] Black-tailed godwit (<i>Limosa limosa</i>) ➤ [A179] Black-headed gull (<i>Chroicocephalus ridibundus</i>) ➤ [A999] Wetland and waterbirds 	<p><i>Special Conservation Interests for this SPA'</i></p> <p>To acknowledge the importance of Ireland's wetlands to wintering waterbirds, this site has a second conservation objective:</p> <p><i>'To maintain or restore the favourable conservation condition of the wetland habitat at Middle Shannon Callows SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.'</i></p> <p>(NPWS (2020) Conservation objectives for Middle Shannon Callows SPA [004096] Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.)</p>	<p>However, the objective of the works involved in the D & R is to stabilise the bog. These works are specifically designed to reverse the drainage of the bog and to minimise the run off of waters from it. The works will be similar in intensity to the active production that was undertaken until recently, but will be less invasive, short term and will involve an estimated six machines/crews working at any one time on the bog for an expected period of 2-3 years. There is no potential for these works to result in significant effects on downstream watercourses and ecological receptors as the works primarily involve the blocking of drainage pathways from the bog. Following the implementation of the PCAS, there will be no possibility of further effects. The likelihood of berm failure is extremely low and the site is not subject to flooding. As such, in the absence of any mitigation, there is no potential for any significant effect on these SCI receptors as a result of water pollution or change to the hydrological regime within the SPA.</p> <p>The potential for disturbance to the SCI species, within and outside of the SPA was also assessed.</p> <p>The following species have been recorded at Turraun bog:</p> <ul style="list-style-type: none"> ➤ [A038] Whooper swan (<i>Cygnus cygnus</i>) ➤ [A050] Wigeon (<i>Anas penelope</i>)

European Sites and distance from Turraun Bog	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 13/01/2021)	Conservation Objectives	Likely Zone of Impact Determination
			<ul style="list-style-type: none"> ➤ [A140] Golden plover (<i>Pluvialis apricaria</i>) ➤ [A142] Lapwing (<i>Vanellus vanellus</i>) (possibly breeding) ➤ [A179] Black-headed gull (<i>Chroicocephalus ridibundus</i>) <p>However, Turraun Bog is located nearly 15km away, it is highly unlikely that whooper swans associated with this SPA will occur here as their core range from nighttime roosts is only 5km.</p> <p>Most of the other above wintering or passage wildfowl species will mainly be using the lake or artificial waterbodies in Turraun Bog, which are not subject to PCAS activities. Many of the breeding lapwing or black-headed gull in Turraun Bog (if any) may not be connected to this SPA.</p> <p>In addition, the works will not result in any loss of habitat, are short term and will not be occurring over the entire bog at any one time, leaving much of the bog completely undisturbed. Hence, there is no potential for the works, in the absence of any mitigation, to result in significant disturbance to these SCI species.</p> <p>There is no potential for significant effects on this SPA and no further assessment is required.</p>

3.2 European Sites with the potential to be significantly affected by the PCAS activities

No European Site has the potential to be significantly impacted by the proposed works.

3.3 Likely cumulative impact of the PCAS activities on European Sites, in-combination with other plans and projects

3.3.1 Review of other plans and projects

The potential for the rehabilitation works to contribute to a cumulative impact on European Sites was considered. The following plans and projects were considered for their potential to result in in-combination effects:

- The National Planning Application Database was consulted on the 14.01.2021 and a number of mostly small-scale proposed or consented developments were found within 5km of Turraun Bog.
- Bord na Móna provided a list of bogs where D & R activities are scheduled to occur within the same timeframe as in Turraun Bog. Four bogs within the larger Boora bog group, that share downstream connectivity to European Sites, were identified, namely Oughter, Pollagh, Derries and Boora. All of these will be subject to Appropriate Assessment as well.
- Private turbary exists in the marginal cutover zone at Turraun Bog and licensed and unauthorised turbary also occurs at various locations within 15km of Turraun Bog, including several locations where the pathways for downstream in combination effects on European Sites may exist, primarily via drainage to EPA blue line watercourses to facilitate turbary.
- There is a current ongoing NPWS Raised Bog Restoration Project, but there is no known temporal or spatial overlap between any planned restoration activities and the D & R activities within 15km of Turraun Bog.
- Laois County Development Plan 2017-2023, Offaly County Development Plan 2014-2020, Westmeath County Development Plan 2014-2020 and Westmeath Biodiversity Action Plan 2014-2020 were also consulted and considered as part of this assessment.

3.3.2 Conclusion of in-combination/cumulative assessment

Due to the nature, small scale and short-term duration of the PCAS activities, no pathway or mechanism for the proposed works to result in any significant effect on any European Site was identified when considered on its own during the assessment process and therefore there is no potential for it to contribute to any such effects when considered in-combination with any other development or works.

The review of plans and projects that is described above did not reveal any additional potential pathways for effect on European Sites that may have arisen as a result of those plans or projects.

4.

ARTICLE 6(3) APPROPRIATE ASSESSMENT SCREENING STATEMENT AND CONCLUSIONS

The findings of this Screening Assessment are presented following the European Commission's Assessment of Plans and Projects Significantly affecting Natura 2000 Sites: Methodological Guidance on the provisions of Article 6(3) and 6(4) of the Habitats Directive 92/43/EEC (EC, 2001) and Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (EC, 2018) as well as the Department of the Environment's Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities (DoEHLG, 2010).

4.1

Data collected to carry out assessment

In preparation of the assessment, the following sources were used to gather information:

- Review of NPWS Site Synopses, mapping and Conservation Objectives for the various European Sites within the Likely Zone of Impact.
- Review of 2019 EU Habitats Directive (Article 17) Report.
- Review of OS maps and aerial photographs of the site of the proposed development.
- Review of online web-mappers: National Parks and Wildlife Service (NPWS), Environmental Protection Agency (EPA), Water Framework Directive (WFD).
- Review of location and layout mapping for proposed rehabilitation
- Review of the detailed description of proposed rehabilitation measures, including methodologies specific to the main categories of land types under consideration.
- Review of the results of previous ecological surveys of Turraun Bog.
- Review of relevant databases including National Biodiversity Ireland Database (NBDC).
- Review of other plans and projects within the area.
- Liaison with Chris Cullen from Bord na Móna.
- Site visit conducted by Inga Reich on 11/01/2021.

4.2

Concluding statement

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

BIBLIOGRAPHY

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

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

Birds Directive (2009/47/EC) – http://ec.europa.eu/environment/nature/legislation/birdsdirective/index_en.htm

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>

CIEEM, 2018, Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine. V1.1

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

Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (Habitats Directive) and Directive 2009/147/EC (codified version of Directive 79/409/EEC as amended) (Birds Directive) – transposed into Irish law as European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477/2011).

DEHLG (2009) Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities. DEHLG, Dublin.

DoEHLG (2010). Appropriate Assessment of Plans and Projects in Ireland. Guidance for Planning Authorities. Revision, February, 2010. Department of the Environment, Heritage and Local Government.

EC (2018) 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. European Commission.

EC (2001) Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Articles 6(3) and (4) of the Habitats Directive 92/43/EEC.

EC (2002) 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, Luxembourg. European Commission.

EC (2006) Nature and biodiversity cases: Ruling of the European Court of Justice. Office for Official Publications of the European Communities, Luxembourg.

EC (2007a) Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC – Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the commission. Office for Official Publications of the European Communities, Luxembourg. European Commission.

EC (2007b) Interpretation Manual of European Union Habitats. Version EUR 27. European Commission, DG Environment.

European Communities (Conservation of Wild Birds) Regulations, 1985, SI 291/1985 & amendments – <http://www.irishstatutebook.ie>.

European Communities (Natural Habitats) Regulations, SI 94/1997, SI 233/1998 & SI 378/2005 – <http://www.irishstatutebook.ie>.

Fossitt, J. A. (2000). A Guide to Habitats in Ireland. Dublin: The Heritage Council.

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

Habitats Directive (92/43/EEC).

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.

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.

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 (2008) The Status of EU Protected Habitats and Species in Ireland. Conservation Status in Ireland of Habitats and Species listed in the European Council Directive on the Conservation of Habitats, Flora and Fauna 92/43/EEC.

NPWS of the DEHLG (2008) The Report on Status of Habitats and Species in Ireland: Technical Reports and Forms.

NPWS Protected Site Synopses and maps available on <http://www.npws.ie/en/ProtectedSites/>.

NPWS (2015) Conservation objectives: Ferbane Bog SAC [000575]. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Accessed online 13.01.2021

NPWS (2015) Conservation objectives: Moyclare Bog SAC [000581]. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Accessed online 13.01.2021

NPWS (2016) Conservation Objectives: Clara Bog SAC 000572. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Accessed online 13.01.2021

NPWS (2016) Conservation Objectives: Mongan Bog SAC 000580. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Accessed online 13.01.2021

NPWS (2018) Conservation objectives: Pilgrim's Road Esker SAC [001776]. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht. Accessed online 13.01.2021

NPWS (2019) Conservation objectives: Fin Lough (Offaly) SAC [000576]. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht. Accessed online 13.01.2021

NPWS (2019) Conservation objectives: Clonaslee Eskers and Derry Bog SAC [000859]. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht. Accessed online 13.01.2021

NPWS (2020) Conservation objectives for Charleville Wood SAC [000571]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht. Accessed online 13.01.2021

NPWS (2020) Conservation objectives for River Shannon Callows SAC [000216]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht. Accessed online 13.01.2021

NPWS (2020) Conservation objectives for Middle Shannon Callows SPA [004096]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht. Accessed online 13.01.2021

NPWS (2020) Conservation objectives for Mongan Bog SPA [004017]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht. Accessed online 13.01.2021

NPWS (2020) Conservation objectives for Slieve Bloom Mountains SPA [004160]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht. Accessed online 13.01.2021

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

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.

Scottish Natural Heritage (SNH) (2016) Assessing Connectivity with Special Protection Areas (SPA)

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.



Appendix 1

**TURRAUN BOG CUTAWAY BOG
DECOMMISSIONING AND
REHABILITATION PLAN 2021**



Turraun Bog

Cutaway Bog Decommissioning and Rehabilitation Plan 2021

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

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

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

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

Industrial peat production has now permanently ceased at Turraun 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. P0500-01, due regard was also given to the proposed Peatlands Climate Action Scheme (PCAS) announced by the Minister. 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 Turraun 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 Turraun Bog as environmental stabilisation, re-wetting and setting the bog on a trajectory towards development of naturally functioning peatland habitats.

Any consideration of any other future after-uses for Turraun 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:	Turraun Bog Rehabilitation Plan 2021					
Document File Path:	G:\Ecology Team\EPA draft rehab plans 2017 word docs\Boora ref.500\ Turraun					
Document Status:	Draft					
This document comprises:	DCS	TOC	Text (Body)	References	Maps	No. of Appendices
	1	2	31	3	(7)	10
Rev.	1.1	Author(s):		Checked By:		Approved By:
Name(s):		SD		MMC		MMC
Date:		21/10/2020		9/12/2020		9/12/2020
Rev.	1.2	Author(s):		Checked By:		Approved By:
Name(s):				MMC		MMC
Date:				11/01/2021		11/01/2021
Rev.	1.3	Author(s):		Checked By:		Approved By:
Name(s):		DMN		MMC		MMC
Date:		26/05/2021		27/05/2021		27/05/2021

Table of Contents

Summary.....	1
1. Introduction.....	5
1.1 Constraints and Limitations.....	6
2. Methodology	7
2.1 Desk Study	7
2.2 Consultation	9
2.3 Field Surveys.....	9
3. Site Description.....	10
3.1 Status and Situation.....	10
3.1.1 Site history.....	10
3.1.2 Current land-use	13
3.1.3. Socio-Economic conditions.....	13
3.2 Geology and Peat Depths	14
3.2.1 Sub-soil geology.....	14
3.2.2 Peat type and depths.....	14
3.3 Key Biodiversity Features of Interest.....	14
3.3.1 Current habitats.....	14
3.3.2 Species of conservation interest	16
3.3.3 Invasive species	18
3.4 Statutory Nature Conservation Designations.....	18
3.4.1 Other Nature Conservation Designations	18
3.5 Hydrology and Hydrogeology	22
3.6 Emissions to surface-water and water-courses.....	22
3.6.1. Decommissioning and Rehabilitation Programme Water Quality Monitoring.	24
3.7 Fugitive Emissions to air	25
3.8 Carbon emissions.....	25
3.9 Current ecological rating	26
3.10 Turraun Bog Characterisation Summary	26
4. Consultation	27
4.1 Consultation to date	27
4.2 Issues raised by Consultees	28
4.2.1 Assessments of rehabilitation	28
4.2.2 Restoration scope.....	28

4.2.3	Monitoring.....	28
4.2.4	Flooding	28
4.2.5	Other issues	28
4.3	Bord na Móna response to issues raised during consultation	29
4.3.2	Assessments of rehabilitation	29
4.3.3	Restoration scope	29
4.3.4	Monitoring.....	29
4.3.5	Impacts on adjacent land.	30
4.3.6	Future management.....	30
4.3.7	Amenity	30
4.3.8	Other issues	31
4.3.9	Concluding statement.	31
5.	Rehabilitation Goals and Outcomes.....	32
6.	Scope of Rehabilitation.....	34
6.1	Key constraints	35
6.2	Key Assumptions	36
6.3	Key Exclusions.....	36
7.	Criteria for successful rehabilitation	37
7.1.	Criteria for successful rehabilitation to meet EPA IPC licence conditions:	37
7.1.1	Additional criteria for successful rehabilitation for the optimisation of climate action and other ecosystem service benefits:	39
7.2.	Critical success factors needed to achieve successful rehabilitation as outlined in the plan.....	42
8.	Rehabilitation Actions and Time Frame	44
8.1	Short-term planning actions (0-1 years).....	45
8.2	Short-term practical actions (0-2 years).....	46
8.3	Long-term (>3 years)	46
8.5	Budget and costing.....	52
9.	Aftercare and Maintenance.....	53
9.1	Programme for monitoring, aftercare and maintenance.....	53
9.2	Rehabilitation plan validation and licence surrender – report as required under condition 10/4	54
10.	References.....	55
	Appendix I: A standard peatland rehabilitation Plan to meet conditions of the IPC Licence	59
	APPENDIX II: Bog Group Context.....	64
	APPENDIX III: Ecological Survey Report.....	67

APPENDIX IV: Environmental Control Measures to be applied to bog rehabilitation.....	72
APPENDIX V: Biosecurity.....	73
Appendix VI: Policy and Regulatory Framework	74
APPENDIX VII. Decommissioning.....	81
1. Condition 10 Decommissioning.....	81
2. Enhanced Decommissioning.....	83
APPENDIX VIII. Glossary.....	84
APPENDIX IX. Extractive Waste Management Plan.....	86
APPENDIX X. Mitigation Measures for the Application of Fertiliser.....	90
APPENDIX XI. Consultation Summaries	91
APPENDIX XII. Archaeology	101

SUMMARY

Name of bog: Turraun **Area:** 535.Ha

Site description:

- Turraun Bog has a long history of peat extraction. This bog was one of the first bogs to be brought under the management of the Turf Development Board, which developed into Bord na Móna. Consequently, it contains some of the oldest cutaway habitat within the BnM estate.
- Turraun Bog was originally drained and developed for industrial peat production in the 1940s. Industrial peat production ceased in 2018.
- Part of Turraun was developed for wetlands and amenity as part of the Lough Boora Discovery Park in the 1990s and a walking trail is still present around the site. There is also now a cycle track linking Lough Boora Discovery Park to the Grand Canal greenway.
- The former peat production footprint now comprises wetlands, bare peat, mosaics of pioneering vegetation, semi mature woodlands and emergent woodland/scrub habitats. Active drainage channels are present on site.
- Peat depths over most of the site are approximately 0.5-1m. Some areas in the southern section contain peat deposits of 1-2.5m. As a result, Turraun is considered a **shallow peat** cutaway bog.
- The Grand Canal pNHA is located adjacent to the northern site boundary of Turraun Bog.

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 Licence.
- 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 **wetland creation and intensive re-wetting**.
- Optimising hydrological conditions for the development of fen and Reeds swamp on shallow cutaway peat, and eventually naturally functioning peatland habitats.
- Rehabilitation will support the National Policies on Climate Action and GHG mitigation by maintaining and enhancing the current condition peat storage capacity of the bog (locking the carbon into the ground). In time, it is expected that the bog will develop its carbon sink function, in part, as *Sphagnum* communities develop across the bog. It will also support Ireland's commitments towards Water Framework Directive and the National River Basin Management Plan 2018-2021 and future National River Basin Management Plans.
- Note that it will take some time for stable naturally functioning peatland and wetland habitats to fully develop at Turraun Bog.

Scope of rehabilitation

The principal scope of this rehabilitation plan is defined by:

- The area of Turraun Bog.
- EPA IPC Licence - Ref. P0500-01. As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. The key objective of 'rehabilitation', as required by this licence, is achieved by the **environmental stabilisation** of the bog.

- **The 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 Turraun Bog, in particular, optimising **climate action benefits**.
- The local environmental conditions of this bog. Turraun Bog has variable environmental characteristics with a range of residual peat depths, hydrology and topography.
- The key goals and outcomes of rehabilitation at this bog outlined above.
- Minimising potential impacts on neighbouring land. Some boundary drains around Turraun Bog will be left unblocked as blocking boundary drains could affect adjacent land.
- Bord na Móna have identified the main land-use at this site as biodiversity and ecosystem services. A significant part of the site is part of the Lough Boora Discovery Park.
- Some areas have been planted with conifer and broad-leaved woodland and are out of scope of this rehabilitation plan.

Criteria for successful rehabilitation:

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

- Rewetting of peat in the former area of industrial peat production to slow water movement across the site to retain silt, accelerating the development of vegetation cover via natural colonisation, and reducing the area of bare exposed peat (IPC Licence validation) through the creation of compatible fen, Reed swamp and other wetland and peatland habitats.
- 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 river catchment (IPC Licence validation). This will be measured by the EPA WFD monitoring programme.
- Optimising the extent of suitable hydrological conditions for climate action (Climate action verification). This will be measured by an aerial survey 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).

Meeting climate action verification criteria and monitoring of these criteria after the Scheme is completed is dependent on support from the Climate Action Fund or other sources of funding.

Summary of measures:

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

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

Timeframe:

- 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.

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.
- For the avoidance of doubt, should the proposed Scheme and the associated statutory obligation on Bord na Móna not materialise, Bord na Móna will not carry out the enhanced decommissioning, rehabilitation and restoration measures described in this plan. Bord na Móna will instead plan to complete only the 'standard' decommissioning and rehabilitation required under Condition 10, see Appendix I, and for which financial provisions have been made, to comply with that element of the Licence.

Monitoring, after-care and maintenance

The monitoring, after-care and maintenance programme for Turraun 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, assess the progress of natural colonisation, monitoring of any potential impacts on neighbouring land and general land security. The number of site visits will reduce after 2 years to bi-annually. These site visits will assess the need to additional rehabilitation, 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 (silt), pH and conductivity.
- Where other uses are proposed for the site, these will be assessed by Bord na Móna in consultation with interested parties. Other after-uses can be proposed for licensed areas and must go through the 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 a 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.
- Carbon emissions monitoring only be carried out on a small proportion of BnM sites to develop better understanding of carbon emissions and GHG emission factors from different types of BnM sites and will be developed on association with other established research programmes. Reduction in carbon emissions will be modelled by a combination of habitat condition assessment and application of appropriate carbon emission factors derived from other sites. Baseline monitoring (habitat condition) will be carried after rehabilitation is completed (during the Scheme). It is proposed that sites can be monitored against this baseline in the future.
- Monitoring as part of Climate Action Verification is dependent on support from the Climate Action Fund or other external funding.

Validation and IPC Licence surrender

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

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

1. INTRODUCTION

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

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

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

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

- Description of site management and status;
- Main issues and approaches to rehabilitation;
- Consultation to date with interested parties;
- Interaction with other policy and legislative frameworks (Appendix VI);
- The planned rehabilitation goals and outcomes;
- The scope of the rehabilitation plan;
- Criteria which define the successful rehabilitation and key targets to validate rehabilitation;
- Proposed rehabilitation actions;
- Proposed timeframe to implement these 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. 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) 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. 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 PCAS will have benefits accruing from biodiversity provision, water quality and storage attenuation as well as increased carbon storage, reduced carbon emissions and acceleration towards carbon sequestration. The Scheme will also facilitate monitoring of carbon fluxes (Greenhouse Gases and fluvial carbon) in selected areas (in addition to other established Research programmes), to monitor changes in where the interventions will accelerate the trajectory towards a naturally functioning peatland ecosystem.

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

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

These are collectively designed to optimise hydrological conditions (ideally and where possible water-levels <10 cm) for climate action benefits and to accelerate the trajectory of the site towards a naturally functioning ecosystem and, eventually, a 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. 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.

Turraun 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 **Turraun Bog**.

Future land-use at Turraun Bog has not been defined by Bord na Móna. Biodiversity and ecosystem services have been currently identified as the primary land-use at Turraun. There are some existing amenities in place, including the cycle route and walking trail and there is a wetland stocked by the a local angling club. Bord na Móna will continue to review the future after-use of its land-bank. Any consideration of any other future after-uses for Turraun 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 Turraun Bog ceased in permanently 2018. Currently the former peat production area comprises both bare peat and re-vegetated areas. The combination of active rehabilitation measures and natural colonisation will quickly establish and/or increase the extent of pioneer vegetation and will be planned to accelerate environmental stabilisation. Nevertheless, it will take some time (30-50 years) for naturally functioning peatland ecosystems to fully re-establish.

Parts of Turraun 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 the margins of Turraun 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.

The former area of Turraun Bog that is now a private Native Woodland Scheme is not considered part of the scope of this rehabilitation plan. Rehabilitation in other areas of the bog may also be constrained due to other property issues or issues such as rights of way.

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 rehabilitation plan considered **recently published** guidance issued by the EPA in 2020 – **Guidance on the process of preparing and implementing a bog rehabilitation plan**.

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

- Experience of 40 years of research on the after-use development and rehabilitation of the Bord na Móna cutaway bogs (Clarke, 2010; Bord na Móna, 2016);
- Significant international engagement during this period with other counties in relation to best-practise regarding peatland rehabilitation and after-use through the International Peat Society and the Society for Ecological Restoration (Joosten & Clarke, 2002; Clarke & Rieley, 2010; Gann *et al.*, 2019);
- Consultation and engagement with internal and external stakeholders;
- GIS Mapping;
- BNM drainage surveys;
- Bog topography and LIDAR data;
- Hydrological modelling; and
- The development of a **Methodology Paper (draft) outlining the 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 Turraun 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.
- Barry, T.A. *et al.* (1973). A survey of cutover peats and underlying mineral soils. Soil Survey Bulletin No. 30. Dublin, Bord na Móna and An Foras Taluntais.
- Bonn *et al.* (2017). Peatland restoration and ecosystem services- science, policy and practice.
- Carroll *et al.* (2009). *Sphagnum* in the Peak District. Current Status and Potential for Restoration. Moors for the Future Report No 16.
- Clark & Rieley (2010). Strategy for responsible peatland management.
- Eades *et al.* (2003). The Wetland Restoration Manual.
- Farrell & Doyle (2003). Rehabilitation of Industrial Cutaway Atlantic Blanket Bog, NW Mayo, Ireland.
- Gann *et al.* (2019). International Principles and Standards for the practice of Ecological Restoration.
- Hinde *et al.* (2010). *Sphagnum* re-introduction project: A report on research into the re-introduction of *Sphagnum* mosses to degraded moorland. Moors for the Future Research Report 18.

- Joosten & Clarke (2002). Wise Use of mires and peatlands – Background and Principles including a framework for Decision-making.
- Lindsay (2010). Peatbogs and Carbon: a Critical Synthesis to Inform Policy Development in Oceanic Peat Bog Conservation and Restoration in the Context of Climate Change.
- Mackin *et al.* (2017). Best practice in raised bog restoration in Ireland. Irish Wildlife Manuals, No. 99. National Parks and Wildlife Service,
- McBride *et al.* (2011). The Fen Management Handbook, (2011), Scottish Natural Heritage.
- McDonagh (1996). Drain blocking by machines on Raised Bogs. Unpublished report for National Parks and Wildlife Service.
- NPWS (2017a). National Raised Bog Special Areas of Conservation management plan. Department of Arts, Heritage and the Gaeltacht.
- 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:

- Boora Integrated Pollution Control Licence;
- Boora Annual Environmental Reports;
- Review of the National Biodiversity Data Centre (NBDC) webmapper;
- Inland Fisheries Ireland (IFI) Reports;
- Environmental Protection Agency database (www.epa.ie);
- EPA Guidance on Requests for Alterations to a Licensed Industrial or Waste Activity;
- BirdWatch Ireland online data (including I-WeBS and CBS datasets; www.birdwatchireland.ie);
- Geological Survey of Ireland - National Draft Bedrock Aquifer map;
- Geological Survey of Ireland - Groundwater Database (www.gsi.ie);
- 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 Turraun Bog was originally surveyed in December of 2009. Additional ecological walk-over surveys and visits have taken place at Turraun Bog between 2009-2020 to inform rehabilitation planning and habitat maps have been updated, where required. The most recent visit undertaken in November 2020. This rehabilitation plan is informed by the original baseline survey as well as subsequent site walk-over surveys and visits, and updates to baseline data.

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

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

3. SITE DESCRIPTION

Turraun Bog is located adjacent to the R357 in Co. Offaly, circa 5.5km to the south-east of Ferbane and 5km north west of Blueball (see Figure 3.1). The surrounding landscape is a mosaic primarily consists of low-lying agricultural land (pasture) interspersed with other raised bogs, many of which have also been managed by Bord na Móna for peat production with some areas utilised for domestic turf-cutting.

Turraun Bog is part of Lough Boora Discovery Park. There are several other Bord na Móna bogs nearby including Pollagh/Cornalaur, The Derries, Oughter, Derrybrat, Boora, Drinagh, Clongawny More and Killaranny. The northern section of Turraun is considered a biodiversity area and is part of the Lough Boora Discovery Park. The Turraun Lagoon is located in this area. There is a small area west of the track through the site containing two small lakes, commercial forestry and woodland. The ecology and amenity potential of Turraun has been studied in detail in the past as part of the development of and study of Lough Boora Discovery Park (Barron *et al.*, 1994; Herry & Finney, 2009; Copland, 2010; Copland, 2015; Egan, 1998; Lally *et al.*, 2012; Renou-Wilson *et al.*, 2008; Rowlands & Feehan, 2000; Trodd 2003).

Turraun is linked to The Derries Bog to the west (also owned by Bord na Móna) by railway line and a machinery travel path. Railway lines and infrastructure also link Turraun to Pollagh Bog and Oughter Bog to the east.

Industrial peat production permanently ceased at Turraun Bog in 2018. A small portion of the original extent of the bog in the south west of the site has been taken up with a forestry plantation managed by Coillte.

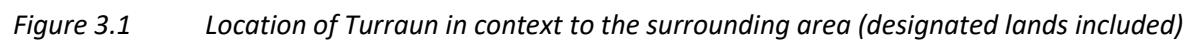
The Boora River (EPA Code: 25B08) flows northward along the western boundary of Turraun Bog. The Pollagh Stream (EPA Code: 25P05) also flows north adjacent to the site eastern boundary. Both water bodies join the River Brosna (EPA Code: 25B09) as it flows west toward the River Shannon less than 500m north of the site. The Grand Canal is situated directly north of and adjacent to Turraun Bog.

3.1 Status and Situation

3.1.1 Site history

Turraun Bog has a long history of peat extraction pre-dating the development of Bord na Móna (Clarke, 2010). This bog was one of the first bogs to be brought under the management of the Turf Development Board, which developed into Bord na Móna. Consequently, it contains some of the oldest cutaway habitat within the Bord na Móna estate. This older cutaway was one of the sites developed as part of the Lough Boora Discovery Park (<https://www.loughboora.com/>). Some rehabilitation and amenity measures, i.e. drain blocking and bunding to create lakes and wetlands, were carried out in the northern section of the site in the 1990s.

Peat production at Turraun Bog ceased in 2018. However, some stockpiles of peat remain on the site following harvesting and these are being transported to Derrinlough Briquette Factory. The site also formerly provided fuel peat for Ferbane Power Station, Co. Offaly and, in latter years, fuel peat was provided to West Offaly Power, Shannonbridge, Co. Offaly. The existing rail line through Turraun is still maintained and is used to transport stock-peat from Turraun and adjacent sites.



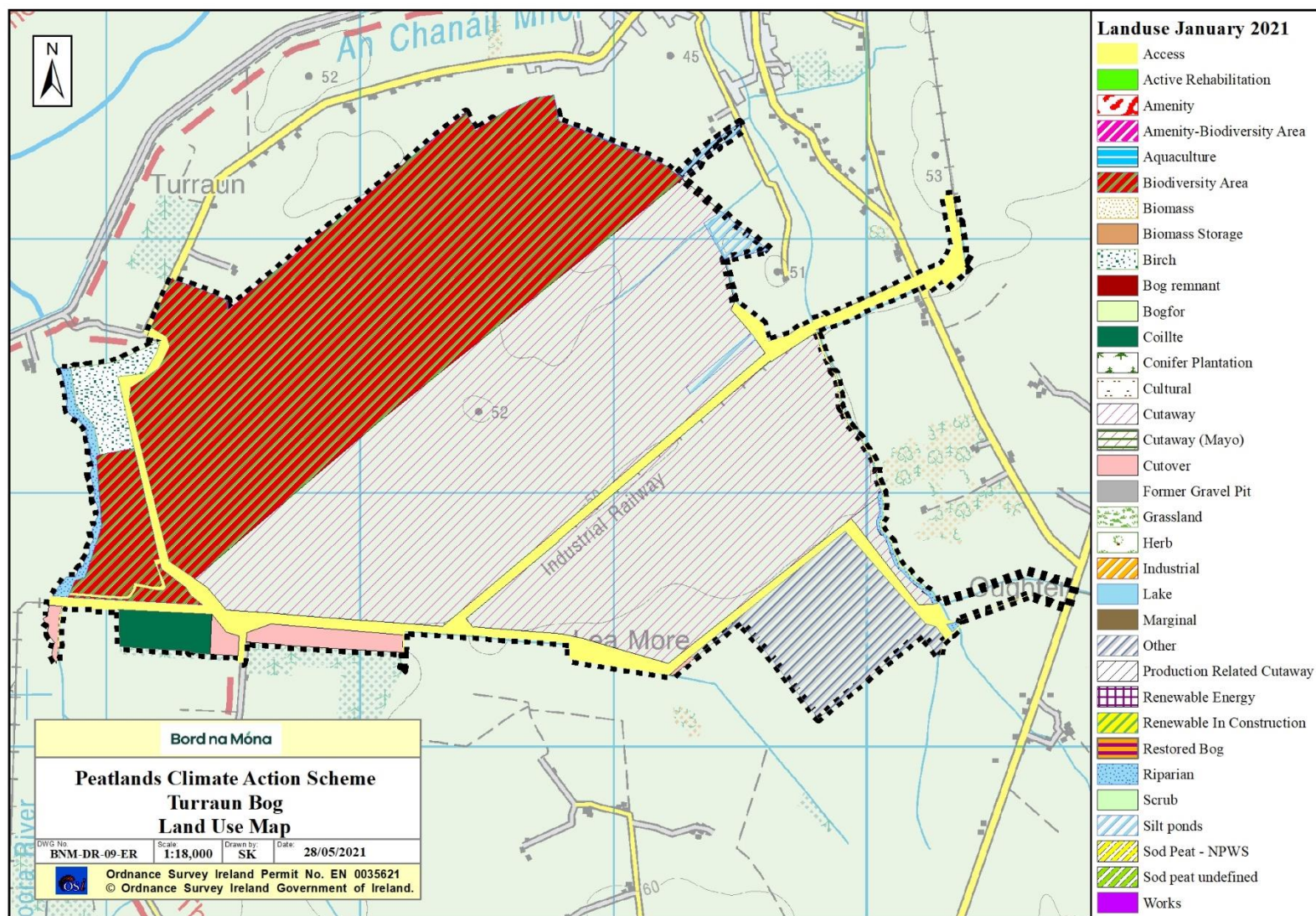


Figure 3.2. Land use at Turraun.

3.1.2 Current land-use

Industrial peat production has now permanently ceased at Turraun Bog. Amenity and Biodiversity and ecosystem services have been identified as the current primary land use at Turraun Bog by Bord na Móna.

A large area in the north of site has been developed as part of the Lough Boora Discovery Park (<https://www.loughboora.com/>). This wetland has hosted nationally important numbers of wintering wildfowl. An amenity walk exists within the woodland habitat to the east of the lake and wetlands extending to the east to encompass Cocta Hill.

The fishing lake to the south-west is used as a Carp fishery by a local fishing club.

The Offaly Way way-marked National walking trail bisects the site and follows the newly upgraded track on the western side of the site.

A block of Conifer Plantation is situated at the south west of the site. This area is managed by Coillte and was planted in the 1980s. The most common crop species is Sitka Spruce *Picea sitchensis*. A smaller amount of Lodgepole Pine *Pinus contorta* also exists within the plantation.

A small area in the north-east of the site is a former Native Woodland plantation, developed by BnM. This consists of Scots pine *Pinus sylvestris* with Birch *Betula pubescens*. The area to the south-east of the site is a private Native Woodland plantation. This area is beyond the scope of this rehabilitation plan.

There are no known rights of way, grazing licences or archaeological features on this bog.

3.1.3 Socio-Economic conditions

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

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

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

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

These job numbers have now declined with the cessation of peat extraction at this bog. It is anticipated that the 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 Turraun Bog is mainly composed of Waulsortian Limestones¹. There is a small area of Fossiliferous dark-grey muddy limestone situated in the north of the site.

The underlying soils and sub-soils are classed as 'Raised Bog Cutover Peat'. Clays underlie the majority of the sampled area (See Figure 8.2) but there is shell marl underlying the peat in places.

3.2.2 Peat type and depths

Commercial peat extraction was undertaken at Turraun Bog up until 2018. The long history of peat extraction at Turraun Bog has resulted in the majority of the site being cutaway (Figure 8.2) with residual peat depths typically very shallow (less than 1m deep, and much less than that in many areas). Some deeper peat deposits persist in small pockets towards the southern section of the site with up to 2.5m of peat remaining in places.

3.3 Key Biodiversity Features of Interest

The bog is currently developing pioneer cutaway habitats (production-related cutaway) and can be divided into sections based on current physical characteristics and land-use. Some rehabilitation measures have previously been carried out on the northern section. The remainder of the site is slowly developing pioneering bare peat habitats. Much more is known about the ecology of Turraun Bog than most Bord na Móna cutaway sites (e.g. Egan (1998); Heery (1999); Rowlands (2001); Copland (2008); Copland (2009); Renou-Wilson *et al.* (2008)).

3.3.1 Current habitats

Northern section

This area has been managed for biodiversity and amenity for a number of years. Turraun lake and wetlands was created by blocking drains and the construction of a berm around a natural basin in the early 1990's. The lake and wetlands provides a large open water habitat for wetland birds. It also provides extensive reedbed area and pioneer fen habitat. An area of developing birch woodland dominates the area to the immediate east of the wetland, much of which has been in development for over 20 years. This woodland now has many areas of closed canopy and is one of the best developed cutaway woodlands within the Bord na Móna estate (See Figure 3.3). The understory of this woodland remains less developed and is still dominated by bramble scrub in many places, where it is dry. Small patches are re-wetting, have high *Sphagnum* cover and have the potential to develop into habitat that is analogous with Annex I bog woodland in the future.

Cocta Hill is situated further east across the northern section of the site. This hill is a north-south oriented glacial ridge that was originally covered with raised bog. The peat has been cutaway and areas of exposed glacial subsoil and shallow peat have resulted in development of habitats not usually seen on cutaway bogs, e.g. calcareous dry grassland. This grassland is a feature of high biodiversity value due to its flora. It is orchid-rich and contains scarce and rare species such as Blue Fleabane and Field Gentian. Dry heath, dense bracken and dry grassland can also be found on Cocta Hill (See Figure 3.3). To the east of the ridge, a native woodland scheme plantation of Scots Pine and Pedunculate Oak was established by Bord na Móna.

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



Figure 3.3. Birch woodland and heathland habitats developing at Turraun.

The Central section

This area was harvested until recently (2018). This area is dominated by bare peat and the associated pioneer habitats. Dry cutaway habitats dominated by Heather and birch scrub are developing on high fields while pioneer poor fen habitat dominated by *Eriophorum* species is developing in wetter or low lying areas.

Southern Section

The southern section has been out of production for many years and is developing into a mosaic of habitats through natural regeneration. Pioneer wetland habitats dominated by *Phragmites australis* and *Typha latifolia* are developing in some areas. *Eriophorum* dominated pioneer fen habitats containing *Juncus* species are also developing in parts of this section (See Figures 3.4 and 3.5). Bare peat cutaway habitat is also present over much of this area. In Winter, large bodies of open water can be found in the low lying areas in this section, which attract wintering waterbirds.

Part of the bog south of the railway is also developing in a similar fashion and re-wetting with a mosaic of small open water bodies, pioneer fen and bare peat habitats. Part of this cutaway area was transferred to a third party as part of a privately developed Native Woodland Scheme.

Western Section

The western section comprises of a small Coillte commercial forestry plantation, a small band of improved grassland, calcareous grassland developing on the gravel used to support the former railway, two small artificial lakes and some areas of bare peat. The conifer forestry plantation contains some old forestry trials. The former railway track has been developed as an amenity trackway and for local access. There is an amenity car-parking facility positioned at the south-west corner of the site. The smaller of the two lakes has very steep banks and has not developed any riparian habitat. The second and larger lake, was developed for angling and was maintained by a local Carp angling group. An area of maturing Bog Woodland has developed on a low-lying section of cutaway bog.

A habitat map of Turraun Bog is shown in Figure 3.6.

3.3.2 Species of conservation interest

A number of species of conservation concern utilize the habitats available at Turraun Bog.

Badger, European Otter, Fox, Hare Pine Marten, Fallow Deer and Rabbit have all been observed on Turraun Bog during Bord na Móna walkover surveys.

Insect records for the area include four butterfly species of conservation concern, namely; Marsh Fritillary, Small Heath, Dingy Skipper and Silver Washed Fritillary. Turraun is part of the NBDC Butterfly Monitoring Scheme. Butterfly diversity has remained relatively stable during the period of monitoring 2012-2018. Species that appeared during the latter part of this monitoring included Dark Green Fritillary and Marsh Fritillary. Species such as Dingy Skipper are supported by the developing calcareous grassland.

Records for 104 Beetle species, of which only *Nebrioporus depressus* and *Paracymus scutellaris* are considered near threatened have also been recorded on or within 1km of the site. Regarding *Hymenopteran* species, 13 have been recorded within 1km of site, of which, Large Red-Tailed Bumblebee *Bombus lapidaries* is designated as “Near Threatened” by the IUCN. Records of six species of mayfly, of which *Procladius bifidus* is categorised as “Vulnerable” also exist. Further entomological records include; 116 Moth species, 30 true bug species, 16 butterfly species separate to those mentioned already, 15 Odonata species, 11 true fly species, five Caddisfly species, two grasshopper species and one *Thysanoptera* species, none of which are of immediate conservation concern. There are also records for five species of spider, none of which are of immediate conservation concern.

There are 233 flowering plant species recorded on or near (within 1km) the site. Of that number only blue fleabane *Erigeron acer* is of direct conservation concern.

Cutaway bog habitat is useful to numerous bird species at different times of year. Birds have been well-recorded at Turraun for over 20 years (Breen, 2000) and over 100 bird species have been recorded. However, habitat succession during this period has resulted in changes to the bird populations using the site. Nevertheless, the site continues to host county, if not nationally, important numbers of certain species.

Wintering wildfowl have been recorded regularly using the site including Mute Swan, Whooper Swan, Mallard, Eurasian Wigeon and Tufted Duck. Other wetland species recorded on site include Grey Heron, breeding Great Crested Grebe and Little Grebe. Waders such as European Golden Plover have been recorded on site during winter. Breeding wader species recorded on site during summer months include Northern Lapwing, Common Sandpiper, Common Snipe, Ringed Plover and Eurasian Woodcock.



Figure 3.4. View of the revegetating milled peat surface (2020) across Turraun bog. Note some Whooper Swans in the background using the developing wetlands.



Figure 3.5 View of wetland habitat and emergent vegetation at Turraun Bog (2020)

Raptors, including Merlin, Common Kestrel, Buzzard and Sparrowhawk have been recorded on site. No confirmed breeding records exist but breeding attempts are considered probable particularly for Kestrel and Sparrowhawk. Barn Owl *Tyto alba* and Long-eared Owl have been recorded attempting to breed on or close to site also. Hen harrier *Circus cyaneus* have been recorded on site during winter months and are known to roost on the site.

Other bird species of conservation concern recorded using the site include Meadow Pipit, Skylark and Common Kingfisher *Alcedo atthis*. Black-Headed Gull *Larus ridibundus* formerly bred at Turraun Bog and may continue to do so irregularly. Passage waders, such as Greenshank, Little Stint Jack Snipe and Oystercatcher have also been recorded stopping in at the wetlands.

3.3.3 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.

A broad range of common garden escapees/Invasive Alien Species are occasionally detected on or close to former peat production sites. All invasive alien species detected will be treated in line with Best Practice during PCAS activities, where necessary. Records exist for American Mink *Mustela vison*, and Sycamore *Acer pseudoplatanus* at Turraun but are unlikely to be further dispersed during or as a result of PCAS activities. No other invasive alien species, as listed under Regulation (EU) 1143/2014 on the prevention and management of the introduction and spread of invasive alien species, likely to be further dispersed during or as a result of PCAS activities has been recorded at Turraun Bog.

3.4 Statutory Nature Conservation Designations

There are no European Sites (SAC or SPA) located within 5km of Turraun Bog (See Figure 3.1). Due to its location within the Lower River Shannon catchment, Turraun is hydrologically connected to at least two downstream European Sites namely the Middle Shannon Callows SPA (Site Code 004096 -17km due west), and the River Little Brosna Callows SPA (Site Code 004086 - ca.22km south west). The nearest SAC is Ferbane Bog SAC (Site Code 000575) which is approximately 6Km to the north-west. Clara Bog SAC (Site Code 000572) is approximately 6.5Km to the north-east of Turraun. Moyclare Bog SAC (Site Code 000581) is situated circa. 8.5Km west of the site.

The Grand Canal pNHA (Site Code 002104) is situated directly to the North of Turraun Bog. Lough Boora pNHA (Site Code: 001365) is approximately 3.5Km to the south of site (Figure 3.1).

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 Turraun Bog (i.e. within 3km) The closest Ramsar Sites to Turraun Bog include Pollardstown Fen (Kildare), Clara Bog and Raheenmore Bog (Offaly).

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

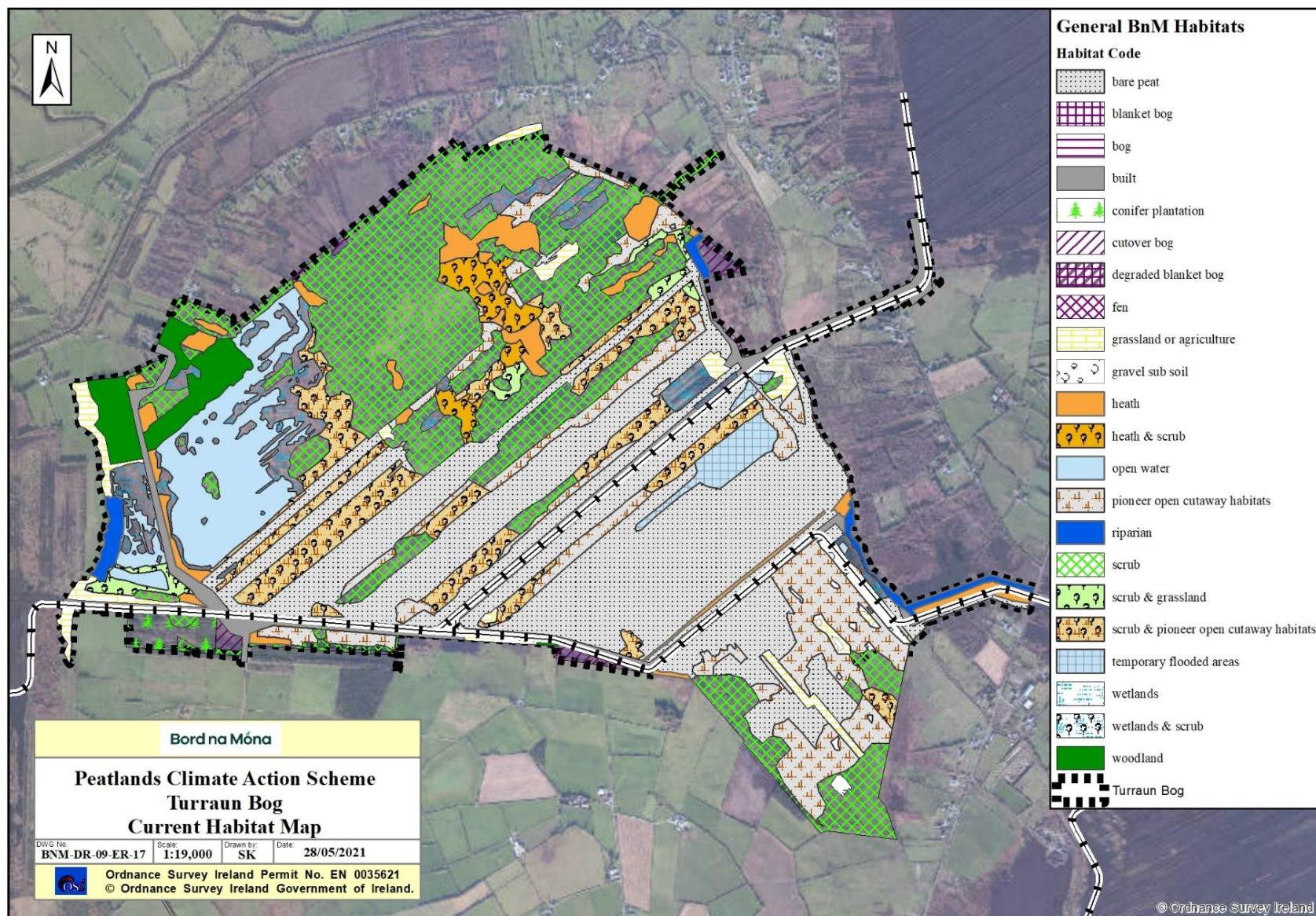


Figure 3.6. *Habitat map of Turraun Bog showing Bord na Moña habitat categorisation (November 2018).*

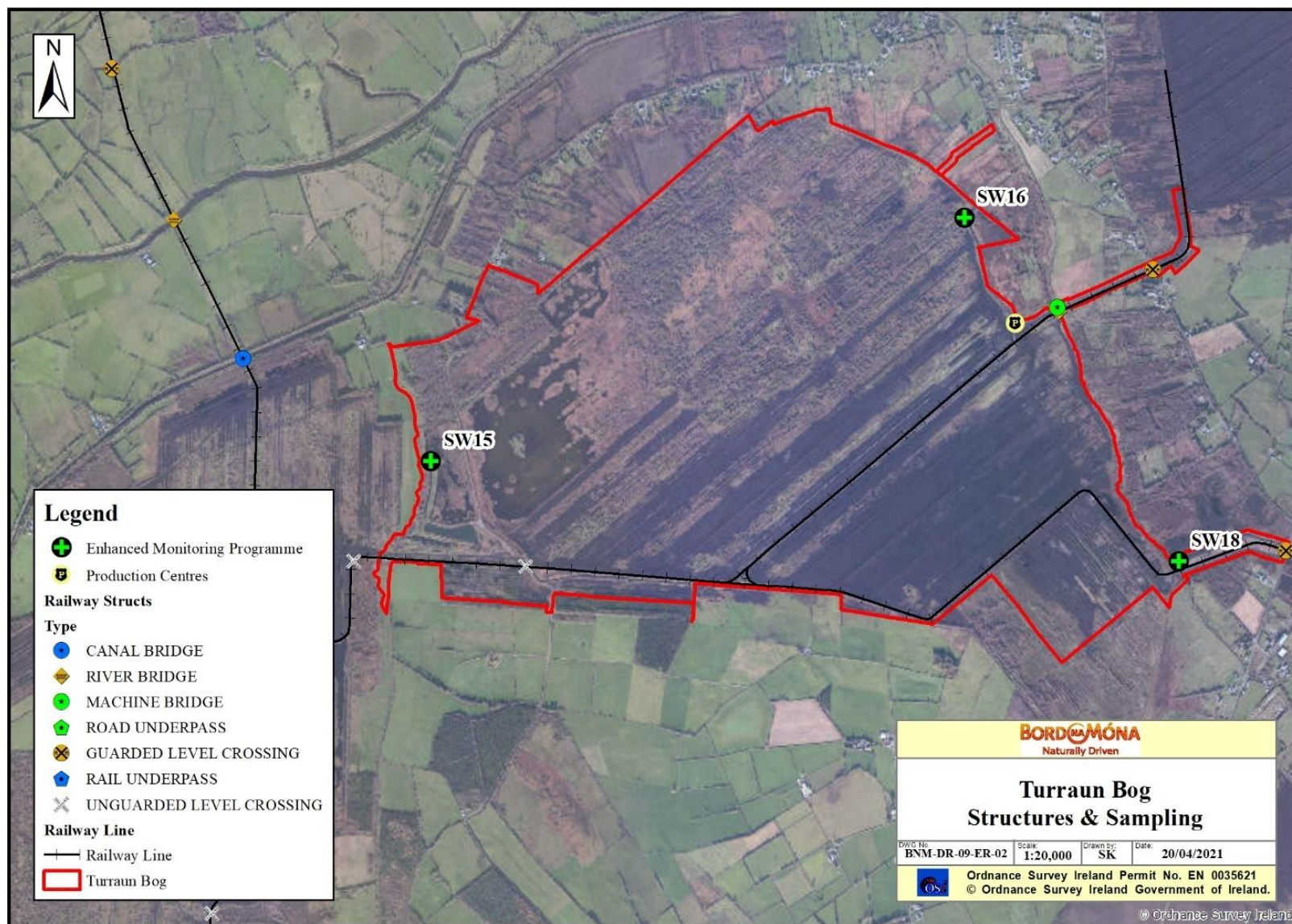


Figure 3.7. Map of Turraun Bog showing structures and designated emission points

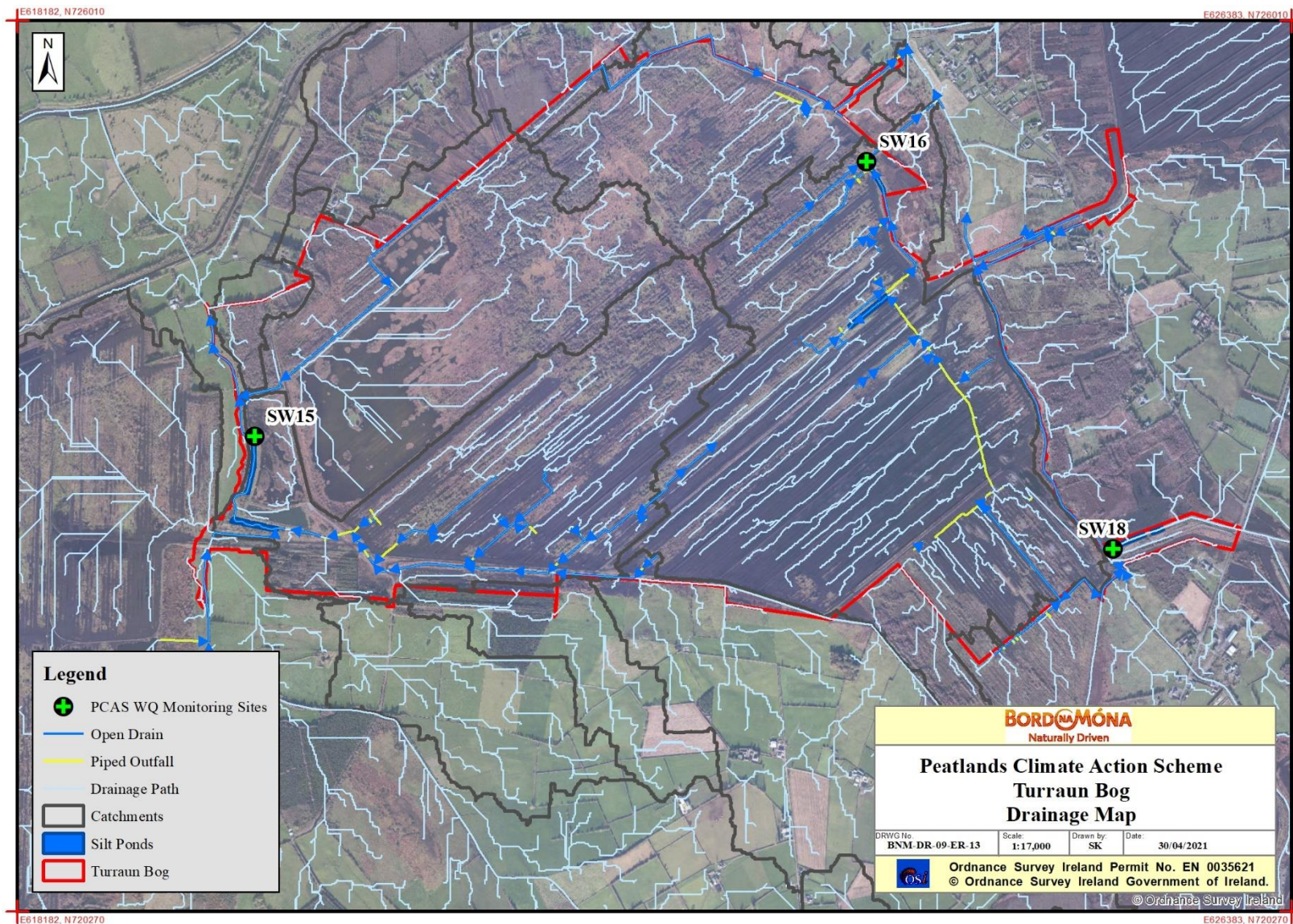


Figure 3.8. Key drainage features.

3.5 Hydrology and Hydrogeology

Turraun Bog has a gravity drainage regime. Part of the bog was rehabilitated as part of the Lough Boora Discovery Park. A lake was developed in a basin by developing a bund that closed one part of this natural basin. This created the lake and associated wetlands. Part of the bog (south-east section, recently in peat extraction) is a mosaic of relatively dry areas with active functioning drains. One section is already developing cutaway wetlands as it is a topographical basin and drainage has been impeded. Initial hydrological modelling indicates the bog has topographical basins that are expected to develop a mosaic of wetland habitats when rehabilitation is carried out and drains are blocked. A significant part of the site is also modelled as being relatively dry (Figure 8.4).

Turraun Bog is located in the Lower River Shannon Catchment (Shannon_Lwr) (Figure 3.7 & 3.8). It is mainly drained to the west, by the Boora River (EPA Code: 25B08). The Pollagh Stream (EPA Code: 25P05) drains Turraun Bog to the east. Both water bodies flow north along the site boundaries (west and east) before converging with the River Brosna (EPA Code: 25B09) south of Ferbane, Co. Offaly.

There are three active silt ponds present on the Turraun site. Two silt ponds are situated in the west of the site. These western silt ponds manage discharges into the Boora River and in turn the Brosna. The remaining silt pond is located in the east of the bog to manage discharges into the Pollagh Stream and Brosna. The bog has field drains running in a general north to south orientation. Turraun is a gravity drained bog.

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

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 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. Lacustrine deposits in the site generally consist of shell marl. The bog water table across the site is expected to be high when bog drains are locked, and perched above the underlying regional groundwater table. The ability of the shallow peat water to interact with the underlying regional groundwater flows is limited by the permeability of the underlying glacial deposits. As such the potential for bog rehabilitation to interact or impact on underlying groundwater is very low.

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. Industrial peat production has now permanently ceased at Turraun 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 period. Silt pond decommissioning will be considered when sites are deemed to be on a trajectory of environmental stability and peatland rehabilitation has been completed.

Turraun bog has 2 treated surface water outlets to the Pollagh Stream (Brosna) 010 IE_SH_25P050300 and the Boora River IE_SH_25B080100 (Figure 3.7 & 3.8). In relation to the Pollagh Stream, peat extraction was identified as a pressure in the second cycle of the river basin management plan but is not indicated as remaining so in the third cycle, currently under preparation, with the downstream receiving Brosna River remaining as not under pressure from peat extraction. With regard to the Boora River, it is indicated as not being at risk. 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 (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.

There are no exceedances in the IPC Licence limits for Suspended solids and Ammonia resulting from ongoing surface water monitoring. Initial monthly ammonia concentrations from August to January 2021 have a range of 0.059 to 0.308mg/l with an average of 0.144mg/l.

The main emission limit value associated with this bog is 35mg/l suspended solids, with trigger levels for ammonia of 3.7mg/l and COD 100mg/l. From an analysis of any monitoring over the past 3 yrs. of the IPC licence environmental monitoring of some of the discharges from this bog, indicate that results were under the ELV for SS and trigger levels for ammonia and COD (Table 3.1).

Table 3.1.

Bog	SW	Monitoring	pH	SS	TS	Ammonia	TP	COD	Colour
Turraun	SW-15	Q3 19	7.7	6	437	0.19	0.05	48	103
Turraun	SW-16	Q3 19	7.5	2	467	0.069	0.05	45	127
Turraun	SW-15	Q4 17	7.3	6	440	0.14	0.05	82	192
Turraun	SW-16	Q4 17	7.4	7	258	0.82	0.05	70	212
Turraun	SW-15	Q2 16	7.8	5	407	0.04	0.11	41	83
Turraun	SW-16	Q2 14	7.2	5	392	2.1	0.05	29	111

Rehabilitation of cutaway peatland is closely linked with control of emissions. One of the criteria for successful rehabilitation is stabilisation through re-vegetation, which will stabilise all substrates and in turn remove the need for further silt control measures. Re-wetted peat also aid the primary objective of stabilizing peat, as when peat is re-wetted it minimises risk to wind erosion. Re-wetted peat and the development of wet peatland habitats can

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

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

Water will still discharge from designated emission points when rehabilitation at Turraun Bog has been completed. Existing silt ponds will continue to be maintained and operated as long as required or such point as they can be decommissioned, with no change in outfall type. This discharge will have improving water quality and there will be increased wetland attenuation, meaning slower release of water. This is expected to have a positive impact on status of the key downstream water body receptors.

3.6.1. Decommissioning and Rehabilitation Programme Water Quality Monitoring.

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

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

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

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

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

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

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

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

3.7 Fugitive Emissions to air

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

3.8 Carbon emissions

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

The EPA-funded CarbonRestore Project (Renou-Wilson *et al.* 2012) found that rewetting of drained peatlands can lead to restoration of functional peatland, such as the return of typical plant and animal species, which in turn may lead to the restoration of peat-formation and the C-sink function. The EPA NEROS project carried out GHG flux research at Moyarwood Bog and found that Moyarwood Bog was overall a Carbon sink (sink for CO₂ and a source for Methane) 6 years after bog restoration was carried out (Renou-Wilson *et al.* 2018).

It is expected that Turraun Bog can become a reduced carbon source following rehabilitation. The potential of any cutaway site to develop as a reduced carbon source/carbon sink in the longer-term depends on the success of the rehabilitation measures, the extent of development of *Sphagnum*-rich or other peat-forming habitats, the balance of carbon fluxes from different cutaway habitats and future climatic conditions. This site is expected to develop a mosaic of fen, Reed swamp, wet woodland, scrub. Birch woodland is expected to develop on the drier mounds and peripheral headlands.

3.9 Current ecological rating

(Following NRA (2009) Evaluation Criteria)

The majority of this site can be rated as having a County level ecological value (C-) as it is dominated by a significant area of naturalising cutaway habitats in good condition and contains sites, habitats and species of potentially a national interest such as the wetlands and lakes. The breeding and wintering wader and water bird usage of this site has transitioned over the years as the site has naturalised and matured. Water birds now utilise the SE section of the site that has been in peat production until recently.

Some sections of cutaway have developed areas of poor fen and scrub and can be rated as having **Moderate value, locally important (D)**.

It is expected that the overall ecological value of this site will increase in the future as the site re-vegetates, matures and forms semi-natural habitats, such as more extensive areas of fen and Reed swamp.

3.10 Turraun Bog Characterisation Summary

Turraun Bog is located c. 5.5km to the south-east of Ferbane and 5km north west of Blueball in Co. Offaly (see Figure 3.1). It is part of the Boora Bog group and is linked to The Derries Bog to the west by railway line and a machinery travel path. Railway lines and infrastructure also link Turraun to Pollagh Bog and Oughter Bog to the east. Turraun Bog is also part of the Lough Boora Parklands.

Turraun Bog has a long history of peat extraction pre-dating the development of Bord na Móna. The peat was harvested for fuel peat to be used in Ferbane Power Station, West Offaly Power (Shannonbridge) and Derrinlough Briquette Factory. Industrial peat extraction has now completely ceased at Turraun Bog (2018). The majority of the bog is classed as shallow peat cutaway bog, with residual peat depths of generally <1 m.

Turraun Bog is located in the Lower Shannon Catchment (WFD Sub Catchment Shannon [Lower]_SC_030). It is mainly drained to the west, by the Boora River (EPA Code: 25B08). The Pollagh Stream (EPA Code: 25P05) drains Turraun Bog to the east. Both water bodies flow north along the site boundaries (west and east) before converging with the River Brosna (EPA Code: 25B09) south of Ferbane, Co. Offaly.

The bog can be broadly divided into three categories:

1. Wetland cutaway bog
2. Dry cutaway and marginal areas of the former production area
3. Other marginal areas with no rehabilitation proposed.

The bog is divided into these four areas to assist rehab planning. In reality, there are natural transitions between these areas where there are ecological and environmental gradients in relation to residual peat, etc. These are summarised further as follows.

- Due to the topography of the site, a significant portion of the former production area will develop into wetland habitats post rehabilitation. Dependant on local water chemistry conditions a mosaic of rich fen, poor fen, Reeds swamp and wet woodland habitats are expected to develop in these areas.
- The dry cutaway and marginal areas of the former production area are located throughout the site. Drain-blocking and some fertiliser application is proposed for these areas. The habitats already present are expected to continue to develop post rehabilitation. Enhanced rehabilitation measures are expected to facilitate and expedite the development of cutaway birch and scrub habitat in these areas.
- Some parts of the former production area are constrained from rehabilitation to prevent unintended impacts occurring on neighbouring lands.

4. CONSULTATION

4.1 Consultation to date

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

There has been ongoing consultation about rehabilitation and other general issues over the years about Turraun 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.
- 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).
- The development of Lough Boora Discovery Park (Offaly County Council);
- Bird surveys carried out by Birdwatch Ireland for Bord na Móna,
- the development of the cycle track (Offaly Leader and Offaly County Council);
- development of a management plan for Lough Boora with local stakeholders from Pollagh (Birdwatch Ireland 2018)
- interaction with the Grand Canal with Waterways Ireland.

The ecology and amenity potential of Turraun has been studied in detail in the past as part of the development of and study of Lough Boora Discovery Park (e.g. Barron *et al.*, 1994; Heery and Finney, 2009; Copland, 2010; Copland, 2015; Egan, 1998; Lally *et al.*, 2012; Renou-Wilson *et al.*, 2008; Rowlands and Feehan, 2000; Trodd, 2003).

To inform the current Plan, both national and local stakeholders, including neighbours whose land adjoins Turraun 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 Turraun Bog (see Appendix XI).

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 Turraun Bog – these are summarised below.

4.2.1 Assessments of rehabilitation

Queries on pre-rehabilitation assessments were raised by NPWS, Offaly 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. Offaly County Council also requested that the after use of the BnM bogs be considered as part of PCAS.

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.

4.2.4 Flooding

The IFA, individual local residents, Offaly County Council 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 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).

Offaly County Council expressed concerns regarding potential issues with security, fire risk and water pollution arising as a result of PCAS.

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. Consultation

BnM carried out extensive consultation as part of the process of developing the rehabilitation plan for Turraun. This is ongoing with a dedicated Community Liaison Officer communicating to affected and interested parties. A website has been developed to make information available. This will be continually updated. It is expected that some PCAS Bogs will become demonstration sites so that interested stakeholders can come to visit and observe the measures on the ground.

4.3.2 Assessments of rehabilitation

AA screening will be undertaken on all the bogs as part of PCAS and this is currently being undertaken by external consultants for Turraun 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 the bogs in PCAS (Appendix XII). The aim for known archaeology on these bogs is to accomplish preservation in situ and we are taking steps to identify and avoid all known archaeology. Bord na Móna aim to achieve this through including all known archaeology in the planning process of rehabilitation works and implementing an exclusion or buffer zone around these features. These measures should sufficiently protect any archaeology in these areas, during any ground works in the final plan. It is anticipated that any archaeology will benefit 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.

4.3.3 Restoration scope

As part of the PCAS, all restoration/rehabilitation options have been developed to support climate action and biodiversity objectives. Other issues such as existing amenity, social impacts, industrial history, archaeology were not part of the direct scope of PCAS but were considered when developing the rehabilitation plan. After use of the bog is outside the scope of PCAS. However, it is envisaged that potential after uses of Turraun Bog for instance, amenity walkways/cycleways should not be adversely impacted by PCAS and will be supported and enabled by the proposed rehabilitation measures. Rehabilitation will lead to the development of a stable diverse re-wetted cutaway landscape that will have added benefits for amenity in the future.

4.3.4 Monitoring

As part of the PCAS, a monitoring and verification plan has been developed to support climate action and biodiversity objectives. This will include stratified monitoring of bog condition, habitats and biodiversity at several different scales. Some fauna monitoring (pollinator transect) is proposed as part of the monitoring and

verification at Turraun 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 Turraun Bog. The re-colonisation of species such as Large Heath is likely to take a longer timeframe.

4.3.5 Impacts on adjacent land.

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

External consultants have been appointed to carry a hydrological assessment to identify any potential impacts to neighbouring lands and to mitigate against any such impacts.

The rehabilitation measures proposed at Turraun 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.

4.3.6. Future management

Turraun is part of the Lough Boora Discovery Park. It will continue to be managed for amenity and biodiversity into the future. There will be more opportunities for other biodiversity/conservation management that are not in the scope of PCAS. Public rights of way will be facilitated.

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

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

4.3.7 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. This site is part of Lough Boora Discovery Park and a cycle track already exists along the southern margin of the site and a walking route is present through the northern part of Turraun Bog. There can be further opportunities to extend amenity at this site. Any future amenity can be positively aligned and integrated to after-use plans following the completion of the proposed rehabilitation at Turraun Bog. Rehabilitation measures proposed for Turraun 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.

4.3.8. *Other issues*

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

4.3.9 *Concluding statement.*

- A large part of Turraun bog is largely stabilised and developing a mosaic of habitats already. This will not be radically changed.
- No specific issues were raised during consultation that required significant changes to the substance of the rehabilitation plan.
- Issues raised by several consultees in relation to potential impacts on adjacent land had already been accounted for during the hydrological analysis and assessment, and corresponding adaptations to incorporate Drainage Management Plan mitigation measures.
- Several marginal drains will not be blocked to avoid impacts on adjacent lands, Coillte forestry, rights of way or turf-banks. This does not change the overall rehabilitation goals and outcomes and can be integrated with the other rehabilitation measures to allow cutaway re-wetting.
- No changes were required to the rehabilitation plan to enable any future potential amenity.

5. REHABILITATION GOALS AND OUTCOMES

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

- Meeting conditions of IPC Licence.
- Stabilisation or reduction in water quality parameters of water discharging from the site (e.g. suspended solids).
- Reducing pressure on receiving water-bodies that have been classified as At Risk from peatlands and from peat extraction, via stabilization or improving water-quality from this bog, and therefore, reducing pressures.
- Optimising hydrological conditions for **climate action benefits as part of PCAS**. Optimising hydrology for the development of embryonic *Sphagnum*-rich vegetation communities on deep peat, and eventually naturally functioning and peatland habitats.
- Optimising hydrological conditions for the development of Reed Swamp and fen on shallow more alkaline peat and other subsoils.
- Optimising hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future, where possible.
- The main goal and outcome of this plan is the successful rehabilitation (environmental stabilisation) of peatlands used for industrial peat production at the bog in a manner that is acceptable to both external stakeholders and to Bord na Móna and which optimise climate action and other ecosystem service benefits.

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

- Current land-uses. Lough Boora Discovery Park is an important midlands amenity site and Turraun is part of this larger area. It is not proposed to carry out any intensive rehabilitation actions to change or negatively affect any amenity infrastructure or existing land-uses.
- Significant rehabilitation has already been carried out over the years at Turraun Bog as part of the development of Lough Boora Discovery Park.
- It will take some time for stable naturally functioning habitats to fully develop at Turraun Bog. This will happen over a longer time-frame than the implementation of this rehabilitation plan
- Re-wetting residual peat will initially maintain and enhance the carbon storage capacity of the bog. There is scientific consensus that restoration of hydrology in damaged bog can improve carbon storage, water storage and attenuation and help support biodiversity both on the site and in the catchment (See Section 3.8). This will reduce carbon emissions from the site from a larger carbon source to a smaller carbon source. In time, the site has the capacity to develop in part as a carbon sink. PCAS is expected to deliver significant contributions to Ireland's climate action.
- It is not expected that the site has the potential to develop active raised bog (ARB) analogous to the priority EU Habitats Directive Annex I habitat within the foreseeable future (c.50 years). Furthermore, only a proportion of the bog has potential to develop *Sphagnum*-rich habitats in this timeframe. Nevertheless, re-wetting across the entire bog, as part of the Scheme, will improve habitat conditions of the whole bog, making the overall bog wetter. Other peatland habitats will develop in a wider mosaic that reflects underlying conditions.

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

6. SCOPE OF REHABILITATION

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

- The area of Turraun Bog (Figure 3.1).
- EPA IPC Licence - Ref. P0500-01. As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the cutaway boglands within the licensed area. Turraun bog is part of the Boora Bog group.
- The proposed Scheme is designed to exceed the stabilisation requirements as defined by the IPC Licence. This Scheme is designed to enhance the ecosystem services of Turraun Bog, in particular, optimising **climate action benefits**. The proposed interventions will mean that environmental stabilisation is achieved (meaning IPC obligations are met) and, in addition, significant other ecosystem service benefits particularly for climate action will be accrued.
- The local environmental conditions of Turraun Bog identify cutaway re-wetting as the most suitable rehabilitation approach for this site. There is a strong alkaline influence on the ground-water at this site. This means that re-wetting will lead to the development of fen, Reed Swamp and other associated wetland/peatland habitats.
- A significant part of the site has already largely vegetated and stabilised and is used for a variety of land-uses. These areas are considered rehabilitated. The aerial photo demonstrates the contrast between the older vegetated cutaway and areas at the southern part of the site that have recently come out of peat extraction.
- Supporting ongoing amenity land-use. Integrating rehabilitation measures with current amenity infrastructure on site. It is not proposed to carry out any rehabilitation actions to change or negatively affect any amenity infrastructure.
- Integrating rehabilitation measures with existing conifer forestry and the BnM Native Woodland Scheme. It is not proposed to change or affect any conifer or commercial forestry via this scheme. The future forestry management of these areas will be defined by Coillte.
- Integrating rehabilitation measures with future potential amenity projects. It is not proposed to change any conditions around the area proposed for this project.
- Enhancing existing wetlands and re-wetting peat in the older cutaway, where possible and where feasible. Any measures will be positively aligned with the above land-uses.
- 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 Turraun Bog as **environmental stabilisation and optimising suitable hydrological conditions, and setting the site on a trajectory towards the development of naturally functioning peatland habitats (fen, Reed swamp and other associated wetland habitats)**.
- Rehabilitation of Turraun Bog will support multiple National strategies of climate action, biodiversity action and other key environmental strategies such as the Water Framework Directive.
- The time frame for the delivery of the planned rehabilitation will be undertaken according to available resources and appropriate constraints.
- It is not proposed to carry out any rehabilitation in the marginal **cutover** bog zone as this is quite fragmented by private turbary.

6.1 Key constraints

- **Bog conditions.** Rehabilitation outcomes of sites are constrained by the environmental characteristics of these particular areas. For example, there is potential for raised bog restoration at some bogs where there has not been significant industrial peat extraction and the peat body is largely intact (deep peat sites that are drained). At other bogs, most of the peat mass has been removed, the environmental characteristics of these areas have therefore changed radically (peat depths, hydrology, water chemistry, substrate type, nutrient status), and there will therefore be different habitat outcomes (wetlands, fen, heathland, grassland and Birch woodland).
- At Turraun Bog, commercial peat extraction was undertaken up until 2018. As a result, peat depths are limited on site with residual peat being quite shallow. In addition, due to the cessation of peat extraction activities combined with previous rehabilitation efforts portions of the bog have since naturally colonised with pioneering vegetation. There are local factors that will influence the future trajectory of this site (such as it was always a relatively 'wet' bog which was never pumped nor potentially fully drained) which need to be considered as part of the wider rehabilitation work.
- **Current land-use.** Lough Boora Discovery Park has integrated several different land-uses during its development. Key land-uses are **amenity** and **forestry**. The Lough Boora Sculpture Park has significant cultural importance. These areas have largely stabilised and are rehabilitated. Any proposed enhancement measures (ie. targeted drain-blocking) will be positively aligned with current land-uses and will look to facilitate amenity, where possible. There are proposals to extend amenity infrastructure and rehabilitation will be positively aligned to enable any future amenity development. Re-wetting will be planned as to not to rule out potential future amenity.
- **Surrounding landscape and neighbours.** Another key constraint is the interaction between the Bord na Móna sites and the surrounding landscape. Care must be taken that no active rehabilitation management is carried out that could negatively and knowingly impact on surrounding land. This includes any hydrological management on neighbouring farmland. It is anticipated that the work proposed here (blocking drains and re-wetting cutaway peatlands) will not have any flooding impacts on adjacent land.
- **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 of the proposed rehabilitation at Turraun Bog is being carried out (Appendix XII). There are several known archaeological features. These are generally located towards the margins of the site and will not be directly affected by the proposed rehabilitation. Rehabilitation in these zones will be avoided or minimised (peat barriers located to avoid damage to any archaeological features) (Figure 8.5). Rehabilitation methodologies in these areas will be amended or the areas excluded, depending on the AIA, to minimise or remove any impact.
- **Public Rights of Way.** Where a public right of way or similar burden exists on Bord na Móna property, consideration will be given to ensuring that this remain intact where possible. In some instances, depending upon previous land-uses and management, alternative solutions may be required. These will be explored in consultation with local communities and statutory bodies during the consultation work associated with the decommissioning and rehabilitation work described here.
- **Other Constrained areas.** None.

6.2 Key Assumptions

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

6.3 Key Exclusions

The scope of this rehabilitation plan does not cover:

- The longer-term restoration trajectory of the site. The plan covers the short-term rehabilitation **actions** (see the Methodology Paper and Table AP-3) and **an additional monitoring and after-care programme** to monitor the rehabilitation and to respond to any needs (failure of environmental stabilisation for example). It is expected that this rehabilitation plan will set the site on an enhanced and accelerated trajectory towards the development of naturally functioning peatland habitats (fen and Reed swamp). The plan does not set any goals or outcomes, for example, the extent (specific area) of active raised bog habitat (ARB) that may develop at this site. This is beyond the scope of this rehabilitation plan.
- This plan is not intended to be an after-use or future land-use plan for Turraun Bog.
- The longer-term management of this site, potentially as a nature conservation site, or for amenity, or for other uses in the future.
- The former area of Turraun Bog site, which is now a private Native Woodland Scheme and outside the BnM red line property boundary.
- The former area of Turraun Bog site that is now a Coilte forestry plantation.

7. CRITERIA FOR SUCCESSFUL REHABILITATION

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

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

Rehabilitation is generally defined by Bord na Móna as

- stabilisation of bare peat areas via targeted active management (e.g. drain-blocking/re-wetting) slowing movement of water across the site and encouraging natural colonisation, and,
- mitigation of key emissions (e.g. 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 stabilisation is achieved (meaning IPC obligations are met) and, in addition, significant other benefits particularly for climate action will be accrued.

In general, the key objective will be to optimise the area of suitable hydrological conditions for climate action benefits (re-wetting peat and keeping water levels close to the peat surface) across this heterogeneous cutaway landscape to accelerate the trajectory of peat re-wetting towards the establishment of naturally functioning peatland habitats (fen and Reed swamp).

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 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. This will be demonstrated by developing a stable or downward trajectory of water quality indicators (suspended solids and ammonia) towards what would be typical of a re-wetted cutaway bog. This will be measured via water quality monitoring (suspended solids and ammonia) for at least 2 years after the rehabilitation has been completed.
- Where the section of the water body, that this bog drains to, 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, confirms that there is an improving trajectory in water quality from the peat extraction associated with activities at this bog. This will be measured by the EPA WFD monitoring programme.

As the monthly monitoring program at Clonad 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.



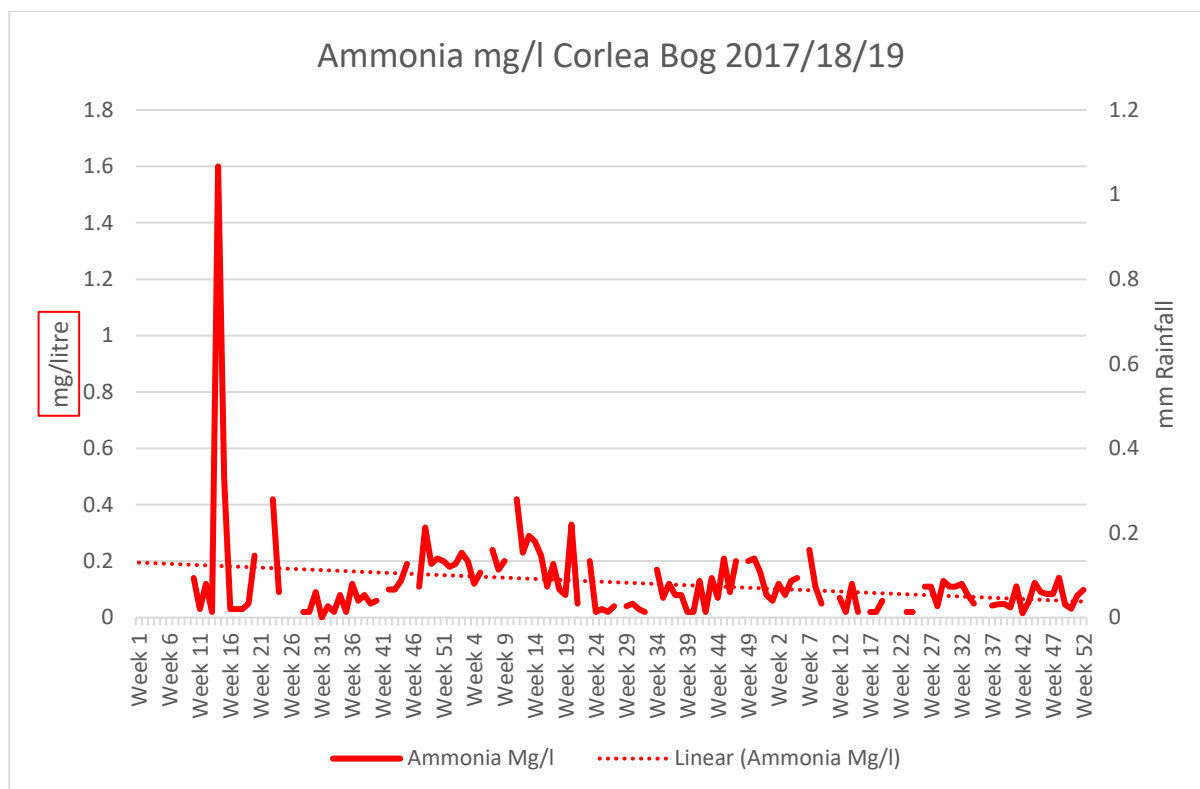


Figure 7.1. Ammonia levels over the period 2015-2019 at Longfordpass and Corlea.

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

- Optimising the extent of suitable hydrological conditions to optimise climate action and other ecosystem service benefits (optimising residual peat re-wetting). This will be measured and demonstrated by site monitoring (updated aerial photography) to measure the extent of suitable hydrological conditions.
- Accelerating the trajectory of the site towards becoming reduced carbon source. This will be measured through habitat mapping and the development of cutaway bog condition assessment. This cutaway bog condition assessment will include assessment of environmental and ecological indicators such as vegetation cover, vegetation communities, presence of key species, *Sphagnum* cover, bare peat cover and water levels (similar to ecotope mapping).
- Reduction in carbon emissions. This will be estimated via a combination of habitat condition assessment and application of appropriate carbon emission factors derived from other sites. Baseline monitoring (habitat condition) will be carried after rehabilitation is completed (during the Scheme). It is proposed that sites can be monitored against this baseline in the future.
- Setting the site on a trajectory towards establishment of a mosaic of compatible habitats including, fen, Reed swamp, heath, scrub, Birch woodland, and embryonic *Sphagnum*-rich peatland communities, where conditions are suitable. These habitats will generally establish initially as pioneer vegetation. It will take some time for stable naturally functioning habitats to fully develop at Turraun Bog. This will be demonstrated by the reduction in bare peat and the establishment of further pioneering habitats. This will be measured via aerial photography, habitat mapping and cutaway/habitat condition assessment.

- Improvement in biodiversity and ecosystem services. This will be demonstrated by metrics outlined in Section 9.1 that can be used to measure changes in ecosystem services (e.g. water quality parameters, development of pioneer habitats, breeding bird monitoring). This will be measured by collecting a range of scientific data that can then quickly be adapted and into metrics that can be used to measure changes in various ecosystem services. Baseline monitoring will be carried after rehabilitation is completed (during the Scheme). It is proposed that sites can be monitored against this baseline in the future. These metrics will be defined in the context of the overall Scheme resources and after consultation with stakeholders.

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

Criteria type	Criteria	Target	Measured by	Expected Time-frame
IPC validation	Rewetting in the former area of industrial peat production	Delivery of rehabilitation measures	Aerial photography after rehabilitation has been completed – to demonstrate measures (drain-blocking) Establishment of a baseline for future monitoring of bare peat, vegetation establishment and habitat condition.	2021-2025
IPC validation	Key water quality parameters Ammonia, Phosphorous, Suspended solids, pH and conductivity	Reduction or stabilisation of key water quality parameters	Water quality monitoring. Started in advance of the proposed rehabilitation.	2020-2023
IPC validation	Reducing pressure from peat production on the local river catchment (WFD)	No decline in the WFD status of the local river catchment from this bog	EPA WFD monitoring programme	WFD schedule
Climate action verification	Optimising the extent of suitable hydrological conditions to optimise climate action	Optimal extent of suitable hydrological conditions	Aerial photography and Habitat mapping to map extent of suitable hydrological conditions. Baseline monitoring to be carried out during the Scheme when rehabilitation is complete. Sites can be re-monitored in the future and 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

Criteria type	Criteria	Target	Measured by	Expected Time-frame
Climate action verification	Setting the site on a trajectory towards establishment of a mosaic of compatible habitats	Establishment of compatible cutaway habitats	Habitat map, Cutaway bog condition map, permanent vegetation monitoring quadrats	2021-2025
Climate action verification	Biodiversity and ecosystem services. Habitat establishment Presence of key species – Sphagnum Breeding and wintering birds Pollinators	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 Breeding birds – Breeding bird survey Pollinators – Pollinator walk	2021-2025

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

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

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

- **Funding to pay for resources required to deliver the planned rehabilitation (Bord na Móna and external).** Bord na Móna maintains a Provision on its balance sheet to pay for these future costs when industrial peat extraction ceases. Bord na Móna is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence. It is expected that additional costs of enhanced rehabilitation will be supported by Government through the Climate Action Fund.
- **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 effective at other sites. Bord na Móna will apply a flexible and adaptable approach to the more innovative rehabilitation measures proposed in this plan. If measures are not initially effective, Bord na Móna will review any requirement for additional practical rehabilitation.
- **Natural colonisation of vegetation to develop semi-natural habitats at a rate within the normal limits.** The development of naturally functioning semi-natural habitats on cutaway peatland takes time. Pioneer vegetation can develop relatively quickly (3-10 years) and wetland habitats can develop relatively quickly. Birch woodland take 20-30 years to develop. However, it may take 50 years for active raised bog vegetation to re-develop on ground that was previously cutaway. Different environmental conditions will have a significant impact on the rate of natural colonisation, and as a result of the combination of different environmental conditions and the application of different rehabilitation measures, there will be a variety of habitat outcomes.
- Rehabilitation measures have been designed to accelerate and work with natural colonisation and other natural processes. Bord na Móna experience of rehabilitation has shown that re-wetting improves conditions for natural colonisation and that natural colonisation is accelerated where the environmental conditions are most suitable. Rehabilitation measures have been designed to modify the conditions of areas within sites where conditions are less suitable for natural colonisation (modifying hydrology, topography, nutrient status or availability of potential seed sources).
- **Monitoring to be robust and effective.** Rehabilitation Monitoring will be established to validate the success of rehabilitation as required by Condition 10 of the IPC Licence and to verify the benefits of the proposed measures to optimise climate action. This will focus on 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 8.4) 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 Turraun Bog will include:

- Re-wetting residual peat areas on the bog using berms and field re-profiling. This 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.
- In some areas, a cut-and-fill cell bunding technique is proposed. 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.
- Re-wetting some areas of the bog through regular field drain blocking using a dozer/excavator to create three peat barriers every 100 m along each field drain.
- Re-alignment of piped drainage.
- 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.
- Blocking drains in targeted existing pioneering vegetation mosaics, to accelerate re-wetting, and/or manage water levels to the correct height to accelerate the current trajectory towards Reed swamp and fen, using a dozer/excavator.
- Targeted fertiliser applications to accelerate vegetation establishment on bare peat on headlands and high fields.
- 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).
- Seedling of vegetation is not required at this site as natural colonisation and the development of pioneer habitats is already significantly progressed.

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

Type	Code	Enhanced Rehabilitation Measure	Extent (Ha)
Dry cutaway	DCT2	Regular drain blocking (3/100 m) + blocking outfalls and managing water levels with overflow pipes + targeted fertiliser treatment	82.65
Marginal land	MLT1	No work required (Marginal land)	198.40
Silt pond		Silt pond	0.70
Wetland Cutaway	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	7.17
Wetland Cutaway	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	14.30
Wetland Cutaway	WLT4	More intensive drain blocking (max 7/100 m), + blocking outfalls and managing overflows + transplanting Reeds and other rhizomes	213.92
Wetland Cutaway	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	1.37
Total			535.16

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

- Seek formal approval of the enhanced plan, noting the alternative adapted standard plan should funding from the proposed Scheme not materialise, from the EPA.
- Agree an *ex ante* budget of eligible costs (based on the approved enhanced plan) with the Scheme regulator.
- Develop a detailed site plan with detailed site drawings outlining how the various rehabilitation methodologies (The proposed Scheme PCAS) will be applied to Turraun Bog. This will take account of peat depths, topography, drainage and hydrological modelling. (See map for an indicative view of the application of different rehabilitation methodologies).
- Carry out a drainage management appraisal of the proposed rehabilitation measures.
- Carry out a review of known archaeology and an archaeological impact appraisal of the proposed rehabilitation. Incorporate the results of this appraisal into the rehabilitation plan to minimise known archaeological disturbance, where possible.
- Carry out a review of issues that may constrain rehabilitation such as known rights of way, turbary and existing land agreements. A known right of way exists along across one of the Bord na Móna margins.
- Carry out an ecological assessment of the potential impacts of the planned rehabilitation, such as the presence of sensitive ground-nesting bird breeding species (e.g. Curlew or Lapwing) or larval webs of Marsh Fritillary butterfly, etc. The scheduling of rehabilitation operations will be adapted, if needed. Surveys will be scoped and carried out based on the baseline ecological survey and previous knowledge of sites.

- Ensure all activities comply with the environmental protection requirements of the IPC Licence.
- Carry out Appropriate Assessment of the Rehabilitation Plan. Incorporate any required mitigation measures from the AA in the plan for the delivery of rehabilitation and decommissioning across the site.
- See Turraun Decommissioning and Rehabilitation Plan – Addendum 1 for more details of the Stage 1 AA screening conclusion.
- Track implementation and enforcement of the relevant IPC Licence conditions, the mitigation measures (AA) and other environmental control measures during the implantation of the rehabilitation plan.

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

- Carry out proposed measures as per the detailed site plan. This will include a combination of drain blocking, peat field re-profiling and cell-bunding. All rehabilitation will be carried out with regard to best practice environmental control measures (Appendix IV);
- Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions.
- Carry out the proposed monitoring, as outlined.
- While natural colonisation is expected to commence almost immediately once peat production ceases, Phase 2 actions will be carried out in targeted areas to accelerate re-vegetation and colonisation of target species. Phase 2 actions will include fertiliser application on high fields and headlands (where there is bare peat).
- Silt-ponds will be monitored during this period and there will be continued maintenance and cleaning to prevent silt run-off from the site during the rehabilitation phase.
- Submit an *ex post* report to the Scheme regulator to verify the eligible measures to be carried out in year 1 of the Scheme, and an *ex ante* estimate for year 2 of the Scheme; and so on for each year of the 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.
- 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.

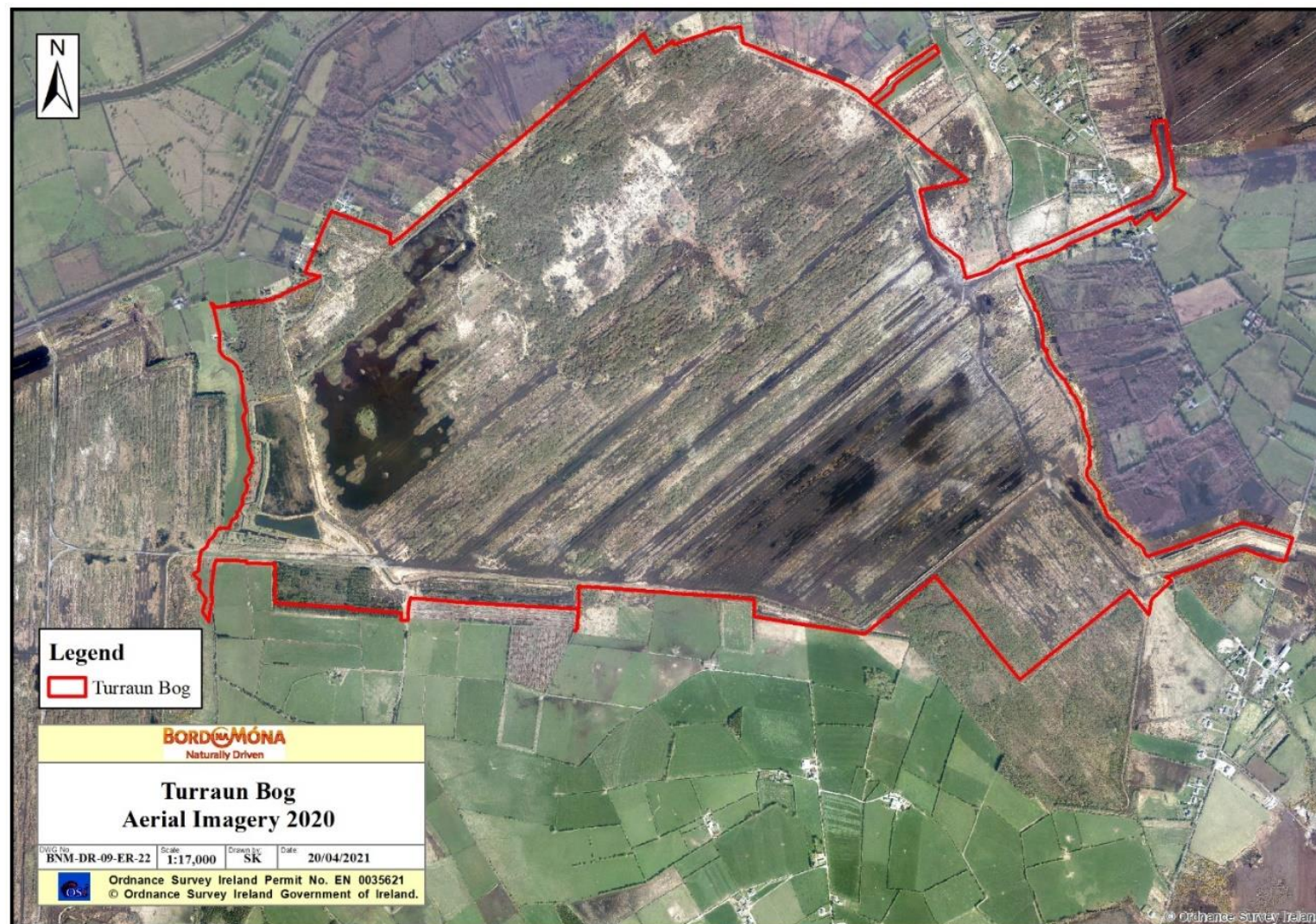


Figure 8.1. Aerial photo of Turraun Bog. Note the western lakes and wetlands and amenity trails. The former peat production area is situated towards the south-east.

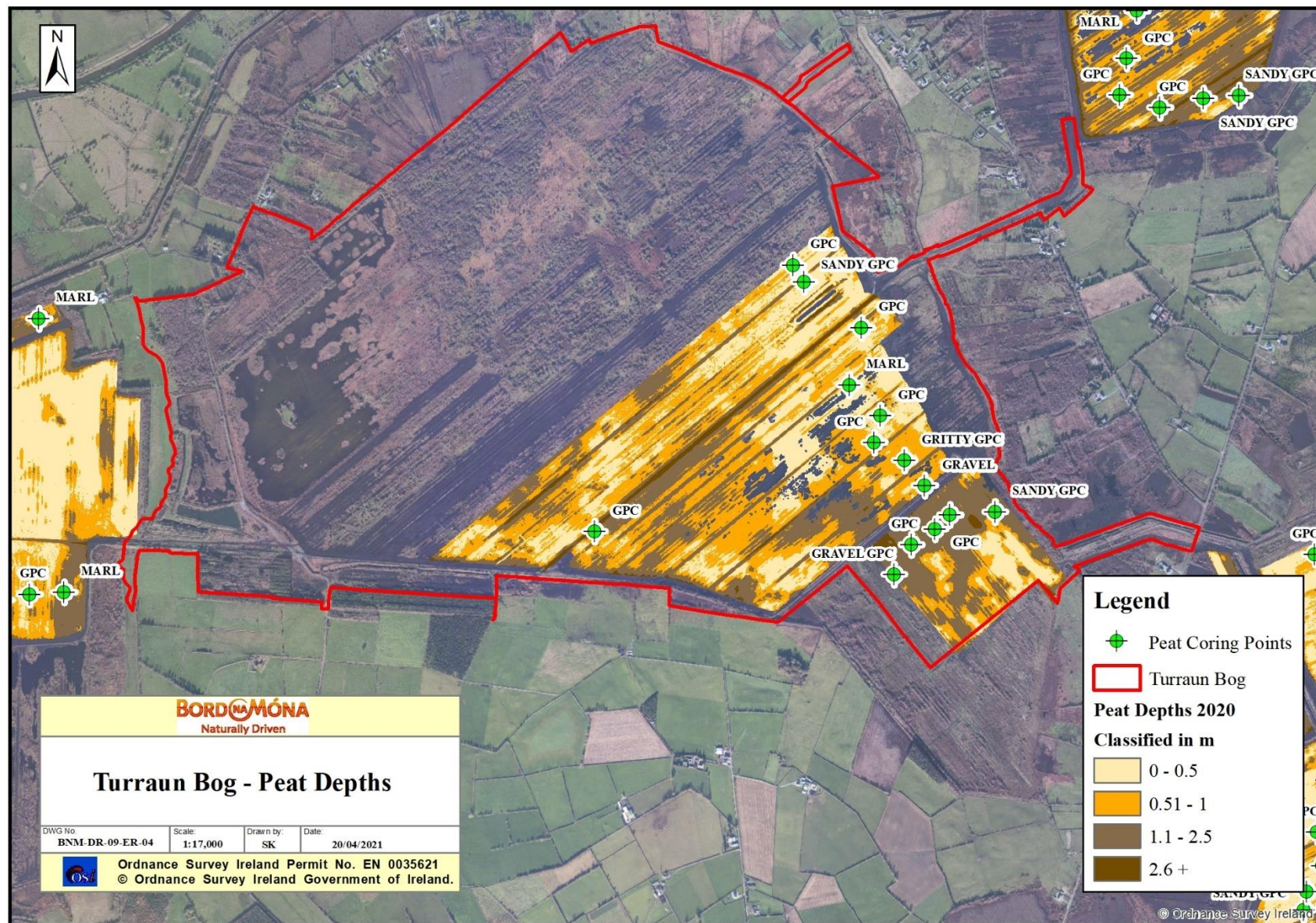


Figure 8.2. Peat depth (2020) map for Turraun Bog. Data is not available for the north-western side as it was cutaway

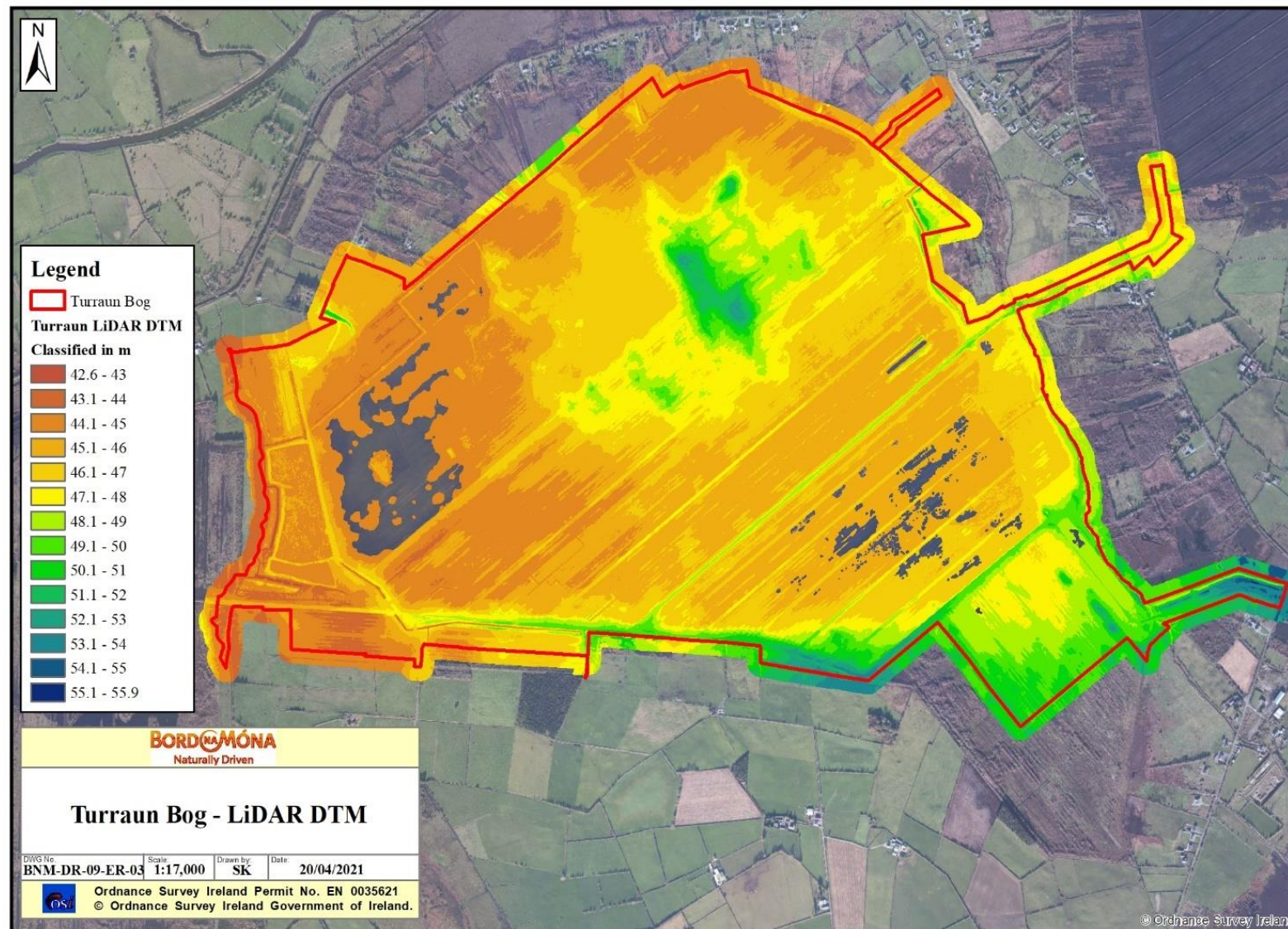


Figure 8.3. LIDAR topography map of Turraun Bog. Low areas and basins are orange-yellow, more elevated areas are blue-green. Note Cocta Hill towards the centre of the site as the elevated area in blue and green.

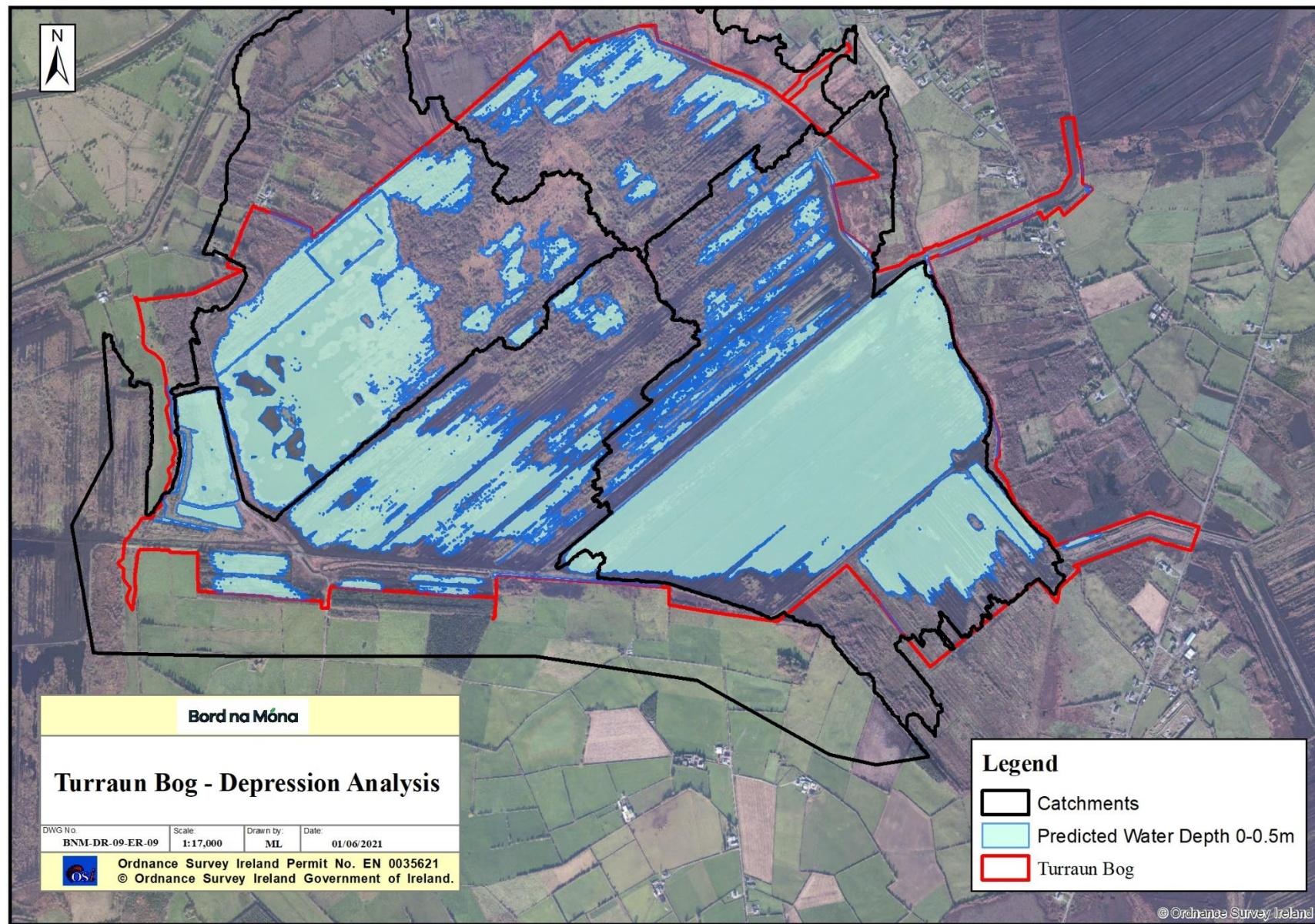


Figure 8.4. Hydrological modelling for Turraun Bog showing range of expected water depths based on current topography.

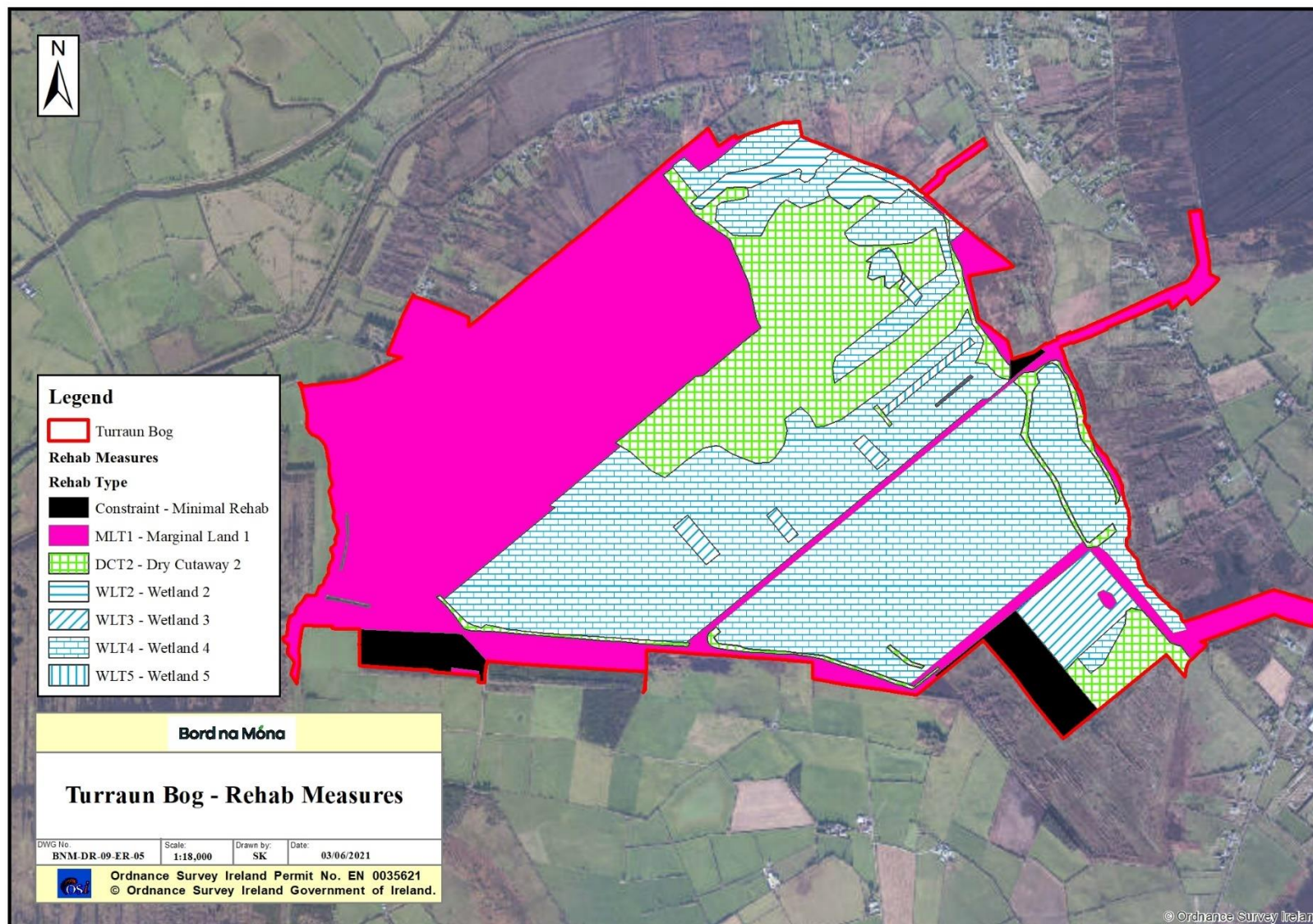


Figure 8.5. Turraun Bog Enhanced Rehabilitation Plan. *Note that the actual distribution of these measures may be subject to change in response to stakeholder consultation and refinement of the enhanced rehabilitation measures.*

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 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.

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

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

9. AFTERCARE AND MAINTENANCE

9.1 Programme for monitoring, aftercare and maintenance

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

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

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

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

Additional monitoring measures are also proposed to monitor ecosystem service benefits that have been derived by rehabilitation. These proposed monitoring measures will be funded by the 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. To be defined in relation to monitoring of the overall Scheme.

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

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

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

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

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.
- Barron, S., Egan, T., Feighery, T., Fleming, E., Healy, K., O'Boyle, D., O'Hora, A. and O'Riordan, P. (1994). Lough Boora Parklands Pre-feasibility study by Boora Enterprise Group. Brosna Press, Ferbane, Ireland.
- 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.
- Clarke, D. and Rieley, J. 2010. Strategy for responsible peatland management. International Peat Society, Finland.
- Clarke, D. (2010). Brown Gold. A history of Bord na Móna and the Irish peat industry. Gill Books.
- Copland, A. (2010). Birds on Cutaway Peatlands at Boora, Co. Offaly. Internal report, Bord na Móna.
- Copland, A. 2015. Assessment of environmental and community opportunities for three cutaway peatland sites in the Lough Boora Discovery Park: Drinagh, The Derries and Turraun. Cutaways for Communities: Conservation, Recreation, Education. Unpublished report prepared for Offaly Local Development Company in association with Bord na Móna.
- Cross, J.R. (2006). The Potential Natural Vegetation of Ireland. *Biology and Environment: Proceeding of the Royal Irish Academy*, Vol. 106B, No. 2, 65-116 (2006).
- Department of Communications, Climate Action and Environment 2019. National Climate Action Plan 2019. <https://www.dccae.gov.ie/en-ie/climate-action/publications/Pages/Climate-Action-Plan.aspx>
- Department of Housing, Planning, Community and Local Government 2017. Public consultation on the River Basin Management Plan for Ireland. Department of Housing, Planning, Community and Local Government. https://www.housing.gov.ie/sites/default/files/public-consultation/files/draft_river_basin_management_plan_1.pdf

- Department of Arts, Heritage and the Gaeltacht 2015. National Peatland Strategy. Department of Arts, Heritage and the Gaeltacht.
- <http://www.npws.ie/sites/default/files/general/Final%20National%20Peatlands%20Strategy.pdf>
- Eades, P., Bardsley, L., Giles, N. & Crofts, A. (2003). The Wetland Restoration Manual. The Wildlife Trusts, Newark.
- Egan, T. (1998). A pilot project for the utilisation of cutaway bogs in West Offaly. In: Towards a conservation strategy for the bogs of Ireland (eds G. O'Leary and F. Gormley), pp. 119-126. Irish Peatland Conservation Council, Dublin.
- 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., Decler, K. & Dixon, K.W. (2019). International Principles and Standards for the practice of Ecological Restoration. Restoration Ecology 27(S1): S1–S46.
- Grand-Clement, E., Anderson, K., Smith D., Angus, M., Luscombe D.J., Gatis, N., Bray L.S., Brazier R.E. (2015). New approaches to the restoration of shallow marginal peatlands Journal of Environmental Management 161.
- Fossitt, J. (2000). A guide to habitats in Ireland. Kilkenny. The Heritage Council.
- Heery, S. and Finney, K. (1999). Lough Boora Parklands. Habitat Survey and Conservation Evaluation. Unpublished Report to the Lough Boora Parklands Group. Heritage Council, Ireland.
- 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.
- Lally, H., Gormally, M., Higgins, T. and Colleran, E. (2012). Evaluating Different Wetland Creation Approaches for Irish Cutaway Peatlands Using Water Chemical Analysis. *Wetlands* 32:129-136.
- Lindsay, R., 2010. Peatbogs and Carbon: a Critical Synthesis to Inform Policy Development in Oceanic Peat Bog Conservation and Restoration in the Context of Climate Change (Report to RSPB Scotland, Edinburgh).
- Mackin, F., Barr, A., Rath, P., Eakin, M., Ryan, J., Jeffrey, R. & Fernandez Valverde, F. (2017) Best practice in raised bog restoration in Ireland. *Irish Wildlife Manuals*, No. 99. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.
- McBride, A., Diack, I., Droy, N., Hamill, B., Jones, P., Schutten, J., Skinner, A. and Street, M. 2011. *The Fen Management Handbook*, (2011), Scottish Natural Heritage, Perth.
- Minayeva, T. et al. (2017). Towards ecosystem-based restoration of peatland biodiversity. *Mires and Peat*, Volume 19 (2017), Article 01, 1–36, <http://www.mires-and-peat.net>
- McDonagh, E. (1996). Drain blocking by machines on Raised Bogs. Unpublished report for National Parks and Wildlife Service. https://www.npws.ie/sites/default/files/publications/pdf/McDonagh_1996_Drain_Blocking_Raised_Bogs.pdf.
- NPWS. (2014). Review of the raised bog Natural Heritage Area network. Department of Arts, Heritage and the Gaeltacht.
- NPWS. (2017a). National Raised bog Special Areas of Conservation management plan. Department of Arts, Heritage and the Gaeltacht. [https://www.npws.ie/sites/default/files/files/FOR%20UPLOAD%20Plan\(WEB_English\)_05_02_18%20\(1\).pdf](https://www.npws.ie/sites/default/files/files/FOR%20UPLOAD%20Plan(WEB_English)_05_02_18%20(1).pdf)
- NPWS. (2017b). Actions for biodiversity 2017-2021. Ireland's 3rd national biodiversity plan. Department of Arts, Heritage and the Gaeltacht. <https://www.npws.ie/sites/default/files/publications/pdf/National%20Biodiversity%20Action%20Plan%20English.pdf>
- NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill. https://www.npws.ie/sites/default/files/publications/pdf/NPWS_2019_Vol2_Habitats_Article17.pdf
- NRA (2009). Guidelines for Assessment of Ecological Impacts of National Road Schemes (Revision 2). National Roads Authority.
- NRA (2010). Guidelines on The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads. National Roads Authority. <https://www.tii.ie/technical-services/environment/construction/Management-of-Noxious-Weeds-and-Non-Native-Invasive-Plant-Species-on-National-Road-Schemes.pdf>.
- 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., Keane, M., McNally, G., O'Sullivan, J. and Farrell, E.P. (2008). Developing a forest resource on industrial cutaway peatland. The BOGFOR programme. COFORD, Dublin.
- 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.
- Rowlands, R. and Feehan, J. (2000). The ecological future of industrially milled cutaway peatlands in Ireland. *Aspects of Applied Biology*, 58, 263-270.
- 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>
- Trodd, W. (2003). Assessment of aquatic habitats in Turraun Nature Reserve for restoration management and use of Chironomidae (diptera: insecta) as indicators of water quality. Unpublished PhD thesis, University College Dublin.
- 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:

- EPA IPC Licence - Ref. P0500-01. As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. Turraun bog is part of the Boora Bog group.
- A key objective of rehabilitation, as defined by this licence, is **environmental stabilisation** of the bog.
- The area of former industrial peat production at Turraun Bog as defined by Figure 3.1. Industrial peat production has now permanently ceased at Turraun Bog.
- Minimising potential impacts on neighbouring land. Some boundary drains around Turraun Bog will be left unblocked as blocking boundary drains could affect adjacent land.
- Land-use. Biodiversity and ecosystem services have been identified as the current primary land-use by Bord na Móna.

Rehabilitation goals and outcomes

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

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

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

Criteria for successful rehabilitation:

- Rewetting of residual peat in the former area of industrial peat production to offset potential 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 indicators

- Demonstrating the delivery of the rehabilitation through site visits and through updated aerial photography (indicating presence of peat barriers, elevated water levels and re-wetting).
- Stabilising potential emissions from the site (silt run-off). The target will be developing a stable or downward trajectory of water quality indicators (suspended solids and ammonia).

Rehabilitation measures: (see Figure Ap-1)

- Blocking field drains in the former industrial production area using a dozer to create regular peat barriers (three barriers per 100 m) along each field drain.
- Re-alignment of piped drainage.
- Realignment of gravity outfalls (where needed).
- Fertiliser treatment of bare peat areas of high fields and headlands (typically slow to naturally re-colonise) to encourage natural colonisation, if needed.
- No measures are planned for the surrounding marginal peatland habitats.
- Silt ponds will continue to be maintained during the rehabilitation and decommissioning.
- Evaluate success of short-term rehabilitation measures and enhance where necessary.
- Decommissioning of silt-ponds will be assessed and carried out, where required.

Timeframe:

- 2021. 1st phase of rehabilitation. Field drain blocking with dozer/excavator.
- 2021. 2nd phase. Further realignment of piped drainage and other re-wetting measures dependent on success of 1st phase re-wetting, as determined by ongoing monitoring of water levels and re-vegetation.
- Other enhancement measures such as fertiliser treatment will be carried out, if needed. These will be determined by ongoing monitoring.
- 2023-2024. Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- 2023-2024. Decommission silt-ponds, if necessary.

Budget and Costing

- Bord na Móna maintains a Provision on its balance sheet to pay for the future costs of rehabilitation and decommissioning when industrial peat extraction ceases. This is updated every year. For more information see the Bord na Móna Annual Report (Bord na Móna 2019). Bord na Móna is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.
- At this time, a standard rehabilitation provision has been allocated to the site based on the area of different cutaway types across the bog.

Table AP-1. Rehabilitation measures and target area.

Type	Code	Description	Area (Ha)
Dry Cutaway	DCT1	Limited drain blocking, Blocking outfalls and managing water levels with overflow pipes	166.1
Marginal land	MLT1	No work required	194.5
Wetland Cutaway	WLT1	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes	158.8
Silt ponds		Silt ponds	0.7
Constraints		Other constraints	0
Total			520.1

Monitoring, after-care and maintenance

- There will be initial quarterly monitoring assessments of the site to determine the general status of the site, the condition of the silt-ponds, assess the condition of the rehabilitation work, assess the progress of natural colonisation, monitoring of any potential impacts on neighbouring land and general land security. The number of site visits will reduce after 2 years to bi-annually. These site visits will assess the need to any additional rehabilitation.
- Water quality monitoring will be established.
- Monitoring results will be maintained, trended and reported on each year as part of the requirement to report on Condition 10.1 of the IPC Licence on Bog Rehabilitation in the Annual Environmental Report, which will be available in April each year at www.epa.ie.
- The parameters to be included (as per condition 6.2 of the IPC Licence) include monthly monitoring for pH, Flow, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD.
- This sampling regime on a selected number of silt ponds will be carried out over a two-year cycle. The original (licence) requirement was for a quarterly sampling regime.
- Where other uses are proposed for the site, these will be assessed by Bord na Móna in consultation with interested parties. Other after-uses can be proposed for licensed areas and must go through the 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.
- The water quality monitoring demonstrates that water quality of discharge is stabilising or improving.
- The site has been environmentally stabilised.

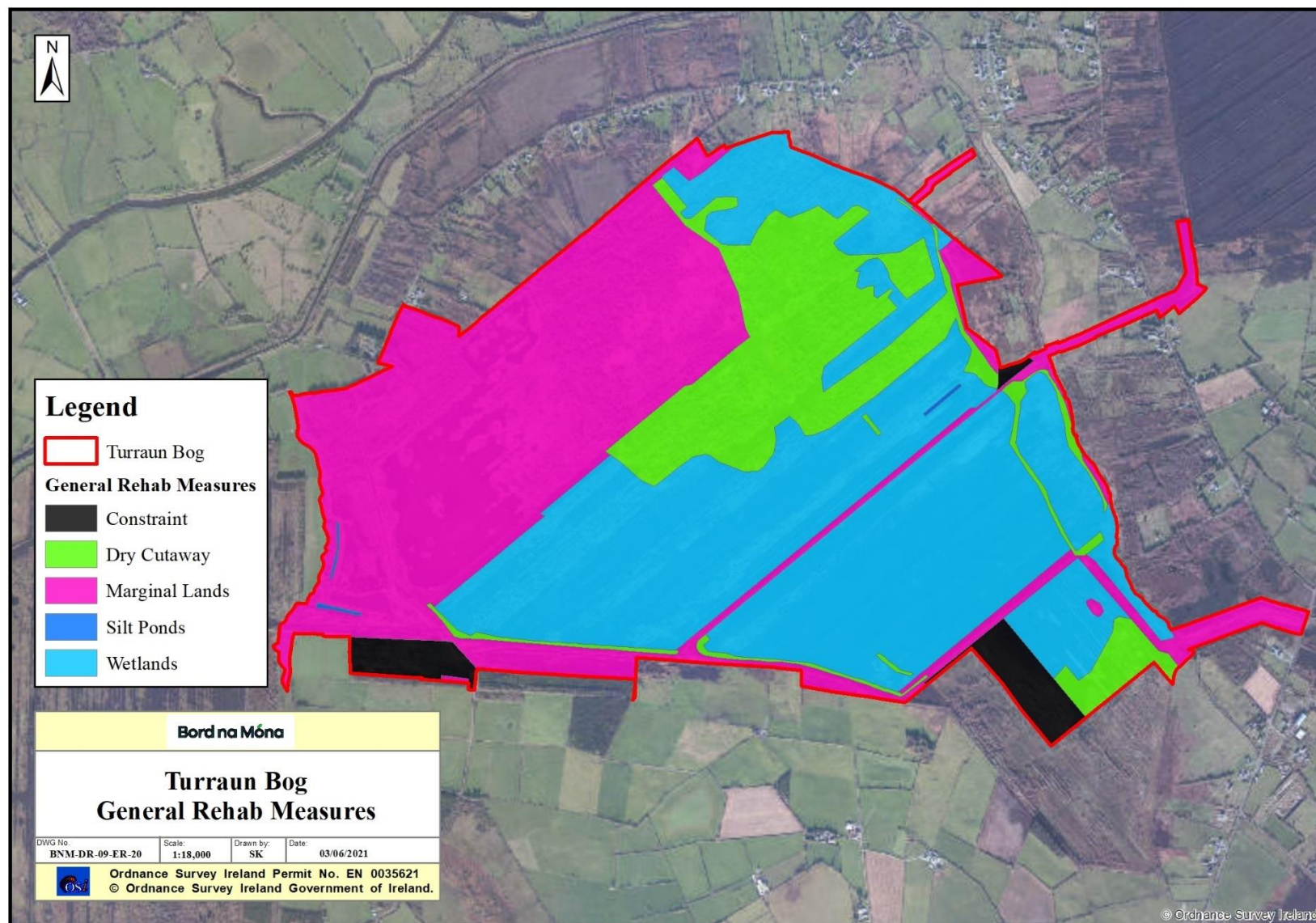


Figure Ap-1. Indicative standard rehabilitation plan for Turraun Bog.

APPENDIX II: BOGA GROUP CONTEXT

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

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

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

The bogs in The Boora Bog Group have been used in the past to supply milled peat for the horticultural market, local power stations (Ferbane, Shannonbridge and West Offaly Power) and Derrinlough Briquette factory.

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

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

Bog Name	Area (ha)	Indicative Peat Production Status and land-use
Killaun	359.5	Killaun is currently a horticultural peat bog and industrial peat production is expected to continue in the future, depending on future milled peat resource requirements (subject to current substitute consent applications and future planning applications for industrial peat production).
Boora	1,842.4	Milled peat production has ceased in Boora East. Milled peat production is anticipated to continue in part of Boora West for the foreseeable future, depending on future milled peat resource requirements (subject to current substitute consent applications and future planning applications for industrial peat production). The majority of Boora bog has already been rehabilitated. A significant area of cutaway bog has been re-wetted, developed as conifer forestry (Coillte) and developed as farmland (1980s). This site now forms the core of Lough Boora Discovery Park.
Pollagh/Cornalaur	280.8	Industrial peat production ceased at Pollagh Bog in 2019. There is some Emerging naturally colonising cutaway. Cornalaur was never developed or in peat extraction.
Noggusboy	917.4	Industrial peat production ceased at Noggusboy Bog West in 2019. Part of the site was developed for conifer forestry by Coillte. Part of the site was developed as Cloghan Lake, as part of Lough Boora Discovery Park, in 1999. Industrial peat production is expected to continue at Noggusboy East in the future, depending on future milled peat resource requirements (subject to

		current substitute consent applications and future planning applications for industrial peat production). There is some emerging naturally colonising cutaway.
Drinagh	1,339.1	Industrial peat production ceased at Drinagh Bog in 2019. Drinagh East is cutaway and has been extensively rehabilitated as wetland. This part of the site has extensive development of naturally functioning peatland habitats. Some Coillte conifer forestry is also present. There is some emerging naturally colonising cutaway in Drinagh West.
Killaranny	242.8	Milled peat production is anticipated to continue at Killaranny into the future, depending on future peat resource requirements, (subject to current substitute consent applications and future planning applications for industrial peat production). A portion of the site is leased by NPWS since 2011 as a re-location area for turf cutters from nearby Clara Bog SAC.
Oughter	352.9	Oughter Bog has not been in peat production since 2012. Industrial peat extraction has now ceased at Oughter Bog. The site has naturally been re-wetting and there is already significant natural colonisation.
Galros	191.5	Milled peat production is anticipated to continue at Galros Bog for the foreseeable future, depending on future milled peat resource requirements, (subject to current substitute consent applications and future planning applications for industrial peat production). Some naturally emerging cutaway habitats are developing in part of the site.
Clongawny More	987.2	Industrial peat production ceased at Clongawny More Bog in 2019. Part of the site rehabilitated, as part of Lough Boora Discovery Park, in 1999. Some Coillte conifer forestry is also present. The site has naturally been re-wetting and there is already significant natural colonisation. Bord na Móna currently have submitted an application for renewable energy development on this bog.
Derrinboy	305.7	Milled peat production is anticipated to continue at Derrinboy Bog for the foreseeable future, depending on future milled peat resource requirements (subject to current substitute consent applications and future planning applications for industrial peat production). Derrinboy Bog supplies horticultural peat.
Moneitta	707.5	Milled peat production is anticipated to continue at Moneitta Bog for the foreseeable future, depending on future milled peat resource requirements (subject to current substitute consent applications and future planning applications for industrial peat production).
Boora_Lemanaghan_Rail_Link	6.9	Not applicable
Derries	368.2	Milled peat production has now ceased at the Derries Bog and the bog is considered cutaway. Wetland rehabilitation carried out over part of site in 1999. Amenity trackway development in 2015. Part of the Lough Boora Discovery Park. The site has now been extensively naturally colonised and is a mosaic of wetland and Birch woodland habitats.
Turraun	534.5	Milled peat production has now ceased at Turraun Bog and the bog is considered cutaway. Wetland rehabilitation carried out over part of area in 1999 as part of the Lough Boora Discovery Park. This section of the site has now been extensively naturally colonised and is a mosaic of wetland and Birch woodland habitats.
Derryclure	327.6	Milled peat production is anticipated to continue at Derryclure Bog for the foreseeable future, depending on future milled peat resource requirements (subject to current substitute consent applications and future planning

		applications for industrial peat production. Derryclure Bog supplies horticultural peat.
Lemanaghan	1,253.7	Milled peat production is anticipated to continue at Lemanaghan for the foreseeable future, depending on future milled peat resource requirements. (subject to current substitute consent applications and future planning applications for industrial peat production There is some naturally emerging cutaway habitats.
Belair North	565.7	Milled peat production is anticipated to continue at Bellair North for the foreseeable future, depending on future peat resource requirements (subject to current substitute consent applications and future planning applications for industrial peat production. There are relatively deep peat resources still present in Bellair North.
Derrybrat	171.6	Milled peat production has now ceased at Derrybrat and the bog is considered cutaway. The site has been partially rehabilitated and there is already significant natural colonisation. Some Coillte conifer forestry has been developed on the site.
Belair South	228.8	Milled peat production has now ceased at Bellair South Bog and the bog is considered cutaway.
Total	10,983.7	

APPENDIX III: ECOLOGICAL SURVEY REPORT

Ecological Survey Report			
<i>Note: This report outlines an ecological survey of the bog. This report should not be taken as a management plan for the site as other land-uses may still be considered. Information within this report may inform the development of other land-uses and identify areas with particular biodiversity value.</i>			
Bog Name:	<u>Turraun</u>	Area (ha):	581.3 ha (1436.4 acres)
Works Name:	Boora	County:	Offaly
Recorder(s):	MMC & DF	Survey Date(s):	03-04/12/2009, 07/2015
Habitats present (in order of dominance) <p>The most common habitats present on the industrial cutaway include:</p> <ul style="list-style-type: none"> • Open water and associated wetland habitats. A significant area is covered by the large lake in Turraun lagoon and the smaller lakes to the west of the road. These lakes have associated emergent and marginal wetland habitats such as Reedbeds (pPhrag, minor pThyp, pSch) and some Poor fen (pRos) and scrub (eBir dominated by Willow) vegetation. One of the smaller lakes is almost entirely infilled with Reedbeds (pPhrag). (Codes refer BnM classification of pioneer habitats of industrial cutaway. See Appendix II). • Maturing Bog woodland (cBir/BirWD) and associated Birch-dominated scrub. The Biodiversity Area and the southern part of the site contain a significant amount of these habitats. There are pockets of Bog woodland developing in the most mature sections of the Biodiversity Area but the majority of it has been classified as scrub as the woodland layers are poorly defined at present. • Pioneer Poor fen communities (pJeff, pEang) and dry grassland (gCo-An) are associated with the Birch scrub. There are small amounts of other communities such as other Poor Fen communities (pTrig), Dry Heath dominated by Heather (dHeath), grassland dominated by Purple Moorgrass (gMol) and small patches of Reeds (pPhrag, pThyp). • The area around Cocta Hill is dominated by a mosaic of Dry Heath dominated by Heather (dHeath), Dense Bracken (pPter), dry grassland dominated by Purple Moorgrass, dry grassland dominated by Cocksfoot (gCo-An) and scrub dominated by Birch but with a significant amount of Pine (eBir/oBir). There is also some bare, exposed glacial till. There are also some bare un-colonised fields in this area. • A significant area of the site is still bare peat with small amounts of pioneer Poor fen communities (pJeff, pEang) and Birch scrub (eBir). • Other habitats around the site include some cutover bog (PB4), Scrub (WS1), Dense Bracken (HP1) and grassy verges (GS2), which are associated with the margins of the bog and are also found along the riparian zones and on embankments between the lakes. (Codes refer to Heritage Council habitat classification, Fossitt 2000), • The NWS scheme is classified as immature woodland (WS2). There is also some biomass crops sown in the southern section (BC1). 			
Description of site <p>Turraun bog is part of the Lough Boora Parklands. It is located between the bogs of Oughter and The Derries. The Grand Canal flows within 0.4km of its northern boundary and the R357 Clochan to Tullamore road is situated approximately 0.7km to the south of the site. This site is notable for the large Biodiversity Area that contains some constructed wetlands on some of the oldest cutaway to have come out of production. Some sections of the cutaway were abandoned in the 1970's and Turraun Lagoon was developed in 1991-1992. The time elapsed since production has allowed the development of a rich mosaic of habitats in this area.</p> <p>The site can be split up into four main sections, the southern section that is zoned on the Land-use Map as Other, the central section that is still in active production or considered production-related cutaway, the northern section that is zoned as a Biodiversity Area and contain Turraun Lagoon and the small area west of the main track through the site that contains two small lakes, some forestry and woodland.</p>			

Southern Section

This area is zoned as Other on the land-use map. The Pollagh stream flows along the north eastern edge of this section while an old railway line forms the northern boundary. The southern section has been out of production for a number of years and is developing into a mosaic of habitats through natural regeneration for the most part. The most obvious feature of this section of the site are the numerous areas of exposed gravel and glacial till. These areas are small and are the highest points in this section. They are slow to re-colonise but where vegetation exists on these mounds it is generally dry grassland (gCal) and disturbed/pioneer vegetation (DisCf) with some Birch scrub (eBir).

This section is for the most part a mosaic of habitats with bare peat, pioneer poor fen communities (pEang, pBulb, pCamp, pJeff), some temporary open water (tOW), pioneer Reedbeds (pPhrag), dry grassland (gCal gCo-An) and Birch scrub (eBir & oBir) all present. Many of the drains also contain Reedmace (pTyph). Maturing Birch scrub is most prominent along the western and southern part of this section. Part of this area along the western boundary has been fenced off as a Native Woodland Scheme and is planted with Oak and Birch. This area is not considered to be owned by BnM even though it is inside the boundary. An area of bare peat with some dHeath was located in the north western corner of this section. Several fields were also sown with a Reed Canary-grass biomass crop.

Central Section

The central section of the site is zoned as active production and production-related cutaway and is dominated by bare peat. A railway line on a tall embankment runs in an east-west direction linking the two sides of the site. The Pollagh Stream forms a boundary along part of the eastern edge of the section. At the time of the survey a large area of cutaway south of the railway line was temporarily wet (tOW) and this corresponds with some of the lowest land within this section (See LIDAR map) so water is pooling in a depression. There is some re-colonisation of the site with only several fields recently out of production and the development of pioneer Poor fen communities (pJeff, minor pEang), dry and wet pioneer grassland communities (gMol, gCal) and scattered emerging Birch scrub.

The northern part (north of the railway) contains much more development of pioneer habitats including several fields that have been out of production for some time (production-related cutaway) and have therefore much more extensive development of Birch scrub. A works area along with silt traps, is located along the eastern boundary. The Silt Pond area contains a series of silt ponds, connecting drains and associated tall embankments of re-vegetating spoil (with pioneer Poor fen communities, pioneer/disturbed vegetation, dry grassland and emerging Birch scrub). A series of adjacent fields to the north are still in production and dominated by bare peat and these are divided by a band of vegetated fields. These fields for the most part contain mosaics of pioneer Poor fen communities (pJeff & pEang) and Birch scrub (eBir & oBir). However, some zonation of communities is evident along these fields that can be related to the underlying topography. Some Dry heath with frequent Heather appears in association with the other habitats to the west while the central zone is characterised by more frequent wetland communities with pioneer Bog Cotton (pEang) and pioneer Reedbed (pPhrag) prominent in association with the Birch scrub. There is also minor development of pioneer Arrowgrass-dominated vegetation (pTrig) on some of the drier areas and on some of the bare fields. Dry grassland also appears in some pockets towards each end of these fields.

Biodiversity Area (Northern section)

The northern section is zoned entirely as biodiversity and has not had any peat harvested from it for 20+ years. Some sections may have come out of production in the 1970's (Rowlands 2001). Part of this area was re-wetted in the 1990's (mainly by blocking the drainage outflows and creating an embankment along the northern boundary) to form a lake in a natural depression in the cutaway. Higgins (2007) describes this lake as an alkaline, largely clear water, mesotrophic-eutrophic lake, with a moderately diverse phytoplankton assemblage comprising a mixture of chlorophytes, cyanophytes and diatoms. The lake is situated in the western part of this section and a small road runs close to its western shore. Around this lake there is extensive and diverse development of marginal wetland communities. These communities are dominated by Reedbeds (mainly pPhrag, some pTyph and pSch), pioneer Poor Fen communities and Birch and Willow scrub. The eastern shore is particularly wet and inaccessible with significant areas of Reedbeds. One large island and many smaller islands have developed within the lake and these islands are dominated by Reedbeds with some Birch and Willow. Some of the banks around the lake

(particularly the southern bank are quite steep with no development of typical bankside/riparian vegetation and a Facebank of exposed peat has developed.

There is a natural transition along a topographical/hydrological gradient from the open water further east towards marginal wetland/scrub communities and onto maturing Bog Woodland where the cutaway becomes drier (is more elevated). It should be noted that not all the maturing bog woodland is found on higher ground. The transitional zone between the lake and the maturing Bog woodland is characterised by pioneer Poor fen communities (pEang, pRos, pJeff) along with some Reedbeds (pPhrag) and emerging and more developed Birch scrub. At the time of the survey some of this cutaway had standing water. Other drier sections contain other Poor Fen communities dominated by Soft Rush and dry grassland also appears (gC0-An) in association with the Birch scrub.

The maturing Bog Woodland is still quite immature to be described as actual woodland habitat. Pockets of this scrub/woodland are better developed than others. Much of it has a closed canopy. However, there are only small areas where a mature canopy has formed and there are distinct woodland layers such as understorey, and scrub under the canopy. The ground vegetation is also poorly formed and dominated in parts by Bramble in the drier sections.

The Bog woodland extends towards higher ground around Cocta Hill. This hill is actually a ridge that runs in a north-south direction. Some glacial sub-soil and bedrock is exposed along this ridge and other sections are covered with a much shallower layer of peat. Consequently other habitats such as Dry Heath dominated by heather (dHeath), Dense Bracken (dPter), dry grassland dominated by Purple Moorgrass and more typical dry calcareous grassland (gCal & gCo-An) communities appear on and around this ridge in association with pockets of emerging and more developed Birch scrub. Of note is the appearance of Common Reed on some of this higher ground. This higher ground is a very complex mosaic of the above habitats. There is also minor development of pioneer Arrowgrass-dominated vegetation (pTrig) on some of the drier areas and on some of the bare fields.

A NWS has been recently established by Bord na Mona to the east of the ridge. Scots Pine and Pedunculate Oak were planted. The Oak has been fenced off while the Scot Pine has been planted outside the area of the fence. Willow, Birch and Rowan are also present in this area along with naturally colonised Scot's Pine and Lodgepole Pine. Pioneer poor fen communities again become prominent along the eastern edge of this section along with maturing Birch scrub where the ground falls to lower ground towards the edge of the site.

Notable indicator species such as Black Bog-rush and ombrotrophic *Sphagnum* species have been recorded at Turraun in the past (Heery 1999, Rowlands 2001) but were not recorded during the recent survey. Black Bog rush may be an indicator of development of rich fen conditions in parts of the Biodiversity area while Rowlands (2001) recorded both *Sphagnum recurvum* and *S. cuspidatum* in some small hollows within the maturing bog woodland. C. Farrell (pers. comm 2010) also recorded these species in the emerging scrub (2006).

Western section (west of road)

This section is the smallest section on the site. Only a small band of improved grassland separates it from the adjacent Derries bog. A minor road along a high ridge forms the eastern boundary and separates the site from the main Turraun lagoon. A small area of conifer plantation has been planted in the south-west corner. Moving north, a railway line crosses the site with calcareous grassland on either side along with some bare peat and developing Gorse scrub. Two distinct small lakes have been created further north. The first is a smaller body of water that has not developed any distinctive riparian vegetation and has quite steep banks. This lake was designed for fishing and is stocked with Carp by the local anglers group. The more northerly lake is quite shallow and the majority of it has infilled with dense Reedbeds. The lakes are surrounded by tall embankments that contain developing scrub (WS1), patches of Dense Bracken (HD1), calcareous grassland (GS1 and ranker tussocky grassland (GS2). A small channel connects these two lakes. Further north a stand of maturing Bog woodland has developed in a low section of cutaway.

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

None

The Grand Canal pNHA (NPWS site code 2104) is located to the north of this site and part of the designated area along the canal is adjacent to part of the northern Turraun boundary.

Watercourses (major water features on/off site)

There are several significant water features on and around the site.

- The Boora River flows along the west side of the site and forms part of the boundary of the site. This river is part of the Brosna catchment. The riparian development along the majority of this river is poor with a deep main channel surrounded by tall embankments that are vegetated by Birch/Willow scrub, Bramble patches, rank grassland (GS2) and Dense Bracken (HP1). Two small streams flow off parts of Taurraun bog (canalised) and link to the Boora River.
- Another small tributary of the Brosna (Pollagh Stream) flows along the west side of the site and forms part of the boundary.

Peat type and sub-soils

The site is dominated by *Phragmites* peat that overlays shell marl for the most part. In some sections the peat is underlain with more gravely glacial till and other parts are underlain with fine-grained silty clays. The Cocta Hill area is underlain with gravel with sand and clay (glacial drift material composed of calcareous limestone).

Fauna biodiversity

Several bird species were noted on the site during the survey. Copland (2008, 2009) outlines in detail breeding bird and wintering water-bird usage of this site.

- A pair of Kestrels was noted over the site.
- Whooper Swans were using the site. A max count estimated that up to 50 birds were using temporary Open Water in a wet section of the site still in active production. Whooper Swans were also using the large lake. There was continual traffic to and from The Derries on both days of the survey.
- Wildfowl were using the wetland including Moorhen, Mallard, Teal, Little Grebe and Tufted Duck.
- Snipe were routinely flushed from most sections of the site with 36 in total recorded.
- Other more common birds were noted on the site. These included Blackbird, Robin, Pheasant, Grey Crow, Rook, Meadow Pipit, Linnet, Field Fare, Blue Tit, Chaffinch and Reed Bunting. Bird activity in the Birch scrub/woodland within the Biodiversity Area was noticeably high compared to other sites surveyed during this period. Copland (2009) also notes that counts of Robin and Blackbird were almost double that of any other site and relates this to the longer development period for scrub/woodland on the site. A Jay was observed along the boundary of this section.
- A Sparrowhawk was noted on the site to the north west of the large lake on the 22nd July 2011

Mammals

- Signs of Deer (most likely Fallow Deer) were noted at several locations around the site including within the Birch scrub/woodland of the Biodiversity Area.
- Rabbit were also quite common on some of the drier sections of cutaway and several Hares were also observed during fieldwork. Grazing by Rabbits/Hares was widespread throughout the site.
- Signs of Badger foraging and footprints were quite regularly noted in the Birch scrub/woodland of the Biodiversity Area. Badger activity in this area was high, although no setts were recorded.
- Otter has been noted using the small fishing lake in 2009 and are likely to be using the large lake in the Biodiversity Area, although no signs were recorded during the survey.
- Pine Martin scats were observed in the woodland areas.

Fish

- One of the small lakes is stocked with Carp and is managed as a fishery by the local fishing club.

Fungal biodiversity <i>Hygrocybe cantharellus</i> (Goblet Waxcap), <i>Laccaria proxima</i> (Scurfy Deceiver), <i>Clavaria argillacea</i> (Moor Club) and <i>Mycena sp.</i>
Activities on the site Activities on the site include: <ul style="list-style-type: none">• Turraun is part of the Lough Boora Parklands and is promoted by Bord na Mona (www.loughbooraparklands.com) as a site for bird watching and other amenity activities such as walking. It is listed in many guide books as a visitor attraction within Co. Offaly and has been the subject of many articles in various publications. A rough track around the large lake and wetland (Turraun Lagoon) is maintained for walking. It is less accessible and less well used than other sites such as Boora Lakes and Boora Sculpture Park. A bird hide has also been erected in the NW corner of the Turraun Lagoon.• The <i>Offaly Way</i> passes though Turraun and follows the road to the west of the site.• The smallest lake was designed and maintained as a fishing lake. It is stocked with Carp at present by the local fishing club.

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 measures 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, work will be halted.
- Rehabilitation 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 bowzers. Only dedicated trained and competent personnel will carry out refuelling operations.
- Mobile storage such as fuel bowzers will be bunded to 110% capacity to prevent spills. Tanks for bowzers 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.
- Rehabilitation and decommissioning will be carried out in accordance with 'best practice' (Currently being updated). In order to ensure compliance and implementation of 'best practice', these measures will be communicated to relevant Bord na Móna staff and updated as required.

APPENDIX V: BIOSECURITY

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

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

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

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

In addition to the above, Best Practise measures around the prevention and spread of Crayfish plague² and Zebra Mussel will be adhered with throughout all rehabilitation measures and activities.

² <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 Boora bog group (Ref. PO-500 SB). As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. The bog is part of the Boora 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 proposed Scheme includes lands previously used to supply peat for electricity generation within the State. 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, under the proposed Scheme, and supported by the Climate Action Fund across a footprint of 33,000 ha (a subset of the BnM estate that has been used for energy production). 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 additional costs associated with the additional and enhanced rehabilitation, i.e., those activities which go beyond the existing decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support under the proposed Scheme.

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

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

3 National Climate Policy

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

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

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

Bord na Móna is following a decarbonisation programme aimed at reducing the carbon emissions from its activities. 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**.

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 NRBMP deliver its objectives in relation to the Water Framework Directive and is one of the five key principle actions.

6 National Biodiversity Action Plan-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.

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

11 National Archaeology Code of Practise

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

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

- BNM must ensure that any monuments or archaeological objects discovered during peat extraction are protected in an appropriate manner by following the Archaeological Protection Procedures.
- BNM must ensure that any newly discovered monuments on Bord na Móna lands are reported in a timely manner to the National Monuments Service of the Department of Arts, Heritage and the Gaeltacht.
- BNM must ensure that any archaeological objects discovered on Bord na Móna lands are reported immediately to the Duty Officer of the National Museum of Ireland.

- Bord na Móna will 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 XII). The recommendations of this assessment will be 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.

12 Bord na Móna Biodiversity Action Plan 2016-2021

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

One example of a key CBD target is:

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

The EU's headline target for progress by 2020 is to:

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

The Pollagh 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 policies.

13 Bord na Móna commitments

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

The company announced that peat production would be cut by over 50 percent in 2019 and would entirely cease over most of its lands by the mid-2020s. Bord na Móna have now announced the complete cessation of industrial peat production across its estate (January 2021). 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 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	Turraun Decommissioning Plan
1	Clean-up of 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	Decommission and Removal of Porto-cabin tea centre and materials store
5	Decommissioning Fuel Tanks and associated facilities	Decommissioning and De-Gassing Mobile Fuel Tanks
6	Decommissioning and Removal of Bog Pump Sites	Not Applicable
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.

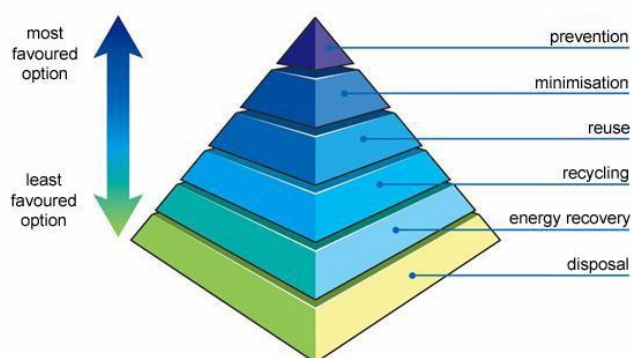
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

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 an EPA Exit Audit (EA) and the eventual partial or full surrender of the licence.

2. Enhanced Decommissioning.

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

Item	Enhanced Decommissioning Type	Turraun 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	Not Applicable

APPENDIX VIII. GLOSSARY

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

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

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

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

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

APPENDIX IX. EXTRACTIVE WASTE MANAGEMENT PLAN

(Minimisation, treatment, recovery and disposal)

Objective:

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

Scope:

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

1.0 Extractive Waste:

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

1.1 Silt Pond excavations and maintenance.

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

1.2 Power Station screenings:

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

1.3 Bog Timbers:

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

2.0 P0502-01 IPPC Licence Extractive Waste Conditions

2.1 Condition 7.5 Extractive Waste Management

The licensee shall draw up a Waste Management Plan (to be known as an Extractive Waste Management Plan) for the minimisation, treatment, recovery and disposal of extractive waste. This Plan shall meet the requirements of regulation 5 of the Waste Management (Management of Waste from the Extractive Industries) Regulations, 2009. The Plan shall be submitted for agreement by the Agency by the 31st December 2012. The Plan shall be reviewed at least once every five years thereafter in a manner agreeable to the Agency and amended in the event of substantial changes to the operation of a waste facility or to the waste deposited. Any amendments shall be notified to the Agency.

All extractive waste shall be managed in accordance with the Extractive Waste Management Plan. A report on the implementation of the Extractive Waste Management Plan shall be provided in the AER.

2.2 Condition 7.6 Waste Facility

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

2.3 Condition 7.7 Excavation Voids

7.7.1 Unless otherwise agreed by the Agency, only extractive waste shall be placed in excavation voids.

7.7.2 When placing extractive waste into excavation voids for rehabilitation and construction purposes, the licensee shall, in accordance with regulation 10 of the Waste Management (Management of Waste from the Extractive Industries) Regulations, 2009, and the Extractive Waste Management Plan:

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

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

3.0 Minimisation.

3.1 Silt pond excavation material and cleanings.

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

3.2 Power Station Screenings.

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

3.3 Bog Timbers.

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

4.0 Treatment**4.1 Silt pond excavation material and cleanings.**

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

4.2 Power Station Screenings.

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

4.3 Bog Timbers

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

5.0 Recovery**5.1 Silt pond excavation material and cleanings.**

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

5.2 Power Station Screenings.

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

5.3 Bog Timbers

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

6.0 Disposal**6.1 Silt pond excavation material and cleanings.**

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

6.2 Power Station Screenings.

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

6.3 Bog Timbers

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

7.0 Extractive Waste Management Plan**5 (2a)(i)**

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

5 (2a)(ii)

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

5 (2a)(iii)

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

5 (2a)(iv)

The peat bogs do not contain any topsoil, so this is not required.

5 (2a)(v)

Peat mineral resources do not undergo any treatment.

5 (2b)

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

5 (2c)(i, ii & iii)

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

5 (3)

The three extractive wastes arising from peat extraction operations at this site are classified wastes from mineral non-metalliferous excavation, with an EWC code of 0101 02. The materials are not classified as hazardous under Directive 91/689/EEC20, and do not contain substances or preparations classified as dangerous under Directives 67/548/EEC5 or 1999/45/EC6 above a certain threshold.

The peat excavations and cleanings are stored in locations and in a manner that they could not collapse and are remote in their nature. The stockpiles are located adjacent to silt ponds that are cleaned regularly and as such these stockpiles are managed and levelled to facilitate further cleanings.

Therefore, the material stored at these waste facilities would not be considered to be a Category A waste facility.

Classification in accordance Annex II.

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

Description of operations.

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

Closure plan. (Bog Rehabilitation Plan).

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

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

10.2 Cutaway Bog Rehabilitation Plan:

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

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

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

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

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

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

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

Review.

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

APPENDIX X. MITIGATION MEASURES FOR THE APPLICATION OF FERTILISER

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

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

APPENDIX XI. CONSULTATION SUMMARIES

Table APXI -1 Consultees contacted

Bog Name	Contact Organisation	Contact Name	Date of Issue	Communication Format	Date Response Received	Response format
Turraun Bog	Offaly County Council - Chief Executive	General E-mail Contact	01/02/2021	E-mail		
Turraun Bog	Offaly County Council - Senior Planner	General E-mail Contact	01/02/2021	E-mail		
Turraun Bog	Offaly County Council - Director of Services	General E-mail Contact	01/02/2021	E-mail		
Turraun Bog	Offaly County Council	General E-mail Contact	01/02/2021	E-mail	Ongoing Dialogue	E-mail
Turraun Bog	Offaly County Council - Heritage Officer	General E-mail Contact	01/02/2021	E-mail		
Turraun Bog	Offaly County Councillors - Edenderry District	Cllr. Mark Hackett (markhackettgreen@gmail.com)	01/02/2021	E-mail		
Turraun Bog	Offaly County Councillors - Edenderry District	Cllr. Noel Cribbin (noelcribbin@yahoo.com)	01/02/2021	E-mail		
Turraun Bog	Offaly County Councillors - Edenderry District	Cllr. Eddie Fitzpatrick (eddiefitzp@eircom.net)	01/02/2021	E-mail		
Turraun Bog	Offaly County Councillors - Edenderry District	Cllr. John Foley (cllr.johnfoley@gmail.com)	01/02/2021	E-mail		
Turraun Bog	Offaly County Councillors - Edenderry District	Cllr. Robert McDermott (robert@edenprint.ie)	01/02/2021	E-mail		
Turraun Bog	Offaly County Councillors - Edenderry District	Cllr. Liam Quinn (liamjq@gmail.com)	01/02/2021	E-mail		
Turraun Bog	Offaly County Councillors - Birr District	Cllr. John Carroll	01/02/2021	E-mail		
Turraun Bog	Offaly County Councillors - Birr District	Cllr. John Clendennon	01/02/2021	E-mail		
Turraun Bog	Offaly County Councillors - Birr District	Cllr. Eamonn Dooley	01/02/2021	E-mail		
Turraun Bog	Offaly County Councillors - Birr District	Cllr. John Leahy	01/02/2021	E-mail		

Turraun Bog	Offaly County Councillors - Birr District	Cllr. Clare Claffey	01/02/2021	E-mail		
Turraun Bog	Offaly County Councillors - Birr District	Cllr. Peter Ormond	01/02/2021	E-mail	24/01/2021	E-mail
Turraun Bog	Offaly County Councillors - Tullamore District	Cllr. Neil Feighery	01/02/2021	E-mail		
Turraun Bog	Offaly County Councillors - Tullamore District	Cllr. Tony McCormack	01/02/2021	E-mail		
Turraun Bog	Offaly County Councillors - Tullamore District	Cllr. Declan Harvey	01/02/2021	E-mail		
Turraun Bog	Offaly County Councillors - Tullamore District	Cllr. Sean O'Brien	01/02/2021	E-mail		
Turraun Bog	Offaly County Councillors - Tullamore District	Cllr. Ken Smollen	01/02/2021	E-mail		
Turraun Bog	Offaly County Councillors - Tullamore District	Cllr. Frank Moran	01/02/2021	E-mail		
Turraun Bog	Offaly County Councillors - Tullamore District	Cllr Danny Owens	01/02/2021	E-mail		
Turraun Bog	TD Laois/Offaly	Barry Cowen	01/02/2021	E-mail		
Turraun Bog	TD Laois/Offaly	Charlie Flanagan	01/02/2021	E-mail		
Turraun Bog	TD Laois/Offaly	Sean Fleming	01/02/2021	E-mail		
Turraun Bog	TD Laois/Offaly	Carol Nolan	01/02/2021	E-mail		
Turraun Bog	TD Laois/Offaly	Brian Stanley	01/02/2021	E-mail		
Turraun Bog	Environmental Protection Agency	General E-mail Contact	01/02/2021	E-mail	Ongoing Dialogue	E-mail
Turraun Bog	National Parks and Wildlife Service	General E-mail Contact	01/02/2021	E-mail	Ongoing Dialogue	E-mail
Turraun Bog	Dept of the Housing Local Government and Heritage	Malcom Noonan (Minister of State at the Department of Housing, Local Government and Heritage)		E-mail		
Turraun Bog	National Monuments Service	General E-mail Contact	01/02/2021	E-mail		
Turraun Bog	National Museum of Ireland (Irish Antiquities Division)	General E-mail Contact	01/02/2021	E-mail	28/12/2020	E-mail
Turraun Bog	Minister for Environment, Climate and Communications	Minister - Eamon Ryan		E-mail		

Turraun Bog	Minister of state for Agriculture with responsibility for Land use and Biodiversity	Pippa Hackett Minister of State for Land Use and Biodiversity)		E-mail		
Turraun Bog	Inland Fisheries Ireland	General E-mail Contact	01/02/2021	E-mail		
Turraun Bog	Waterways Ireland	General E-mail Contact	01/02/2021	E-mail		
Turraun Bog	The Heritage Council	General E-mail Contact	01/02/2021	E-mail		
Turraun Bog	An Forum Uisce (The Water Forum)	General E-mail Contact	01/02/2021	E-mail		
Turraun Bog	OPW	General E-mail Contact	01/02/2021	E-mail	Ongoing Dialogue	E-mail
Turraun Bog	Inland Waterways Association Offaly	General E-mail Contact	01/02/2021	E-mail		
Turraun Bog	An Taisce	General E-mail Contact	01/02/2021	E-mail		
Turraun Bog	Friends of the Earth	General E-mail Contact	01/02/2021	E-mail		
Turraun Bog	Birdwatch Ireland	General E-mail Contact	01/02/2021	E-mail		
Turraun Bog	Irish Peatlands Conservation Council	General E-mail Contact	01/02/2021	E-mail	Ongoing Dialogue	E-mail
Turraun Bog	Irish Wildlife Trust	General E-mail Contact	01/02/2021	E-mail		
Turraun Bog	Butterfly Conservation Ireland	General E-mail Contact	01/02/2021	E-mail	Ongoing Dialogue	E-mail
Turraun Bog	Community Wetlands Forum (part of Irish Rurallink)	General E-mail Contact	01/02/2021	E-mail		
Turraun Bog	Turf Cutters and Contractors Association	Postal Address	15/01/2021	Post		
Turraun Bog	Offaly Public Participation Network (PPN)	General E-mail Contact	01/02/2021	E-mail		
Turraun Bog	Sustainable Water Action Network (SWAN)	General E-mail Contact	01/02/2021	E-mail		
Turraun Bog	Irish Farmers Association (Laois Offaly and Westmeath Office)	General E-mail Contact	01/02/2021	E-mail	Ongoing Dialogue	E-mail
Turraun Bog	Irish Farmers Association (Head Office)	General E-mail Contact	01/02/2021	E-mail	Ongoing Dialogue	E-mail
Turraun Bog	National Association of Regional Game Councils	General E-mail Contact	01/02/2021	E-mail	Ongoing Dialogue	E-mail

Turraun Bog	ICMSA (Irish Creamery Milk Suppliers Association)	General E-mail Contact	01/02/2021	E-mail	Ongoing Dialogue	E-mail
Turraun Bog	ICSA (Irish Cattle and Sheep Farmers Association)	General E-mail Contact	01/02/2021	E-mail		
Turraun Bog	Midlands & East Regional WFD Operational Committee	General E-mail Contact	01/02/2021	E-mail		
Turraun Bog	Shannon Flood Risk State Agency Co-ordination Working Group	General E-mail Contact	01/02/2021	E-mail		
Turraun Bog	CARO (Climate Action Regional Office) Eastern and Midlands	General E-mail Contact	01/02/2021	E-mail		
Turraun Bog	Coillte	General E-mail Contact	01/02/2021	E-mail	Ongoing Dialogue	

Table APXI -2 Response summary from Consultees contacted

Organisation	Summary of Response by Stakeholder	BnM Response
Offaly County Councillors - Birr District	<p>Cllr. Peter Ormond contacted BnM to make submission on the rehabilitation of Offaly bogs on behalf of Fianna Fáil councillors on Offaly County Council. A number of concerns were raised in the submission;</p> <ol style="list-style-type: none"> 1) Advised that the Fianna Fáil council members are concerned at the short notice period prior to the end of the consultation process for PCAS 2) Request for details on the consultation process by BnM to date 3) Advised that PCAS should be considerate of the social, cultural, economic, industrial and ecclesiastical history of the region in which it takes place 4) Expressed interest and support for comments regarding natural capital by BnM staff during interviews with The Irish Times 5) A number of specific questions were asked of BnM including; <ul style="list-style-type: none"> • What is the acreage of each of the bogs covered by this submission and what percentage of that total area will be re-wetted or regenerated? • Given that peat production has long ceased in Derries, Oughter and Pollagh bogs are we correct in assuming that re-wetting of these two bogs is the only option? • Please clarify what amenity opportunities exists for these three bogs? • What opportunities have been examined and have any plans been considered? • Will the swing bridge over the Grand Canal at Turraun and the Bridge north of that bridge over the river Brosna linking Lemonaghan bog to Boora bog remain in place? • How is the stewardship of the cutaways going to be addressed? • Will there be a risk assessment carried out in relation to Outfalls, Deep Drains, and Silt Ponds? • Will fire breaks be provided in each of the bogs? • What plans are being put in place to protect the environment 	<p>Response 26/01/2021, acknowledgement, all concerns addressed in future drafts of rehab plans and that stakeholder engagement had been increased by 3 weeks.</p> <p>BnM have an extensive community consultation process ongoing with a dedicated Community Liaison Officer communicating to affected and interested parties. There is ongoing consultation.</p> <p>A wide variety of issues were considered when planning rehabilitation. Turraun already has significant amenity and social value, and its former industrial heritage has been recognised.</p> <p>There will be scope for potential future amenity, but this is not part of the scope of PCAS.</p> <p>The primary scope of PCAS is re-wetting and climate action. Other land-uses such as commercial forestry etc are not appropriate.</p> <p>Hydrological assessments have been carried out of the rehabilitation plan to assess impacts on adjacent land.</p> <p>Options for the decommissioning of the swing-bridge in the future are being considered. Currently it will remain in place until rail usage is discontinued.</p> <p>Turraun is part of the Lough Boora Discovery Park and will remain so for the foreseeable future.</p> <p>BnM have considered fire risk as part of its overall care and maintenance programme of its bogs. Re-wetting will significantly reduce fire-risk and the impacts of fire in the future.</p>

	<p>from fire risks?</p> <ul style="list-style-type: none"> • The need to enforce litter control cannot be overstated. 	
Offaly County Council	Request for all draft rehabilitation plans in Co. Offaly.	BnM provided the requested documents. A virtual meeting, including a general PCAS presentation, was held for Offaly County Council on 10/02/2021
Offaly County Council	Offaly County Council e-mailed a submission to outline potential for integration of PCAS with opportunities regarding the Offaly County Council Inaugural Digital Strategy 2020-2022.	A meeting on Offaly's digital strategy was held between BnM and Offaly County Council on 04/03/2021.
Offaly County Council	<p>Submission provided on behalf on Offaly County Council on a number of PCAS bogs including Turraun on 22/02/2021. Key points raised were;</p> <ol style="list-style-type: none"> 1) Requested that details of security fencing to be identified and detailed on plans. 2) Long term rehabilitation plan to be provided addressing above areas of consideration post 2024 if required. 3) Public Rights of Way access locations are to be maintained with relevant stakeholders and marked on drawings. 4) A number of technical issues with draft rehabilitation plans. 5) Advised BnM to carefully consider after use of bogs as part of PCAS 6) Request that the impact of PCAS on surrounding roads be considered as part of rehabilitation plans. 7) Advised that long term management (post 2024) is considered by BnM. 8) Advised that Appropriate assessment and the habitats directive are taken into account by BnM. 9) Advised that BnM consider management of flooding & water pollution, fire risk, invasive species and waste management as part of PCAS. 	<p>A virtual meeting/general presentation on PCAS to between BnM and Offaly Councillors and OCC personnel was conducted on 10/02/2021.</p> <p>BnM provided further PCAS documentation on request, via e-mail on 27/01/2021.</p> <p>Refer to Section 4 for response on issues raised. Dialogue with Offaly County Council is ongoing.</p>

Irish Peatlands Conservation Council	<p>Responded to consultation regarding Turraun Bog and the PCAS project at large to express support for the project and list a number of comments on how the project might be improved;</p> <ol style="list-style-type: none"> 1) Potential for inclusion of local environmental groups in species specific conservation plans 2) Requested that a map of potentially suitable areas for such projects should be included in rehab plans 3) Promoted the idea of creating a biodiversity action plan that considers the use of site by all relevant stakeholders 4) Recommended following the NPWS community engagement strategy as it was largely successful in bring local communities along with restoration projects 	<p>BnM responded and advised that all issues raised will be taken into account in future drafts of plan.</p> <p>BnM have engaged with the local community in the past in relation to conservation and amenity management and a plan was developed, facilitated by Birdwatch Ireland.</p> <p>There is potential for species-specific conservation and biodiversity action in the future. This will require further engagement, planning and support.</p> <p>BnM have an extensive community consultation process ongoing with a dedicated Community Liaison Officer communicating to affected and interested parties.</p>
NPWS Regional Network	<p>NPWS responded through e-mail thread on the 02, 03,07,09/12/2020 in relation to all PCAS bogs. The main points discussed were to advise of the requirement to investigate if assessment under the SEA and Birds directives for each site.</p>	<p>BnM acknowledged via e-mail to address queries on 09/12/2021. Also, a phone conversation with local NPWS Conservation Ranger on discussed biodiversity and rehabilitation measures on PCAS bogs including Turraun Bog.</p>
National Museum of Ireland (Irish Antiquities Division)	<p>Responded through e-mail 28/12/2020 in relation to all PCAS bogs. Issues raised were;</p> <ol style="list-style-type: none"> 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 	<p>BnM acknowledged and responded via e-mail on 28/12/2020 to assure BnM will give due cognisance to all points within all rehabilitation plans for Turraun Bog.</p> <p>A virtual meeting on PCAS between BnM and NMI was held on 18/01/2021</p>
Irish Farmers Association	<p>Responded to consultation regarding Turraun Bog and the PCAS project at large on multiple dates throughout ongoing discourse.</p> <ol style="list-style-type: none"> 1) Potential for flooding on adjacent lands. 2) Health and Safety 3) Perceived potentially detrimental impact of PCAS on property value 4) Reiterated the desire of the IFA that people who have been cutting turf on bogs should retain this right. 	<p>A working group has been established at a high level between BnM and IFA on various issues including PCAS. A meeting was held between BnM and IFA representatives on 18/02/2021 to present details on PCAS. Dialogue is ongoing.</p>
The Heritage Council	<p>Responded to consultation via e-mail on 04/01/2021 asking for more information on PCAS in general and looking to be involved in any seminar or information events.</p>	<p>BnM responded via phone conversation on 11/01/2021. Dialogue is ongoing.</p>

The Irish Wildlife Trust	<p>Responded to consultation via e-mail on 01/02/2021 to acknowledge receipt of PCAS plans and indicate desire to make a submission. Submission received on 23/03/2021 supporting the PCAS scheme and specifically requesting:</p> <ol style="list-style-type: none"> 1. Consideration of statutory protection for rehabilitated bogs; 2. Consideration for re-wilding in determining future habitats and species presence, including species re-introductions; 3. Appropriate monitoring is established. 	<p>BnM responded via email and phone throughout February and March. A virtual meeting/PCAS presentation was held for IWT on 17/02/2021. Dialogue is ongoing.</p> <p>Statutory protection of cutaway bogs is a matter for Government.</p> <p>Rehabilitation looks to encourage re-wilding and natural colonisation – particularly in a wetter context, which is more optimal for climate action.</p> <p>A monitoring plan will be established.</p>
Trinity College	<p>A researcher at Trinity College, Dublin, made a submission on PCAS by e-mail 24/01/2021. The following points were raised;</p> <ol style="list-style-type: none"> 1) Advised that the consultation phase of the project should be given more time 2) Advised that there is little evidence of pre-project and post-project measurement 3) Advised that further community engagement with local stakeholders and research-based stakeholders would benefit the project 	<p>BnM acknowledged and will give due cognisance to all points raised in the submission by Trinity College Researcher in the rehabilitation plan for Turraun Bog and other PCAS projects.</p> <p>BnM raised responded via e-mail.</p> <p>A significant amount of consultation was carried out and consultation is ongoing.</p> <p>Monitoring and verification will be carried out.</p>
Dept. of Agriculture, Food & the Marine (DAFM)	<p>Submission by e-mail to express support for PCAS in general. Submission recommended;</p> <ol style="list-style-type: none"> 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. 	<p>BnM acknowledged and responded via e-mail on 02/03/2021 to assure that all points raised within the submission will be considered. A virtual meeting/PCAS presentation was held for DAFM on 11/12/2020.</p> <p>BnM has and is continuing to engage with land-owners.</p> <p>Legal advice to date is that the scheme does not come under the EIAR Directive.</p> <p>Hydrological assessments have been carried out of the rehabilitation plan to assess impacts on adjacent land.</p>

Butterfly Conservation Ireland	<p>Responded to consultation via e-mail with submission on Turraun Bog. Concerns raised were:</p> <p>1) Alterations to the text of the rehab plan.</p> <p>2) Request for all turf cutting on BnM land to end.</p> <p>4) Suggest monitoring for Large Heath Butterfly or food plant Hare's-tail Cottongrass.</p> <p>5) Suggested alterations to habitat design in rehab plan to further connect regional high bog habitats and create further raised bog habitat on site. Also, BCI reiterated need to protect valuable habitat such as species rich grassland</p> <p>6) Advised BnM to ensure that quality habitats already found on site are not damaged by PCAS activities. 7) Requested that sensitive or valuable habitats such as dry calcareous grassland remain undisturbed by PCAS</p>	<p>BnM acknowledged via e-mail; Phone conversation with BCI on 19/01/2021.</p> <p>BnM has ceased all peat production including issuing of turf-cutting licences on its lands. Private turbary holders can continue to cut turf where they have rights to do so.</p> <p>The monitoring programme will monitor for Large Heath. A butterfly transect established at Turraun and monitored for 5 years so far has not recorded Large Heath. This is not unexpected as the transect does not cross suitable habitat. Species-rich calcareous grassland at Cocta Hill and other locations will remain undisturbed.</p> <p>Woodland and wetland habitats already established at Turraun will remain largely undisturbed. Some areas will be assed to consider options for further re-wetting via targeted drain-blocking.</p>
ICMSA (Irish Creamery Milk Suppliers Association)	Virtual meeting/PCAS presentation organised for 03/03/2021.	<p>A meeting was held by BnM on 03/03/2021 to present details on PCAS to the ICMSA and members.</p> <p>Dialogue is ongoing.</p>
University College Dublin	<p>A researcher from UCD contacted BnM with a submission on PCAS. The researcher suggested that the rehabilitations contain a good level of detail regarding rehab but could be improved by including more detail on water table level monitoring and measuring.</p>	<p>BnM acknowledged and will give due cognisance to all points raised in the submission by UCD Researcher in the rehabilitation plan for Turraun Bog and other PCAS projects.</p> <p>Water table monitoring is included in the monitoring plan and piezometers have been installed in Turraun bog to facilitate this monitoring</p>
Office of Public Works	Responded via e-mail 01/12/2020 querying the reason for inclusion of OPW in the PCAS stakeholders list.	BnM responded with and explanation via e-mail on 01/12/2020.
Local Resident A	Contacted BnM via e-mail 01/02/2021 to request inclusion in the up- coming consultation process and any events based on PCAS	

Local Resident B	Contacted BnM via e-mail on 03/02/2021, to make BnM aware that numerous areas of her local bog had become inundated with water over the Winter and to request clarification on the nature of BnM PCAS based rewetting of bogs	BnM responded 05/02/2021 to provide assurance that the areas of the bogs that will be re-wet are generally low lying and that headlands/high fields would remain drier. No potential impacts are expected for adjacent lands. It is normal for seasonal inundation to raise water levels in general during the winter and there can be periods of localised flooding on adjacent land during high rain-fall.
The NARGC	NARGC contacted BnM via email on 01/02/2021 to request rehab plan for Turraun Bog	BnM responded on 02/01/2021 with the requested documentation
Local Resident C	Local resident C responded via e-mail on 01/02/2021 to request clarification on PCAS activities and any potential impacts PCAS could have on adjoining lands	BnM responded via e-mail 02/02/2021 to provide draft rehabilitation plan and organise a phone discussion to provide details on PCAS to the stakeholders No potential impacts expected for adjacent lands.

APPENDIX XII. ARCHAEOLOGY

Role of the Archaeological Liaison Officer

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



Code of Practice

22

Code of Practice

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



	Procedure: ENV017	Rev: 1
Title: Archaeological Findings	Approved: EM	Date: 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	13/09/2020	First release	EMcD

Archaeological Impact Assessment of Proposed Bog Rehabilitation at Turraun Bog, Co. Offaly. Dr. Charles Mount. April 2021.



Archaeological Impact Assessment of Proposed Bog Decommissioning and Rehabilitation at Turraun Bog, Co. Offaly

Report For

Bord Na Móna Energy Ltd.

Author

Dr. Charles Mount

Bord Na Móna Project Archaeologist



11. INTRODUCTION

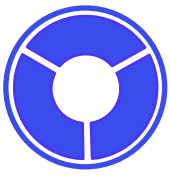
The EPA (2020) *Guidance on the process of preparing and implementing a bog rehabilitation plan* notes that the licensee should characterise the bog prior to embarking on detailed planning and implementation. This characterisation should detail how the land is classified in terms of statutory protections, 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, following consultation with the National Monuments Service and the National Museum of Ireland, 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.1847 hectares at Turraun Bog, Co. Offaly 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 Turraun Bog will include:

- Blocking field drains in the former industrial production area using a dozer to create regular peat barriers (three barriers per 100 m) along each field drain.
- Re-alignment of piped drainage.
- Realignment of gravity outfalls (where needed).
- Fertiliser treatment of bare peat areas of high fields and headlands (typically slow to naturally re-colonise) to encourage natural colonisation, if needed. (It is noted that the application of fertiliser may need additional assessment and approval as per the IPC Licence).
- No measures are planned for the surrounding marginal peatland habitats.
- Silt ponds will continue to be maintained during the rehabilitation and decommissioning.
- Evaluate success of short-term rehabilitation measures and enhance where necessary.
- Decommissioning of silt-ponds will be assessed and carried out, where required.

Turraun Bog is located c.0.8km south of Pollagh, Co. Offaly, and the Grand Canal, and north of the R357 road. The overall rehabilitation area occupies the townlands of Lea Beg, Lea More, and Turraun, on OS 6 inch sheet Offaly No. 15.

12. 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 Turraun Bog. The overall extent of the rehabilitation is indicated in Fig. 1. This area was examined using information from:



- The IAWU Peatland Survey
- The Sites and Monuments Record that is maintained by the Dept of Housing, Local Government and Heritage
- The topographical files of the National Museum of Ireland.
- The Excavations Database
- Previous assessments

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

13. DESKTOP ASSESSMENT

Recorded Monuments

The Record of Monuments and Places (RMP) for Co. Offaly which was established under Section 12 of the National Monuments (Amendment) Act, 1994 was examined as part of the assessment (DAHGI 1995). This record was published by the Minister in 1995 and includes sites and monuments that were known in Turraun Bog before that date. This review established that there are no RMPs situated in the proposed rehabilitation area (see Fig. 1). The closest RMP externally to the bog is a levelled enclosure in Lea More townland (RMP OF015-014----) c.0.36km north-east of the bog.

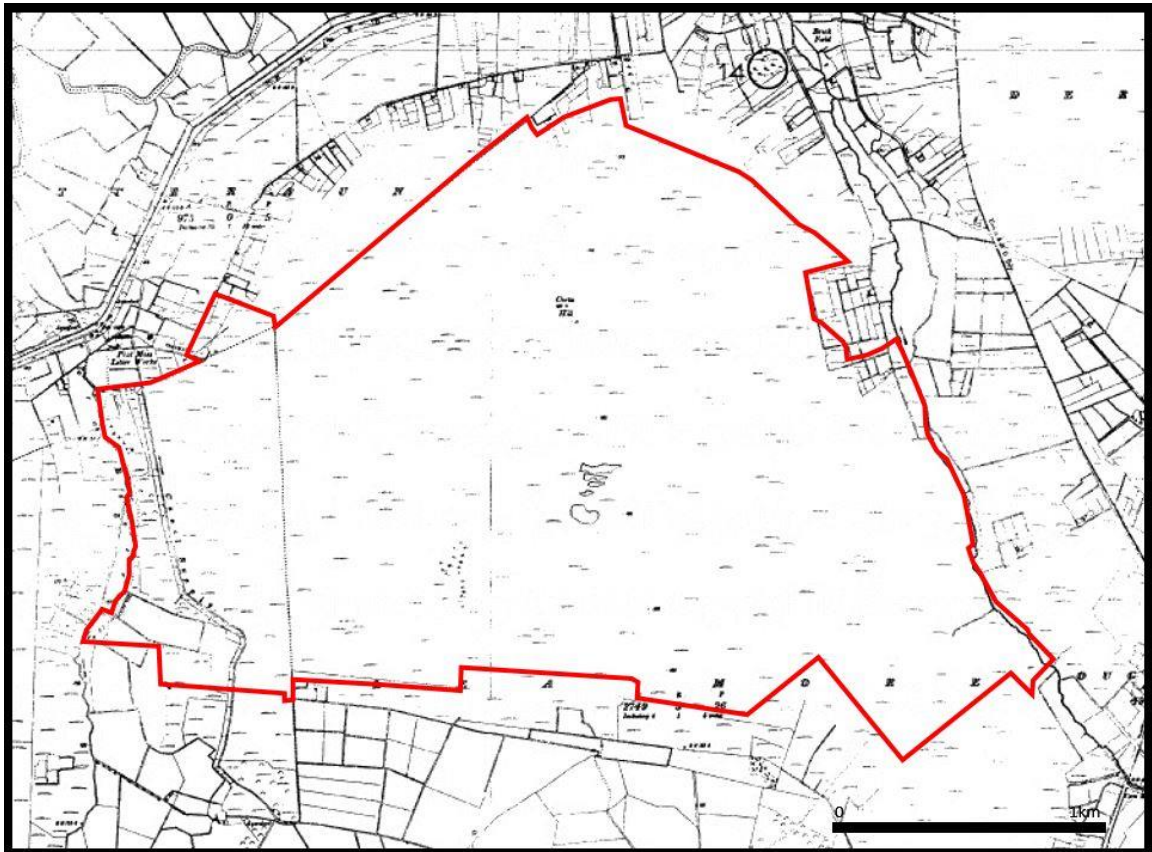




Fig. 1. Turraun Bog, Co. Offaly, detail of the Record of Monuments and Places map sheet No. 15. The proposed rehabilitation area is outlined with the red line. There are no Recorded Monuments in the rehabilitation area.

Peatland survey

Turraun Bog was surveyed by the Irish Archaeological Wetland Unit (IAWU) in 1997 as part of the Archaeological Survey of Ireland Peatland Survey (Unlicensed). There were no sightings of archaeology recorded during the survey. There have been no further archaeological surveys in Turraun Bog.

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 27th of April 2021. The SMR consists of records included in the RMP and sites and monuments notified to the Dept. since the publication of the RMP. This review established that there are no entries in the SMR in the proposed rehabilitation area.

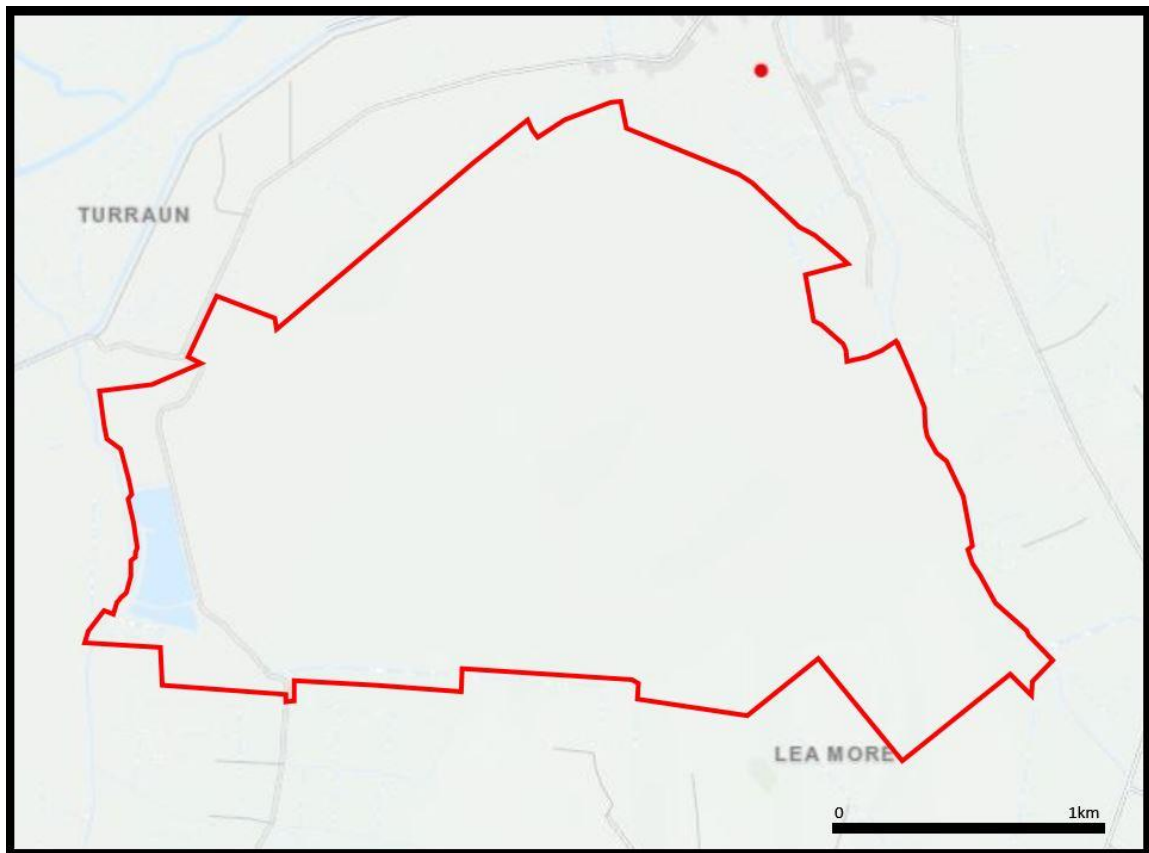
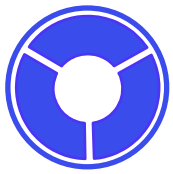


Fig. 2. Turraun Bog, Co. Offaly, detail of the Sites and Monuments Record. The proposed rehabilitation area is outlined with the red line. There are no SMRs in the rehabilitation area.



Reported finds

The topographical files of the National Museum of Ireland were searched for records of finds from the bog in April 2021 (thanks to Isabella Mulhall) and the finds are included below in Table 1.

Townland	Museum No.	Description
Lea Beg	M1951:15	Bog Butter in hide container
Lea Beg	1969:19	Socketed Spearhead, bronze
Lea Beg	1969:19:1	Socketed Spearhead shaft
Lea Beg	1969:837	Human skull
Lea Beg	1991:3	Utilised pebble too
Lea More	R1691	Kite-shaped Bronze spearhead

Table 1. List of archaeological finds from Turraun Bog reported to the National Museum of Ireland.

Archaeological investigations

Reports of archaeological excavations and licensed monitoring in the study area listed in the excavations database at excavations.ie were examined as part of the assessment. There are no reports of archaeological investigations carried out in the rehabilitation area in the database.

Previous assessments

Turraun 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 the IAWU survey in 1997 and noted that there was a moderate potential for archaeological features to be uncovered during the course of any future development works in Turraun Bog.

14. IMPACT ASSESSMENT

There are no known archaeological sites in the rehabilitation area. Known archaeological finds consist of metal and stone artefacts, bog butter and human remains (see Table 1).

15. RECOMMENDATIONS

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.

16. CONCLUSION

This is a desk-based archaeological assessment and includes a collation of existing written and graphic information to identify the likely archaeological potential of the proposed rehabilitation area. There are



no known archaeological sites in the rehabilitation area. Known archaeological finds consist of metal and stone artefacts, bog butter and human remains. 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.

17. REFERENCES

DAHGI 1995. Recorded Monuments Protected under Section 12 of the National Monuments (Amendment) Act, 1994. County Offaly.

EPA 2020. Guidance on the process of preparing and implementing a bog rehabilitation plan.

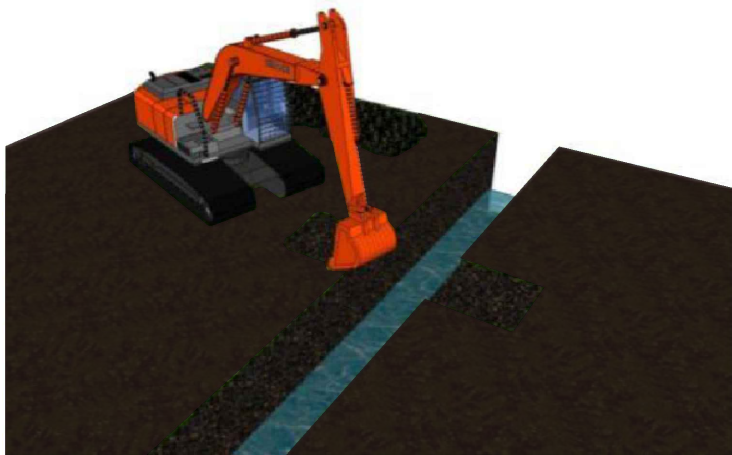
Dr. Charles Mount
28 April 2021



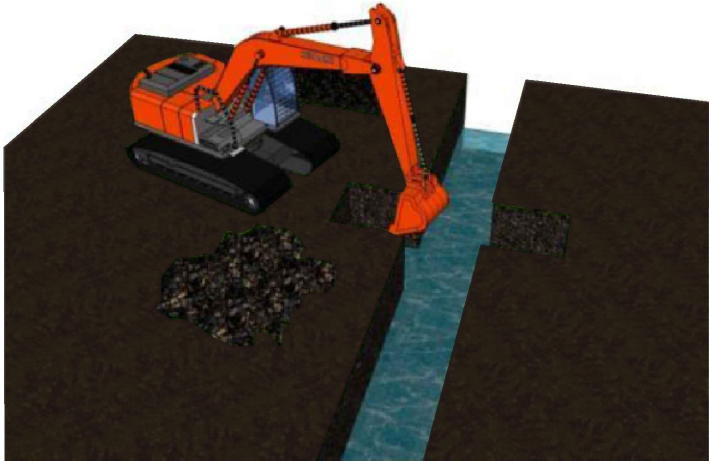
Appendix 2

REHABILITATION METHODS

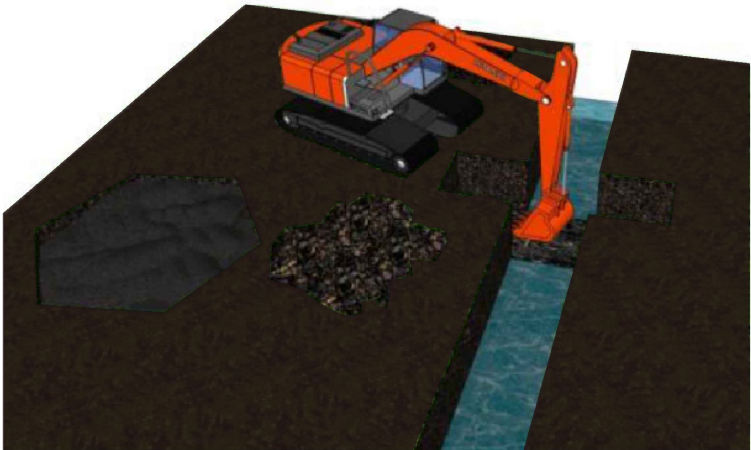
1. Before building drain block, the sides and bottom of the ditch is cleaned using the excavator to remove dry degraded peat, to ensure a good peat-to-peat contact.
(If any vegetation present, it should be carefully removed and left aside for replacement at the end of the process.)



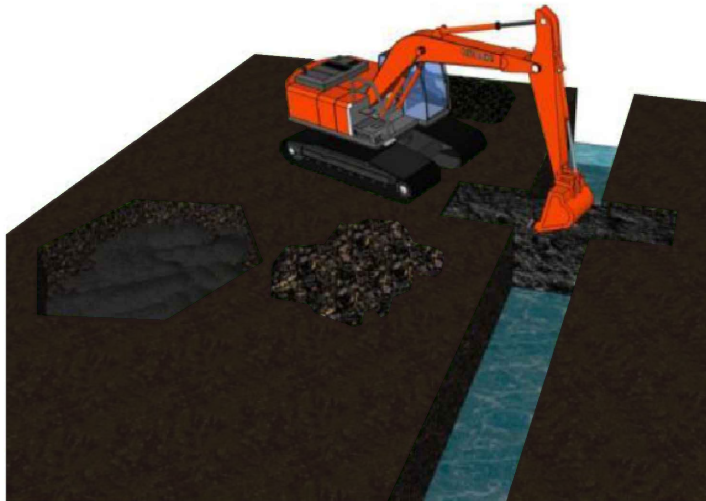
2. Cut key in either side of the drain approximately 500mm deep, and ensure that it is wider than the actual drain. Remove 500mm of peat from bottom of the drain also and place behind the machine for replacement later.



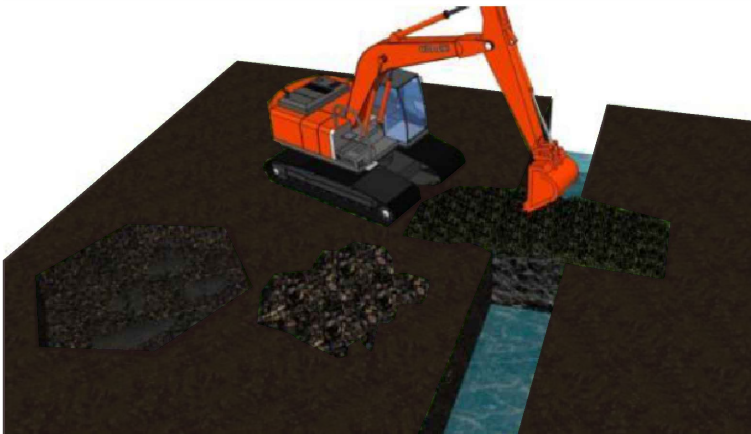
3. Open an area behind machine to be used as a borrow pit. Avoid using the surface layer of peat (top 100-200mm) which is likely to be very permeable. Only use the deeper, more compacted peat to build the drain block.
(If any vegetation present, it should be carefully removed and left aside for replacement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



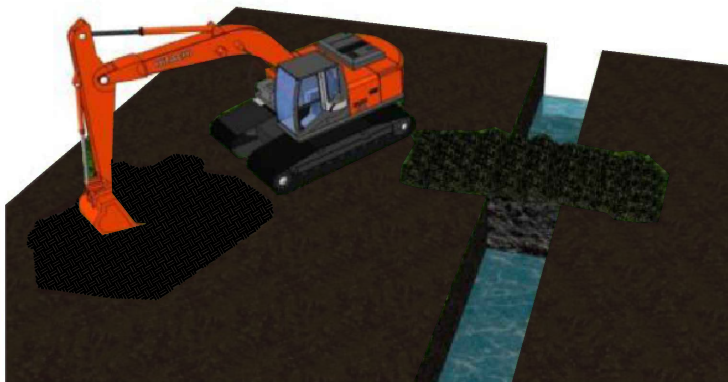
4. Dig out peat from the borrow pit and place into the drain compacting in 300mm layers. Compact the peat firmly using the excavator bucket before laying more peat from the borrow pit.



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

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

PROJECT:

Peatland Climate Action Scheme
PCAS

TITLE:

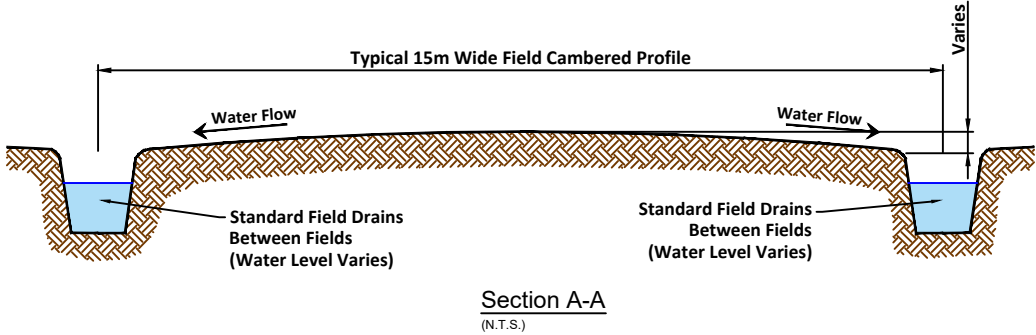
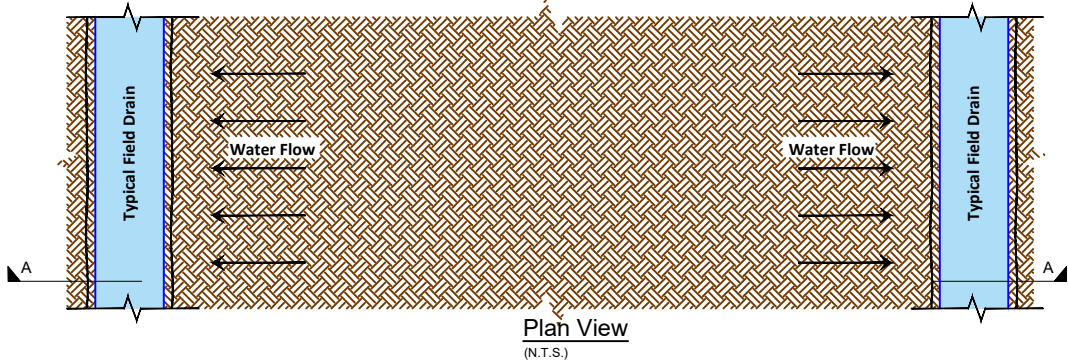
Rehabilitation Method DPT 2
Peat Drain Blocking

Drawn By:	Checked By:	Approved:
CAD	Discip. Lead	Design Lead
P.K.	D.K.	P.N.
Date:	18/12/20	Scale : N.T.S.
Drawing No.:	PCAS-0100-002	
Rev:	b	

C:\Users\Kierman\PI\Desktop\Castlegar\DR\PCAS-0100-002b_DPT_2_PeatDrainBlock.dwg

Existing Layout:

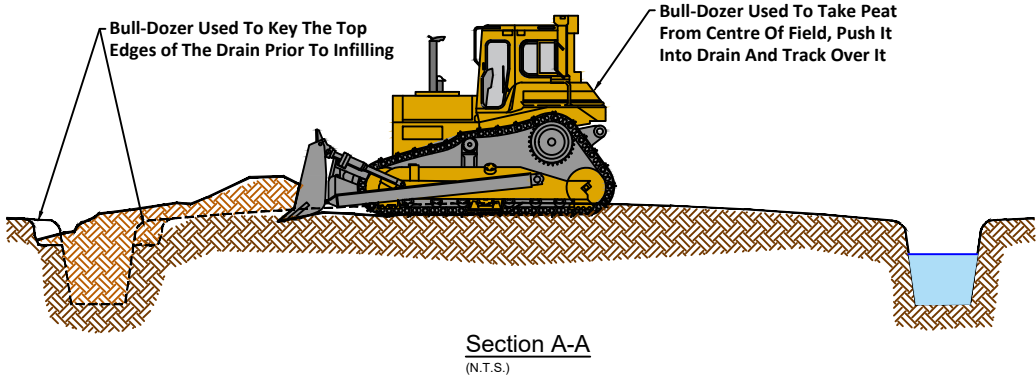
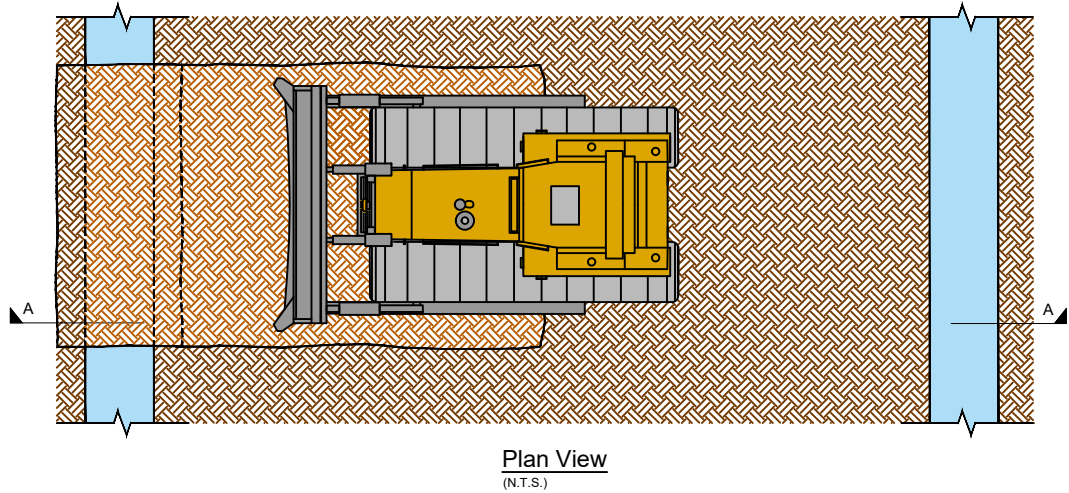
Typical existing bare peat fields are cambered (higher) in the centre and lower towards the drains, helping drainage of the fields but limiting the re-wetting of the central area. The concept of drain blocking is to raise the water levels in the drains to re-wet the cutaway and slow the water movement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



- NOTES:**
- FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
 - 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.
 - REFER TO RELEVANT SITE PLAN FOR No. OF DRAIN BLOCKS SPECIFIED PER 100M DRAIN LENGTH.
 - REFER TO RELEVANT SITE PLAN FOR SPECIFIC FINISHED GROUND LEVELS TO BE ACHIEVED.
 - ALL DETAILS TO BE AGREED WITH BORD NA MONA OPERATIONS PRIOR TO CONSTRUCTION.
 - OPERATORS TO CONFORM WITH ALL STANDARD OPERATING PROCEDURES.
 - 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.

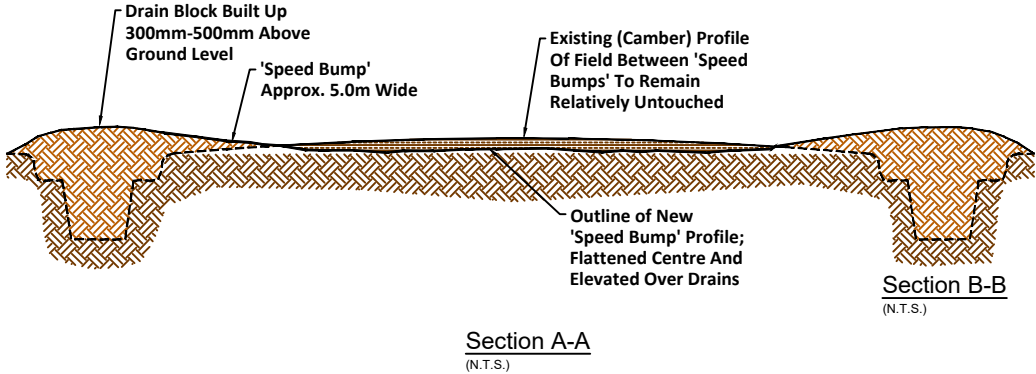
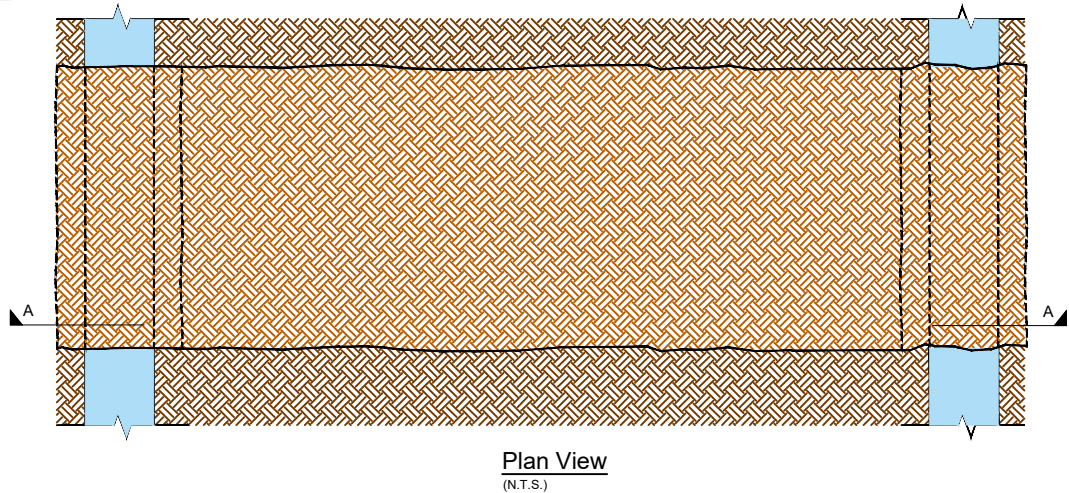
Phase 1
Forming 'Speed Bump'

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'.



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.



STATUS			
c	For Approval	P.K.	03/03/21
b	'Key' Added To Top Edges Of Drain at Drain Block Locations	P.K.	08/02/21
a	Issued For Information	P.K.	29/01/21
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

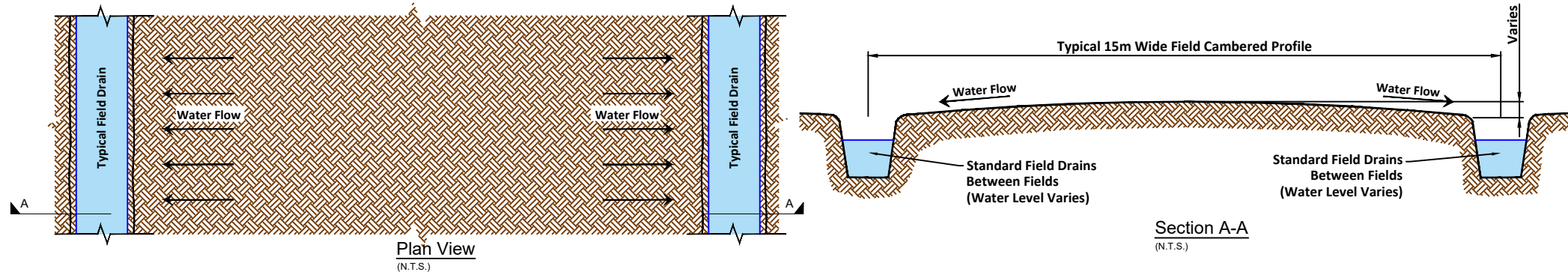
PROJECT:
Peatland Climate Action Scheme
PCAS

TITLE:
Rehabilitation Method 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.:				Rev:
PCAS-0100-008				c

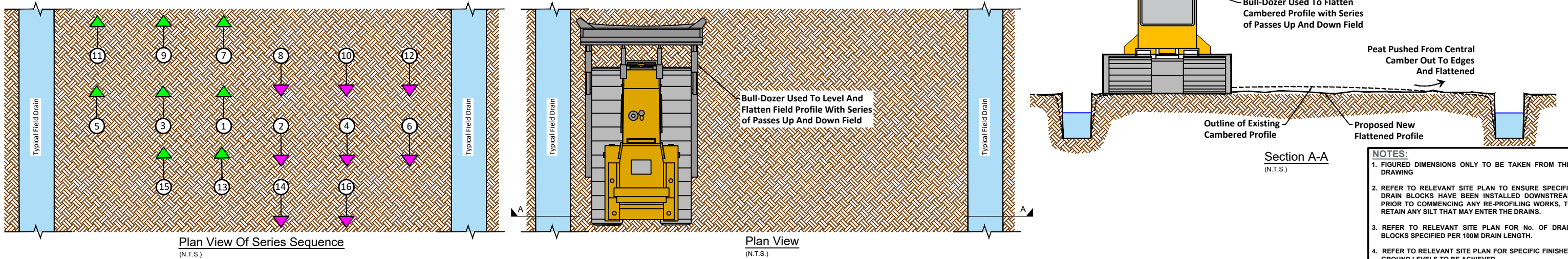
Existing Layout:

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

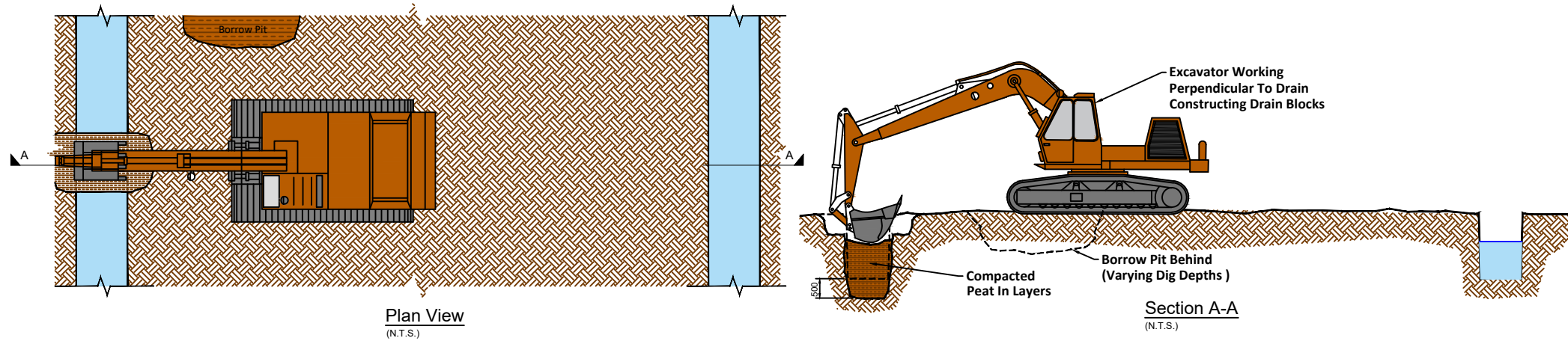
Field to be re-profiled using bull-dozer making a total of 16 passes, 8 passes up and 8 passes down, flattening the camber on the production field. (Sequence of runs shown below)



- NOTES:**
- FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
 - 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.
 - REFER TO RELEVANT SITE PLAN FOR No. OF DRAIN BLOCKS SPECIFIED PER 100M DRAIN LENGTH.
 - REFER TO RELEVANT SITE PLAN FOR SPECIFIC FINISHED GROUND LEVELS TO BE ACHIEVED.
 - ALL DETAILS TO BE AGREED WITH BORD NA MONA OPERATIONS PRIOR TO CONSTRUCTION.
 - OPERATORS TO CONFORM WITH ALL STANDARD OPERATING PROCEDURES.
 - 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.

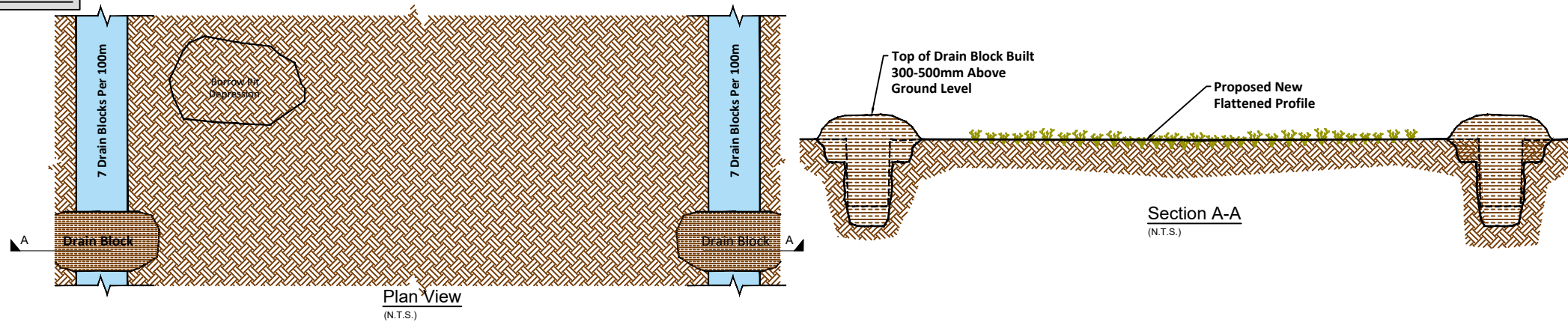
Phase 2 Peat Drain Blocking

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.)



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.



STATUS			
b	For Approval	P.K.	25/02/21
a	Issued For Information	P.K.	29/01/21
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

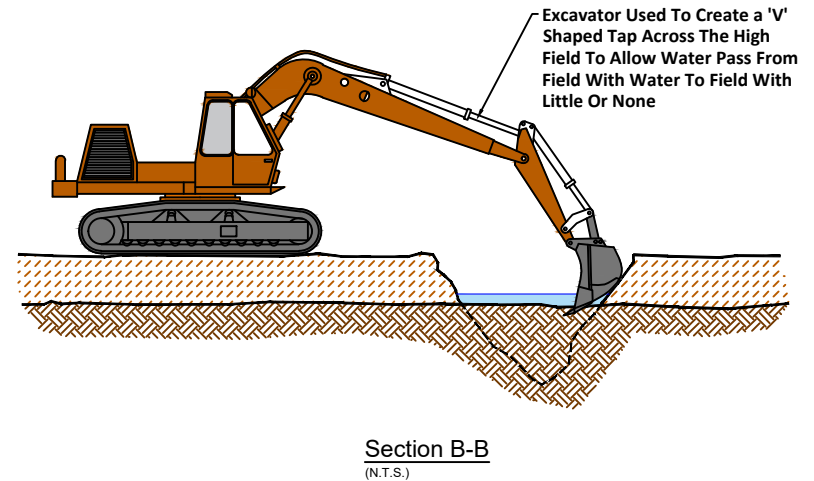
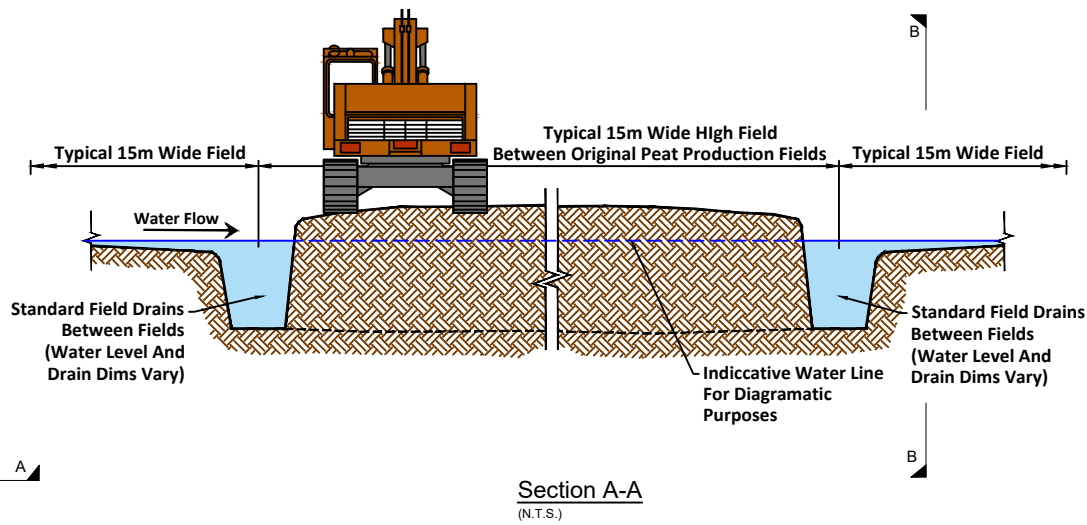
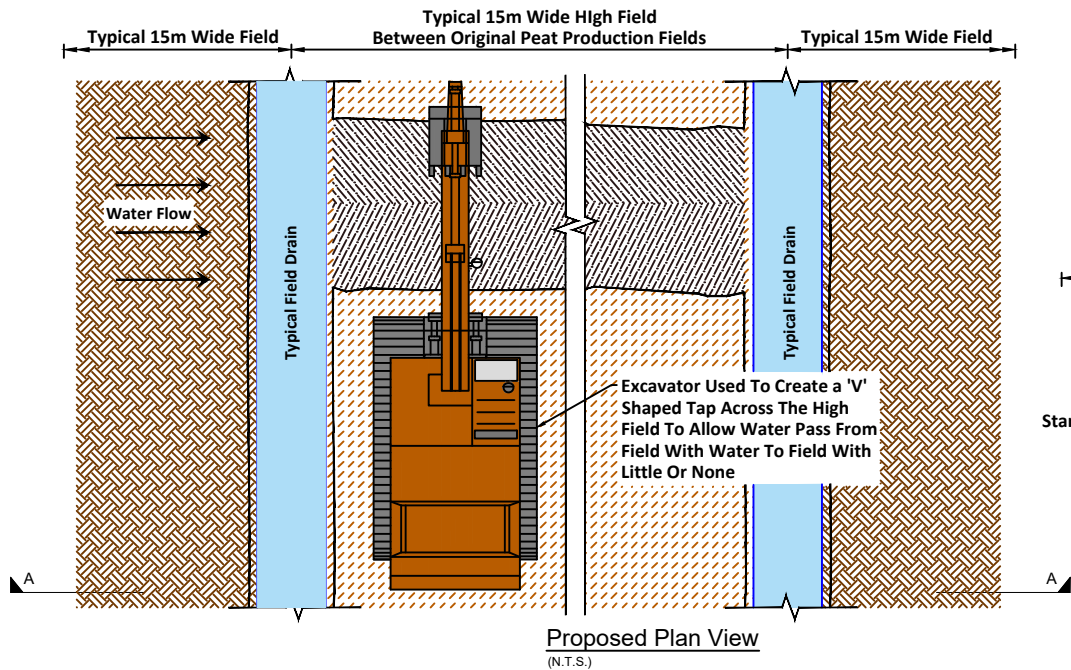
PROJECT:
Peatland Climate Action Scheme
PCAS

TITLE:
Rehabilitation Method WLT 5
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:	28/01/21	Scale :	Not to Scale	A3
Drawing No.:	PCAS-0100-012			Rev:

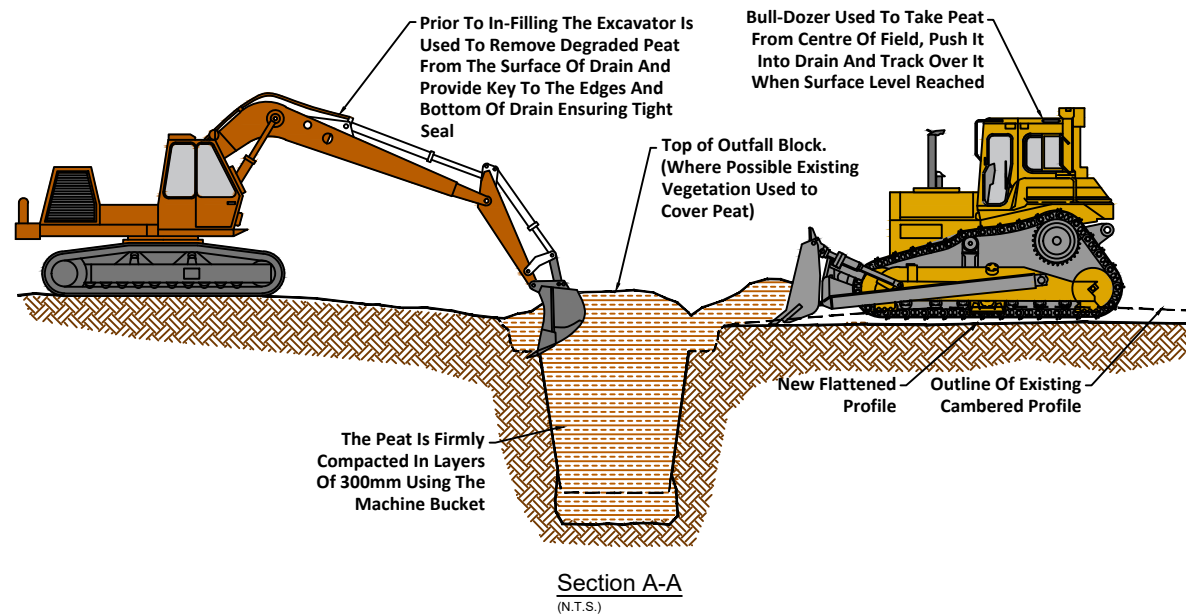
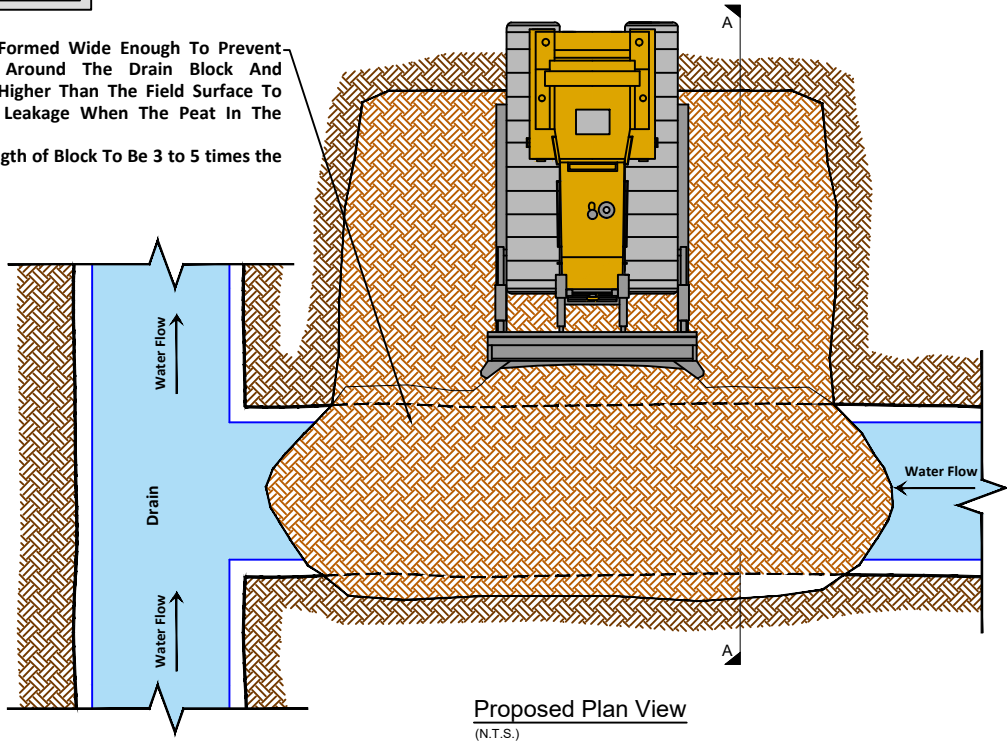
b

"V" Tap Across High Field To Control Water Levels



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



NOTES:

- FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
- 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.
- REFER TO RELEVANT SITE PLAN FOR No. OF DRAIN BLOCKS SPECIFIED PER 100M DRAIN LENGTH.
- REFER TO RELEVANT SITE PLAN FOR SPECIFIC FINISHED GROUND LEVELS TO BE ACHIEVED.
- ALL DETAILS TO BE AGREED WITH BORD NA MONA OPERATIONS PRIOR TO CONSTRUCTION.
- OPERATORS TO CONFORM WITH ALL STANDARD OPERATING PROCEDURES.
- 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	'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

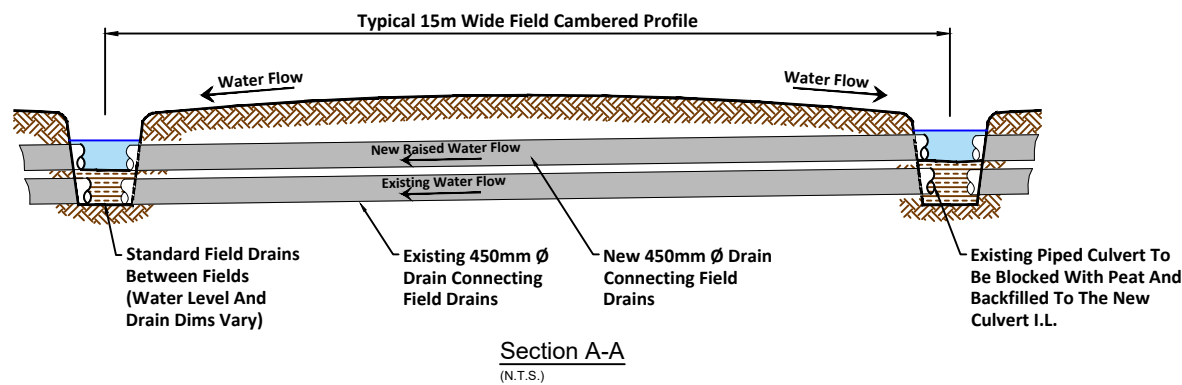
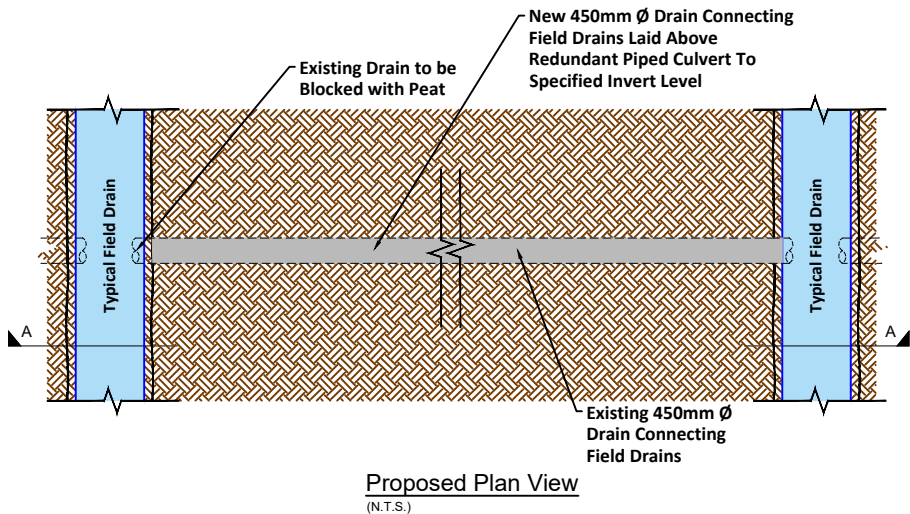
BORD NA MÓNA
Naturally Driven
Bord Na Móna Engineering Department
LEABEG, TULLAMORE CO. OFFALY
Tel. 057 9345900
Fax. 057 9345160

PROJECT:
Peatland Climate Action Scheme
PCAS

TITLE:
Modifying of Outfalls
& Managing Water Levels

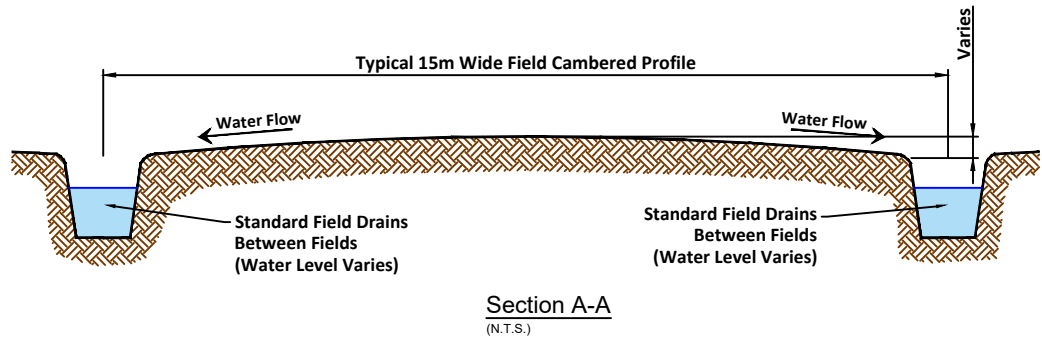
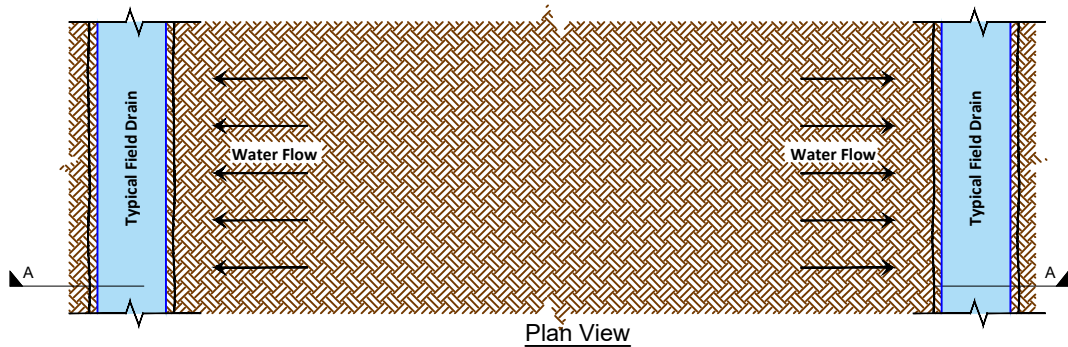
Drawn By:	Checked By:	Approved:
CAD Designer	Discip. Lead	Design Lead
P.K.	D.K.	P.N.
Date: 20/01/21	Scale: Not to Scale	A3
Drawing No.: PCAS-0100-014	Rev: c	

Raise Piped Culverts To Control Water Levels



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.

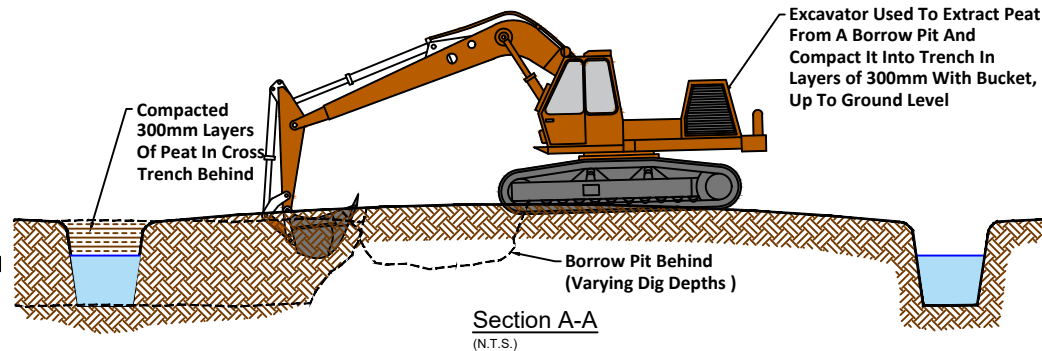
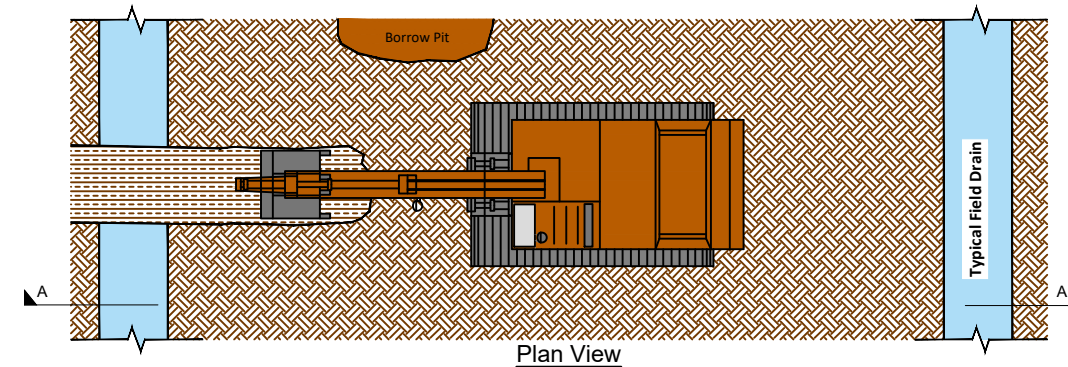


NOTES:

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.

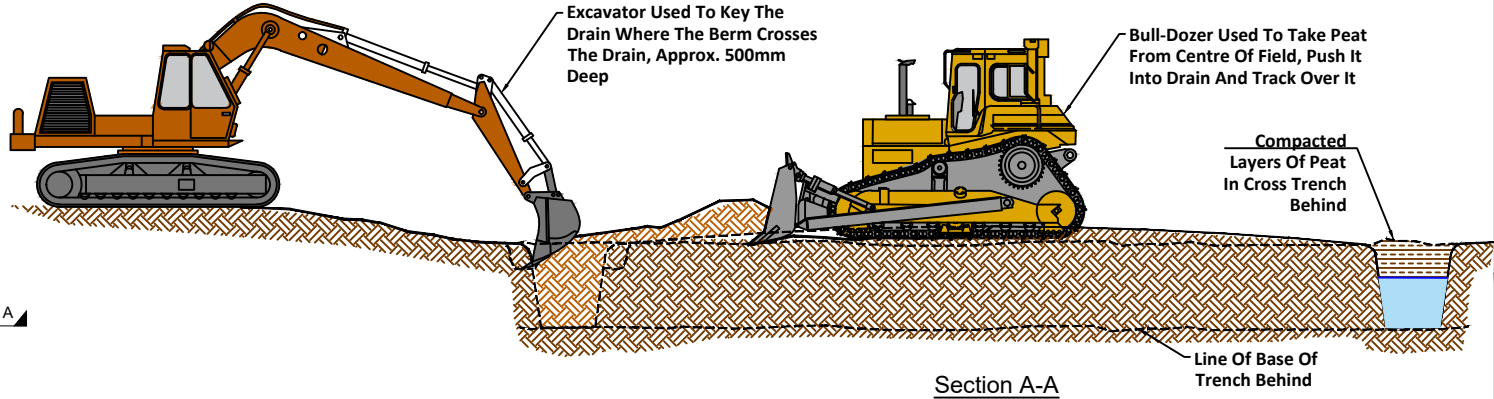
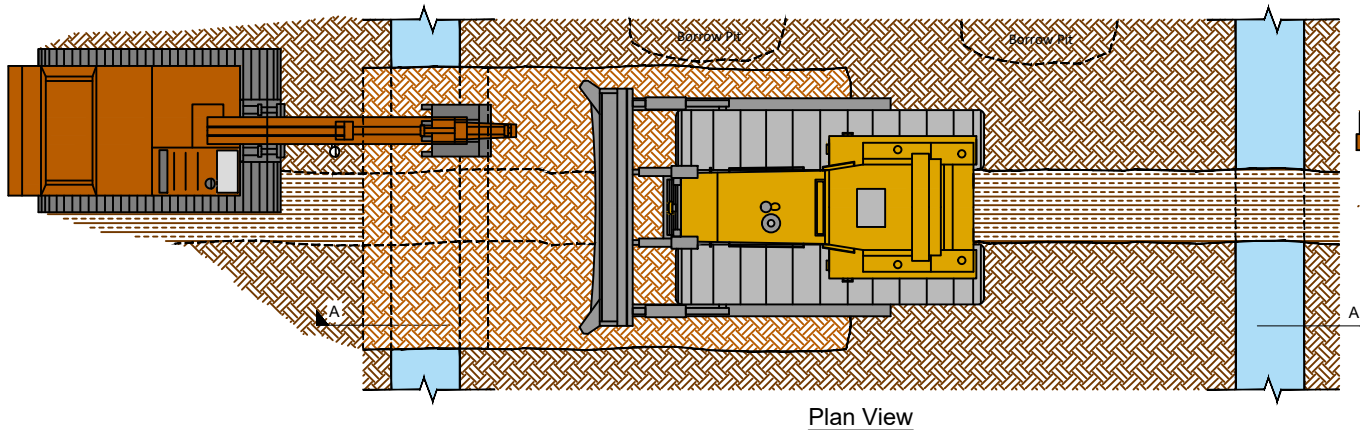
Phase 1 Forming Peat Trench

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.



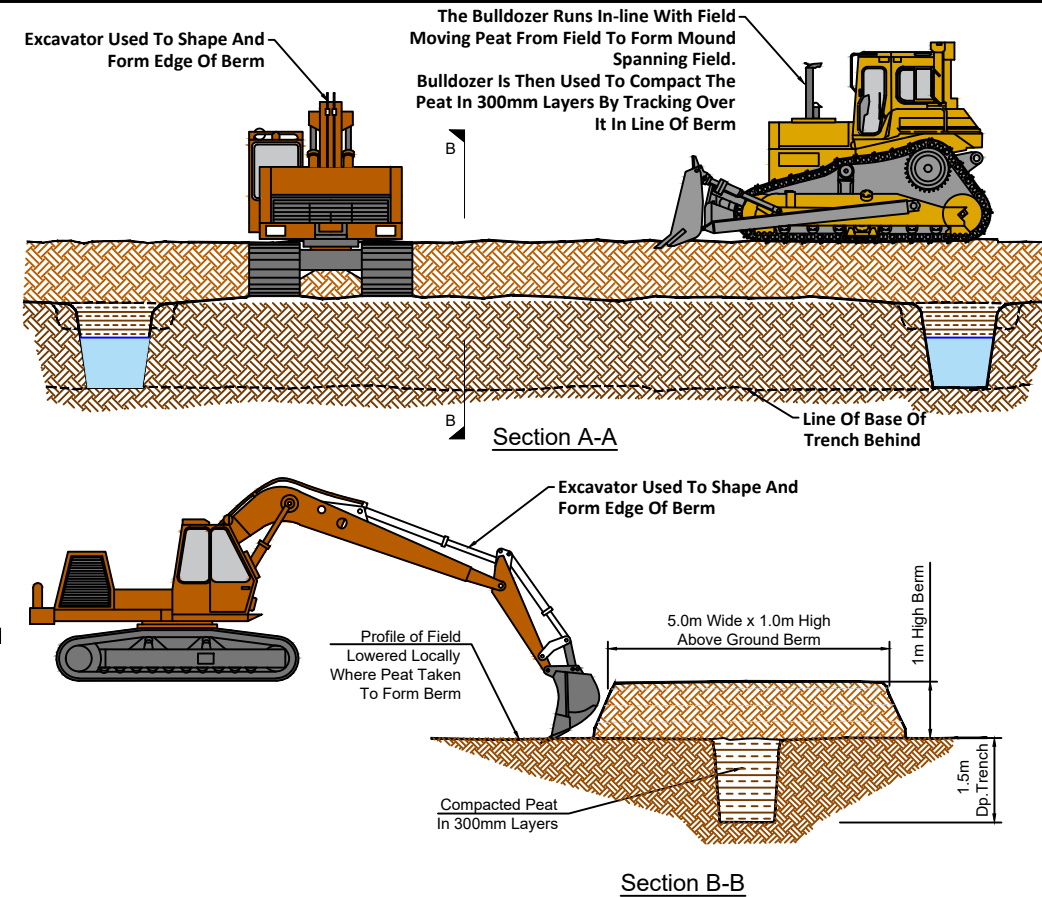
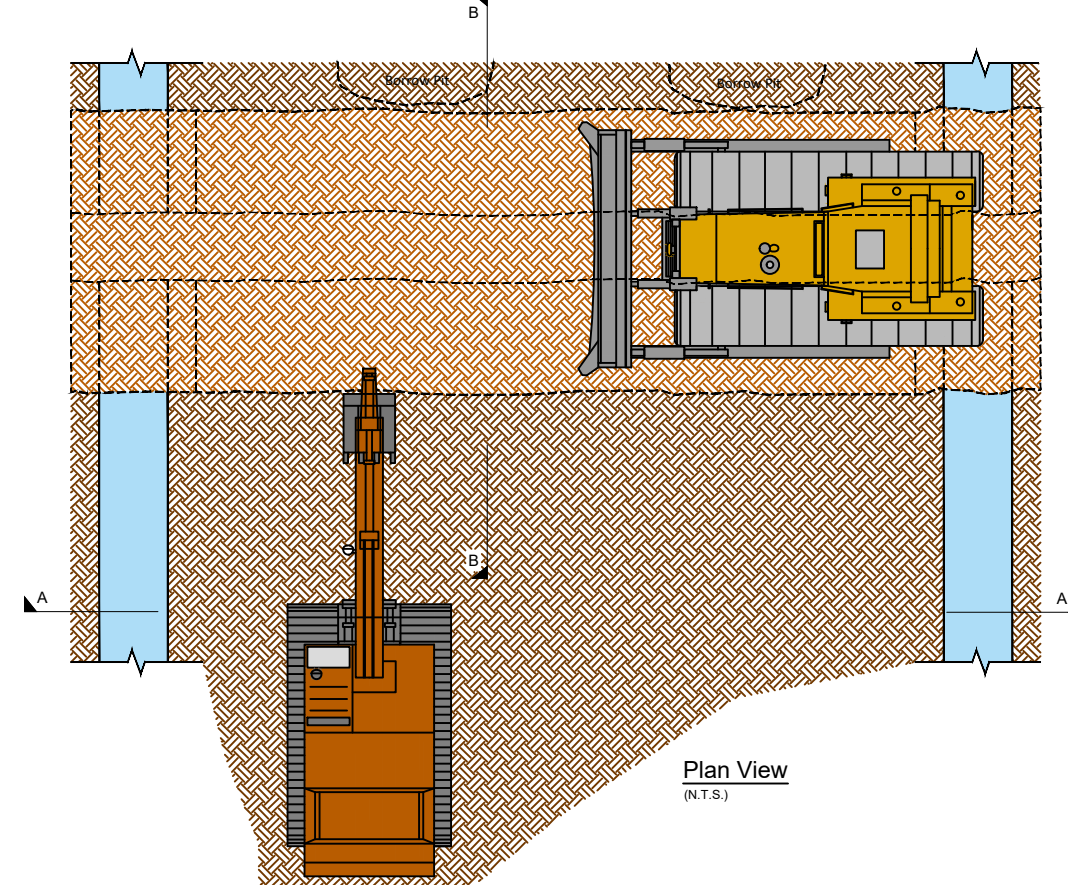
Phase 2 Forming Peat Berm

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.



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.



STATUS

Rev	Description	Issued By	Date
a	Issued For Approval	P.K.	12/03/21

BORD NA MONA
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
P.K.	D.K.	P.N.
Date: 28/01/21	Scale: Not to Scale	A3
Drawing No.: PCAS-0100-015	Stage: For Approval	Rev: a