
BORD NA MÓNA

Cutaway Bog Decommissioning and Rehabilitation Plan

Screening Report for Appropriate Assessment

Belmont Bog

Co. Offaly

June 2021



Jennings O'Donovan & Partners Limited,

Consulting Engineers,
Finisklin Business Park,
Sligo.

Tel.: 071 9161416

Fax: 071 9161080

email: info@jodireland.com



JENNINGS O'DONOVAN & PARTNERS LIMITED

*Project, Civil and Structural Consulting Engineers,
FINISKLIN BUSINESS PARK,
SLIGO,
IRELAND.*

Telephone (071) 9161416

Fax (071) 9161080




Email info@jodireland.com

Web Site www.jodireland.com

**DOCUMENT APPROVAL**

PROJECT	Belmont Bog, Co. Offaly	
CLIENT / JOB NO	Bord Na Móna	6367
DOCUMENT TITLE	Cutaway Bog Decommissioning and Rehabilitation Plan Screening Report for Appropriate Assessment, Belmont Bog, Co. Offaly	

Prepared by**Reviewed by****Approved by**

Document FINAL	Name Pat Doherty	Name Dr. Monica Sullivan	Name David Kiely
Date June 1 st , 2021	Signature 	Signature 	Signature 

Directors: D. Kiely, C. McCarthy

Regional Director: A. Phelan

Consultants: C. Birney, R. Gillan

Senior Associates: R. Davis, S. Gilmartin, J. Healy, S. Lee,
J. McElvaney, T. McGloin, S. Molloy

Associates: M. Forbes, A. Ganley, D. Guilfoyle,
L. McCormack, M. Sullivan

Company Reg No. 149104 **VAT Reg. No.** IE6546504D



Contents

1	INTRODUCTION	1
1.1	Appropriate Assessment Process	2
1.1.1	Stages of the Appropriate Assessment Process	2
1.2	Guidelines; Project Approach & Baseline Surveys.....	3
1.2.1	Guidelines & Project Approach.....	3
1.2.2	Desktop Review	3
1.2.3	Baseline Surveys	5
1.3	Certainty and Sufficiency of Data Provided	12
2	Stage 1 Screening	13
2.1	Screening Evaluation Process	13
2.2	Overview of Belmont Bog Decommissioning and Rehabilitation	15
2.3	Screening Evaluation: Is the Project Directly Connected to or Necessary for Management of a European Site?	16
2.4	Description of the proposed Decommissioning and Rehabilitation	16
2.4.1	Location, Size, Scale, Landcover	16
2.4.2	Application of Protective Measures in the Screening Evaluation	17
2.4.3	Decommissioning and Rehabilitation Stage	17
2.4.4	Operational Stage	34
2.4.5	Other Projects and Plans with Potential to Cause In-Combination Effects	35
2.5	European Sites under consideration	38
2.5.1	Distance of the Project to European Sites	38
2.6	Sources of Information & Consultation	49
2.6.1	Consultation	49
2.6.2	Sources of Information	50
2.7	Potential Sources, Pathways and Timing of Impacts to European Sites (SACs & SPAs)	51
2.7.1	Direct Impact to Habitats within the SAC (<i>no potential for this impact to occur</i>)	51
2.7.2	Indirect impacts to habitats within SAC boundaries	52
2.7.3	Indirect or ex-situ disturbance or displacement of Qualifying Species of SACs	52
2.7.4	Indirect or ex-situ mortality of Qualifying Interests of SACs	53
2.7.5	Other Projects with Potential to Cause Cumulative Impacts to SAC sites	53

2.7.6	Direct Impacts to Habitats within SPAs	53
2.7.7	Indirect impacts habitats within SPA sites	54
2.7.8	Indirect or ex-situ disturbance/displacement of bird species of Special Conservation Interest.....	54
2.7.9	Other Projects with Potential to Cause Cumulative Impacts to SPA sites	55
2.8	Screening Evaluation of the Potential for Effects on European Sites (SACs & SPAs)	55
2.8.1	Screening for Appropriate Assessment: Conclusion Statement.....	76
3	REFERENCES	77

Table of Figures

Figure 1	The Appropriate Assessment Process
Figure 2	Area of Search (in Red) for Records of Rare, Threatened & Protected Species (Source NBDC)
Figure 3	Current Habitats at Belmont Bog
Figure 4	Stage 1 Screening
Figure 5	Site Location of Belmont Bog
Figure 6	Waste Hierarchy
Figure 7	Proposed Enhanced (PCAS) Rehabilitation Plan
Figure 8	SPAs within 15km of Belmont Bog
Figure 9	SACs within 15km of Belmont Bog

Table of Appendices

Appendix A	Finding of No Significant Effects (FONSE) Report
Appendix B	Belmont Bog: Cutaway Bog Decommissioning and Rehabilitation Plan 2020
Appendix C	Site Synopses
Appendix D	Methodology Drawings

1 INTRODUCTION

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

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

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Blackwater bog group (Ref. P0502-01). As part of the condition 10.2 of the IPC license, decommissioning and rehabilitation of cutaway boglands is required. Belmont bog, located within the above group, is also to be subject to the above referenced improvements as part of a scheme titled the Peatland Climate Action Scheme (hereafter PCAS). The pertinent detail per BnM bog for both requirements under IPC license condition 10.2 and the proposed PCAS is described in a decommissioning and rehabilitation plan (hereafter 'plan' or 'the plan'), as required under Condition 10.2 of the respective IPC license. It is this plan which forms the subject of the appraisal herein.

The general objective of peatland rehabilitation is to ensure environmental stabilisation of the former industrial peat production areas. Enhanced rehabilitation focuses on optimizing suitable hydrological conditions (stable water levels close to the surface) by blocking production field drains, and other measures that will be planned in detail. This will create soggy peatland conditions that will be naturally colonised by plants and animals and will allow compatible peatland habitats to re-develop. It will also slow water movement across these bogs.

The enhanced decommissioning to be carried out on the bogs as part of the PCAS includes typically the clean-up of the bog, the cleaning of silt ponds, the management of peat stockpiles via levelling, the decommissioning and de-gassing of mobile fuel tanks, and the removal of buildings (generally porto-cabins).

This Screening Report for Appropriate Assessment has been prepared by Jennings O'Donovan and Partners Limited and contains sufficient objective scientific information to facilitate the competent public authority to determine whether the decommissioning and rehabilitation outlined in the plan referenced above requires Appropriate Assessment, or whether the potential for significant effects on any designated European Site can be excluded.

1.1 Appropriate Assessment Process

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

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

1.1.1 Stages of the Appropriate Assessment Process

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

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



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

1.1.1.1 Stage 1 - Screening for AA

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

1.1.1.2 Stage 2 – Appropriate Assessment

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

1.1.1.3 Stage 3 - Alternative Solutions

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

1.1.1.4 Stage 4 - IROPI

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

1.2 Guidelines; Project Approach & Baseline Surveys

1.2.1 Guidelines & Project Approach

The preparation of this Screening for Appropriate Assessment Report has had regard to;

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

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

1.2.2 Desktop Review

The Biodiversity baseline information presented in this report was collated from site investigations and field surveys, along with publicly available online resources including from the National Biodiversity Data Centre (NBDC) and the National Parks and Wildlife Service (NPWS) online webpage, which are regularly updated. Belmont Bog is not an IWeBs site and is not monitored by BirdWatch Ireland as part of the IWeBS network.

Records held by the NBDC for protected species in the wider area surrounding Belmont Bog were obtained from the polygon surrounding Belmont Bog as shown on Figure 2. Protected species records held by the NPWS were also obtained for the wider area surrounding Belmont Bog and these include otter (recorded downstream of Belmont Bog along the Blackwater River), Irish hare, common frog, badger, Irish hare, hedgehog, white-clawed crayfish, barn owl, hedgehog, white-clawed crayfish, Geyer's whorl snail, Desmoulins whorl snail and green-winged orchid. Of the species records held by the NPWS only Irish hare has been recorded within or immediately adjacent to Belmont Bog.

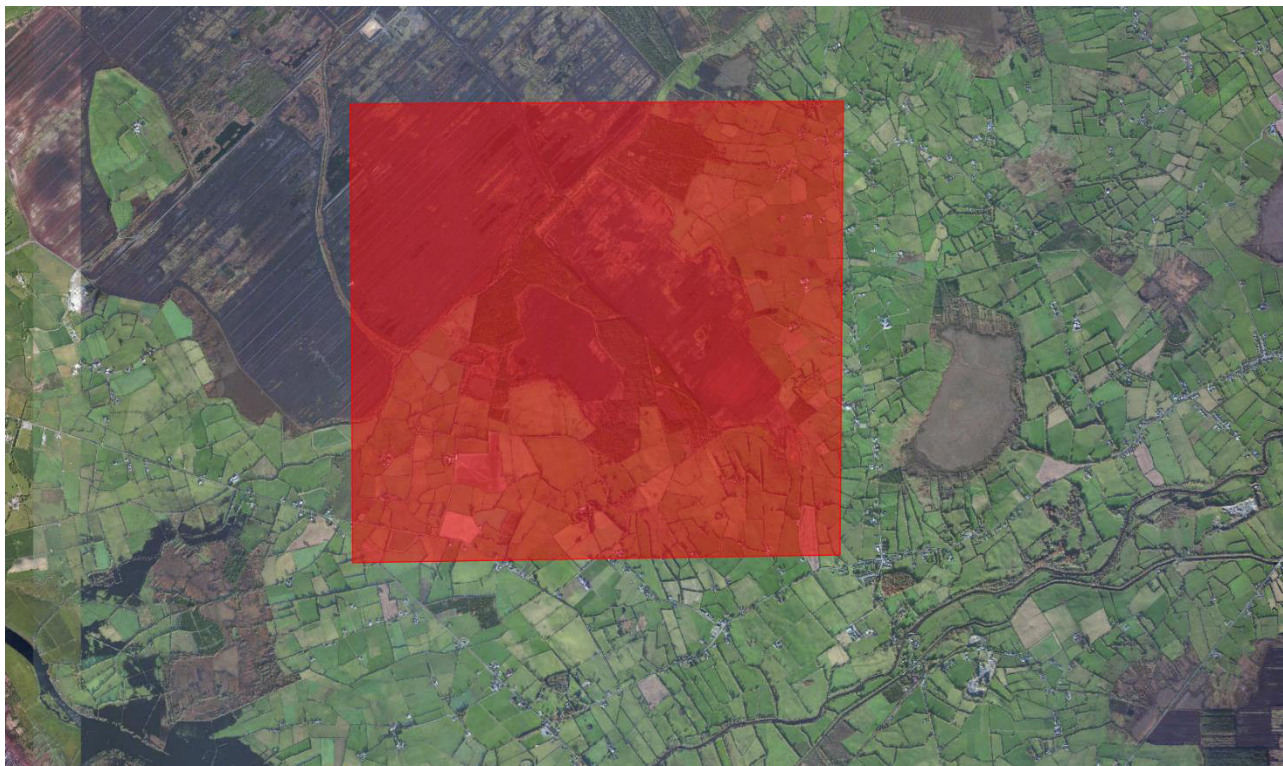


Figure 2: Area of Search (in Red) for Records of Rare, Threatened & Protected Species (Source NBDC)

Table 1: Rare, Threatened and Protected Species recorded within the Area of Search shown on Figure 2

Record Date	Species
06/06/2002	Black-headed Gull (<i>Larus ridibundus</i>)
26/05/2020	Marsh Fritillary (<i>Euphydryas aurinia</i>)
26/05/2020	Small Heath (<i>Coenonympha pamphilus</i>)
31/12/2014	Eurasian Badger (<i>Meles meles</i>)
27/03/2012	Irish Hare (<i>Lepus timidus subsp. hibernicus</i>)
27/03/2012	Pine Marten (<i>Martes martes</i>)

There are two recent records from May 2020 of Marsh fritillary within Belmont, towards the northeast of the bog and within the bog, towards the eastern boundary.

1.2.3 Baseline Surveys

1.2.3.1 Habitats & Fauna

A range of baseline surveys have previously been completed at Belmont Bog by Bord na Mona. As part of the formulation of the Belmont Bog Rehabilitation Plan ecological field surveys were completed 27th March 2012 and 26th May 2020. Targeted winter bird surveys were completed throughout the 2014 – 2015 non-breeding season.

Surveys to inform the current Appropriate Assessment reporting were completed by JOD on the following dates: 10th January and 30th March 2021. Conditions on both surveys dates were good and no constraints were identified.

The habitat and fauna surveys completed in 2012 and 2020 were based on an Extended Phase 1 Habitat Survey which involved walking the bog, identifying and mapping habitats, recording all birds seen and heard and recording all signs of non-volant protected mammals during the survey.

The non-breeding and breeding season surveys completed between 2014/2015 were detailed bird surveys that involved multiple visits to Belmont Bog during each month of the non-breeding season (Biosphere Environmental Services, 2015).

The field surveys completed in 2021 involved a transect of the bog to record bird species, and particularly wetland birds and bird species that are listed as special conservation interest bird species of European Sites. The 2021 January and March surveys also involved a survey of all silt ponds on site, as well as the section of the Blackwater River flowing along the northern boundary of the site, for the presence of otter holts, couches and field signs.

Habitats were identified and mapped during the 2012 and 2020 field surveys and a detailed description of the field survey results is provided as Appendix III Ecological Survey Report to the Belmont Rehabilitation Plan 2021. Figure 3 provides a habitat map of Belmont Bog. Following the completion of these surveys the most common habitats present at Belmont Bog identified as:

- Emerging scrub dominated by *Betula Pubescens*
- Pioneer Poor Fen communities
- Bare peat
- Small areas of open water
- Reedbeds
- Pioneering wet grassland dominated by *Juncus effusus* and *Molinia caerulea*
- Rich fen dominated by *Schoenus nigrans* and *Molinia caerulea*
- Dry Heath

- Dry grassland
- Dry disturbed/pioneer communities

The most common habitats present around the margins at this site include:

- Conifer plantation (WD4)
- Scrub (*Betula pubescens* dominated and *Ulex europaeus* dominated),
- Raised Bog (PB1 - marginal & sub-marginal ecotopes)
- Cutover bog (PB4)
- Birch woodland (WN7)
- Dry meadows and grassy verges (GS2)
- Wet grassland (GS4)
- Improved agricultural grassland (GA1).

Bird species, that are listed on Annex 1 of the Birds Directive and waterbirds, recorded during the non-breeding season surveys of 2014/2015 are summarised in Table 2 below.

Table 2: Annex 1 Birds Species & Waterbirds Recorded during Non-Breeding Season Surveys

2014/2015
3 Whooper swan recorded flying over the site as opposed to on the site on the 20 th January 2015
Regular roosting/foraging of whooper swan within Belmont Bog (towards the north of the bog) and within Blackwater Bog, north of Belmont Bog between November 2014 and January 2015. A maximum count of 42 birds were recorded.
40 golden plover flying over the site as opposed to on the site on the 17 th December 2014.
75 Lapwing on Belmont Bog, near the eastern boundary on the 9 th February 2015
1 merlin flying through the site as opposed to on the site on the 12 th February 2015
1 pintail was recorded on the 14 th November 2014 near the northern boundary of Belmont Bog
1 Peregrine fly over the site as opposed to on the site on the 25 th November 2014

Bird species, that are listed as special conservation interest bird species of SPAs, recorded during the breeding season surveys of 2013 and 2014 are summarised in Table 3 below.

Table 3: Annex 1 Birds Species & Waterbirds Recorded during Breeding Season Surveys

2013	2014
Snipe (1 pair)	Lapwing (2 pairs)
	Snipe (3 pairs)

The results of the non-breeding surveys in 2012/2013 and 2013/2014 found that both Blackwater Bog and Belmont Bog comprise substantial wetland habitats suitable for supporting important populations of wintering birds. Of particular note are nationally important populations of whooper swan and teal recorded over the wider Blackwater Bog area. The non-breeding bird survey report for 2014/2015 concluded that the Blackwater Bog area (which includes Belmont Bog) is representative of a site of national importance for wintering birds.

During the 2021 surveys in January, no wetland birds of conservation concern or representative of special conservation interest bird species of SPAs were observed at Belmont Bog. Breeding activity of wetland birds were identified during the March 2021 site visit, when a pair of lapwing were recorded over the flooded bog area to the north and east of Belmont Bog.

The silt ponds offer suitable foraging habitat for kingfisher. There is no suitable nesting habitat for kingfisher occurring within the project site. While there are previous records for Kingfisher at the project site, this species was not recorded during any field surveys completed at Belmont Bog between 2009 and 2021.

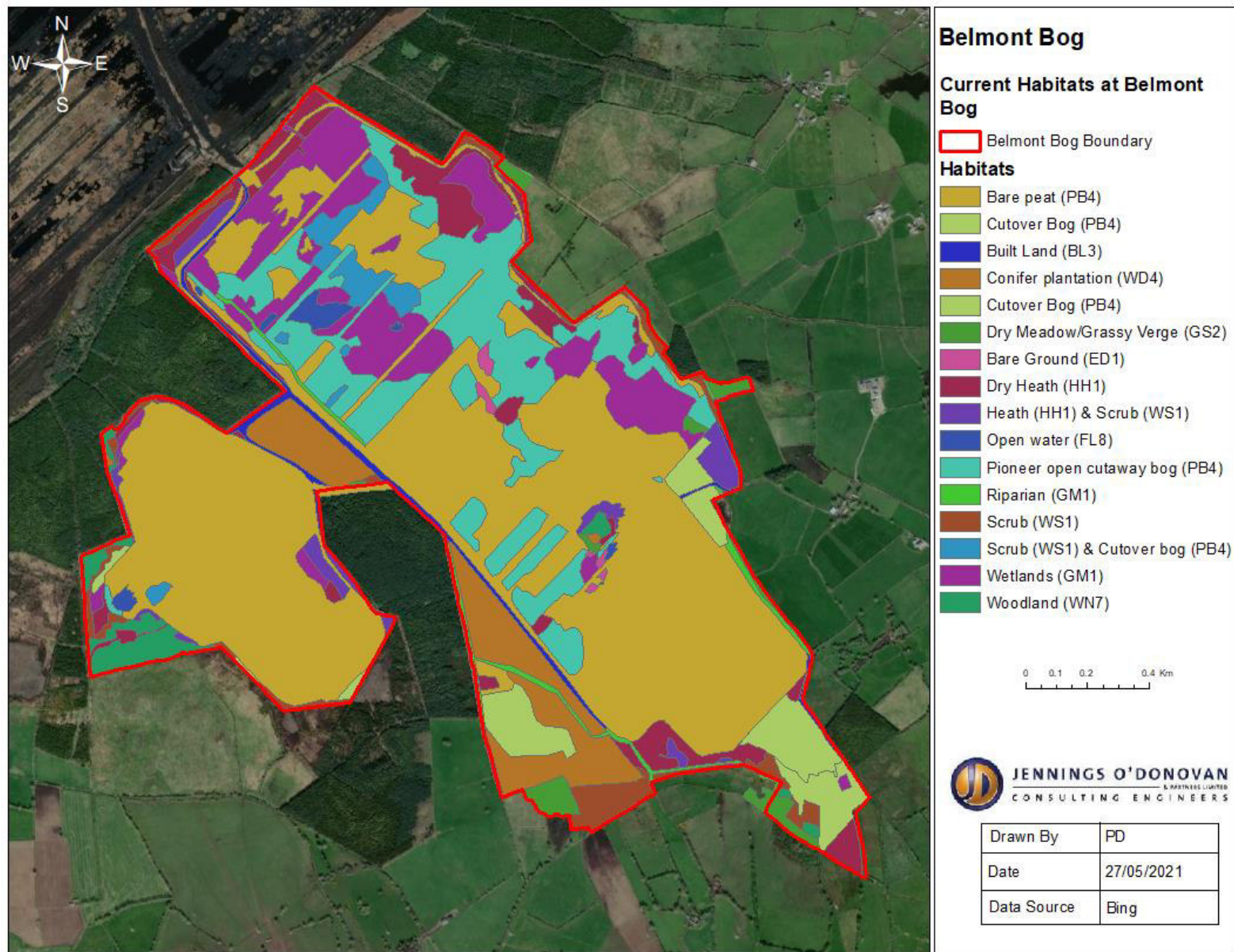


Figure 3: Current Habitats at Belmont Bog

Within the boundary of Belmont Bog the onsite silt ponds represent suitable habitat for supporting otters and their holts and couches. During the 2021 surveys at Belmont Bog, each of the 4 silt ponds associated with Belmont Bog (2 are located on site while 2 are located to the east of the bog's eastern boundary) were surveyed for the presence of otter holts and couches as well as field signs indicating the presence of otters. No definitive signs of otters were recorded at any of the 4 silt ponds occurring at the Belmont Bog.

1.2.3.2 Baseline Water Quality

Belmont Bog is located in the Shannon catchment and Shannon_SC_030 sub-catchment. The primary receiving surface water receptor for surface water draining from Belmont Bog is the Blackwater River which flows along the northern boundary of Belmont Bog. The Blackwater River in turn drains to the River Shannon approximately 6.5km downstream from the Belmont Bog. Belmont Bog is also flanked to the north and south by two no. tributaries of the River Blackwater namely the Moyclare and the Lisdaly.

The nearest EPA water quality data for the Blackwater River is located at Blackwater Bridge approximately 3.5km downstream from Belmont Bog (and downstream of the confluence of the Blackwater River with both the Moyclare and Lisdaly Rivers). The latest water quality monitoring undertaken from this monitoring station is from 2017 and resulted in a finding of Good water quality status.

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

There are 4 silt ponds at Belmont Bog and there are 2 treated surface water outlets, both to the Blackwater (Shannonbridge) 020 IE_SH_25B270200. Peat extraction was not identified as a pressure in the second cycle of the river basin management plan and is indicated as remaining so in the third cycle, currently under preparation.

The main emission limit value associated with this bog is 35mg/l suspended solids, with trigger levels for ammonia of 4.27mg/l and COD 100mg/l. From an analysis of any available monitoring over the past 5 yrs. of the IPC licence environmental monitoring programme, indicate that results were under the ELV for SS and the trigger level for Ammonia, and within the trigger level for COD. See Table 4 below. There are no known exceedances in the IPC Licence limits for Suspended solids and Ammonia resulting from the surface water monitoring programme at Belmont.

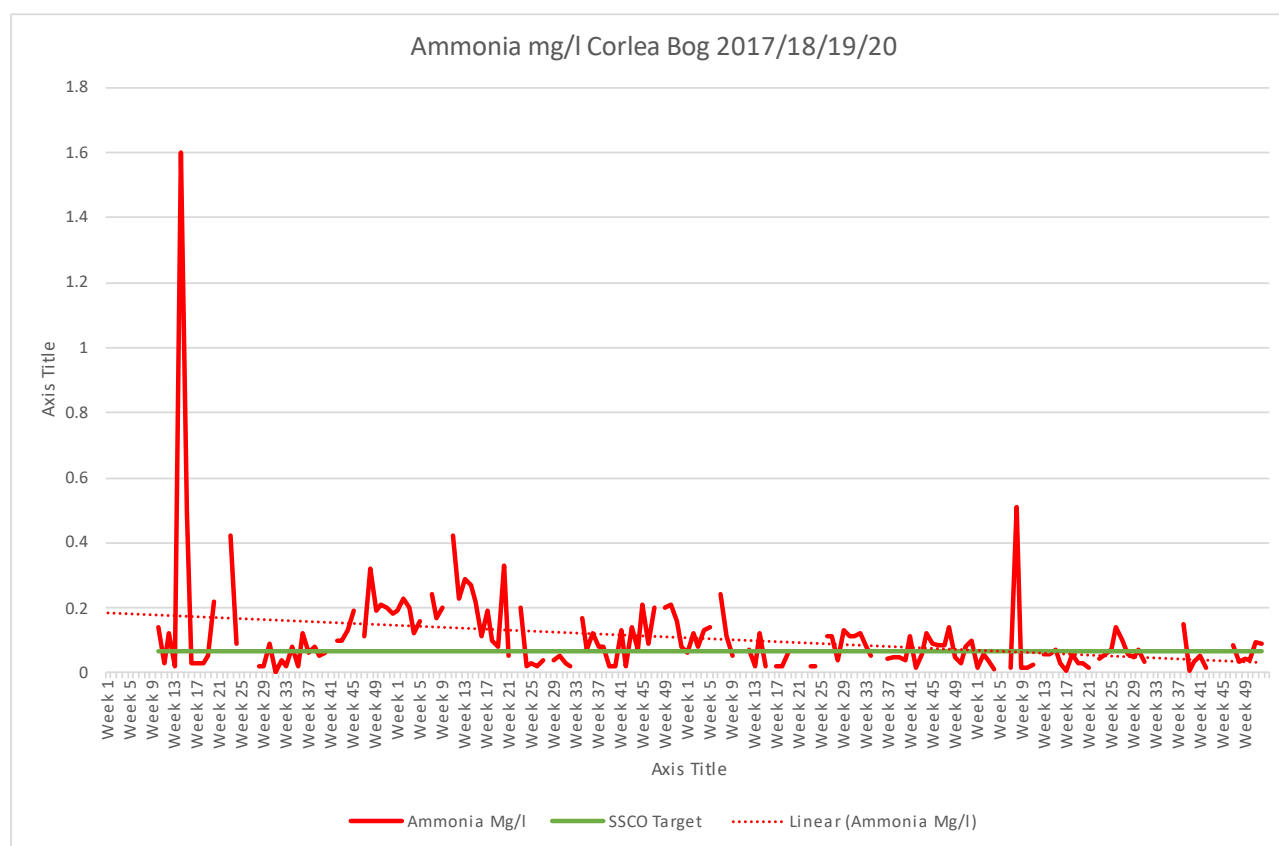
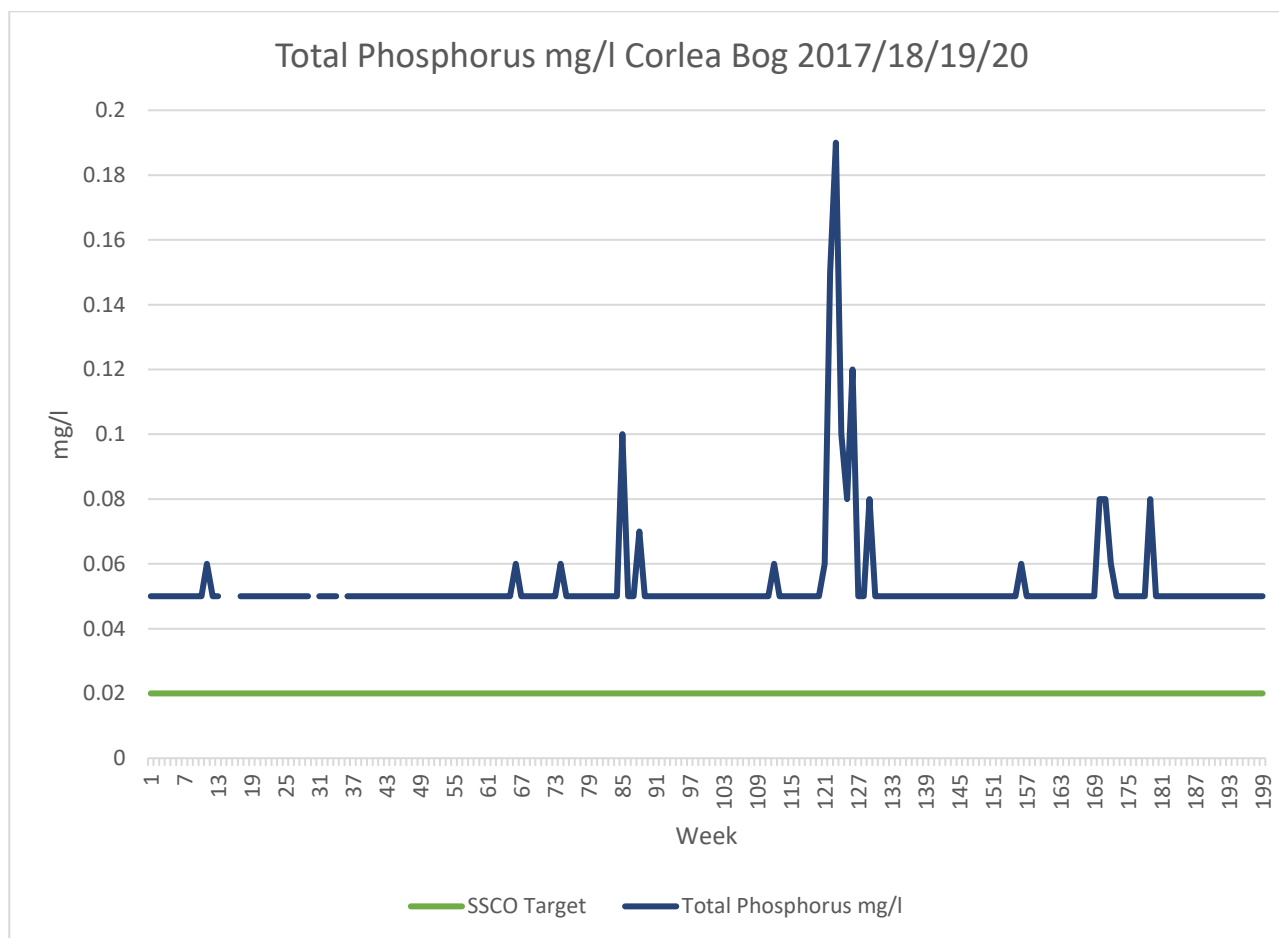
Table 4: EPA Monitoring data (EPA) for the previous three years in relation to Belmont Bog

Bog	SW	Monitoring	pH	SS	TS	Ammonia	TP	COD	Colour
Derries	SW-14	Q3 18	7.6	5	396	0.02	0.05	33	66
Derries	SW-14A	Q3 18	7.9	21	336	0.78	0.05	60	125
Derries	SW-14	Q1 17	7.5	75	370	0.02	0.05	96	253
Derries	SW-14A	Q1 17	7.4	53	342	0.02	0.05	89	239

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

This projection is supported by water quality monitoring of 2 other similar raised bogs (Longfordpass Bog, Co. Tipperary and Corlea Bog, Co. Longford) that were previously subject to industrial peat extraction and that have since been subject to peatland rehabilitation. Graph 1 below shows the downward trend for ammonia at Corlea Bog. Graph 2 shows a consistent low level of TP recorded for Corlea Bog. The laboratory detection limit for TP is 0.05mg/l and Graph 2 shows that concentrations for TP are below the laboratory limits of detection, indicating very low levels. Similarly, the laboratory detection limits for SS was 5mg/l up until July 2019. The laboratory was changed in July 2019 and a new detection limit for SS of 2mg/l was applied. The SS concentrations were consistently below the 5mg/l and the 2mg/l at both laboratories, indicating very low SS concentrations in silt pond outfalls. Rehabilitation measures continue to take hold at Corlea Bog and it has yet to stabilise, but the downward trend for ammonia found during the stabilisation of rehabilitation measures shows that once stabilised the re-wetted bog will reduce ammonia emissions to well below the IPC limits. It is also reasonable to predict a downward trend for SS and TP as the rehabilitation measures become established.

It is further noted that the concentrations of TP, SS and ammonia reported in Table 4 above are from onsite silt ponds. The water from the silt pond discharges to the Blackwater River. Water quality in this receiving watercourse is reported to be of 'Good' status, indicating that the waters discharging from the silt ponds at Belmont Bog to the receiving watercourses is not undermining the water quality status of the Blackwater River.

**Graph 1: Ammonia Concentrations and Trend at Corlea Bog****Graph 2: TP Concentrations at Corlea Bog, showing the limit of detection at 0.05mg/l**

1.2.3.3 Baseline Geology & Hydrogeology

The bog is located in an area with a Locally Important Aquifer zone- i.e. Bedrock which is Moderately Productive only in Local Zones. 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 underlying geology at Belmont Bog is a combination of Limestone (Unit Name Waulsortian Limestones-described as Massive unbedded lime-mudstone), which underlies most of the northern bog unit, and 'Dark-grey argillaceous & cherty limestone & shale' which underlies the southern bog unit and a smaller section of the northern bog unit¹. This formation comprises dark-grey to black, fine-grained, occasionally cherty, micritic limestones that weather paler, usually to pale grey. There are rare dark coarser grained calcarenitic limestones, sometimes graded, and interbedded dark-grey calcar.

The peat is underlain by glacial deposits interbedded with glacio-fluvial deposits over limestone bedrock. The glacial deposits generally consist of grey gravelly clay/silt (present on an adjacent cutaway site). The bog water table across the site is expected to be high when bog drains are 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.

1.3 Certainty and Sufficiency of Data Provided

All field survey work was carried out by qualified and experienced ecologists, and in line with Best Practice.

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

In addition, where required, or possible, specific data requests have been made to NPWS via the online data request facility, specifically with regards to records of sensitive species.

Further sources of data which were reviewed included previously commissioned baseline reporting of Bord na Mona Bog Groups, reporting to inform Bord na Mona wind farm proposals, and any available Bord na Mona wind farm monitoring reports where it was deemed there was overlap with the current scope of PCAS activities. Citations are provided at the end of this report for any reports which have been referenced.

For the avoidance of doubt, due regard has been given to the passage of time & any changes to the baseline environment in the interim period were considered by a suitably qualified ecologist; visits to inform the current appraisal were used as ground-truthing exercises to confirm the relevance or not of any previously defined baseline.

In the most part, due the continuation of industrial Peat Extraction by Bord na Mona up to and including the year 2018, it was considered that habitats at many of the bogs under consideration remained relatively unchanged from the point at which many prior baseline surveys were undertaken, and therefore, it is considered that data presented in prior baseline reporting was of relevance.

2 Stage 1 Screening

2.1 Screening Evaluation Process

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

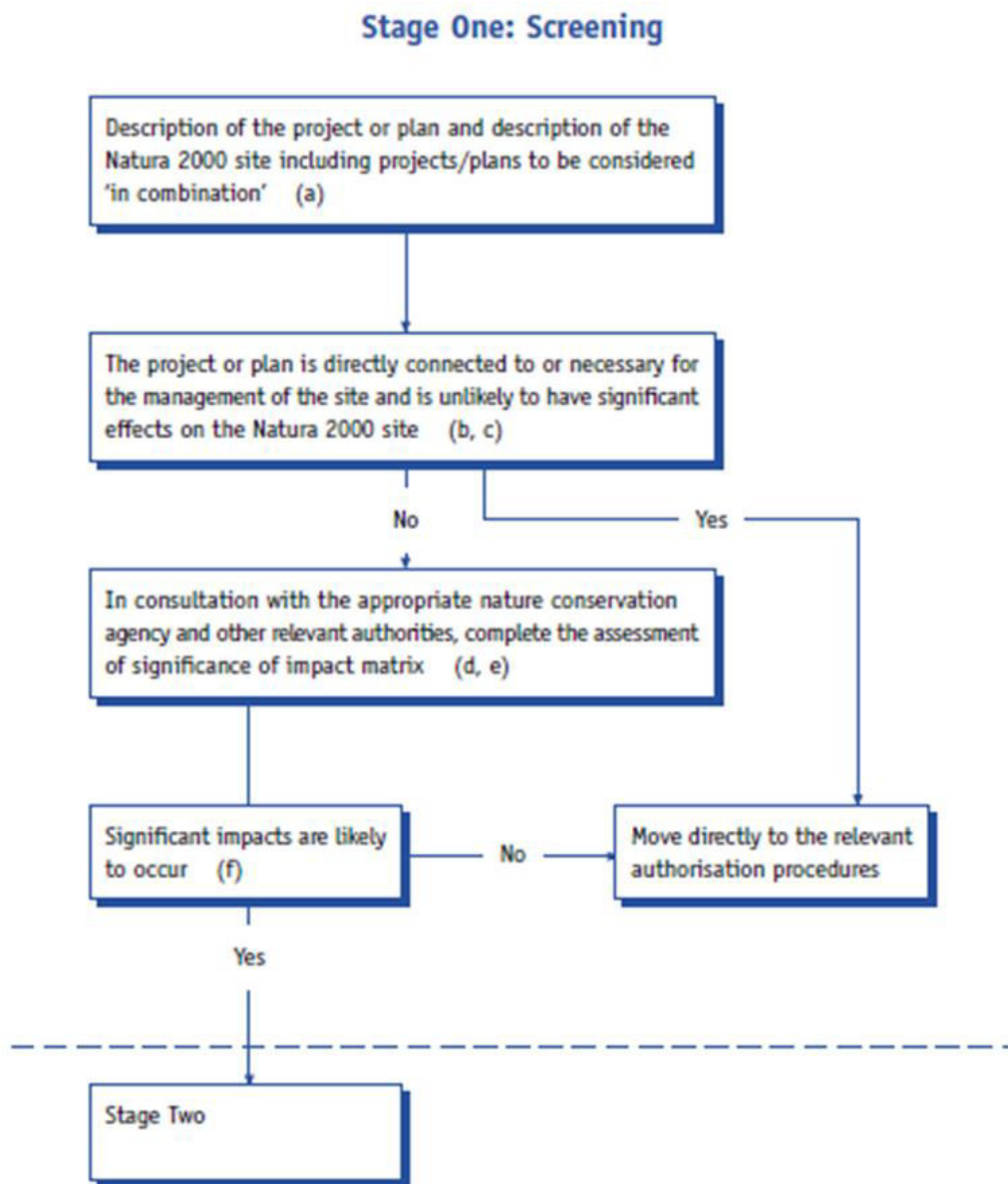


Figure 4: Stage 1 Screening

2.2 **Overview of Belmont Bog Decommissioning and Rehabilitation**

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Blackwater bog group (Ref.-P0502-01). As part of Conditions 10.1 and 10.2 of this license, respectively, decommissioning and rehabilitation must be undertaken to ensure the permanent rehabilitation of the cutaway bog lands within the licensed area. Belmont bog is part of the Blackwater bog group. Belmont Bog is located in Co. Offaly.

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

It is proposed by Government that Bord na Móna carry out a 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 Belmont 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. P0502-01, which requires the following:

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

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

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

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

Rehabilitation seeks to address the requirements of Condition 10.2 of IPC License Ref. P0502-01, 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. P0502-01:

"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."

Belmont Bog was drained and developed for industrial peat production in the 1960s and has been in active peat production since 1964. Industrial peat production ceased circa 2018. The primary rehabilitation goal and outcome for Belmont Bog is **environmental stabilisation** of the bog.

Enhanced Rehabilitation interventions supported by the above referenced Scheme will ensure that environmental stabilisation is achieved (meaning IPC obligations are met), and importantly, significant additional benefits, particularly relating to climate action and other ecosystem services, will also be delivered.

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

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

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

2.4 Description of the proposed Decommissioning and Rehabilitation

2.4.1 Location, Size, Scale, Landcover

2.4.1.1 Location

Belmont Bog is located in Co. Offaly, 1km north-west of Belmont Village. It is part of the Blackwater Bog group and is located on the south side of the Blackwater River, adjacent to Blackwater Bog, with a railway bridge and travel bridge connecting the two sites. There is also access to the bog via a farmyard in Clonbonniff. The site is flanked to the north and south by two no. tributaries of the River Blackwater namely the Moyclare and the Lisdaly (respectively).

See **Figure 5: Site Location of Belmont Bog** (over).

2.4.1.2 Size, Scale, Landcover

Size and Scale: Belmont Bog comprises 318Ha in total.

Belmont Bog has developed in two connecting basins, with the northern basin being much larger. These basins, or bog units are separated by a ridge of high ground that has been developed as a conifer plantation by Coillte. Both bog units are situated quite close to the Blackwater River, adjacent to the western margin, although there is a narrow band of marginal habitats between the river and the bog. There are two connecting travel paths within the conifer plantation.

The surrounding landscape is a mosaic primarily consist 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. Belmont Bog lies to the east of the River Shannon.

Belmont is an older production bog and about a third (33%) of the site is developing pioneer cutaway habitats. The western half of the northern section has significant groundwater spring influence, which has had a significant effect on the developing pioneer vegetation. There are frequent rich fen vegetation indicators. The southern bog unit contains the most recently active milled peat production areas. Some remnant raised bog around the margins are still utilised for private sod peat cutting.

2.4.2 Application of Protective Measures in the Screening Evaluation

The Screening evaluation to inform the AA process, presented in Section 2.8 below, has been carried out in the absence of any protective measures or mitigation measures considered to avoid harmful effects on European Sites.

2.4.3 Decommissioning and Rehabilitation Stage

The proposed **decommissioning** at Belmont Bog includes the cleaning of existing silt ponds, the decommissioning and Removal of a Porto-cabin tea centre and a further materials store, decommissioning and de-gassing mobile fuel tanks, and peat stockpile management via levelling. Further measures may include the lifting of the existing rail line, decommissioning of existing level crossings and measures to restrict access to the bog.

The proposed Belmont Bog rehabilitation comprises a series of bespoke (to Belmont Bog) interventions designed to stabilise the existing baseline and meet compliance with the requirements of the existing EPA, IPC License and the proposed PCAS. Prescriptive measures are unique to the existing baseline habitats and comprise 3 no. broad categories, 1) those associated with (exposed) Deep Peat; 2) measures associated with the creation of wetland habitats, 3) measures associated with marginal lands, such as access roads and, habitats around the periphery of the bog, and 4) measures associated with dry cutaway. The aim of Rehabilitation is as much as possible to place existing peatlands on a trajectory towards a naturally functioning peatland system (Renou-Wilson 2012).

2.4.3.1 Decommissioning and Rehabilitation Access

Access will be through the existing entrance at Belmont, where existing infrastructure is already in place via access tracks to facilitate the previous peat extraction. Alternative access to the bog is also available at Belmont. No change to baseline conditions to facilitate access for either decommissioning or rehabilitation is required.



2.4.3.2 Standard Methodology for Decommissioning

Decommissioning at Belmont 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. P0502-01. 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 Belmont. 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 Belmont Bog. As required by the license, these waste items will be removed for recycling or disposal, using external contractors with the required waste collection permits, with waste records maintained as required. Where possible, Bord na Mona will utilize the appropriate waste hierarchy to identify waste that can reused or recycled ahead of disposal.

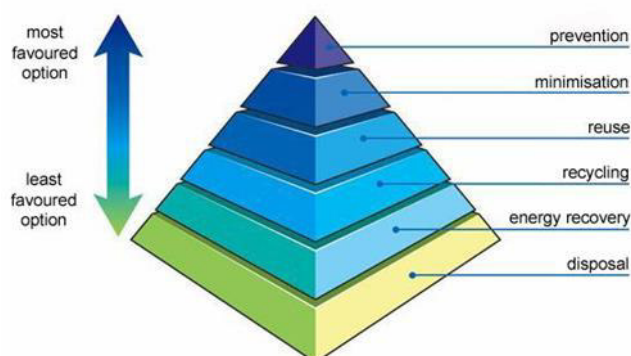


Figure 6: Waste Hierarchy

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

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

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

Peat stockpiles: Any existing and unsalable peat stockpiles which are required to be 'decommissioned' and rehabilitated into the adjoining fields ('levelling'), from where it was originally harvested. This process first involves the associated silt pond being cleaned if necessary, the stockpile field drains blocked to capture any run-off, with blockages every 100m. The peat is then deposited by dozer onto the adjoining field and blocked drain, where it is cambered and compacted.

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

De-sludging of Septic Tanks: The septic tank at the bog will be de-sludged by a licenced contractor. All sludge material will be transported off-site for treatment and disposal at an appropriately licenced facility.

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

2.4.3.3 Standard Methodology for Rehabilitation Activities

The rehabilitation plan for Belmont Bog 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 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
- The development of a **Methodology Paper (draft) outlining the proposed Scheme (PCAS)**. The rehabilitation plan (provided as Appendix B to this report) 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 Belmont Bog, in particular, optimising **climate action benefits**.

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.
- 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:

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

See the Rehabilitation plan included as Appendix B.

Consultation

A number of stakeholders were identified and contacted during the rehabilitation planning process for their views. See Appendix B.

Field Surveys

See Section 1.1.1 above for an overview of the field surveys completed at Belmont Bog that are used to inform this screening report for PCAS at Belmont Bog.

Rehabilitation Packages

The key interventions to be applied for the restoration/rehabilitation of Belmont Bog is re-wetting 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 (100mm \pm 50mm). Several different approaches can be taken to this type of restoration/rehabilitation and 8 rehabilitation prescription types with different rehabilitation/restoration intensities to implement the PCAS at Belmont Bog are proposed (see Table 5 which lists the rehabilitation prescription types that will be implemented at Belmont Bog): Figure 5 shows the locations at Belmont Bog where these prescription types will be applied.

Table 5: Rehabilitation Categories

Type	Code	Description	Area (Ha)
Deep peat cutover bog	DPT1	Regular drain blocking (3/100 m) + blocking outfalls and managing water levels with overflow pipes	0
	DPT2	More intensive drain blocking (7/100 m) + blocking outfalls and managing overflows	4.2
	DPT3	More intensive drain blocking (7/100 m), + field reprofiling + blocking outfalls and managing overflows	0
	DPT4	Berms and field re-profiling (45m x 60m cell) + blocking outfalls and managing overflows + drainage channels for excess water + <i>Sphagnum</i> inoculation	45.2
	DPT5	Cut and Fill cell bunding (30m x 30m cell) + blocking outfalls and managing overflows + drainage channels for excess water + <i>Sphagnum</i> inoculation	8.7
Dry cutaway	DCT1	Blocking outfalls and managing water levels with overflow pipes	4.7
	DCT2	Regular drain blocking (3/100 m) + blocking outfalls and managing water levels with overflow pipes + targeted fertiliser treatment	54.5
	DCT3	More intensive drain blocking (7/100 m) + blocking outfalls and managing overflows + targeted fertiliser treatment	0
Wetland cutaway	WLT1	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes	0
	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	8.4
	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	8.1

Type	Code	Description	Area (Ha)
	WLT4	More intensive drain blocking (7/100 m), + blocking outfalls and managing overflows + transplanting Reeds and other rhizomes	104.4
	WLT5	More intensive drain blocking (7/100 m), + field reprofiling + blocking outfalls and managing overflows + transplanting Reeds and other rhizomes	0
Marginal land	MLT1	No work required	57.5
	MLT2	More intensive drain blocking (7/100 m)	6
	MLT3	More intensive drain blocking (7/100 m) + blocking outfalls and managing overflows with + boundary berm	0
Other		Silt-ponds	0.2
Other		Constrained Areas	16
Total			317.8

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

1. Regular Drain Blocking (3/100m)
2. Intensive Drain Blocking (max 7/100m)
3. Blocking Outfalls
4. Managing Water levels with overflow pipes and/or cutting taps in high fields
5. Field Reprofiling
6. Infilling drains and creating cross-berms
7. Berms and field reprofiling (45m x 60m cell)
8. Drainage channels for excess water
9. Cut and fill cell bunding (30m x 30m cell)
10. Sphagnum Inoculation
11. Formation of berms to create wetlands/silt attenuation areas

In addition, PCAS activities will include:

12. Silt Pond Cleaning
13. Retention of Hydraulic Breaks (DMP measure)

A suite of methodology drawings is further provided as Appendix D and should be read in conjunction with the following text.

1. Regular Drain Blocking (3/100m)

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

The number of peat blockages per 100m is determined by the topography of the site, but an allowance has been estimated at on average 3 blocks per 100m of field drain. The methodology follows NPWS guidelines published by the National Parks and Wildlife Service (Mackin *et al.*, 2017²) and in line with methodologies originally developed by McDonagh (1997).

In all instances, peat blockages will be installed using a specially adapted tracked machine. The process involves clearing the drain and creating a 'key' in the drain sides in order to ensure a tight seal is maintained. The drain is subsequently blocked with peat taken from a nearby 'borrow pit' and involves placing layer after layer of peat until it is built up to above the ground surface, after which it is covered with a 'scraw' of vegetation (where available). Each peat blockage takes approximately 5mins to complete. Appendix D provides further details on the approach to peat blockages. Figure 7 indicates the locations where drain blocks will be provided.

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

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

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

The increased number of peat blockages (compared with the standard measures) will benefit re-wetting and trapping silt on cutaway with slightly greater slopes and will further slow the movement of water from these sites. Methods are as per 1 but blockages are at a higher frequency along the length of the drainage feature. See also Appendix D. Figure 7 indicates the locations where drain blocks will be provided.

3. Blocking Outfalls

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

² https://www.npws.ie/sites/default/files/publications/pdf/IWM99_RB_Restoration_Best%20Practice%20Guidance.pdf

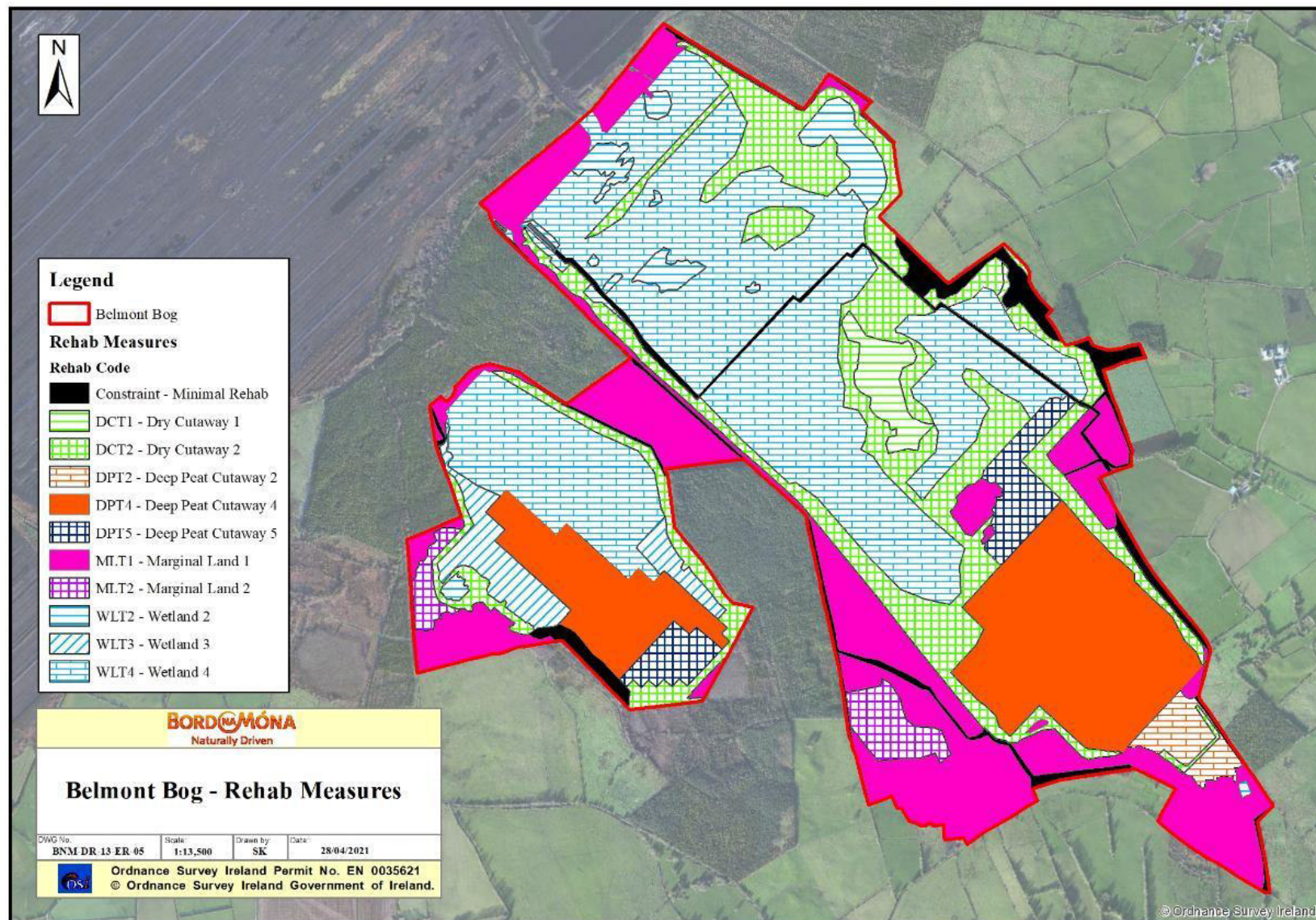


Figure 7: Proposed Enhanced (PCAS) Rehabilitation Plan

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.

See also Appendix D. Figure 7 indicates the locations where drain blocks will be provided.

4. Managing water levels with overflow pipes and/or cutting taps in fields

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

Overflow pipes are installed using an excavator.

Plate 1: Examples of installed overflow pipes



Another technique to manage water levels is by cutting a 'tap' or transverse V-shaped drain across existing high cutaway fields. This is completed using an excavator. See also Appendix D for detailed methodology drawings.

5. Field Reprofilng

The concept of field re-profiling is to level the surface of the individual peat production fields to allow more uniform coverage of water at an ideal depth (c.100mm \pm 50mm) for vegetation colonisation and in particular the development of mosses that will accelerate the trajectory towards naturally functioning peatland ecosystems. It can be applied to residual peat of various depths including deep cutover peat. Peat production fields generally have a convex camber toward the edges and have a heterogeneous topography. It is usual for the drains and edges of the fields to become wet whilst the high centres of the fields remain dry. Small hollows within the peat fields will retain surface water for longer. This enhanced measure will target the development of a flat or concave topography that will help the retention of shallow surface water. This approach will be combined with other measures such as drain blocking to re-wet peat to increase the cover of shallow surface water and re-wetted peat on the former production fields. In general, peat production fields will still have a prevailing slope (they will be flatter or convex, but not level).

This method uses a bull dozer to remove the high central camber from individual production fields and deposit the peat on the lower-lying edges of the same production field and partially in the drains (see Appendix D for further details on the field reprofiling methods). It is not intended to completely infill the drains, but the drains will be blocked with peat blocks. It is planned to create a final profile with a largely flat or slightly concave surface. This will depend on the general topography and slope. On cutaway with increased slopes, it will be more advantageous to create shallow depressions. Any depressions will be 10-20cm deep, and a maximum of 20m long (although natural topography may require flexibility in sizing). Depressions can be separated by a strip of undisturbed peat 1-2 m wide.

An alternative to using a dozer is to use a screw-leveller to create a 'clean cut' into a field of deep peat. Any peat which has been thrown to the side is then using to infill adjacent drains using a dozer.

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

See Methodology drawings included as Appendix D.

6. Infilling Drains and creating cross-berms

Where the peat field is located on topography sloping parallel to field drains, cross-berms will be installed across the field in order to retain water and saturated conditions within the field. Peat is taken from the centre of the field and a dozer is used to push peat in a line perpendicular to the field drains so that a cross-berm is formed. The standard specification for cross-berms will be 5m wide and 500mm high.

Appendix D provides further details on the methods for installing cross-berms. The in-filling and blocking of drains will be completed in line with items 1 and 2 above.

See Methodology drawings included as Appendix D. Figure 7 indicates the locations where infilling drains and creating cross-berms will be provided.

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

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

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

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

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

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

The exact dimensions of the cells will be dependent upon the topography of the site and the heights of the various peat fields. For example, it may be appropriate to have cells that are only two fields wide where two low fields have higher fields on either side. It may not be appropriate to equalise the levels of two adjacent fields where there is a significant height difference. The length of the cells may be shorter if the fields are on a steeper gradient to that the base of the cells is flat to retain water. Such flexibility is essential to maximise water retention on site and minimise machinery and peat movements. This enhanced measure requires more intensive planning to adapt it towards varying topography. The methodology to be used for the creating of cells is provided in Appendix D. Figure 7 indicates the locations where berms will be provided.

8. Drainage channels for excess water

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

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

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

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

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

The cut and fill cell bunding approach aims to create 'saucers' or flat bunded areas (cells) on peat with berms to hold shallow water at appropriate levels. Each cell is approximately 30 x 30 m and laser levels will be used on excavators and bulldozers to aid the construction of flat cells surrounded by slightly convex berms. As cells are constructed production field drains will be infilled with peat. Cells will be sized relatively small to prevent wave erosion affecting the development of moss growth.

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

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

The methodology to be used for the creating of cells is provided in Appendix D. Figure 7 indicates the locations where bunded cells will be provided.

10. Sphagnum Inoculation

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

There is potential to use Sphagnum inoculation to establish and diversify selected small areas on target sites with Sphagnum species, which in turn, and in combination with natural colonisation, can then naturally colonise the remaining deep peat cutover bog area. Sphagnum inoculation should only be used in appropriate environmental conditions (water-logged, deep peat with stable water levels and with more acidic water chemistry).

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

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

11. Formation of Berms to create wetland areas

Berms are to be created as part of wetland prescriptions to enclosed areas of shallow standing water. Methods will be similar to those applied for cross-berms to prevent sheet flow of water on reprofiled fields.

An Excavator is used to form a key in the drain where the berm crosses. A strip of peat is taken from the central camber of the field, pushed into the drain and compacted by the bull-dozer tracking over the drain block. 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 500mm High Cross Berm.

See Methodology drawings included as Appendix D. Figure 7 indicates the locations where berms will be provided.

12. Silt pond Cleaning

The cleaning procedure for Silt Ponds is as follows:

- If the silt pond system has a by-pass channel or a stand-by pond, then the drainage is diverted through these. If not, then the inlet to the pond is blocked or the supply pump switched off for the duration of the cleaning.
- If the outlet from the pond has a weir then the level is lowered to de-water the silt. If not, then the outlet pipe is blocked for the duration of the cleaning.
- The pond is cleaned from the inlet to the outlet either from one side, if the width allows or from both sides, if not.
- The silt is deposited as far back from the silt pond as possible with the excavator, or additionally with the aid of a dozer if space is limited.
- If necessary, a peat bund is left between the pond and the excavated silt to retain liquid sludge from flowing back into the pond.
- When the pond has been cleaned, the inlet is opened and the pond allowed to fill before lowering the outlet weir.
- If the drainage was diverted during the maintenance, then it is redirected back into the pond.
- Once cleaned, the date is entered on to the inspection log.

13. Retention of Hydraulic Breaks

To sustain hydrological continuity through the margins of the proposed rehabilitation and decommissioning site and to avoid flooding of adjacent lands, it is proposed to retain/create certain key hydraulic breaks (drains) along the margins of the bog site. These works will be completed to retain peripheral surface water drainage around the margins of the bog rehabilitation sites allowing hydrological flow from lands upstream of the site to areas downstream of the rehabilitation site. These works may require localised instream excavation, widening and regrading of existing drains with tracked excavators, and the removal of debris.

2.4.3.4 Decommissioning and Rehabilitation Timescale and Resource Requirements Duration

Decommissioning activities will be completed within a period of 12 months and are scheduled to be completed before the end of 2021.

Rehabilitation activities will be completed within a period of approximately 7 months. Due to the seasonal flooding at Belmont Bog over the winter period no rehabilitation works can be progressed between the months of November to March inclusive. As such rehabilitation activities will be carried out between the months of April to October inclusive.

The duration of activities provided are approximate and may be slightly shorter or longer, depending on weather conditions and progress on rehabilitation prescriptions. In any case, the rehabilitation period will not be longer than 1 year.

Hours of Work

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

2.4.3.5 Use of Natural Resources

Land Requirement: There is no land requirement in respect of **decommissioning**. In total **rehabilitation** activities will take place on 317.8 hectares of land (note 58.1 hectares that will be treated as MLT1 will not require any rehabilitation activities). As rehabilitation through stabilisation and land cover change is the primary objective, no 'negative quality' land take is associated with Rehabilitation. No land take is required for e.g., the storage of vehicles – vehicles are typically left in situ at points of work or on 'headlands'.

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

Soils/Peat:

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

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

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

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

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

2.4.3.6 Emissions & Wastes during Rehabilitation

Dust, Noise, Vibration: Dust, noise and localised vibration along access routes arising from the arrival and departure of **decommissioning** vehicles or **rehabilitation** machinery will be localised to the access tracks or rail line, occur in low volumes and last for a negligible duration – it is common practice on BnM

working bogs to leave vehicles *in situ* once on site, therefore daily trips into and out of the bog are not expected. Dust and noise limits are currently set on IPC licenses.

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

Durations overall are expected over a 12-month period at Belmont Bog or until rehabilitation is complete. Fuel and some pipes may require to be delivered. No blasting or piling is required.

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

Welfare Facilities: Welfare facilities are available at Belmont Bog in the form of an existing tea centre. Portaloos will be provided for site operatives during decommissioning and rehabilitation works. All wastewater generated at portaloos will be held within the portaloos tanks and will be regularly serviced by a licenced contractor. All wastewater from the portaloos will be collected from the site and treated and disposed of at a suitably licenced facility.

2.4.4 Operational Stage

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

Operational Activities: Operational activities will mainly comprise non-intrusive environmental & ecological monitoring (including surface water monitoring, vegetation monitoring but also the use of drones to provide catalogues of aerial photography), and may also include minimal works such as repairs to existing peat blockages, adjustment of overflow pipes (where required) and or fertilisation to increase successional rates. Maintenance of existing silt ponds to reduce emissions to local water bodies, as conditioned by the existing IPC license, will still be required. Monitoring of adjacent land will be undertaken during the operation phase and where required boundary drain maintenance and upgrades may be required beside low and moderate vulnerability land as identified in the Belmont Bog Drainage Management Plan (RPS, 2021).

Operational Access: Operational access will be through the Belmont Bog, where existing infrastructure is already in place via access tracks (such as railway line or machinery travel path), providing the main access to the site.

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

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

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

Fugitive emissions to air

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

Carbon Emissions

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

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

The location of the proposed Belmont Bog decommissioning and rehabilitation does not overlap the footprint of any other existing projects or plans.

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

There is no known licenced or unlicenced peat extraction through turbary being undertaken around the margins of Belmont Bog. However, it is likely that turbary is undertaken at other locations within 15km. This has the potential to result in in-combination effects from the release of hydrocarbons, emissions to air and water, and through modification to drainage regimes.

A planning search of the National Planning Database (May, 2021) found no recent (within the last 5-years) proposed or consented developments within the vicinity of Belmont Bog.

There are 4 no. local authority jurisdictions within 15km of Belmont Bog (Offaly County Council, Westmeath County Council, Galway County Council and Laois County Council). All four have County Development Plans and/or plans relating to Heritage and Biodiversity.

There is a current ongoing NPWS Raised Bog Restoration Project which may include at some date some raised bogs within 15km of Belmont Bog. None of these NPWS SAC bogs are located within the River Brosna sub-catchment in which Belmont Bog is located. Given the absence of a hydrological link

between the Belmont Bog and other NPWS SAC bogs within the Brosna catchment and the unknown temporal overlap between any NPWS planned restoration activities and the decommissioning and rehabilitation of Belmont Bog, the PCAS at Belmont Bog will not combine with bog restoration works at other NPWS SAC bog sites.

2.4.5.1 Other BnM Bog Group Decommissioning and Rehabilitation

There are no other BnM bogs within the Blackwater River sub-catchment (i.e. the sub-catchment in which Belmont Bog is located). Other BnM bogs are located within the Shannon catchment and these will also be subject to decommissioning and rehabilitation to meet the various, pertinent, IPC license conditions. However, currently, the only known temporal overlap between these proposed activities elsewhere in the Shannon catchment is at Kilmacshane Bog (4.7km to the west), Garryduff Bog (6.7km to the west) and Clooniff bog (7.3km to the northwest). The construction phase of decommissioning and rehabilitation at this bog may overlap with decommissioning and rehabilitation activities at the above three bogs. These three bogs are located within the River Shannon catchment and all three along with Belmont Bog share connectivity to the Middle Shannon Callows SAC and SPA downstream.

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

The decommissioning and rehabilitation of any other bogs within the greater Blackwater Group will be subject to Appropriate Assessment and it is assumed the requisite mitigation will be in place should the potential for any adverse effects on European site integrity be identified as part of the Appropriate Assessment process. This should also identify the potential for any sequential in-combination pathways, in particular should temporal overlap exist.

2.4.5.2 Turbary

No private turbary exists at Belmont Bog. Licensed turbary occurs at various locations within 15km of Belmont Bog, however no known licenced turbary sites are located within the Shannon sub-catchment in which the Belmont Bog is located. Unauthorised private turbary is also likely to exist at 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.

2.4.5.3 NPWS Raised Bog Restoration at River Shannon Callows SAC

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

and observations received on the (draft) National Raised Bog SAC Management Plan³. One of the primary mitigation elements proposed is that screening for appropriate assessment and if necessary appropriate assessment will be carried out in relation to any site specific/project level measures including restoration measures and turf-cutting. If AA of a project at site level determines that adverse effects are likely, or cannot be ruled out, the project will either not be pursued or, where considered appropriate, the derogation steps of Article 6(4) will apply, but only in a case in which there are imperative reasons of overriding public interest (IROPI) requiring a project to proceed, there are no less damaging alternative solutions, and compensatory measures have been identified that can be put in place.

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

Furthermore, as noted in Section 2.4.5 above there are no raised bog SACs occurring within the Brosna sub-catchment.

2.4.5.4 Agricultural Activity

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

2.4.5.5 Local Authority Development Plans

The following development plans have been identified:

- Offaly County Development Plan 2021 – 2027
- County Offaly Heritage Plan 2017-2021
- Westmeath County Development Plan 2014 -2020
- Draft Westmeath County Development Plan 2021 – 2027
- Roscommon County Development Plan 2021 – 2027
- County Roscommon heritage Plan 2017-2021
- Galway County Development Plan 2015-2021
- Galway County Biodiversity and Heritage Plan 2017-2022

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

³ https://www.npws.ie/sites/default/files/general/AA%20Determination%20NRBMP%202017_2022_0.pdf

2.4.5.6 Other Projects or Activities

A review of the Offaly County Council planning portal was completed in May 2021 to identify other projects, recently applied for or granted (i.e. within the last 5 years) surrounding Belmont Bog. No recent project were identified surrounding Belmont Bog or downstream of Belmont Bog along the Blackwater River.

In light of the above the likelihood of cumulative interaction with other plans or projects is considered low, due to limited temporal or spatial overlap; the small scale of the projects identified in the vicinity of Belmont Bog; the absence of hydrological connectivity or shared hydrological catchment with many of the other plans or projects described, the separation distance or setback buffers between the described plans or projects and European Sites, and the requirement for Appropriate Assessment for other plans or projects.

2.5 European Sites under consideration

2.5.1 Distance of the Project to European Sites

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

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

There are **15 European Sites** - 10 Special Areas of Conservation (SAC) and 5 Special Protection Area (SPA) - **within 15km of Belmont Bog**. The locations of these European Sites are illustrated in **Figure 8: SPAs within 15km of Belmont Bog and Figure 9: SACs within 15km of Belmont Bog**.

Table 6 lists the European Sites occurring within 15km of Belmont Bog, specifies the distances to each of these European Sites and provides a comment on the presence or absence of hydrological connectivity between Belmont Bog and each of the European Sites listed.

Table 6: Proximity of the proposed Belmont Bog to European Sites

European Site (SAC or SPA)	Site Code	Distance from the Development*	Hydrological Connectivity (Y/N: If Yes Downstream or Upstream connectivity relative to Belmont Bog)
River Shannon Callows SAC	000216	3.7km W	Y: approximately 5.5km downstream
All Saints Bog And Esker SAC	000566	12.5km S	N
Pilgrim's Road Esker SAC	001776	8.6km NE	N
Crosswood Bog SAC	002337	11.4km SE	N
Redwood Bog SAC	002353	14.5km SW	N
Ridge Road, SW of Rapemills SAC	000919	4.7km NW	N

European Site (SAC or SPA)	Site Code	Distance from the Development*	Hydrological Connectivity (Y/N: If Yes Downstream or Upstream connectivity relative to Belmont Bog)
Ferbane Bog SAC	000575	4.2km E	N
Fin Lough (Offaly) SAC	000576	3km N	N
Moyclare Bog SAC	000581	800m E	N
Mongan Bog SAC	000580	13.8km NW	N
Mongan Bog SPA	004017	4km N	N
River Little Brosna Callows SPA	004086	14km S	N
Middle Shannon Callows SPA	004096	3.7km W	Y: approximately 5.5km downstream
River Suck Callows SPA	004097	9km W	N
All Saints Bog SPA	004103	12.5km S	N

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

The Qualifying Interests/Special Conservation Interests and locational context for each of the 15 European Sites examined in this Screening Report are provided in **Table 7**.

The Site Synopsis and Conservation Objectives for each site are available in full on the National Parks & Wildlife Service website at <https://www.npws.ie/protected-sites> and references including date of access, are included in Section 3. Conservation Objectives were reviewed to inform the current appraisal – in particular to identify any possible sensitivities and resultant pathways for likely significant effects.

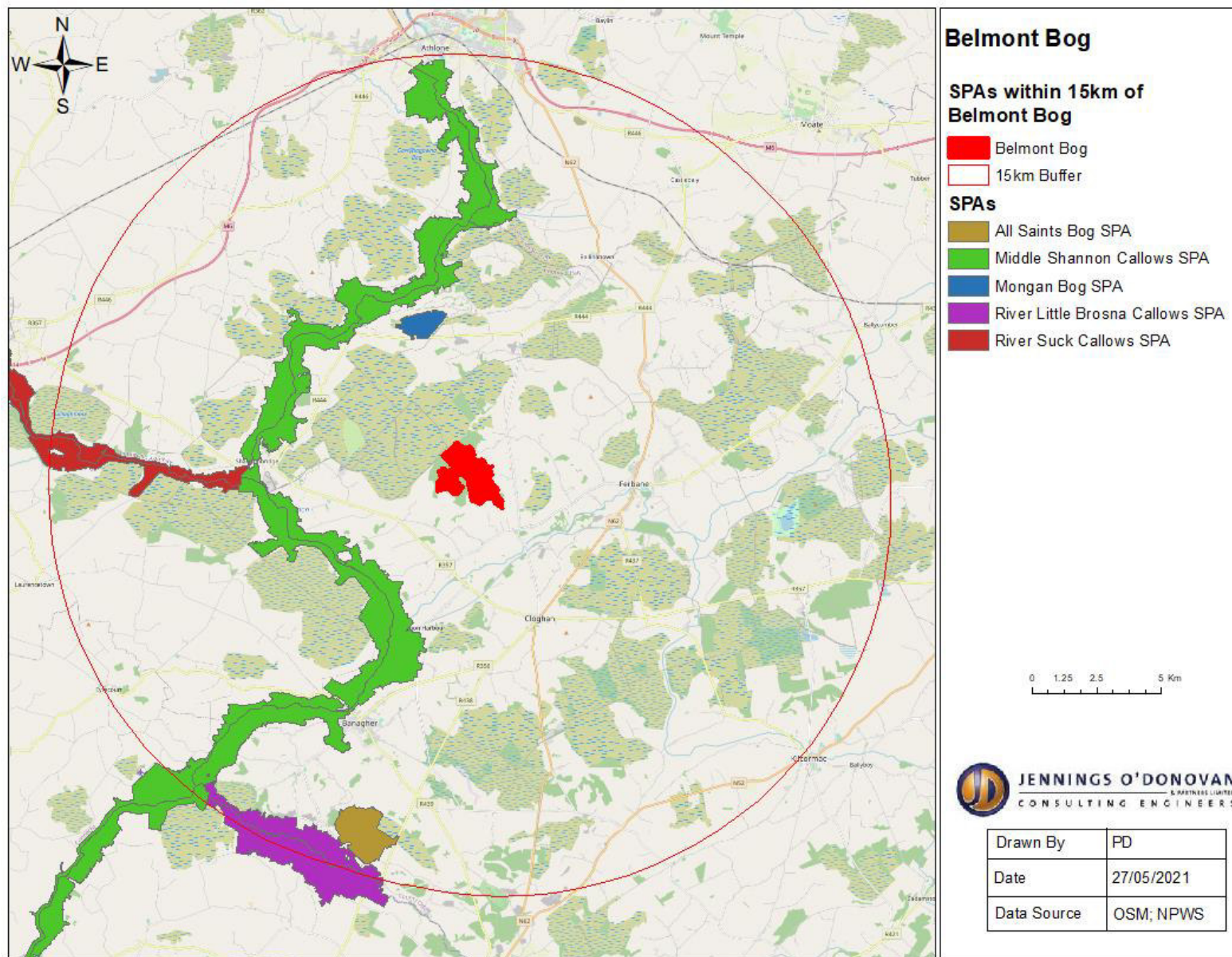


Figure 8: SPAs within 15km of Belmont Bog

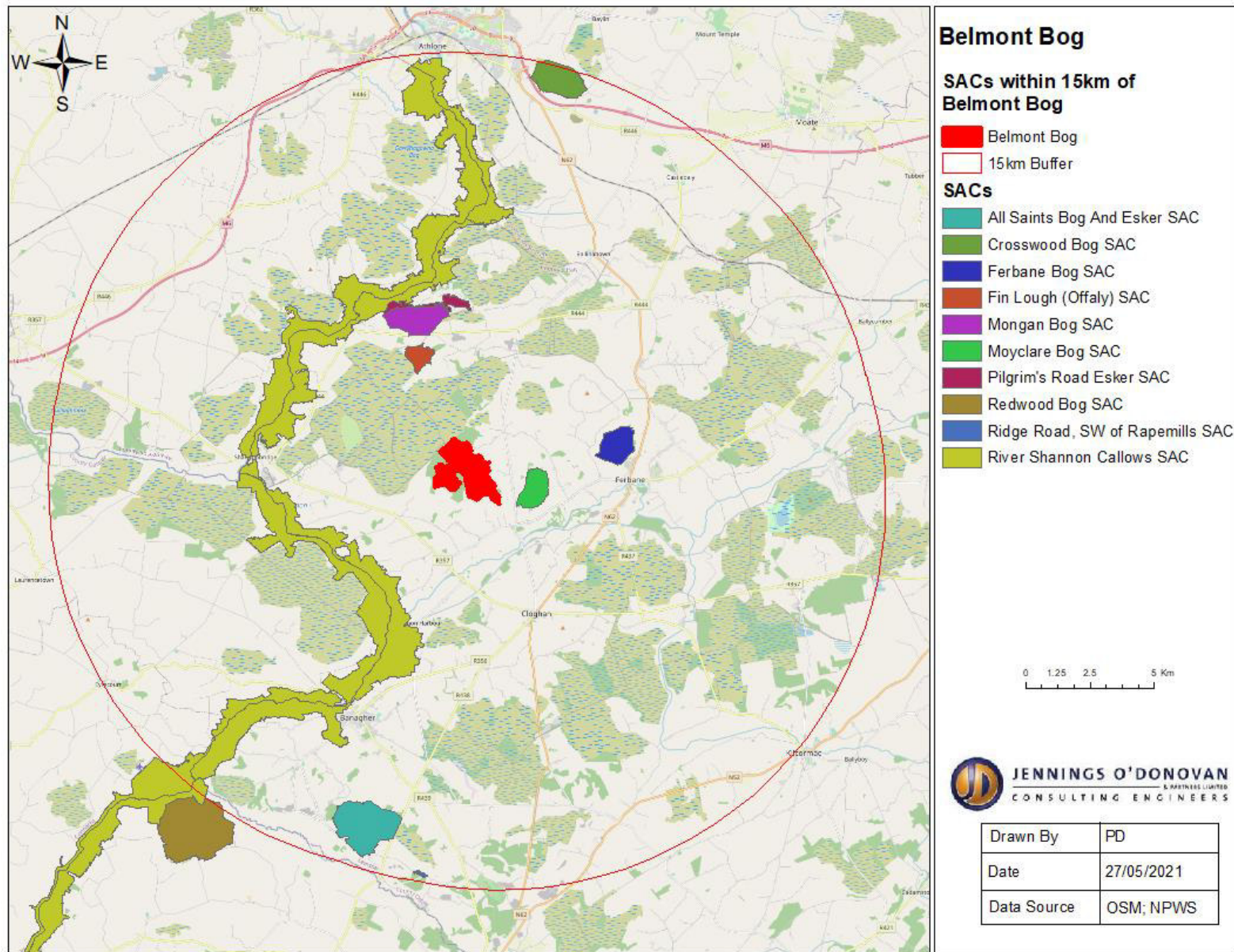


Figure 9: SACs within 15km of Belmont Bog

Table 7: Description of European Sites within a 15km radius of Belmont Bog

	European Site Name and Code	Qualifying Interest / Special Conservation Interest and Code *denotes a priority habitat	Summary Description (from Site Synopsis)	Data Source
1	River Shannon Callows SAC	<p>Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) [6410]</p> <p>Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis) [6510]</p> <p>Limestone pavements [8240]</p> <p>Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p> <p>Lutra lutra (Otter) [1355]</p>	<p>The River Shannon Callows is a long and diverse site which consists of seasonally flooded, semi-natural, lowland wet grassland, along and beside the river between the towns of Athlone and Portumna. It has by far the largest area of lowland semi-natural grassland and associated aquatic habitats in Ireland, and one in which there is least disturbance of natural wetland processes. Botanically, it is extremely diverse with two legally protected species of plants and many scarce species. Excellent examples of two habitats listed on Annex I of the E.U. Habitats Directive occur within the site – Molinia meadows and lowland hay meadows with good examples of a further two Annex habitats (both with priority status). In winter the site is internationally important for numbers and species of waterfowl. In spring it feeds large numbers of birds on migration, and in summer it holds very large numbers of breeding waders, rare breeding birds and the endangered Corncrake, as well as a very wide variety of more common grassland and wetland birds. The presence of Otter, an Annex II species, adds further importance to the site.</p>	https://www.npws.ie/protected-sites/sac/000216
2	Ferbane Bog SAC	<p>Active raised bogs [7110]</p> <p>Degraded raised bogs still capable of natural regeneration [7120]</p> <p>Depressions on peat substrates of the Rhynchosporion [7150]</p>	<p>Ferbane Bog is a relatively large, domed, raised bog located about 10 km east of Shannonbridge in Co. Offaly. It is underlain by low permeability Waulsortian limestone and clay-rich tills.</p> <p>Ferbane Bog is a good example of a raised bog and is of considerable conservation significance. Active raised bogs are becoming increasingly rare in Ireland, and Europe, and are listed as a priority habitat on</p>	https://www.npws.ie/protected-sites/sac/000575

	European Site Name and Code	Qualifying Interest / Special Conservation Interest and Code *denotes a priority habitat	Summary Description (from Site Synopsis)	Data Source
			Annex I of the E.U. Habitats Directive.	
3	Fin Lough (Offaly) SAC	Alkaline fens [7230] Vertigo geyeri (Geyer's Whorl Snail) [1013]	<p>Fin Lough is a shallow limestone lake surrounded by a complex of wetland habitats; 7 km north-east of Shannonbridge in Co. Offaly. The name Fionn Loch, "White Lake", probably derives from the white colour of the lake bottom caused by marl deposits. It is a shallow lake, about 16 ha in extent (in winter) and bounded to the north and east by the Clonfinlough esker ridge, and to the south and west by Blackwater Bog, which is now largely cut-over. The lake and its surrounding wetland communities are arranged in distinct zones reflecting wetness and substrate. They include open water, Reedswamp, tall sedge, alkaline fen, fen-bog transition, swamp woodland and bog. The transition from calcium-rich lake to reedbed, to fen, to bog is relatively intact in some areas, which is exceptional for this part of the country.</p> <p>Fin Lough remains an important site, however, because of the diversity of wetland habitats and species that it supports.</p>	https://www.npws.ie/protected-sites/sac/000576
4	Moyclare Bog SAC	Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the Rhynchosporion [7150]	<p>Moyclare Bog is a small raised bog situated 4 km west of Ferbane in Co. Offaly. Its mean height above sea level is 54 m. On the western edge of the bog, a low peat face with no perimeter drain lies adjacent to wet peaty pasture, which has a spring-line at its junction with mineral soil. The water from this spring disappears under the peat dome of the bog. The site occurs in close proximity to a number of important raised bogs close to the floodplain of the River Shannon.</p> <p>Whilst relatively small, Moyclare bog is a site of high conservation value as it is relatively intact and contains examples of the Annex I habitats active raised bog,</p>	https://www.npws.ie/protected-sites/sac/000581

	European Site Name and Code	Qualifying Interest / Special Conservation Interest and Code *denotes a priority habitat	Summary Description (from Site Synopsis)	Data Source
			degraded raised bog and depressions on peat substrates (Rhynchosporion). The uncut peat dome has an unusually high proportion of active raised bog.	
5	Mongan Bog SAC	Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the Rhynchosporion [7150]	<p>Mongan Bog is a midland raised bog of medium size situated immediately east of the monastic site of Clonmacnoise, Co. Offaly, and 12 km south of Athlone. It is situated in a basin, surrounded on 95% of its perimeter by high ground on mineral soil. At two points in the north, it shares a common boundary with Pilgrim's Road Esker SAC. Most of the bog is a Statutory Nature Reserve, established in 1987. The bog has been the subject of ongoing intensive research since 1972.</p> <p>Mongan Bog is of high conservation importance as it is a good example of a raised bog site which contains examples of the Annex 1 habitats active raised bog, degraded raised bog and depressions on peat substrates (Rhynchosporion). It is mostly intact and has classic hummock and pool formations over a large proportion of the surface. It has several features of special zoological interest. Scenically it is part of an area rich in intact natural features (callows, eskers, limestone pavement) which enhances its importance further. The ongoing intensive research on aspects of bog ecology at the site reinforces its international importance.</p>	https://www.npws.ie/protected-sites/sac/000580
6	Pilgrim's Road Esker SAC	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (*important orchid sites) [6210]	Pilgrim's Road Esker SAC is a narrow esker ridge extending 2 km east from Clonmacnoise in Co. Offaly. The site is adjacent to the River Shannon Callows, to the north, and Mongan raised bog, to the south. The western area includes Bunthulla Hill (north of the road) and Hanging Hill (south of the road); the central area runs along both	https://www.npws.ie/protected-sites/sac/001776

	European Site Name and Code	Qualifying Interest / Special Conservation Interest and Code *denotes a priority habitat	Summary Description (from Site Synopsis)	Data Source
			<p>sides of the summit ridge before widening out eastwards to include a substantial area of esker grassland centred on the site of an old ring-fort.</p> <p>Pilgrim's Road Esker is the most scenically impressive esker in the midlands and the one best known to the public. Orchid-rich calcareous grassland is a rare habitat in Ireland and is listed as a priority habitat under Annex I of the E.U. Habitats Directive. Furthermore, the population of the rare Green-winged Orchid is the largest known in Ireland.</p>	
7	Crosswood Bog SAC	[7110] Raised Bog (Active)* [7120] Degraded Raised Bog	<p>Crosswood Bog is a site of considerable conservation significance as it comprises a raised bog, a rare habitat in the E.U. and one that is becoming increasingly scarce and under threat in Ireland. This site supports a good diversity of raised bog microhabitats, including hummock/hollow complexes, pools and wooded flushes. Furthermore, it supports a population of the rare bog moss <i>Sphagnum pulchrum</i>. Active raised bog is listed as a priority habitat on Annex I of the E.U. Habitats Directive. Priority status is given to habitats and species that are threatened throughout the E.U. Ireland has a high proportion of the total E.U. resource of this habitat type (over 60%) and so has a special responsibility for its conservation at an international level.</p>	https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY002337.pdf
8	Redwood Bog SAC	[7110] Raised Bog (Active)* [7120] Degraded Raised Bog [7150] Rhynchosporion Vegetation	<p>Redwood Bog is a site of considerable conservation significance as it comprises a raised bog, a rare habitat in the E.U. and one that is becoming increasingly scarce and under threat in Ireland. This site supports a good diversity of raised bog microhabitats, including hummock/hollow complexes, pools and flushes. This bog has developed on the margins of a floodplain and is one of the few remaining</p>	https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY002353.pdf

	European Site Name and Code	Qualifying Interest / Special Conservation Interest and Code *denotes a priority habitat	Summary Description (from Site Synopsis)	Data Source
			floodplain bogs in the country. Active raised bog is listed as a priority habitat on Annex I of the E.U. Habitats Directive. Priority status is given to habitats and species that are threatened throughout the E.U. Ireland has a high proportion of the total E.U. resource of this habitat type (over 60%) and so has a special responsibility for its conservation at an international level. Part of the site is already a State-owned nature reserve and supports Greenland White-fronted Goose, a bird species listed on Annex I of the E.U. Birds Directive.	
9	Ridge Road, SW of Rapemills SAC	[6210] Orchid-rich Calcareous Grassland*	Although small, this SAC is of ecological value as a good example of species-rich calcareous grassland, rich in orchids. This habitat type is increasingly rare as a result of agricultural intensification, and is given priority status on Annex I of the E.U. Habitats Directive. The vegetation at Ridge Road is diverse and features a variety of unusual plant communities, as well as a large population of Green-winged Orchid. Eskers are becoming increasingly rare in Ireland - many have been destroyed as a result of gravel extraction.	https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY000919.pdf
10	All Saints Bog And Esker SAC	[6210] Orchid-rich Calcareous Grassland* [7110] Raised Bog (Active)* [7120] Degraded Raised Bog [7150] Rhynchosporion Vegetation [91D0] Bog Woodland*	All Saints' Bog is a unique bog, important for its vegetation types, plants, invertebrates and birds. To conserve the site peat cutting needs to stop, drains need to be blocked and marginal dams built to raise the water table. The esker supports species-rich grassland, including rare species, and this area should continue to be grazed but left unfertilized. Further gravel extraction should be prevented, although some disturbance may be required to conserve the Red Hemp-nettle and Blue Fleabane.	https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY000566.pdf

	European Site Name and Code	Qualifying Interest / Special Conservation Interest and Code *denotes a priority habitat	Summary Description (from Site Synopsis)	Data Source
11	Mongan Bog SPA	Greenland White-fronted Goose (Anser albifrons flavirostris) [A395]	<p>Mongan Bog is a midland raised bog of medium size situated immediately east of the monastic site of Clonmacnoise, Co. Offaly, and 12 km south of Athlone. It is situated in a basin, surrounded on part of its perimeter by high ground on mineral soil.</p> <p>Mongan Bog is owned by An Taisce (the National Trust) and is a Ramsar Convention site, a Biogenetic Reserve and a Statutory Nature Reserve.</p>	https://www.npws.ie/protected-sites/spa/004017
12	Middle Shannon Callows SPA	<p>Whooper Swan (Cygnus cygnus) [A038]</p> <p>Wigeon (Anas penelope) [A050]</p> <p>Corncrake (Crex crex) [A122]</p> <p>Golden Plover (Pluvialis apricaria) [A140]</p> <p>Lapwing (Vanellus vanellus) [A142]</p> <p>Black-tailed Godwit (Limosa limosa) [A156]</p> <p>Black-headed Gull (Chroicocephalus ridibundus) [A179]</p> <p>Wetland and Waterbirds [A999]</p>	<p>The Middle Shannon Callows SPA is a long and diverse site which extends for approximately 50 km from the town of Athlone to the town of Portumna; it lies within Counties Galway, Roscommon, Westmeath, Offaly and Tipperary. The site averages about 0.75 km in width though in places is up to 1.5 km wide. Water levels on the site are greatly influenced by the very small fall between Athlone and Portumna and by the weir at Meelick. The site has extensive areas of callow, or seasonally flooded, semi-natural, lowland wet grassland, along both sides of the river. The callows are mainly too soft for intensive farming but are used for hay or silage or for summer grazing. Other habitats of smaller area which occur alongside the river include lowland dry grassland, freshwater marshes, reedbeds and wet woodland. The diversity of semi-natural habitats present, and the sheer size of the site attract an excellent diversity of bird species, including significant populations of several.</p> <p>The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds. The Shannon Callows is the largest site monitored as part of I-WeBS</p>	https://www.npws.ie/protected-sites/spa/004096

	European Site Name and Code	Qualifying Interest / Special Conservation Interest and Code *denotes a priority habitat	Summary Description (from Site Synopsis)	Data Source
			and many parts of it are inaccessible on the ground.	
13	River Little Brosna Callows SPA	<p>Whooper Swan (<i>Cygnus cygnus</i>) [A038]</p> <p>Wigeon (<i>Anas penelope</i>) [A050]</p> <p>Teal (<i>Anas crecca</i>) [A052]</p> <p>Pintail (<i>Anas acuta</i>) [A054]</p> <p>Shoveler (<i>Anas clypeata</i>) [A056]</p> <p>Golden Plover (<i>Pluvialis apricaria</i>) [A140]</p> <p>Lapwing (<i>Vanellus vanellus</i>) [A142]</p> <p>Black-tailed Godwit (<i>Limosa limosa</i>) [A156]</p> <p>Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179]</p> <p>Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395]</p> <p>Wetland and Waterbirds [A999]</p> <p>T</p>	<p>The River Little Brosna Callows SPA is one of the top sites in the country for wintering waterfowl and part of the site is a Wildfowl Sanctuary. It is of international importance on account of the total numbers of birds that use it, as well as for its Greenland White-fronted Goose, Golden Plover and Black-tailed Godwit populations. In addition, there are a further seven species with nationally important populations, several of which are the largest in the country. Also of note is that three of the species which occur regularly, i.e. Whooper Swan, Greenland White-fronted Goose and Golden Plover, are listed on Annex I of the E.U. Birds Directive.</p>	<p>npws.ie/sites/default/files/protected-sites/synopsis/SY004086.pdf</p>
14	River Suck Callows SPA (004097)	<p>Whooper Swan (<i>Cygnus cygnus</i>) [A038]</p> <p>Wigeon (<i>Anas penelope</i>) [A050]</p> <p>Golden Plover (<i>Pluvialis apricaria</i>) [A140]</p> <p>Lapwing (<i>Vanellus vanellus</i>) [A142]</p> <p>Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395]</p> <p>Wetland and Waterbirds [A999]</p>	<p>The River Suck Callows SPA is a linear, sinuous site comprising a section of the River Suck from Castlecoote, Co. Roscommon to its confluence with the River Shannon close to Shannonbridge, a distance of approximately 70 km along the course of the river. The River Suck Callows SPA is of considerable ornithological importance, in particular for the presence of nationally important populations of five species. Of note is that three of the species that occur regularly, i.e. Whooper Swan, Greenland White-fronted Goose and Golden Plover, are listed on Annex I of the E.U. Birds Directive. Part of the River Suck Callows SPA is a Wildfowl Sanctuary.</p>	<p>NPWS (2014) River Suck Callows SPA (004097) Version dated 31.10.2014. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Accessed online 15.01.2021</p>

	European Site Name and Code	Qualifying Interest / Special Conservation Interest and Code *denotes a priority habitat	Summary Description (from Site Synopsis)	Data Source
15	All Saints Bog SPA	Greenland White-fronted Goose (Anser albifrons flavirostris) [A395]	All Saints Bog is a lowland raised bog located about 5 km north-west of Birr in Co. Offaly. It is separated from the River Little Brosna callows by a fragmented esker ridge. The site is unique in that it contains the largest stand of birch (Betula sp.) woodland in the country growing on an active raised bog. At the time this site was designated as a Special Protection Area (SPA) it was known to be utilised by part of an internationally important population of Greenland Whitefronted Goose. Greenland White-fronted Goose is regarded as a special conservation interest for this SPA. All Saints Bog was formerly used by part of the internationally important Greenland White-fronted Goose population based on the River Little Brosna. In recent years, however, there has been little or no use of All Saints by the geese following a general trend of less usage of raised bogs in favour of grassland sites. The last record of Greenland White-fronted Goose within the site was 75 individuals in 1993/94. Merlin has been seen on the bog during the breeding season and may breed there. The peat dome and marginal areas provide good foraging habitat for this bird of prey species.	NPWS (2012) All Saints Bog SPA

2.6 Sources of Information & Consultation

2.6.1 Consultation

To inform the current Rehabilitation Plan, both national and local stakeholders, including neighbours whose land adjoins Belmont 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 Belmont Bog. See Section 4 of the Rehabilitation Plan included as Appendix B for a full consultation report.

A process of engagement and Informal consultation was undertaken with NPWS regarding proposed Decommissioning and Rehabilitation Techniques. Due cognisance was given to information available on

the NPWS website at: <https://www.npws.ie/development-consultations#2>. Consulting NPWS about environmental assessments.

2.6.2 Sources of Information

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

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

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

- Review of the National Biodiversity Data Centre (NBDC) webmapper;
- Inland Fisheries Ireland (IFI) Reports;
- Environmental Protection Agency database (www.epa.ie);
- EPA Guidance on Requests for Alterations to a Licensed Industrial or Waste Activity;
- BirdWatch Ireland online data (including I-WeBS and I datasets; www.birdwatchireland.ie);
- Geological Survey of Ireland - National Draft Bedrock Aquifer map;
- Geological Survey of Ireland - Groundwater Database (www.gsi.ie);
- National Parks & Wildlife Services Public Map Viewer (www.npws.ie);
- Water Framework Directive catchments.ie/maps/ Map Viewer (www.catchments.ie);
- OPW Indicative Flood Maps (www.floodmaps.ie),
- CFRAM Preliminary Flood Risk Assessment (PFRA) maps (www.cfram.ie);
- River Basin Management Plan for Ireland 2018 – 2021;
- Bord na Móna Annual Report 2019;
- Spatial data in respect of Article 17 reporting, available online at <https://www.npws.ie/maps-and-data/habitat-and-species-data/article-17>.
- Spatial data in respect of Article 12 reporting, available online at <https://www.npws.ie/maps-and-data/habitat-and-species-data/article-12-data>.
- Available data on Greenland White-fronted Geese such as annual reporting by the Greenland White-fronted Goose Study and National Parks and Wildlife Service.

Planning peatland rehabilitation also takes account of research, experience and engagement with other peatland restoration and rehabilitation projects and peatland research including Irish, UK, European and International best-practise guidance (full citations are in the References Section):

- Bord na Móna Biodiversity Action Plan
- Anderson *et al.* (2017). An overview of the progress and challenges of peatland restoration in Western Europe.
- Bonn *et al.* (2017). Peatland restoration and ecosystem services- science, policy and practice.
- Carroll *et al.* (2009). Sphagnum in the Peak District. Current Status and Potential for Restoration. Moors for the Future Report No 16.
- Clark & Rieley (2010). Strategy for responsible peatland management.
- Eades *et al.* (2003). The Wetland Restoration Manual.
- Farrell & Doyle (2003). Rehabilitation of Industrial Cutaway Atlantic Blanket Bog, NW Mayo, Ireland.
- Gann *et al.* (2019). International Principles and Standards for the practice of Ecological Restoration.
- Hinde *et al.* (2010). Sphagnum re-introduction project: A report on research into the re-introduction of Sphagnum mosses to degraded moorland. Moors for the Future Research Report 18.
- Joosten & Clarke (2002). Wise Use of mires and peatlands – Background and Principles including a framework for Decision-making.
- Lindsay (2010). Peatbogs and Carbon: a Critical Synthesis to Inform Policy Development in Oceanic Peat Bog Conservation and Restoration in the Context of Climate Change.
- Mackin *et al.* (2017). Best practice in raised bog restoration in Ireland. Irish Wildlife Manuals, No. 99. National Parks and Wildlife Service,
- McBride *et al.* (2011). The Fen Management Handbook, (2011), Scottish Natural Heritage.
- McDonagh (1996). Drain blocking by machines on Raised Bogs. Unpublished report for National Parks and Wildlife Service.
- NPWS (2017a). National Raised bog Special Areas of Conservation management plan 2017-2022. Department of Arts, Heritage and the Gaeltacht.
- Quinty & Rochefort (2003). Peatland Restoration Guide, second edition. Canadian Sphagnum Peat Moss Association and New Brunswick Department of Natural Resources and Energy.
- Renou-Wilson *et al.* (2011). BOGLA-D - Sustainable Management of Peatlands in Ireland. STRIVE Report No 75 prepared for the Environmental Protection Agency.
- Schouten (2002). Conservation and Restoration of Raised Bogs: Geological, Hydrological and Ecological Studies. Dúchas - The Heritage Service of the Department of the Environment and Local Government, Ireland;
- Thom (2019). Conserving Bogs – Management Handbook.
- Wheeler & Shaw (1995). Restoration of Damaged Peatlands – with Particular Reference to Lowland Raised Bogs Affected by Peat Extraction.
- Wittram *et al.* (2015). A Practitioners Guide to *Sphagnum* Reintroduction. Moors for the Future Partnership.

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

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

There is no spatial overlap between Belmont Bog and any of the SAC's under consideration. It can therefore reasonably be concluded that there is no potential for interactions and associated direct impact/effects (such as habitat loss, or loss of habitat connectivity) on any SAC's from the proposed decommissioning and rehabilitation of Belmont Bog.

2.7.2 Indirect impacts to habitats within SAC boundaries

All SACs are located at significant distance from the Belmont Bog (the nearest being River Shannon Callows SAC/Middle Shannon Callows SPA), located approximately 4km to the west). There will be no potential for the project to result in emissions to air, noise emissions or visual disturbance to the SACs occurring in the wider surrounding area. As such the consideration of indirect impacts is restricted to emissions to the aquatic environment.

Sources (all outside SAC boundaries):

The following processes/elements associated with rehabilitation works have the potential to represent sources of perturbation to water quality along and downstream of the Blackwater River that receive drainage water from Belmont Bog: Movement of soil or peat; machinery; earthworks; excavations; unforeseen events such as the failure of drain blocks and berms resulting in the release of silt-laden water to waterbodies; temporary overburden storage; works in or near water; re-grading of a boundary drains (where required); changes in local hydrological and hydrogeological conditions; cleaning of silt ponds; removal of waste and/or raw material; lifting of rail; use of fuels; chemicals or fertiliser.

Pathway: water runoff flow paths, watercourses, flooding/changes to hydrological regimes, air

Pathway Connectivity between Belmont Bog and SACs

Of the 10 SACs occurring in the wider surrounding area, as listed on Table 7 and shown on Figure 9, all except the River Shannon Callows SAC are not connected via a hydrological pathway to Belmont Bog.

Belmont Bog is located within the River Shannon catchment and there is a hydrological pathway between Belmont Bog and the River Shannon Callows SAC, established by surface water discharges from Belmont Bog to Blackwater River, which in turn drains to the River Shannon Callows SAC. This is a distant pathway with the nearest point of the River Shannon Callows SAC located approximately 5.5km downstream from Belmont Bog.

2.7.3 Indirect or ex-situ disturbance or displacement of Qualifying Species of SACs

Belmont Bog is located at a remote distance from any of the 10 SACs occurring in the wider area. The River Shannon Callows SAC is the only SAC in the wider surrounding area that is designated for its role in supporting mobile Annex 2 qualifying species. Fin Lough SAC is the only other SAC designated for supporting Annex 2 species, namely Vertigo snail species, which are considered to be a sedentary species whose dispersal is believed to be mediated by mammals and birds (NPWS, 2019; Horsak, 2017). Otter is the Annex 2 qualifying species of the River Shannon Callows SAC and therefore consideration of indirect or ex-situ disturbance or displacement is restricted to the otter population of this SAC that are reliant on the aquatic environment.

Sources (all outside SAC boundaries): The following processes/elements associated with rehabilitation works have the potential to represent sources of perturbation to water quality along and downstream of the Esker Stream that receive drainage water from Belmont Bog: Movement of soil or

peat; machinery; earthworks; excavations; unforeseen events such as the failure of drain blocks and berms resulting in the release of silt-laden water to waterbodies; temporary overburden storage; works in or near water; re-grading of a boundary drains (where required); changes in local hydrological and hydrogeological conditions; cleaning of silt ponds; removal of waste and/or raw material; lifting of rail; use of fuels; chemicals or fertiliser.

Pathway: water runoff flow paths, watercourses,

Pathway Connectivity between Belmont Bog and SACs

Of the 10 SACs occurring in the wider surrounding area, as listed on Table 7 and shown on Figure 9, all except the River Shannon Callows SPA are not connected via a hydrological pathway to Belmont Bog.

Belmont Bog is located within the River Shannon catchment and there is a hydrological pathway between Belmont Bog and the River Shannon Callows SAC, established by surface water discharges from Belmont Bog to Blackwater River, which in turn drains to the River Shannon Callows SAC. This is a distant pathway with the nearest point of the River Shannon Callows SAC located approximately 5.5km downstream from Belmont Bog.

2.7.4 Indirect or ex-situ mortality of Qualifying Interests of SACs

Belmont Bog is located at a remote distance from any of the 10 surrounding SACs. As noted above the River Shannon Callows SAC is the only SAC occurring in the wider surrounding area that supports mobile Annex 2 qualifying species (i.e. otters). Otter has been recorded in the local area surrounding Belmont Bog in past. No signs of otters were recorded at the bog during surveys in 2012 and 2020. No holts, couches, other resting places or other field signs of otters were recorded on Belmont Bog during these habitat surveys. In addition, the field surveys completed in 2021 have confirmed the absence of otters and their resting places at Belmont Bog and no other field signs were observed during these recent surveys. As such there will be no potential for the rehabilitation works to result in mortality to otters outside the boundary of the River Shannon Callows SAC.

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

Other projects occurring in the surrounding area has been identified and have been detailed in Section 2.4.5 above. These projects are minor in scale and will not have the potential to combine with the rehabilitation works at Belmont Bog to result in cumulative negative impacts to the aquatic environment downstream of Belmont Bog. It is further noted that given the requirement for Habitats Regulations pertaining to other plans or projects, it can reasonably be assumed that, where necessary, all other plans or project occurring in the wider area surrounding Belmont Bog will be subject to mitigation to ensure adverse effects on European Sites are avoided.

2.7.6 Direct Impacts to Habitats within SPAs

There is no spatial overlap between Belmont Bog and any of the SPA's under consideration. It can therefore reasonably be concluded that there is no potential for direct impact/effects (such as habitat loss, or loss of habitat connectivity) on any SPA's from the proposed decommissioning and rehabilitation of Belmont Bog. Possible pathways can only exist for indirect effects on SPA's either secondary, cross-

factor or 'ex-situ'. Therefore, there is **no possibility of direct impacts to SPA** habitats, and this impact pathway is screened out from further evaluation. No potential for likely significant effects identified.

2.7.7 Indirect impacts habitats within SPA sites

All 5 SPAs in the wider surrounding area are located at significant distance from the Belmont Bog (the nearest being the Middle Shannon Callows SPA, located approximately 4km to the west or 5.5km downstream). There will be no potential for the project to result in emissions to air, noise emissions or visual disturbance to the SPAs occurring in the wider surrounding area. As such the consideration of indirect impacts is restricted to emissions to the aquatic environment.

Sources (all outside SPA boundaries):

The following processes/elements associated with rehabilitation works have the potential to represent sources of perturbation to water quality along and downstream of the Blackwater River that receive drainage water from Belmont Bog: Movement of soil or peat; machinery; earthworks; excavations; unforeseen events such as the failure of drain blocks and berms resulting in the release of silt-laden water to waterbodies; temporary overburden storage; works in or near water; re-grading of a boundary drains (where required); changes in local hydrological and hydrogeological conditions; cleaning of silt ponds; removal of waste and/or raw material; lifting of rail; use of fuels; chemicals or fertiliser.

Pathway: water runoff flow paths, watercourses, flooding/changes to hydrological regimes, air

Pathway Connectivity between Belmont Bog and SPAs

Of the 5 SPAs occurring in the wider surrounding area, as listed on Table 7 and shown on Figure 8, all except the Middle Shannon Callows SPA are not connected via a hydrological pathway to Belmont Bog.

Belmont Bog is located within the River Shannon catchment and there is a hydrological pathway between Belmont Bog and the Middle Shannon Callows SPA, established by surface water discharges from Belmont Bog to Blackwater River, which in turn drains to the Middle Shannon Callows SPA. This is a distant pathway with the nearest point of the Middle Shannon Callows SPA located approximately 5.5km downstream from Belmont Bog.

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

Sources: the sources of potential disturbance/displacement impacts to wetland bird species in general that could arise as a result of the PCAS at Belmont Bog include decommissioning and Rehabilitation activities; movement of construction machinery and vehicles including rail; presence of personnel; noise and vibration and/or visual intrusion from construction works and machinery.

Pathway: contact, visibility, noise – all pathways will only be representative of functional impact pathways where special conservation interest bird species (or other wetland bird species) of the surrounding SPAs are found to rely on Belmont Bogs.

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

Timing of Impacts: As outlined above, the potential for effects only relates to the decommissioning and rehabilitation Stage as source magnitude during any operational phase activities can be screened out. In terms of Timing of Effects, this is limited to the migratory (September to November for Autumn and March to mid-May for Spring) and winter period (October to March) when most of the SCI species for which these sites are designated are present⁴.

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

Other projects occurring in the surrounding area has been identified and have been detailed in Section 2.4.5 above. These projects are minor in scale and will not have the potential to combine with the rehabilitation works at Belmont Bog to result in cumulative negative impacts to the aquatic environment downstream of Belmont Bog. It is further noted that given the requirement for Habitats Regulations pertaining to other plans or projects, it can reasonably be assumed that, where necessary, all other plans or project occurring in the wider area surrounding Belmont Bog will be subject to mitigation to ensure adverse effects on European Sites are avoided.

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

The Screening evaluation is based on a conceptual site model which identifies potential impact source-pathways between the described Belmont Bog decommissioning and rehabilitation and each European Site. This allows for an assessment of any potential for significant effects on the Qualifying Interests / Special Conservation Interests and their respective Conservation Objectives. The relevant stage of the Belmont Bog decommissioning and rehabilitation is the construction stage, no impact source-pathways are identified during the operational stage.

The following impact source-pathways for the 10 SAC sites are evaluated in relation to any potential for significant effects (Table 8 below):

- Direct Impacts to Habitat within SACs
- Indirect impacts habitats within SACs
- Indirect or ex-situ disturbance or displacement of Qualifying Species of SACs
- Indirect/ex-situ mortality of Qualifying Species of SACs

The following impact source-pathways for the 5 SPA sites are evaluated in relation to any potential for significant effects (Table 9 below):

- Direct Impacts to Habitat within SPAs

⁴ Periods are as defined in the SNH document 'Survey Methods for use in assessing the impacts of onshore windfarms on bird communities'. (2005). SNH, Battleby, Scotland.

-
- Indirect impacts habitats within SPAs
 - Indirect or ex-situ disturbance or displacement of Special conservation interests/wetland bird species
 - Indirect/ex-situ mortality of special conservation interests/wetland birds of SPAs

The evaluation of potential for in-combination effects with regard to Other Plans or Projects includes the plans or projects described in Section 2.4.5. This evaluation has found that there is no potential for the PCAS at Belmont Bog to combine with other plans or projects to result in cumulative negative impacts to the SACs or SPAs occurring in the wider area surrounding Belmont Bog. Given this evaluation the potential for the PCAS at Belmont Bog to result in cumulative negative impacts to European Sites is **Screened Out**.

CONFIDENTIAL

Table 8: Evaluation of Possibly Significant Effects to the 10 SAC sites

	European Site	Separation Distance from Belmont Bog	Hydrological Connection – Yes/No	Evaluation of the potential for Belmont Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the 10 SAC Sites: <ol style="list-style-type: none"> 1. Direct impacts to Habitats of SACs 2. Indirect impacts to Habitats of SACs 3. Indirect/ex-situ disturbance or displacement of Qualifying Species of SACs 4. Indirect or ex-situ mortality of Qualifying Species of SACs
1	River Shannon Callows SAC (000216)	3.7km W	Yes: 5.5km Downstream	<p>1. Screened Out – No possibility for direct loss, reduction or degradation of terrestrial or aquatic habitats within the SAC</p> <p>Due to the remote distance separating the PCAS at Belmont Bog from this SAC there will be no potential for the PCAS, alone or in-combination with other plans or projects, to result in significant direct impacts to habitats within this SAC</p> <p>2: Screened Out – No possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to the SAC</p> <p>As identified in Section 2.7.2 above rehabilitation works are likely to result in the mobilisation of peat material with subsequent runoff to the Blackwater River. The loss of sediment to the Blackwater River from surface water runoff will coincide with the reprofiling of the bog surface, the blocking of drains and the creation of berms. The maintenance of silt ponds will also have the potential to mobilise sediment in ponds and result in the release of sediment downstream to these watercourses. These works will be completed over a short time scale and during the late spring and summer when surface water runoff will be lower (works at Belmont Bog can only be scheduled for this time of the year due to seasonal winter flooding). The release of silt-laden waters to these watercourses during these works will have the potential to result in localised short-term impacts to water quality. The presence of drain blocks and berms at Belmont Bog subsequent to the completion of works will retard runoff from the site and minimise the volume of surface water runoff discharging from the bog to these receiving watercourses. The presence of these features will over time reduce the potential for silt-laden surface water runoff to be released to the Blackwater River and downstream to the Shannon catchment.</p>

	European Site	Separation Distance from Belmont Bog	Hydrological Connection – Yes/No	Evaluation of the potential for Belmont Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the 10 SAC Sites: <ol style="list-style-type: none"> 1. Direct impacts to Habitats of SACs 2. Indirect impacts to Habitats of SACs 3. Indirect/ex-situ disturbance or displacement of Qualifying Species of SACs 4. Indirect or ex-situ mortality of Qualifying Species of SACs
				<p>The rehabilitation works have also been identified as having the potential to result in changes to the hydrological regime of Blackwater River. Where such an impact is likely to occur it will be a localised impact confined to the stretch of these watercourses immediately downstream of Belmont Bog.</p> <p>The qualifying habitats of the River Shannon Callows SAC that can be influenced by freshwater/lotic processes are [6410] Molinia meadows and [91E0] alluvial woodland. These habitats can also be influenced by freshwater/lotic processes during spate events when the meadow or woodland floor is flood by rivers and streams. All other qualifying habitats of the SAC are terrestrial that are not connected to or at very remote distances from the Belmont Bog, such that there will be no potential for the PCAS to result in negative effects to their conservation status.</p> <p>The extent of alluvial woodland or Molinia meadow occurring within the River Shannon Callows SAC have not been mapped in the conservation objectives mapping. However, the known extent of these habitats have been mapped at a national level as part of the Article 17 mapping of the range of these habitats. In addition, the extent of alluvial woodland has also been mapped at a national levels as part of the National Survey of Native Woodland. The nearest example of alluvial woodland as mapped on either of these datasets is located at the downstream end of Maddens Island, approximately 15km downstream from Belmont Bog. The nearest location of Molinia meadows as mapped by the Article 17 dataset is approximately 8km downstream from Belmont Bog. This example of Molinia meadows is situated in an area of callows that has been subject to arterial drainage and is situated approximately 75m from the bankside of the River Shannon.</p>

	European Site	Separation Distance from Belmont Bog	Hydrological Connection – Yes/No	Evaluation of the potential for Belmont Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the 10 SAC Sites: <ol style="list-style-type: none"> 1. Direct impacts to Habitats of SACs 2. Indirect impacts to Habitats of SACs 3. Indirect/ex-situ disturbance or displacement of Qualifying Species of SACs 4. Indirect or ex-situ mortality of Qualifying Species of SACs
				<p>Any potential impacts to water quality as a result of the PCAS at Belmont Bog will be localised to the Blackwater River downstream of the project site. This will be due to the short-term and relatively small-scale nature of the rehabilitation works and the required timing of the works during the late spring and summer months when the potential for runoff will be minimised. In addition and as detailed in Section 1.2.3 above, the surface water draining from Belmont Bog have not been found to have a negative impact on the water quality of receiving waters downstream. The surface water quality of this river downstream of Belmont Bog was found to be at good status in 2017, during which time Belmont Bog was still subject to industrial peat extraction. As noted above the works associated with the PCAS and the associated potential for silt mobilisation will represent a fraction of the potential mobilisation associated with industrial peat activities. Given that the latter did not undermine water quality in the Blackwater, there will be no potential for the PCAS to result in perturbations to the water quality of this river. Furthermore the implementation of the PCAS at Belmont Bog will contribute positively to managing surface water within the Shannon sub-catchment with a downward trajectory in a variety of surface water parameter concentrations predicted to occur over the longer term.</p> <p>Given that Belmont Bog is separated from the nearest point of the River Shannon Callows SAC by approximately 5.5km which involves the Blackwater River draining to the Shannon, significant dilution and attenuation of any surface water runoff from Belmont Bog will occur within the hydrological pathway prior to the SAC and any contaminants discharging from the bog will have the potential to result in only localised impacts along the Blackwater River and will be imperceptible further downstream. In light of the significant dilution and attenuation achievable downstream of Belmont Bog within the Shannon sub-catchments there will be no potential for inputs of</p>

	European Site	Separation Distance from Belmont Bog	Hydrological Connection – Yes/No	<p>Evaluation of the potential for Belmont Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the 10 SAC Sites:</p> <p>1. Direct impacts to Habitats of SACs</p> <p>2. Indirect impacts to Habitats of SACs</p> <p>3. Indirect/ex-situ disturbance or displacement of Qualifying Species of SACs</p> <p>4. Indirect or ex-situ mortality of Qualifying Species of SACs</p>
				<p>silt-laden surface water runoff or any other contaminants that may arise as a result of the rehabilitation works at concentrations required to result in likely significant effects to the conservation objectives of the qualifying habitats of the River Shannon Callows SAC occurring downstream.</p> <p>Given the short-term nature of the rehabilitation works, the potential for positive impacts to local water quality downstream subsequent to the completion of the rehabilitation works, the downward trajectory in concentrations of potential water quality contaminants following the implementation of PCAS measures, and the small scale nature of other projects occurring in the vicinity of Belmont Bog, there will be no potential for the PCAS at Belmont Bog to combine with other projects to result in cumulative negative impacts to the qualifying habitats of the River Shannon Callows SAC downstream.</p> <p>3. Screened Out - No potential for indirect or ex-situ disturbance or displacement of Qualifying species</p> <p>The qualifying species of the River Shannon Callows SAC that are dependent on freshwater/lotic habitats are otters.</p> <p>Field surveys completed at Belmont Bog recorded no evidence of otters relying on the silt ponds as a resting or breeding site (no holts or couches were identified).</p> <p>Given the absence of otter holts and couches at Belmont Bog and the distance of approximately 5.5km from Belmont Bog and the River Shannon Callows SAC there will be no potential for the PCAS to result in disturbance</p>

	European Site	Separation Distance from Belmont Bog	Hydrological Connection – Yes/No	<p>Evaluation of the potential for Belmont Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the 10 SAC Sites:</p> <p>1. Direct impacts to Habitats of SACs</p> <p>2. Indirect impacts to Habitats of SACs</p> <p>3. Indirect/ex-situ disturbance or displacement of Qualifying Species of SACs</p> <p>4. Indirect or ex-situ mortality of Qualifying Species of SACs</p>
				<p>or displacement impacts that could in turn result in likely significant effects to the otter population of the River Shannon Callows SAC.</p> <p>4: Screened Out - No potential for indirect or ex-situ mortality to species of Qualifying Interests</p> <p>Belmont Bog does not support otters, which is the only qualifying feature of the River Shannon Callows SAC that could be at risk of mortality as a result of collision with machinery.</p> <p>The PCAS at Belmont Bog will not, alone or in-combination with other plans or projects, have the potential to result in mortality to qualifying species of this SAC..</p>
2	Ferbane Bog SAC	4.2km E	No	<p>1: Screened Out - No likelihood for significant direct impacts to habitats within the SAC</p> <p>Due to the remote distance separating the PCAS at Belmont Bog from this SAC there will be no potential for the PCAS, alone or in-combination with other plans or projects, to result in significant direct impacts to habitats within this SAC.</p> <p>2: Screened Out - No likelihood for significant indirect impacts to habitats within the SAC</p> <p>Due to the absence of hydrological pathways and the separation distance between proposed activities and this European Site, no pathways for effects are identified.</p> <p>3: Screened Out - No potential for indirect or ex-situ disturbance or displacement of Qualifying Species</p> <p>No Annex 2 species are listed as qualifying species/qualifying features of interest for this SAC.</p> <p>4: Screened Out - No potential for indirect or ex-situ mortality of Qualifying Species</p> <p>No Annex 2 species are listed as qualifying species/qualifying features of interest for this SAC.</p>

	European Site	Separation Distance from Belmont Bog	Hydrological Connection – Yes/No	Evaluation of the potential for Belmont Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the 10 SAC Sites: <ol style="list-style-type: none"> 1. Direct impacts to Habitats of SACs 2. Indirect impacts to Habitats of SACs 3. Indirect/ex-situ disturbance or displacement of Qualifying Species of SACs 4. Indirect or ex-situ mortality of Qualifying Species of SACs
3	Fin Lough (Offaly) SAC	3km N	No	<p>1: Screened Out - No likelihood for significant direct impacts to habitats within the SAC Due to the remote distance separating the PCAS at Belmont Bog from this SAC there will be no potential for the PCAS, alone or in-combination with other plans or projects, to result in significant direct impacts to habitats within this SAC.</p> <p>2: Screened Out - No likelihood for significant indirect impacts to habitats within the SAC Due to the absence of hydrological pathways and the separation distance between proposed activities and this European Site, no pathways for effects are identified.</p> <p>3: Screened Out - No potential for indirect or ex-situ disturbance or displacement of Qualifying Species Qualifying species only relate to <i>Vertigo</i> snail species which are not sensitive to indirect disturbance at the distance of separation from the PCAS at Belmont Bog. Furthermore as noted in Section 2.7.3 above no suitable habitat for <i>Vertigo</i> species is supported by Belmont Bog.</p> <p>4: Screened Out - No potential for indirect or ex-situ mortality of Qualifying Species Due to the remote distance separating the PCAS at Belmont Bog from this SAC and the habitat of the SAC supporting <i>Vertigo</i> species there will be no potential for the PCAS to result in ex-situ mortality to this species.</p>
4	Moyclare Bog SAC	800m E	No	<p>1: Screened Out - No likelihood for significant direct impacts to habitats within the SAC Due to the remote distance separating the PCAS at Belmont Bog from this SAC there will be no potential for the PCAS, alone or in-combination with other plans or projects, to result in significant direct impacts to habitats within this SAC.</p> <p>2: Screened Out - No likelihood for significant indirect impacts to habitats within the SAC</p>

	European Site	Separation Distance from Belmont Bog	Hydrological Connection – Yes/No	<p>Evaluation of the potential for Belmont Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the 10 SAC Sites:</p> <p>1. Direct impacts to Habitats of SACs</p> <p>2. Indirect impacts to Habitats of SACs</p> <p>3. Indirect/ex-situ disturbance or displacement of Qualifying Species of SACs</p> <p>4. Indirect or ex-situ mortality of Qualifying Species of SACs</p>
				<p>Due to the absence of hydrological pathways and the separation distance between proposed activities and this European Site, no pathways for effects are identified.</p> <p>3: Screened Out - No potential for indirect or ex-situ disturbance or displacement of Qualifying Species</p> <p>No Annex 2 species are listed as qualifying species/qualifying features of interest for this SAC.</p> <p>4: Screened Out - No potential for indirect or ex-situ mortality of Qualifying Species</p> <p>No Annex 2 species are listed as qualifying species/qualifying features of interest for this SAC.</p>
5	Mongan Bog SAC	13.8km NW	No	<p>1: Screened Out - No likelihood for significant direct impacts to habitats within the SAC</p> <p>Due to the remote distance separating the PCAS at Belmont Bog from this SAC there will be no potential for the PCAS, alone or in-combination with other plans or projects, to result in significant direct impacts to habitats within this SAC.</p> <p>2: Screened Out - No likelihood for significant indirect impacts to habitats within the SAC</p> <p>Due to the absence of hydrological pathways and the separation distance between proposed activities and this European Site, no pathways for effects are identified.</p> <p>3: Screened Out - No potential for indirect or ex-situ disturbance or displacement of Qualifying Species</p> <p>No Annex 2 species are listed as qualifying species/qualifying features of interest for this SAC.</p> <p>4: Screened Out - No potential for indirect or ex-situ mortality of Qualifying Species</p> <p>No Annex 2 species are listed as qualifying species/qualifying features of interest for this SAC.</p>
6	Pilgrim's Road Esker SAC	8.6km NE	No	<p>1: Screened Out - No likelihood for significant direct impacts to habitats within the SAC</p>

	European Site	Separation Distance from Belmont Bog	Hydrological Connection – Yes/No	<p>Evaluation of the potential for Belmont Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the 10 SAC Sites:</p> <p>1. Direct impacts to Habitats of SACs</p> <p>2. Indirect impacts to Habitats of SACs</p> <p>3. Indirect/ex-situ disturbance or displacement of Qualifying Species of SACs</p> <p>4. Indirect or ex-situ mortality of Qualifying Species of SACs</p>
				<p>Due to the remote distance separating the PCAS at Belmont Bog from this SAC there will be no potential for the PCAS, alone or in-combination with other plans or projects, to result in significant direct impacts to habitats within this SAC.</p> <p>2: Screened Out - No likelihood for significant indirect impacts to habitats within the SAC</p> <p>Due to the absence of hydrological pathways and the separation distance between proposed activities and this European Site, no pathways for effects are identified.</p> <p>3: Screened Out - No potential for indirect or ex-situ disturbance or displacement of Qualifying Species</p> <p>No Annex 2 species are listed as qualifying species/qualifying features of interest for this SAC.</p> <p>4: Screened Out - No potential for indirect or ex-situ mortality of Qualifying Species</p> <p>No Annex 2 species are listed as qualifying species/qualifying features of interest for this SAC.</p>
7	Crosswood Bog SAC	11.4km SE	No	<p>1: Screened Out - No likelihood for significant direct impacts to habitats within the SAC</p> <p>Due to the remote distance separating the PCAS at Belmont Bog from this SAC there will be no potential for the PCAS, alone or in-combination with other plans or projects, to result in significant direct impacts to habitats within this SAC.</p> <p>2: Screened Out - No likelihood for significant indirect impacts to habitats within the SAC</p> <p>Due to the absence of hydrological pathways and the separation distance between proposed activities and this European Site, no pathways for effects are identified.</p> <p>3: Screened Out - No potential for indirect or ex-situ disturbance or displacement of Qualifying Species</p> <p>No Annex 2 species are listed as qualifying species/qualifying features of interest for this SAC.</p> <p>4: Screened Out - No potential for indirect or ex-situ mortality of Qualifying Species</p>

	European Site	Separation Distance from Belmont Bog	Hydrological Connection – Yes/No	Evaluation of the potential for Belmont Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the 10 SAC Sites: <ol style="list-style-type: none"> 1. Direct impacts to Habitats of SACs 2. Indirect impacts to Habitats of SACs 3. Indirect/ex-situ disturbance or displacement of Qualifying Species of SACs 4. Indirect or ex-situ mortality of Qualifying Species of SACs
				No Annex 2 species are listed as qualifying species/qualifying features of interest for this SAC.
8	Redwood Bog SAC	14.5km SW	No	<p>1: Screened Out - No likelihood for significant direct impacts to habitats within the SAC Due to the remote distance separating the PCAS at Belmont Bog from this SAC there will be no potential for the PCAS, alone or in-combination with other plans or projects, to result in significant direct impacts to habitats within this SAC.</p> <p>2: Screened Out - No likelihood for significant indirect impacts to habitats within the SAC Due to the absence of hydrological pathways and the separation distance between proposed activities and this European Site, no pathways for effects are identified.</p> <p>3: Screened Out - No potential for indirect or ex-situ disturbance or displacement of Qualifying Species No Annex 2 species are listed as qualifying species/qualifying features of interest for this SAC.</p> <p>4: Screened Out - No potential for indirect or ex-situ mortality of Qualifying Species No Annex 2 species are listed as qualifying species/qualifying features of interest for this SAC.</p>
9	Ridge Road, SW of Rapemills SAC	4.7km NW	No	<p>1: Screened Out - No likelihood for significant direct impacts to habitats within the SAC Due to the remote distance separating the PCAS at Belmont Bog from this SAC there will be no potential for the PCAS, alone or in-combination with other plans or projects, to result in significant direct impacts to habitats within this SAC.</p> <p>2: Screened Out - No likelihood for significant indirect impacts to habitats within the SAC Due to the absence of hydrological pathways and the separation distance between proposed activities and this European Site, no pathways for effects are identified.</p>

	European Site	Separation Distance from Belmont Bog	Hydrological Connection – Yes/No	Evaluation of the potential for Belmont Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the 10 SAC Sites: <ol style="list-style-type: none"> 1. Direct impacts to Habitats of SACs 2. Indirect impacts to Habitats of SACs 3. Indirect/ex-situ disturbance or displacement of Qualifying Species of SACs 4. Indirect or ex-situ mortality of Qualifying Species of SACs
				3: Screened Out - No potential for indirect or ex-situ disturbance or displacement of Qualifying Species No Annex 2 species are listed as qualifying species/qualifying features of interest for this SAC. 4: Screened Out - No potential for indirect or ex-situ mortality of Qualifying Species No Annex 2 species are listed as qualifying species/qualifying features of interest for this SAC.
10	All Saints Bog and Esker SAC	12.5km S	No	1: Screened Out - No likelihood for significant direct impacts to habitats within the SAC Due to the remote distance separating the PCAS at Belmont Bog from this SAC there will be no potential for the PCAS, alone or in-combination with other plans or projects, to result in significant direct impacts to habitats within this SAC. 2: Screened Out - No likelihood for significant indirect impacts to habitats within the SAC Due to the absence of hydrological pathways and the separation distance between proposed activities and this European Site, no pathways for effects are identified. 3: Screened Out - No potential for indirect or ex-situ disturbance or displacement of Qualifying Species No Annex 2 species are listed as qualifying species/qualifying features of interest for this SAC. 4: Screened Out - No potential for indirect or ex-situ mortality of Qualifying Species No Annex 2 species are listed as qualifying species/qualifying features of interest for this SAC.

Table 9: Evaluation of Possibly Significant Effects to the 5 SPA sites

	European Site	Separation Distance from Belmont Bog	Hydrological Connection – Yes/No	Evaluation of the potential for Belmont Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the 5 SPA Sites: <ol style="list-style-type: none"> 1. Direct impacts to Habitats of SPAs 2. Indirect impacts to Habitats of SPAs 3. Indirect/ex-situ disturbance or displacement of special conservation interest /wetland species of SPAs 4. Indirect or ex-situ mortality of Qualifying Species of SPAs
1	Middle Shannon Callows SPA (004096)	3.7km W	Yes: 5.5km Downstream	<p>1. Screened Out – No likelihood for significant direct impacts to habitats within the SPA</p> <p>Due to the remote distance separating the PCAS at Belmont Bog from this SPA there will be no potential for the PCAS, alone or in-combination with other plans or projects, to result in significant direct impacts to habitats within this SPA</p> <p>2: Screened Out - No likelihood for significant indirect impacts to habitats within the SPA</p> <p>As identified in Section 2.7.7 above rehabilitation works are likely to result in the mobilisation of peat material with subsequent runoff to the Blackwater River. The loss of sediment to the Blackwater River from surface water runoff will coincide with the reprofiling of the bog surface, the blocking of drains and the creation of berms. The maintenance of silt ponds will also have the potential to mobilise sediment in ponds and result in the release of sediment downstream to these watercourses. These works will be completed over a short time scale and during the late spring and summer when surface water runoff will be lower (works at Belmont Bog can only be scheduled for this time of the year due to seasonal winter flooding). The release of silt-laden waters to these watercourses during these works will have the potential to result in localised short-term impacts to water quality. The presence of drain blocks and berms at Belmont Bog subsequent to the completion of works will retard runoff from the site and minimise the volume of surface water runoff discharging from the bog to these receiving watercourses. The presence of these features will over time reduce the potential for silt-laden surface water runoff to be released to the Blackwater River and downstream to the Shannon catchment.</p>

	European Site	Separation Distance from Belmont Bog	Hydrological Connection – Yes/No	<p>Evaluation of the potential for Belmont Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the 5 SPA Sites:</p> <p>1. Direct impacts to Habitats of SPAs</p> <p>2. Indirect impacts to Habitats of SPAs</p> <p>3. Indirect/ex-situ disturbance or displacement of special conservation interest /wetland species of SPAs</p> <p>4. Indirect or ex-situ mortality of Qualifying Species of SPAs</p>
				<p>The rehabilitation works have also been identified as having the potential to result in changes to the hydrological regime of Blackwater River. Where such an impact is likely to occur it will be a localised impact confined to the stretch of these watercourses immediately downstream of Belmont Bog.</p> <p>The wetland habitats of the Middle Shannon Callows SPA that can be influenced by freshwater/lotic processes are the sections of watercourse channels within the SPA and the fringing bankside wetland habitats that are subject to inundation during times of flood.</p> <p>Any potential impacts to water quality as a result of the PCAS at Belmont Bog will be localised to the Blackwater River downstream of the project site. This will be due to the short-term and relatively small-scale nature of the rehabilitation works and the required timing of the works during the late spring and summer months when the potential for runoff will be minimised. In addition and as detailed in Section 1.2.3 above, the surface water draining from Belmont Bog have not been found to have a negative impact on the water quality of receiving waters downstream. The surface water quality of this river downstream of Belmont Bog was found to be at good status in 2017, during which time Belmont Bog was still subject to industrial peat extraction. As noted above the works associated with the PCAS and the associated potential for silt mobilisation will represent a fraction of the potential mobilisation associated with industrial peat activities. Given that the latter did not undermine water quality in the Blackwater, there will be no potential for the PCAS to result in perturbations to the water quality of this river. Furthermore, the implementation of the PCAS at Belmont Bog will contribute positively to managing surface water within the Shannon sub-catchment with a downward trajectory in a variety of surface water parameter concentrations predicted to occur over the longer term.</p>

	European Site	Separation Distance from Belmont Bog	Hydrological Connection – Yes/No	<p>Evaluation of the potential for Belmont Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the 5 SPA Sites:</p> <p>1. Direct impacts to Habitats of SPAs</p> <p>2. Indirect impacts to Habitats of SPAs</p> <p>3. Indirect/ex-situ disturbance or displacement of special conservation interest /wetland species of SPAs</p> <p>4. Indirect or ex-situ mortality of Qualifying Species of SPAs</p>
				<p>Given that Belmont Bog is separated from the nearest point of the Middle Shannon Callows SPA by approximately 5.5km which involves the Blackwater River draining to the Shannon, significant dilution and attenuation of any surface water runoff from Belmont Bog will occur within the hydrological pathway prior to the SPA and any contaminants discharging from the bog will have the potential to result in only localised impacts along the Blackwater River and will be imperceptible further downstream. In light of the significant dilution and attenuation achievable downstream of Belmont Bog within the Shannon sub-catchments there will be no potential for inputs of silt-laden surface water runoff or any other contaminants that may arise as a result of the rehabilitation works at concentrations required to result in likely significant effects to the conservation objectives of the qualifying habitats of the Middle Shannon Callows SPA occurring downstream.</p> <p>Given the short-term nature of the rehabilitation works, the potential for positive impacts to local water quality downstream subsequent to the completion of the rehabilitation works, the downward trajectory in concentrations of potential water quality contaminants following the implementation of PCAS measures, and the small scale nature of other projects occurring in the vicinity of Belmont Bog, there will be no potential for the PCAS at Belmont Bog to combine with other projects to result in cumulative negative impacts to the qualifying habitats of the River Shannon Callows SAC downstream.</p> <p>3. Screened Out - No potential for indirect or ex-situ disturbance or displacement of special conservation interests/wetland bird population supported by the Middle Shannon Callows SPA</p> <p>The wetland birds of the Middle Shannon Callows SPA can be influenced by freshwater/lotic processes.</p>

	European Site	Separation Distance from Belmont Bog	Hydrological Connection – Yes/No	<p>Evaluation of the potential for Belmont Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the 5 SPA Sites:</p> <p>1. Direct impacts to Habitats of SPAs</p> <p>2. Indirect impacts to Habitats of SPAs</p> <p>3. Indirect/ex-situ disturbance or displacement of special conservation interest /wetland species of SPAs</p> <p>4. Indirect or ex-situ mortality of Qualifying Species of SPAs</p>
				<p>Recent field surveys completed at Belmont Bog in January 2021 recorded no evidence of wintering wetland birds relying upon Belmont Bog. While surveys completed in 2014/2015 recorded whooper swan at Blackwater Bog to the north and Belmont Bog and concluded that these areas provide a significant role in supporting wintering populations of wetland birds (see Section 1.2.3 above) the absence of whooper swans at Belmont Bog during January and March 2021 suggests that these species are not as reliant on the bog as previously identified during the 2014/2015 season.</p> <p>It is also noted that whooper swans were identified on the Blackwater Bog and in the vicinity of Belmont during 2014/2015 when industrial peat harvesting activities were ongoing at both these bogs, suggesting that the flocks of whooper swans using the bog at this time were tolerant of peat harvesting activity occurring in the surrounding area and were not disturbed by such activities. Thus, given that the works required for the PCAS will be of a much lower intensity and will be representative of a minor fraction of the activity associated with industrial peat harvesting activity, it is considered that even in the event that PCAS works were to be undertaken at Belmont Bog during the winter months and where flocks of whooper swans are present the works will not result in significant disturbance to these flocks.</p> <p>Given the absence of wetland birds relying on Belmont Bog; the distance of approximately 5.5km from Belmont Bog and the Middle Shannon Callows SPA, and the requirement (as detailed in Section 2.4.3.4 above) to progress PCAS works during the months of April to October (outside the wintering bird season) there will be no potential for the PCAS to result in disturbance or displacement impacts that could in turn result in likely significant effects to the wetland bird populations of the Middle Shannon Callows SPA.</p>

	European Site	Separation Distance from Belmont Bog	Hydrological Connection – Yes/No	Evaluation of the potential for Belmont Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the 5 SPA Sites: 1. Direct impacts to Habitats of SPAs 2. Indirect impacts to Habitats of SPAs 3. Indirect/ex-situ disturbance or displacement of special conservation interest /wetland species of SPAs 4. Indirect or ex-situ mortality of Qualifying Species of SPAs
				4: Screened Out - No potential for indirect or ex-situ mortality to species of Special Conservation Interest Based on the 2021 field surveys Belmont Bog is not relied upon by populations of wetland bird species and no wetland birds were identified on site during recent surveys in January and March 2021. As such there will be no risk of mortality to wetland bird species as a result of collision with machinery. The PCAS at Belmont Bog will not, alone or in-combination with other plans or projects, have the potential to result in mortality to wetland bird population supported by the Middle Shannon Callows SPA.
2	Mongan Bog SPA (004017)	4km N	No	1: Screened Out - No likelihood for significant direct impacts to habitats within the SPA Due to the remote distance separating the PCAS at Belmont Bog from this SPA there will be no potential for the PCAS, alone or in-combination with other plans or projects, to result in significant direct impacts to habitats within this SAC. 2: Screened Out - No likelihood for significant indirect impacts to habitats within the SPA Due to the absence of hydrological pathways and the separation distance between proposed activities and this European Site, no pathways for effects are identified. 3: Screened Out - No potential for indirect or ex-situ disturbance or displacement of special conservation interest /wetland birds No special conservation interest bird species/wetland bird species of this SPA rely on Belmont Bog and there will be no potential for PCAS activities at Belmont Bog to result in disturbance or displacement to the populations of special conservation interest bird species/wetland bird species supported by this SPA. 4: Screened Out - No potential for indirect or ex-situ mortality to special conservation interest /wetland bird species

	European Site	Separation Distance from Belmont Bog	Hydrological Connection – Yes/No	Evaluation of the potential for Belmont Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the 5 SPA Sites: <ol style="list-style-type: none"> 1. Direct impacts to Habitats of SPAs 2. Indirect impacts to Habitats of SPAs 3. Indirect/ex-situ disturbance or displacement of special conservation interest /wetland species of SPAs 4. Indirect or ex-situ mortality of Qualifying Species of SPAs
				<p>Belmont Bog is not relied upon by populations of wetland bird species and no wetland birds were identified on site during recent surveys in January and March 2021. As such there will be no risk of mortality to wetland bird species as a result of collision with machinery.</p> <p>The PCAS at Belmont Bog will not, alone or in-combination with other plans or projects, have the potential to result in mortality to wetland bird population supported by this SPA.</p>
3	River Little Brosna Callows SPA	14km W	No	<p>1: Screened Out - No likelihood for significant direct impacts to habitats within the SPA</p> <p>Due to the remote distance separating the PCAS at Belmont Bog from this SPA there will be no potential for the PCAS, alone or in-combination with other plans or projects, to result in significant direct impacts to habitats within this SAC.</p> <p>2: Screened Out - No likelihood for significant indirect impacts to habitats within the SPA</p> <p>Due to the absence of hydrological pathways and the separation distance between proposed activities and this European Site, no pathways for effects are identified.</p> <p>3: Screened Out - No potential for indirect or ex-situ disturbance or displacement of special conservation interest /wetland birds</p> <p>No special conservation interest bird species/wetland bird species of this SPA rely on Belmont Bog and there will be no potential for PCAS activities at Belmont Bog to result in disturbance or displacement to the populations of special conservation interest bird species/wetland bird species supported by this SPA.</p> <p>4: Screened Out - No potential for indirect or ex-situ mortality to special conservation interest /wetland bird species</p>

	European Site	Separation Distance from Belmont Bog	Hydrological Connection – Yes/No	Evaluation of the potential for Belmont Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the 5 SPA Sites: <ol style="list-style-type: none"> 1. Direct impacts to Habitats of SPAs 2. Indirect impacts to Habitats of SPAs 3. Indirect/ex-situ disturbance or displacement of special conservation interest /wetland species of SPAs 4. Indirect or ex-situ mortality of Qualifying Species of SPAs
				<p>Belmont Bog is not relied upon by populations of wetland bird species and no wetland birds were identified on site during recent surveys in January and March 2021. As such there will be no risk of mortality to wetland bird species as a result of collision with machinery.</p> <p>The PCAS at Belmont Bog will not, alone or in-combination with other plans or projects, have the potential to result in mortality to wetland bird population supported by this SPA.</p>
4	River Suck Callows SPA (004097)	9km W	No	<p>1: Screened Out - No likelihood for significant direct impacts to habitats within the SPA</p> <p>Due to the remote distance separating the PCAS at Belmont Bog from this SPA there will be no potential for the PCAS, alone or in-combination with other plans or projects, to result in significant direct impacts to habitats within this SAC.</p> <p>2: Screened Out - No likelihood for significant indirect impacts to habitats within the SPA</p> <p>Due to the absence of hydrological pathways and the separation distance between proposed activities and this European Site, no pathways for effects are identified.</p> <p>3: Screened Out - No potential for indirect or ex-situ disturbance or displacement of special conservation interest /wetland birds</p> <p>No special conservation interest bird species/wetland bird species of this SPA rely on Belmont Bog and there will be no potential for PCAS activities at Belmont Bog to result in disturbance or displacement to the populations of special conservation interest bird species/wetland bird species supported by this SPA.</p> <p>4: Screened Out - No potential for indirect or ex-situ mortality to special conservation interest /wetland bird species</p>

	European Site	Separation Distance from Belmont Bog	Hydrological Connection – Yes/No	Evaluation of the potential for Belmont Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the 5 SPA Sites: <ol style="list-style-type: none"> 1. Direct impacts to Habitats of SPAs 2. Indirect impacts to Habitats of SPAs 3. Indirect/ex-situ disturbance or displacement of special conservation interest /wetland species of SPAs 4. Indirect or ex-situ mortality of Qualifying Species of SPAs
				<p>Belmont Bog is not relied upon by populations of wetland bird species and no wetland birds were identified on site during recent surveys in January and March 2021. As such there will be no risk of mortality to wetland bird species as a result of collision with machinery.</p> <p>The PCAS at Belmont Bog will not, alone or in-combination with other plans or projects, have the potential to result in mortality to wetland bird population supported by this SPA.</p>
5	All Saints Bog SPA	12.5km S	No	<p>1: Screened Out - No likelihood for significant direct impacts to habitats within the SPA</p> <p>Due to the remote distance separating the PCAS at Belmont Bog from this SPA there will be no potential for the PCAS, alone or in-combination with other plans or projects, to result in significant direct impacts to habitats within this SAC.</p> <p>2: Screened Out - No likelihood for significant indirect impacts to habitats within the SPA</p> <p>Due to the absence of hydrological pathways and the separation distance between proposed activities and this European Site, no pathways for effects are identified.</p> <p>3: Screened Out - No potential for indirect or ex-situ disturbance or displacement of special conservation interest /wetland birds</p> <p>No special conservation interest bird species/wetland bird species of this SPA rely on Belmont Bog and there will be no potential for PCAS activities at Belmont Bog to result in disturbance or displacement to the populations of special conservation interest bird species/wetland bird species supported by this SPA.</p> <p>4: Screened Out - No potential for indirect or ex-situ mortality to special conservation interest /wetland bird species</p>

	European Site	Separation Distance from Belmont Bog	Hydrological Connection – Yes/No	Evaluation of the potential for Belmont Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the 5 SPA Sites: <ol style="list-style-type: none"> 1. Direct impacts to Habitats of SPAs 2. Indirect impacts to Habitats of SPAs 3. Indirect/ex-situ disturbance or displacement of special conservation interest /wetland species of SPAs 4. Indirect or ex-situ mortality of Qualifying Species of SPAs
				<p>Belmont Bog is not relied upon by populations of wetland bird species and no wetland birds were identified on site during recent surveys in January and March 2021. As such there will be no risk of mortality to wetland bird species as a result of collision with machinery.</p> <p>The PCAS at Belmont Bog will not, alone or in-combination with other plans or projects, have the potential to result in mortality to wetland bird population supported by this SPA.</p>

2.8.1 Screening for Appropriate Assessment: Conclusion Statement

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

Table 10: European Sites Considered within an Extended Buffer

No.	European Site	Site code
1	River Shannon Callows SAC	000216
2	All Saints Bog And Esker SAC	000566
3	Pilgrim's Road Esker SAC	001776
4	Crosswood Bog SAC	002337
5	Redwood Bog SAC	002353
6	Ridge Road, SW of Rapemills SAC	000919
7	Ferbane Bog SAC	000575
8	Fin Lough (Offaly) SAC	000576
9	Moyclare Bog SAC	000581
10	Mongan Bog SAC	000580
11	Mongan Bog SPA	004017
12	River Little Brosna Callows SPA	004086
13	Middle Shannon Callows SPA	004096
14	River Suck Callows SPA	004097
15	All Saints Bog SPA	004103

Following screening it can reasonably be concluded that **there is no likelihood of significant effects to these 15 European Sites** because of the proposed project, either alone or in-combination with other plans or projects. **Therefore, the potential for significant effects on these 15 European Sites has been excluded and have been 'Screened Out' from the Appropriate Assessment process and no Appropriate Assessment is required for these European Sites.**

3 REFERENCES

- Anderson, R., Farrell, C., Graf, M., Muller, F., Calvar, E., Frankard, P., Caporn, S., Anderson, P. (2017). An overview of the progress and challenges of peatland restoration in Western Europe. *Restoration Ecology*, Issue 2 Pages 271-282.
- Bonn, A., Allott, T., Evans, M., Joosten, H. & Stoneman, R. (2017) *Peatland restoration and ecosystem Services- science, policy and practice*. Cambridge University Press.
- Bord na Móna 2014. Blocking Drains in Irish raised bogs. The Bord na Móna Raised Bog Restoration Project. Cris, R. Buckmaster, S. Bain, C. Reed, M. (Eds) (2014) *Global Peatland Restoration demonstrating SUCCESS*. IUCN UK National Committee Peatland Programme, Edinburgh. <http://www.iucn-uk-peatlandprogramme.org/sites/www.iucn-uk-peatlandprogramme.org/files/IUCNGlobalSuccessApril2014.pdf>
- Carroll, J., Anderson, P., Caporn, S., Eades, P., O'Reilly C. & Bonn, A. 2009. Sphagnum in the Peak District. Current Status and Potential for Restoration. *Moors for the Future Report No 16*. Moors for the Future Partnership.
- Chanin P (2003). *Ecology of the European Otter*. Conserving Natura 2000 Rivers Ecology Series No. 10. English Nature, Peterborough.
- Chanin, P., (2013) *Otters (The British Natural History Collection)*. Whittet Books Ltd.
- Charles, P, Edwards, P (eds) (2015). *Environmental Good Practice on Site*. CIRIA.
- Clark, D. and Rieley, J. 2010. Strategy for responsible peatland management. International Peat Society, Finland.
- Cramp, S. (1977-1993). *Handbook of the birds of Europe, the Middle East and North Africa: the birds of the Western Palearctic* (7 Vols). Oxford University Press, Oxford.
- Crowe, O. (2005). *Ireland's Wetlands and their Waterbirds: Status and Distribution*. Birdwatch Ireland, Newcastle, Co. Wicklow.
- Department of Environment, Heritage and Local Government (2009) *Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities*, DoEHLG, Dublin.
- Duffy, M. (2018) *The Corncrake Conservation Project Annual Report*. 2018. Available online at: <https://www.npws.ie/sites/default/files/general/corncrake-report-2018.pdf>
- Eades, P., Bardsley, L., Giles, N. & Crofts, A. (2003). *The Wetland Restoration Manual*. The Wildlife Trusts, Newark.
- Farrell, C. A. and Doyle, G. J. 2003. Rehabilitation of Industrial Cutaway Atlantic Blanket Bog, NW Mayo, Ireland. *Wetlands Ecology and Management*, 11, 21-35.
- Fox, T. & Stroud, D.A. (2002). The Greenland White-fronted Goose *Anser albifrons flavistris*. *BWP Update* 4: 65-68.
- Gann, G.D., McDonald, T., Walder, B., Aronson, J., Nelson, C.R., Jonson, J., Hallett, J.G., Eisenberg, C., Guariguata, M.R., Liu, J., Hua, F., Echeverría, C., Gonzales, E., Shaw, N., Decler, K. & Dixon, K.W. (2019). International Principles and Standards for the practice of Ecological Restoration. *Restoration Ecology* 27(S1): S1–S46.
- Hayhow, D.B. (2009). *Consequences of winter habitat use in a migratory shorebird*. Thesis submitted for the degree of Doctor of Philosophy at the University of East Anglia, Norwich, 2009. Available at: https://ueaeprints.uea.ac.uk/id/eprint/10607/1/Thesis_hayhow_d_2009.pdf

- Heery, S. (2018) Birds in Central Ireland. 6th mid Shannon Bird Report. 2012-2016. BirdWatch Ireland, Kilcoole, County Wicklow.
- Hinde, S., Rosenburgh, A., Wright, N., Buckler, M. and Caporn, S. 2010. Sphagnum re-introduction project: A report on research into the re-introduction of Sphagnum mosses to degraded moorland. Moors for the Future Research Report 18. Moors For The Future Partnership.
- EU Birds Directive (2009) Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (codified version) Official Journal of the European Union 26.1.2010 L20/7 – L20/25
- EU Habitats Directive (1992) Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora Official Journal of the European Communities 22/07/1992 L206/07 – L206/50
- Environment and Heritage Service (2002) The Habitats Regulations: A guide for competent authorities. Environment and Heritage Service, Belfast.
- European Commission (2018) Managing Natura 2000 Sites: The Provisions of Article 6 of the 'Habitats Directive' 92/43/EEC. https://ec.europa.eu/environment/nature/natura2000/management/docs/art6/EN_art_6_guide_jun_2019.pdf
- Fox, A.D, I. Francis, D. Norriss & Alyn Walsh. 2019. Report of the 2018/2019 International Census of Greenland White-fronted Geese. Greenland White-fronted Goose Study / National Parks & Wildlife Service report, Kalo
- Horsak, M., Hajek, M., Horsakova, V., Hlavac, J., Hajkova, P., Dite, D., Peterka, T., et al. (2017). Refugial occurrence and ecology of the land snail *Vertigo lilljeborgi* in fen habitats in temperate mainland Europe. Journal Of Molluscan Studies, 83.
- Inland Fisheries Ireland (2016) Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters. Available online at: <https://www.fisheriesireland.ie/documents/624-guidelines-on-protection-of-fisheries-during-construction-works-in-and-adjacent-to-waters/file.html>
- Irish Statute Book (Various) European Communities (Natural Habitats) Regulations 1997 (S.I. 94/97) as amended in 1998 (S.I. No. 233/1998), 2005 (S.I. No. 378/2005) and 2011 (SI No. 477/2011). Dublin, Ireland
- Joosten, H. and Clarke, D. 2002. Wise Use of mires and peatlands – Background and Principles including a framework for Decision-making. I.M.C.G. – I.P.S., Jyväskylä, Finland.
- Lewis, L.J., Burke, B., Fitzgerald, N., Tierney, T.D. & Kelly, S. (2019). Irish Wetland Bird Survey: Waterbird Status and Distribution 2009/10-2015/16. Irish Wildlife Manuals, No. 106. National Parks and Wildlife Service, Department of culture, Heritage and the Gaeltacht, Ireland.
- Lindsay, R., 2010. Peatbogs and Carbon: a Critical Synthesis to Inform Policy Development in Oceanic Peat Bog Conservation and Restoration in the Context of Climate Change (Report to RSPB Scotland, Edinburgh).
- Livezey KB, Fernańdez-Juricic E, Blumstein DT. Database of bird flight initiation distances to assist in estimating effects from human disturbance and delineating buffer areas. Journal of Fish and Wildlife Management 7(1):181-191; e1944-687X. doi: 10.3996/082015-JFWM-078
- Mackin, F., Barr, A., Rath, P., Eakin, M., Ryan, J., Jeffrey, R. & Fernandez Valverde, F. (2017) Best practice in raised bog restoration in Ireland. Irish Wildlife Manuals, No. 99. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.

McBride, A., Diack, I., Droy, N., Hamill, B., Jones, P., Schutten, J., Skinner, A. and Street, M. 2011. The Fen Management Handbook, (2011), Scottish Natural Heritage, Perth.

McDonagh, E. (1996). Drain blocking by machines on Raised Bogs. Unpublished report for National Parks and Wildlife Service.

https://www.npws.ie/sites/default/files/publications/pdf/McDonagh_1996_Drain_Blocking_Raised_Bogs.pdf.

NPWS (2017). National Raised Bog SAC Management Plan 2017-2022. Available at: [https://www.npws.ie/sites/default/files/files/FOR%20UPLOAD%20Plan\(WEB_English\)_05_02_18%20\(1\).pdf](https://www.npws.ie/sites/default/files/files/FOR%20UPLOAD%20Plan(WEB_English)_05_02_18%20(1).pdf)

NPWS (2014) Ballynamona Bog and Corkip Lough SAC 002339. Version dated 09.01.2014. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Accessed online 30.07.2020

NPWS (2013) Lisduff Turlough SAC 000609. Version dated 04.09.2013. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Accessed online 30.07.2020

NPWS (2014) Glenloughaun Esker SAC 002213. Version dated 03.01.2014. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Accessed online 30.07.2020

NPWS (2014) Killeglan Grassland SAC 002214. Version dated 03.01.2014. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Accessed online 30.07.2020

NPWS (2016) Ballygar (Aghrane) Bog SAC 002199. Version dated 04.04.2016. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Accessed online 30.07.2020

NPWS (2013) Lough Croan Turlough SAC 000610. Version dated 04.09.2013. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Accessed online 30.07.2020

NPWS (2013) Four Roads Turlough SAC 001637. Version dated 06.11.2013. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Accessed online 30.07.2020

NPWS (2013) Castlesampson Esker SAC 001625. Version dated 06.11.2013. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Accessed online 30.07.2020

NPWS (2015) Lough Funshinagh SAC 000611. Version dated 23.11.2015. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Accessed online 30.07.2020

NPWS (2013) Site Synopsis: River Shannon Callows SAC 000216. Version dated 12.08.2013. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Accessed online 01.07.2020

NPWS (2012) Site Synopsis: Middle Shannon Callows SPA 004096. Version dated 10.01.2012. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Accessed online 01.07.2020

NPWS (2010) Four Roads Turlough SPA 004140. Version dated 10.06.2010. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Accessed online 30.07.2020

NPWS (2014) Site Synopsis: River Suck Callows SPA 004097. Version dated 31.10.2014. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Accessed online 01.07.2020

NPWS (2020) Conservation objectives for River Shannon Callows SAC [000216]. Generic Version 7.0 dated 07.04.2020. Department of Culture, Heritage and the Gaeltacht. Accessed online 01.07.2020

NPWS (2020) Conservation objectives for Middle Shannon Callows SPA [004096]. Generic Version 7.0 dated 07.04.2020. Department of Culture, Heritage and the Gaeltacht. Department of Culture, Heritage and the Gaeltacht. Accessed online 01.07.2020

NPWS (2020) Conservation objectives for River Suck Callows SPA [004097]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht. Accessed online 31.07.20

- NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 3: Species Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill
- NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill
- NPWS (2015) A framework for Corncrake Conservation to 2022. National Parks and Wildlife Service, Department of Arts, Heritage & the Gaeltacht. Available online at:
<https://www.npws.ie/sites/default/files/publications/pdf/A%20Framework%20for%20Corncrake%20Conservation%20to%202022%20%28Nov2015%29.pdf>
- NPWS (2015). Article 12 Reporting: Annex 2: Bird Species status and trends reporting format for the period 2008-2012. Available online at:
http://cdr.eionet.europa.eu/Converters/run_conversion?file=/ie/eu/art12/envuvesya/IE_birds_reports-14328-144944.xml&conv=343&source=remote#A082_B
- NRA (2008) Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes; Available online at: <https://www.tii.ie/tii-library/environment/construction-guidelines/Guidelines-for-the-Crossing-of-Watercourses-during-the-Construction-of-National-Road-Schemes.pdf>
- Office for Official Publications of the European Communities (2000) Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC. Office for Official Publications of the European Communities, Luxembourg.
- Office for Official Publications of the European Communities (2001) Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC. Office for Official Publications of the European Communities.
- OPW (2013) Construction, Replacement or Alteration of Bridges and Culverts. Available online at: <https://www.gov.ie/en/publication/957aa7-consent-requirements-constructionalteration-of-watercourse-infrastru/>
- Quinty, F. and L. Rochefort, 2003. Peatland Restoration Guide, second edition. Canadian Sphagnum Peat Moss Association and New Brunswick Department of Natural Resources and Energy. Québec, Québec.
- Renou-Wilson F., Bolger T., Bullock C., Convery F., Curry J. P., Ward S., Wilson D. & Müller C. (2011). BOGLAND - Sustainable Management of Peatlands in Ireland. STRIVE Report No 75 prepared for the Environmental Protection Agency. Johnstown Castle, Co. Wexford.
- Schouten, M.G.C. 2002. Conservation and Restoration of Raised Bogs: Geological, Hydrological and Ecological Studies. Dúchas - The Heritage Service of the Department of the Environment and Local Government, Ireland; Staatsbosbeheer, the Netherlands; Geological Survey of Ireland; Dublin.
- Scottish Natural Heritage. (2017) '*Survey Methods for use in assessing the impacts of onshore windfarms on bird communities*' Version 2. SNH, Battleby, Scotland.
- Scottish Natural Heritage. (2017) '*Assessing Connectivity with Special Protection Areas (SPA's)*'. SNH, Battleby, Scotland. Available online at: <https://www.nature.scot/sites/default/files/2018-08/Assessing%20connectivity%20with%20special%20protection%20areas.pdf>
- Scottish National Heritage (2016) *Dealing with Construction and birds. Guidance Version 3*. SNH, Battleby, Scotland.
- Scottish National Heritage (2009) *Monitoring the impact of onshore wind farms on birds - January 2009. Guidance Note*. SNH, Battleby, Scotland.

-
- Thom, T., Hanlon, A., Lindsay, R., Richards, J., Stoneman R. & Brooks, S. (2019). Conserving Bogs – Management Handbook. <https://www.iucn-uk-peatlandprogramme.org/sites/default/files/header-images/Conserving%20Bogs%20the%20management%20handbook.pdf>
- Wernham, C.V., Toms, M.P., Marchant, J.H., Clark, J.A. Sitiwardens, G.M.&Baillie, S.R. (eds). 2002. *The Migration Atlas; movements of the birds of Britain and Ireland*. T. & A.D.Poyser, London.
- Wetlands International. (2018). *Waterbird Population Estimates*. wpe.wetlands.org.
- Wheeler, B. D., & Shaw, S. C. (1995). Restoration of Damaged Peatlands – with Particular Reference to Lowland Raised Bogs Affected by Peat Extraction. London: HMSO.
- Wittram, B. W., Roberts, G., Buckler, M., King, L., & Walker, J. S. (2015). A Practitioners Guide to Sphagnum Reintroduction. Edale: Moors for the Future Partnership.

Appendix A FONSE

Finding of No Significant Effects Report (FONSE)

In accordance with the EC (2001) guidance document, *Assessment of plans and projects significantly affecting Natura 2000 sites – Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC*, A Finding of No Significant Effects Report has been completed for the proposed Decommissioning and Rehabilitation Plan for Belmont Bog. The standard matrix for this report provided in Annex 2 of the guidance document was followed. Line items in italics are taken directly from the guidance document.

Finding of No Significance Effects Report		
<i>Name and location of the Natura 2000 sites</i>	The Screening Evaluation provided herein has examined the potential for any effects arising via source pathway linkages with regard to connectivity to designated European Sites (SACs and SPAs) within the zone of influence of all predicted Project impacts. An extended buffer zone of 15km was further considered, in line with NPWS guidance (DoEHLG, 2009), for evaluation of effects on any European Site which may arise associated with the proposed decommissioning and rehabilitation of Belmont Bog, as required. There are a total of 15 European sites located within the 15km zone of consideration:	
	No.	European Site
		Site code
	1	River Shannon Callows SAC
	2	All Saints Bog And Esker SAC
	3	Pilgrim's Road Esker SAC
	4	Crosswood Bog SAC
	5	Redwood Bog SAC
	6	Ridge Road, SW of Rapemills SAC
	7	Ferbane Bog SAC
	8	Fin Lough (Offaly) SAC
	9	Moyclare Bog SAC
	10	Mongan Bog SAC
	11	Mongan Bog SPA
	12	River Little Brosna Callows SPA
	13	Middle Shannon Callows SPA
	14	River Suck Callows SPA
	15	All Saints Bog SPA
<i>Description of the project or plan</i>	<p>Overview: Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Blackwater bog group (Ref. P0502-01). As part of Conditions 10.1 and 10.2 of this license, respectively, decommissioning and rehabilitation must be undertaken to ensure the permanent rehabilitation of the bog lands within the licensed area. Belmont bog is part of the Blackwater bog group. Belmont Bog is located in Co. Offaly</p> <p>A document titled 'Belmont Bog Cutaway Bog Decommissioning and Rehabilitation Plan 2021' has been prepared specifically to describe the proposed decommissioning and rehabilitation measures at Belmont Bog as appended to this document as Appendix B.</p> <p>Purpose: The decommissioning and Rehabilitation of Belmont Bog as required under IPC license.</p>	

Finding of No Significance Effects Report		
Is the Project or Plan directly connected with or necessary to the management of the site (provide details)?	No	
Are there other projects or plans that together with the project of plan being assessed could affect the site (provide details)?	Yes: In addition to the proposed decommissioning and rehabilitation plan the following projects were considered:	
	No.	European Site
		Site code
	1	River Shannon Callows SAC
	2	All Saints Bog And Esker SAC
	3	Pilgrim's Road Esker SAC
	4	Crosswood Bog SAC
	5	Redwood Bog SAC
	6	Ridge Road, SW of Rapemills SAC
	7	Ferbane Bog SAC
	8	Fin Lough (Offaly) SAC
	9	Moyclare Bog SAC
	10	Mongan Bog SAC
	11	Mongan Bog SPA
	12	River Little Brosna Callows SPA
	13	Middle Shannon Callows SPA
	14	River Suck Callows SPA
15	All Saints Bog SPA	
	1 Other BnM Bog Group Decommissioning and Rehabilitation Plans	
	2 Turbary	
	3 Agriculture	
	4 Local Authority Development Plans	
The Assessment of Significant Effects		
Describe how the project or plan (alone or in combination) is likely to affect the Natura 2000 site	There is no <i>potential</i> for the Decommissioning and Rehabilitation plan to cause any effects to the 15 no. European Sites noted above:	
	Therefore, these EU sites have been 'Screened Out' at Stage One of the Appropriate Assessment process.	
Explain why these effects are not considered significant	Stage 1 Conceptual Models have been presented in respect of each European Site within the extended 15km study area. Within same, potential sources of effects have been examined. In respect of the European Sites listed above, the Potential for Significant Effects can be excluded, due to an absence of impact pathways and separation distance. We refer to Section 2.8 and 2.9 of the Appropriate Assessment Report for detailed examination.	
Name of Agency or Body Consulted	Summary of Response	
NPWS	We refer Section 2.6.1 of the Appropriate Assessment Report for details.	

Finding of No Significance Effects Report			
Data Collected to Carry out the Assessment			
<i>Who carried out the assessment</i>	<i>Sources of Data</i>	<i>Level of assessment completed</i>	<i>Where can the full results of the assessment be accessed and viewed</i>
Jennings O'Donovan Consulting Engineers.	A combination of consultation, desktop studies and field surveys.	Following screening it can reasonably be concluded that there is no possibility of Significant Effects on these 15 European sites as a result of the proposed decommissioning and rehabilitation, as described in Appendix B.	Bord na Mona, Leabeg, Blueball, Tullamore, Co. Offaly, R35 P304.

Appendix B Belmont Bog: Cutaway Bog Decommissioning and Rehabilitation Plan 2020



Belmont Bog

Cutaway Bog Decommissioning and Rehabilitation Plan 2021

This document seeks to address the requirements of Condition 10.2 of IPC License Ref. P0502-01:

“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 Belmont Bog upon cessation of peat production and compliments the licence requirement to decommission the site.

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

Industrial peat production has now fully ceased at Belmont Bog. Bord na Móna have now announced the complete cessation of industrial peat production (Jan 2021).

In addition, to preparing this document to comply with Condition 10 of IPC Licence Ref. P0502-01, 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 Belmont 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 Belmont Bog as environmental stabilisation, re-wetting and setting the bog on a trajectory towards development of naturally functioning peatland and wetland habitats.

Any consideration of any other future after-uses for Belmont 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:	Belmont Bog Decommissioning and Rehabilitation Plan 2020					
Document File Path:	G:\Ecology Team\EPA draft rehab plans 2017 word docs\Blackwater ref.502\Blackwater sub-group 2017\Belmont					
Document Status:	Draft					
This document comprises:	DCS	TOC	Text (Body)	References	Maps	No. of Appendices
	1	3	31	3	(7)	10
Rev.	1.0	Author(s):		Checked By:		Approved By:
Name(s):		CC		MMC		MMC
Date:		02/12/2020		11/12/2020		11/12/2020
Rev.	1.1	Author(s):		Checked By:		Approved By:
Name(s):		SD		MMC		MMC
Date:		28/04/2021		30/04/2021		21/05/2021

Table of Contents

Summary.....	7
1. Introduction.....	11
1.1 Constraints and Limitations.....	12
2. Methodology	14
2.1 Desk Study	14
2.2 Consultation	16
2.3 Field Surveys	16
3. Site Description.....	17
3.1 Status and Situation.....	17
3.1.1 Site history.....	17
3.1.2 <i>Current land-use</i>	17
3.1.2 Socio-Economic conditions.....	19
3.2 Geology and Peat Depths	19
3.2.2 Peat type and depths.....	20
3.3 Key Biodiversity Features of Interest.....	20
3.3.1 Current habitats.....	20
3.3.2 Species of conservation interest	22
3.3.3 Invasive species	24
3.4 Statutory Nature Conservation Designations.....	24
3.4.1 Other Nature Conservation Designations	25
3.5 Hydrology and Hydrogeology	25
3.6 Emissions to surface-water and water-courses.....	26
3.7 Fugitive Emissions to air	29
3.8 Carbon emissions.....	29
3.9 Current ecological rating	30
3.10 Belmont Bog Characterisation Summary	30
4. Consultation	32
Consultation to date.....	32
4.2 Issues raised by Consultees	32
4.2.1 Assessments of rehabilitation	32
4.2.2 Sphagnum inoculation.....	32

4.2.3	Restoration scope	33
4.2.4	Monitoring	33
4.2.5	Flooding	33
4.2.6	Other issues	33
4.3	Bord na Móna response to issues raised during consultation	33
4.3.1	Assessments of rehabilitation	33
4.3.2	Sphagnum inoculation	34
4.3.3	Restoration scope	34
4.3.4	Monitoring	34
4.3.5	Flooding	34
4.3.6	Other issues	35
4.3.7	Concluding statement.	35
5.	Rehabilitation Goals and Outcomes	36
6.	Scope of Rehabilitation	38
6.1	Key constraints	38
6.2	Key Assumptions	39
6.3	Key Exclusions	39
7.	Criteria for successful rehabilitation	40
7.1.	Criteria for successful rehabilitation to meet EPA IPC licence conditions:	40
7.2.	Critical success factors needed to achieve successful rehabilitation as outlined in the plan	45
8.	Rehabilitation Actions and Time Frame	47
8.1	Short-term planning actions (0-1 years)	48
8.2	Short-term practical actions (0-2 years)	49
8.3	Long-term (>3 years)	50
8.5	Budget and costing	50
9.	Aftercare and Maintenance	56
9.1	Programme for monitoring, aftercare and maintenance	56
9.2	Rehabilitation plan validation and licence surrender – report as required under condition 10.4	57
10.	References	58
	Appendix I: A standard peatland rehabilitation Plan to meet conditions of the IPC Licence	62
	APPENDIX II: Bog Group Context	66
	APPENDIX III: Ecological Survey Report	73
	APPENDIX IV. Environmental Control Measures to be applied to bog rehabilitation	77
	APPENDIX V. Biosecurity	78

Appendix VI. Policy and Regulatory Framework	79
APPENDIX VII. Decommissioning	86
APPENDIX VIII. Glossary	89
APPENDIX IX. Extractive Waste Management Plan	91
APPENDIX X. Mitigation Measures for the Application of Fertiliser	95
APPENDIX XI. Consultation Summaries	96
APPENDIX XII. Archaeology	103

SUMMARY

Name of bog: Belmont **Area:** 317.8 ha

Site description:

- Belmont Bog was originally drained and developed for industrial peat production in the 1960's. Industrial peat production ceased in 2019.
- Belmont Bog originally developed in two connecting basins, with the northern basin being much larger. These basins, or bog units are separated by a ridge of high ground that has been developed as a conifer plantation by Coillte. The southern bog unit is also referred to as Kilcommin.
- Fen peat is exposed across the majority of Belmont. Shell marl underlies the peat in the silt pond and under the lowest part of the basin. Gravel is exposed around the margins of the bog in places and in mounds through the centre. The deepest peat is found in the east of the site.
- Belmont is an older production bog and about a third (33%) of the site is **developing pioneer cutaway** habitats. Pioneer habitats here have characteristic rich fen indicators.
- Some remnant raised bog around the margins are still utilised for private sod peat cutting.
- Belmont is located adjacent to the River Blackwater [ShannonBridge]¹ and in close proximity to several designated conservation sites.

Rehabilitation goals and outcomes

Bord na Moña 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 deep peat re-wetting**.
- Optimising hydrological conditions for the development of embryonic *Sphagnum*-rich vegetation communities in suitable deep residual peat areas.
- Optimising hydrological conditions for the development of wetland, Reed Swamp and fen habitats on shallow cutaway peats.
- 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 Belmont Bog.
- Optimising hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future.

Scope of rehabilitation

The principal scope of this rehabilitation plan is defined by:

- The area of Belmont Bog.
- EPA IPC Licence - Ref. P0502-01. 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 Belmont Bog, in particular, optimising **climate action benefits**.
- The local environmental conditions of this bog. Belmont Bog has variable environmental characteristics with a range of residual peat depths, hydrology and topography. Part of the site has remnants of deep peats and is suited to deep peat re-wetting.
- The key goals and outcomes of rehabilitation at this bog outlined above.
- To minimise potential impacts on neighbouring land, some boundary drains around Belmont Bog will be left unblocked, as blocking boundary drains could affect adjacent land.
- Other constraints including Coillte conifer forestry, turbary, archaeology and rights of way.
- Future land-use at Belmont has not been defined by Bord na Móna. Biodiversity and ecosystem services have been identified as the current primary land use.

Criteria for successful rehabilitation:

The Criteria for successful rehabilitation to meet Condition 10 of the IPC Licence have been defined as:

- Rewetting of residual deep peat in the former area of industrial peat production to slow water movement across the site to retain silt, encouraging development of vegetation cover via natural colonisation, and reducing the area of bare exposed peat (IPC Licence validation). The target will be the delivery of measures and this will be measured by an aerial survey after rehabilitation is completed. (IPC Licence validation).
- Stabilising/improving key emissions to water (e.g. potential silt-run-off). This will be measured via water quality monitoring (suspended solids and ammonia) for at least 2 years after the rehabilitation has been completed (IPC Licence validation).
- Reducing pressure from peat production on the local 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 appraisal of the potential impacts of the planned rehabilitation.
- Carry out proposed measures, which will be a combination of drain blocking, peat field re-profiling, wetland creation and fertiliser applications targeting bare peat on headlands, high fields and other areas.
- Phase 2 measures may include seeding of targeted vegetation and inoculation of *Sphagnum*.
- Silt ponds will continue to be maintained during the rehabilitation and decommissioning phase.
- Evaluate success of short-term rehabilitation measures outlined above and remediate, where necessary.

- Decommissioning of silt-ponds will be assessed and carried out, where required.

Timeframe:

- 2020-2021: Short-term planning actions.
- 2021: Short-term practical actions.
- 2021-2024: Any Long term practical actions; Evaluate success of short-term rehabilitation measures outlined above and remediate, where necessary.
- 2024: Decommission silt-ponds, if necessary.

Budget and Costing

- The rehabilitation plan outlined in this document is predicated on the understanding that it is the Minister's intention to support, via the Climate Action Fund, Bord na Móna in developing a package of measures, 'the proposed Scheme', for enhanced decommissioning, rehabilitation and restoration of cutaway peatlands referred to as, the Peatlands Climate Action Scheme'. *However, only the additional costs associated with the additional and enhanced rehabilitation, i.e, measures which go beyond the existing standard mandatory decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support.*
- In relation to the pre-existing Condition 10 IPC Licence requirement to carry out what can be termed the 'standard' decommissioning and rehabilitation, Bord na Móna maintains a Provision on its balance sheet to pay for these future costs when industrial peat extraction ceases. This is updated every year. For more information see the Bord na Móna Annual Report (Bord na Móna 2020). Bord na Móna is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.
- 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 Belmont 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 an aerial remote sensing survey, after rehabilitation measures are implemented. It is proposed that sites can be monitored against this baseline in the future.
- Biodiversity Ecosystem services will be monitored using specific indicators.
- 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 indicators are stabilising/improving.
- The site has been environmentally stabilised.

1. INTRODUCTION

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Blackwater bog group (Ref. P0502-01). 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. Belmont bog is part of the Blackwater bog group (see Appendix I for details of the bog areas within the Blackwater Bog Group). Belmont Bog is located in Co. Offaly.

This document seeks to address the requirements of Condition 10.2 of IPC License Ref. P0502-01:

“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.

Belmont 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 **Belmont Bog**.

Belmont Bog is also referred to as 'Belmount' and the use of this designation, such as in mapping, should be seen as interchangeable with 'Belmont'.

Future land-use at Belmont Bog has not been defined by Bord na Móna. Biodiversity and ecosystem services have been identified as the current primary land use at Belmont Bog. Bord na Móna will continue to review the future after-use of its land-bank. Any consideration of any other future after-uses for Belmont 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 Belmont Bog permanently ceased in 2019. The area until recently in peat production area is bare peat, however substantive areas of Belmont are recolonising or have been for a number of years, with resultant pioneering vegetation now in situ. It is anticipated that the combination of active enhanced rehabilitation measures and natural colonisation will quickly support the further development of pioneer vegetation. Nevertheless, it will take some time (30-50 years) for naturally functioning peatland ecosystems to fully re-establish across the entirety of Belmont.

Parts of Belmont 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 Belmont Bog that are outside of the control of Bord na Móna. Nevertheless, Bord na Móna are aware of such issues which may constrain the proposed rehabilitation actions, and this rehabilitation plan considered potential impacts of these on the delivery of the stated objectives.

Rehabilitation in other areas of the bog may also be constrained due to other property issues or issues such as rights of way. There are no known archaeology records at Belmont.

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 Belmont 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:

- Blackwater Integrated Pollution Control Licence;
- Blackwater 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, Belmont Bog was surveyed in August 2010. A further confirmatory site visit to examine Belmont Bog took place by BNM Ecologists in May of 2020 and habitat maps have been updated, where required, accordingly. This rehabilitation plan is informed by the original baseline survey as well as subsequent confirmatory site walk-over surveys and visits, and updates to baseline data.

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

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

3. SITE DESCRIPTION

Belmont Bog is located in Co. Offaly, 1km north-west of Belmont Village (see Figure 3.1). It is part of the Blackwater Bog group and is located on the east side of the Blackwater River, adjacent to Blackwater Bog, with a railway bridge and travel bridge connecting the two sites. There is also access to the bog via a farmyard in Clonbonniff. The site is flanked to the north and south by two no. tributaries of the River Blackwater namely the Moyclare and the Lisdaly 25 .

Belmont Bog has developed in two connecting basins, with the northern basin being much larger. These basins, or bog units are separated by a ridge of high ground that has been developed as a conifer plantation by Coillte. Both bog units are situated quite close to the Blackwater River, adjacent to the western margin, although there is a narrow band of marginal habitats between the river and the bog. There are two connecting travel paths within the conifer plantation.

The surrounding landscape is a mosaic primarily consist 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. Belmont Bog lies to the east of the River Shannon.

Belmont is an older production bog and about a third (33%) of the site is developing pioneer cutaway habitats. The western half of the northern section has signifiant groundwater spring influence, which has had a significant effect on the developing pioneer vegetation. There are frequent rich fen vegetation indicators. The southern bog unit contains the most recently active milled peat production areas. Some remnant raised bog around the margins are still utilised for private sod peat cutting.

The site is located adjacent to the River Blackwater [ShannonBridge] and in close proximity to several designated conservation sites including Moyclare Bog SAC (Site Code 000581), the Middle Shannon Callows SPA (Site Code 004096) and the River Shannon Callows SAC (Site Code: 000216). The River Suck Callows SPA (Site Code 004097) is ca.7km west.

3.1 Status and Situation

3.1.1 Site history

Belmont Bog has been in peat production since the 1960's. The peat was harvested for fuel peat to be used in Longford and West Offaly Power in Shannonbridge, Offaly.

3.1.2 Current land-use

Industrial peat extraction has ceased at Belmont Bog. Future land-use at Belmont has not been defined by Bord na Móna. At present, biodiversity and ecosystem services have been identified as the current primary land use at Belmont Bog.

Part of the site is planted with conifer forestry and is managed by Coillte.

There is a small mixed woodland towards the centre of the northern section on a mineral 'island' that predates the conifer plantation and was likely planted before 1980.

Private turf-cutters are using some marginal turf-banks.

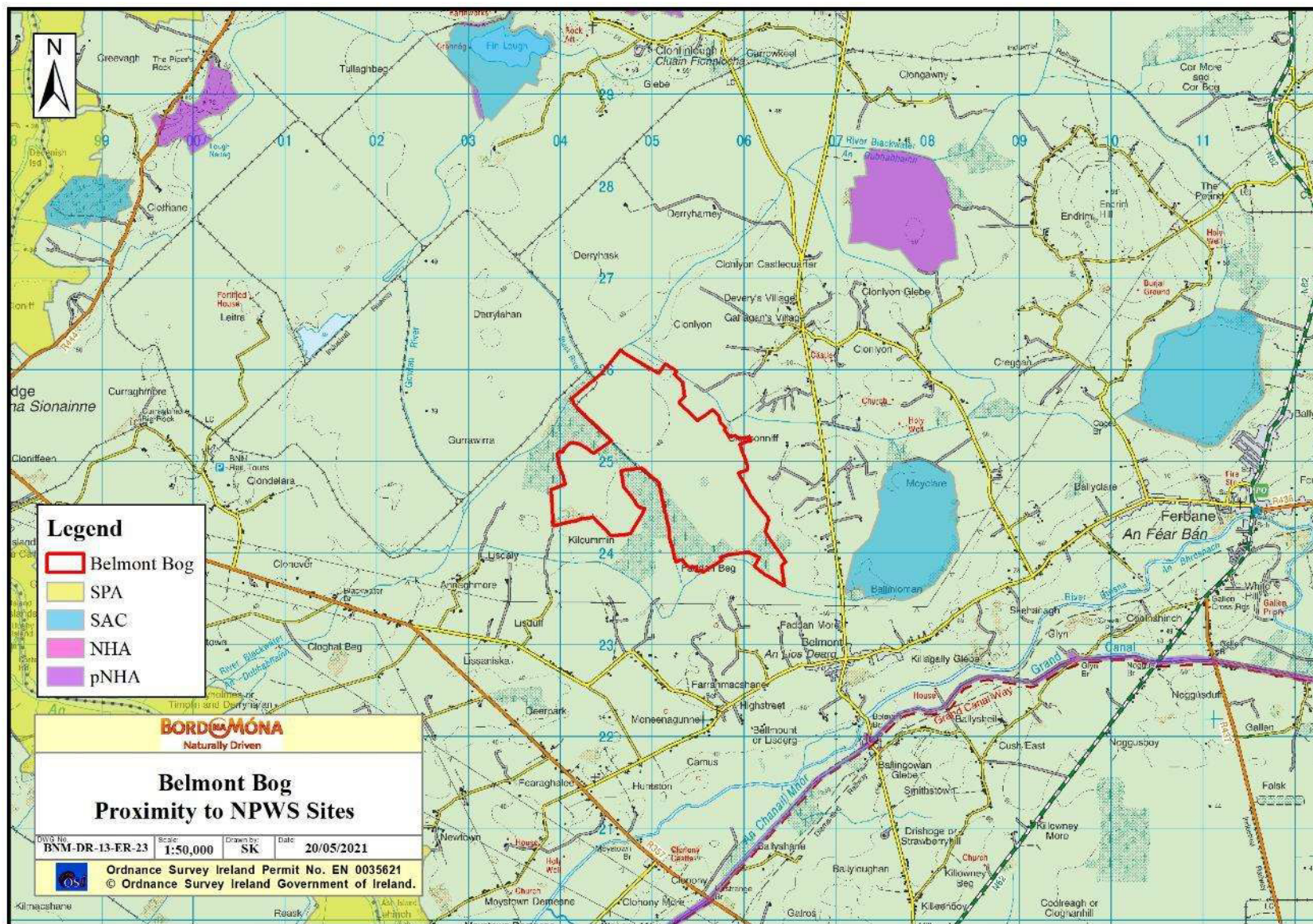


Figure 3.1 Location of Belmont Bog and lands designated for conservation in the context of the surrounding area

3.1.2 *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 Belmont 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 Belmont Bog is a combination of Limestone, which underlies most of the northern bog unit, and 'Dark-grey argillaceous & cherty limestone & shale' which underlies the southern bog unit and a smaller section of the northern bog unit².

The underlying soils and sub-soils are classed as 'Raised Bog Cutover Peat', with some surrounding 'Limestone till', although this is located outside the Belmont Bog boundary. Shell marl underlies the peat in places, and particularly towards the western basins. Along with ground-water, this exerts a significant influence on the development of habitats across this site. Glacial gravel is exposed around the margins of the bog in places and in mounds through the centre.

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

3.2.2 Peat type and depths

Peat depths of over 4 m only occur within the south-eastern portion of both the northern and southern bog units. The peat present is mostly “red” or “*Sphagnum* peat” and was formerly used as fuel peat supplying West Offaly Power. The peat type in the north-western section is fen peat.

3.3 Key Biodiversity Features of Interest

Belmont Bog has developed in two connecting basins, with the northern basin being much larger. These basins, or bog units are separated by a ridge of high ground that has been developed as a conifer plantation by Coillte. Both bog units are situated quite close to the Blackwater River, adjacent to the western margin, although there is a narrow band of marginal habitats between the river and the bog. There are two connecting (unsurfaced) travel paths within the conifer plantation.

The northern bog unit is the largest section of high bog. It is orientated Northwest-Southeast with the Blackwater river flowing along the northwest margin. There is a fall in the bog from the southeast to northwest and all of the bog drains towards the Blackwater River accordingly. The north-western half of the bog can be described as a typical basin bog with high ground around the margins and lower ground towards the centre. The majority of the pioneer cutaway vegetation has developed in this half of the bog, while the southern Bog Unit was until recently, largely under active milled peat production.

One feature of Belmont is the appearance of two relatively large gravel mounds through the centre of the site, as well as several smaller lower mounds. One of these mounds (Derries Hill) was planted with Oak (*Quercus* sp.) and Sitka Spruce (*Picea sitchensis*) in the 1960's-1970's. Gravel is also exposed around the site in several places, particularly along the north-west margin. Belmont Bog is located adjacent to the River Blackwater and includes part of the riparian zone. The River Blackwater and its associated riparian habitats is an important wildlife corridor and is a key link for connectivity of habitats and species. There is a natural transition of habitats from the river to the edge of the former production bog in places.

Belmont is also characterised by having one of the largest areas of pioneer cutaway vegetation dominated by Black Bog-rush. This is an unusual and scarce pioneer cutaway vegetation type and is generally thought to be an indicator of alkaline ground-water influence and potential rich fen development in the future. Other rich fen species indicators are present.

3.3.1 Current habitats

The most common habitats found around the margins of Belmont Bog include Conifer plantation (WD4), Marginal raised bog (PB1), Cutover bog (PB4), Scrub (WS1), Birch woodland (WN7), Dry meadows and grassy verges (GS2) (marginal grassy areas), Wet grassland (GS4) (privately managed farmland) and Improved agricultural grassland (GA1) (privately managed farmland).

Various access routes (tracks or railways with associated habitat) are present, and the south-eastern corner of the southern bog unit contains a small (<5ha) extent of raised bog.

In May 2020, a site visit by BNM ecologists confirmed the presence of fen-forming habitats in the NW section of Belmont, with indicator species such as Black Bog Rush *Schoenus nigricans*, Common Butterwort *Pinguicula vulgaris* and Lustrous Bog-moss *Sphagnum subnitens* present.

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



Figure 3.3 View of Pioneering habitat at Belmont Bog (2020)



Figure 3.4 View of Pioneering Habitat and existing Silt Pond (foreground) at Belmont Bog (2020)



Figure 3.5 View of Pioneering Fen forming Habitat Belmont Bog (2020)

3.3.2 Species of conservation interest

Belmont Bog attracts breeding waders including Northern Lapwing *Vanellus vanellus* (Red-listed on the Birds of Conservation Concern in Ireland list³ and highlighted as a conservation priority in the Government's Prioritised Action Framework 2014-2020⁴). Common Ringed Plover *Charadrius hiaticula* (Amber listed), and Common Snipe *Gallinago gallinago* (Red listed) have also been recorded. Kingfisher *Alcedo atthis* (Amber listed) may utilise the adjacent rivers and outfalls around the Bog. Both Lapwing (3 no.) and Snipe (3 no. including a 'chipping' bird) were present at Belmont in May of 2020. Part of the bog becomes wet during the winter and attracts Whooper Swan *Cygnus cygnus* (Amber listed in Ireland and also on Annex I of the EU Birds Directive) along with other species of waterfowl such as Greylag Geese *Anser anser* and Golden Plover *Pluvialis apricaria* (red listed in Ireland as a breeding and wintering species).

A review of available Biodiversity records from the National Biodiversity Data Centre (hereafter NBDC) on the tetrad (N02M) wherein Belmont Bog is located found no further bird records. The 10km square wherein Belmont Bog is located (N02), however has records for 98 species of Bird which includes Red-listed species such as Barn Owl *Tyto alba*, Black-headed Gull *Larus ribundus*, Corn Crane *Crex crex*, Eurasian Curlew *Numenius arquata*, European Nightjar *Caprimulgus europaeus*, Red Grouse *Lagopus lagopus* and Yellowhammer *Emberiza citrinella*. Amber-listed species included Whooper Swan *Cygnus Cygnus*, Hen Harrier *Circus cyaneus*, Common Kestrel *Falco tinnunculus*, Kingfisher and Merlin *Falco columbarius*.

Merlin has previously been recorded at Belmont, during studies of Blackwater Bog over the winter period 2014/15. A flock of 3 Whooper Swan were also recorded flying through Belmont in January of 2015 and a roosting/foraging area was identified in the northern part of Belmont. The same study identified wintering Lapwing and Golden Plover activity in close proximity to Belmont whilst Mallard and Teal (peak count 600), and to a lesser extent Wigeon, were regular on the lakes and ponds within the Blackwater Bog site. Numbers of

³ Gilbert, G., Stanbury, A. and Lewis, L., 2021. Birds of Conservation Concern in Ireland 4: 2020–2026. Irish Birds, 43, pp.1-22

⁴ <https://www.npws.ie/sites/default/files/general/PAF-IE-2014.pdf>

Whooper Swans approached up to 100 using the wetland close to the Balcwater River during 2010. Other raptor species noted at Blackwater included Peregrine Falcon and Kestrel.

A historical Hen Harrier roost is known to exist at Fin Lough, ca.3km to the north west of Belmont. Up to 5 harriers have been recorded utilising this roost during the winter months⁵, and the species was recorded 'regularly' at the nearby Blackwater bog, mostly within the northern and central sectors. Flight activity to and from the roost was from multiple directions but did include movements potentially towards or from the Belmont vicinity.

Along with Birds, eighteen species of Butterfly including Marsh Fritillary *Euphydryas aurinia*, have been recorded in the 10km square N02. At Belmont itself, prior to 2020, two species of Butterfly, Peacock *Inachis io*, and Small Tortoiseshell *Aglais urticae* have been recorded within the site boundary. However, in May of 2020 a small (defined as <100 adults) colony of Marsh Fritillary was discovered on site by BNM ecologists. Circa 30 adults were recorded on the wing on May 26th. In addition, other butterfly species recorded onsite included Small Copper *Lycaena phlaeas*, Small Heath *Coenonympha pamphilus*, Orange Tip *Anthocharis cardamines*, Common Blue *Polyommatus Icarus*, and Dingy Skipper *Erynnis tages*.

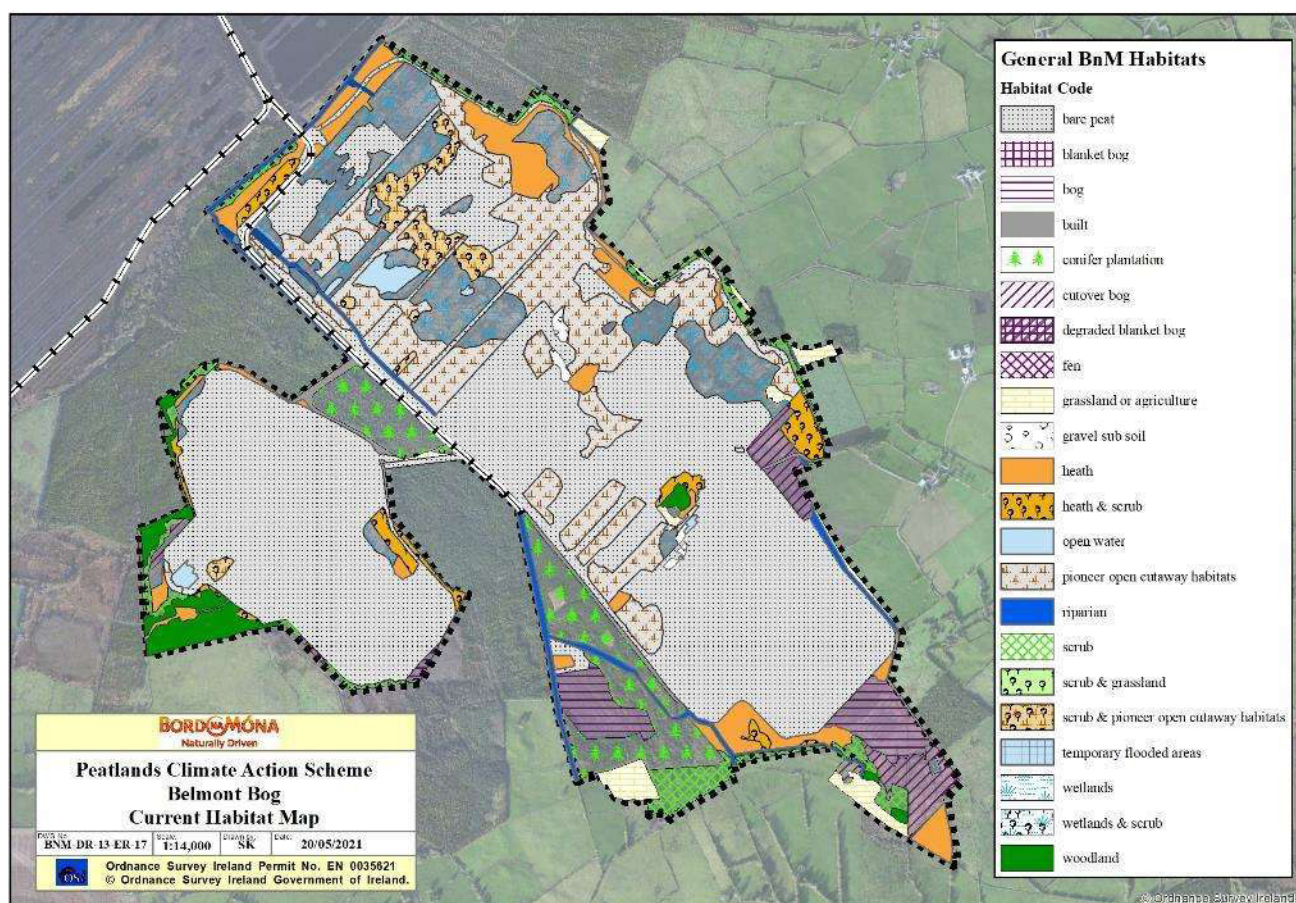


Figure 3.6 Habitat map of Belmont Bog showing Bord na Móna habitat categorisation

⁵ BES (2015). BORD NA MONA WINTER BIRD SURVEY, 2014-2015 BLACKWATER BOG GROUP DRAFT REPORT OCTOBER 2015.

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. Zebra Mussel *Dreissena polymorpha*, has been recorded in the 10km square N02, as have 6 no. species of vascular plants classified as Invasive Species, 4 no. species of terrestrial mammal classified as Invasive species and 2 no. species of bird classified as Invasive species. A broad range of common garden escapes are occasionally present around the margins of Bord na Móna bogs, and although spatial overlap with the PCAS is expected to be limited, these are, where necessary, to be treated in line with Best Practice during PCAS activities.

3.4 Statutory Nature Conservation Designations

National conservation designations

Moyclare Bog is a small raised bog situated 4 km west of Ferbane in Co. Offaly. Its mean height above sea level is 54 m. On the western edge of the bog, a low peat face with no perimeter drain lies adjacent to wet peaty pasture, which has a spring-line at its junction with mineral soil. The water from this spring disappears under the peat dome of the bog. The site occurs in close proximity to a number of important raised bogs close to the floodplain of the River Shannon. Whilst relatively small, Moyclare bog is a site of high conservation value as it is relatively intact and contains examples of the Annex I habitats active raised bog, degraded raised bog and depressions on peat substrates (Rhynchosporion). The uncut peat dome has an unusually high proportion of active raised bog.

The River Shannon Callows is a long and diverse site which consists of seasonally flooded, semi-natural, lowland wet grassland, along and beside the river between the towns of Athlone and Portumna. It is approximately 50 km long and averages about 0.75 km wide (reaching 1.5 km wide in places). Along much of its length the site is bordered by raised bogs (many, but not all, of which are subject to large-scale harvesting), esker ridges and limestone-bedrock hills. The soils grade from silty-alluvial to peat. This site has a common boundary, and is closely associated, with two other sites with similar habitats, River Suck Callows and Little Brosna Callows. The Shannon Callows has by far the largest area of lowland semi-natural grassland and associated aquatic habitats in Ireland, and one in which there is least disturbance of natural wetland processes. Botanically, it is extremely diverse with two legally protected species of plants and many scarce species. Excellent examples of two habitats listed on Annex I of the E.U. Habitats Directive occur within the site – *Molinia* meadows and lowland hay meadows with good examples of a further two Annex habitats (both with priority status). In winter the site is internationally important for numbers and species of waterfowl. In spring it feeds large numbers of birds on migration, and in summer it holds very large numbers of breeding waders, rare breeding birds and the endangered Corncrake, as well as a very wide variety of more common grassland and wetland birds. The presence of Otter, an Annex II species, adds further importance to the site.

The Middle Shannon Callows SPA is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Whooper Swan, Wigeon, Corncrake, Golden Plover, Lapwing, Black-tailed Godwit and Black-Headed Gull. It is also of special conservation interest for holding an assemblage of over 20,000 wintering waterbirds. It holds internationally important populations of two species - Whooper Swan and Black-tailed Godwit. In addition, there are four species that have wintering populations of national importance. Of particular note is that several of the species which occur regularly are listed on Annex I of the E.U. Birds Directive, i.e. Whooper Swan, Corncrake and Golden Plover.

The River Suck Callows SPA is a linear, sinuous site comprising a section of the River Suck from Castlecoote, Co. Roscommon to its confluence with the River Shannon close to Shannonbridge, a distance of approximately 70 km

along the course of the river. The river forms part of the boundary between Counties Galway and Roscommon. The site includes the River Suck itself and the adjacent areas of seasonally-flooded semi-natural lowland wet callow grassland. The River Suck is the largest tributary of the River Shannon. The River Suck Callows SPA is of considerable ornithological importance, in particular for the presence of nationally important populations of five species. Of note is that three of the species that occur regularly, i.e. Whooper Swan, Greenland White-fronted Goose and Golden Plover, are listed on Annex I of the E.U. Birds Directive.

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 Belmont Bog (i.e. within 3km) The closest Ramsar Sites to Belmont Bog include Mongan Bog and Clara Bog.

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

3.5 **Hydrology and Hydrogeology**

Belmont Bog is located in the Lower Shannon Catchment (WFD Sub Catchment Shannon[Lower]_SC_030). It is drained by the Blackwater (Shannonbridge) River and its tributaries, the Moyclare River to the north and the Lisdaly_25 to the south. Although the Moyclare river occurs in close proximity to the north, there is no connectivity from BnM field drains at Belmont to this hydrological feature.

Silt ponds are present at the northwest of the bog to manage discharge to the Blackwater (Shannonbridge) – and all drainage flows are towards these. The bog has field drains running in a general northeast to south west orientation. A new outfall was dug in the northern basin in the past 10 years to improve drainage. Anecdotally this northern basin was always difficult to drain as it had significant spring/ground-water influence. Some sections are still quite quaky in spite of the former industrial development of peat extraction. This is having a significant impact on the trajectory of wetland habitats developing on site with Rish fen indicators present.

The bog is located in an area with a Locally Important Aquifer zone- i.e. Bedrock which is Moderately Productive only in Local Zones. 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. GSI's 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 underlying geology at Belmont Bog is a combination of Limestone (Unit Name Waulsortian Limestones-described as Massive unbedded lime-mudstone), which underlies most of the northern bog unit, and 'Dark-grey argillaceous & cherty limestone & shale' which underlies the southern bog unit and a smaller section of the northern bog unit⁶. This formation comprises dark-grey to black, fine-grained, occasionally cherty, micritic limestones that weather paler, usually to pale grey. There are rare dark coarser grained calcarenitic limestones, sometimes graded, and interbedded dark-grey calcar.

The peat is underlain by glacial deposits interbedded with glacio-fluvial deposits over limestone bedrock. The glacial deposits generally consist of grey gravelly clay/silt (present on an adjacent cutaway site). The bog water table across the site is expected to be high when bog drains are 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 Belmont Bog.

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

There are three river waterbodies in this subcatchment. The BLACKWATER (SHANNONBRIDGE)_020 is classified NOT AT RISK due to Good status maintained in the 2013-2015 cycle. The BLACKWATER (SHANNONBRIDGE)_010 is AT RISK due to Moderate status and known pressure. The SHANNON (LOWER)_010, is unassigned and now AT REVIEW due to lack of biology data but potential pressures identified.

Belmont bog has 2 treated surface water outlets, both to the Blackwater (Shannonbridge) 020 IE_SH_25B270200. Peat extraction was not identified as a pressure in the second cycle of the river basin management plan and is indicated as remaining so in the third cycle, currently under preparation.

The main emission limit value associated with this bog is 35mg/l suspended solids, with trigger levels for ammonia of 4.27mg/l and COD 100mg/l.

Initial monthly ammonia concentrations from August to January 2021 have a range of 0.063 to 0.916mg/l with an average of 0.250mg/l.

⁶ <https://www.gsi.ie/en-ie/data-and-maps/Pages/Bedrock.aspx>

From an analysis of any available monitoring over the past 5 yrs. of the IPC licence environmental monitoring programme, indicate that results were under the ELV for SS and the trigger level for Ammonia, and within the trigger level for COD (Table 3.1).

Table 3.1.

Bog	SW	Monitoring	pH	SS mg/l	TS mg/l	Ammonia mg/l	TP mg/l	COD mg/l	Colour
Belmont Bog	SW-84	Q3 20	7.7	7	458	0.033	0.05	51	194
Belmont Bog	SW-84	Q4 20	7.3	>2	219	0.073	0.05	83	269
Belmont Bog	SW-84	Q4 20	7.1	>2	178	0.111	0.05	81	377
Belmont Bog	SW-81	Q4 18	7.9	5	226	0.72	0.05	50	134
Belmont Bog	SW-84	Q4 18	6.6	5	270	3.4	0.05	85	283
Belmont Bog	SW-81	Q3 15	8.1	5	410	0.16	0.05	23	99
Belmont Bog	SW-84	Q3 15	7.7	5	354	0.21	0.05	66	206

There are no known exceedances in the IPC Licence limits for Suspended solids and Ammonia resulting from the surface water monitoring programme at Belmont. As part of the rehabilitation plan and validation, surface water quality will be monitored to establish an expected stabilization or improvement in water quality parameters.

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 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 programme 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 Belmont Bog has been completed. This discharge will have improving water quality and there will be increased wetland attenuation, meaning slower release of water. This is expected to have a positive impact on status of downstream watercourses.

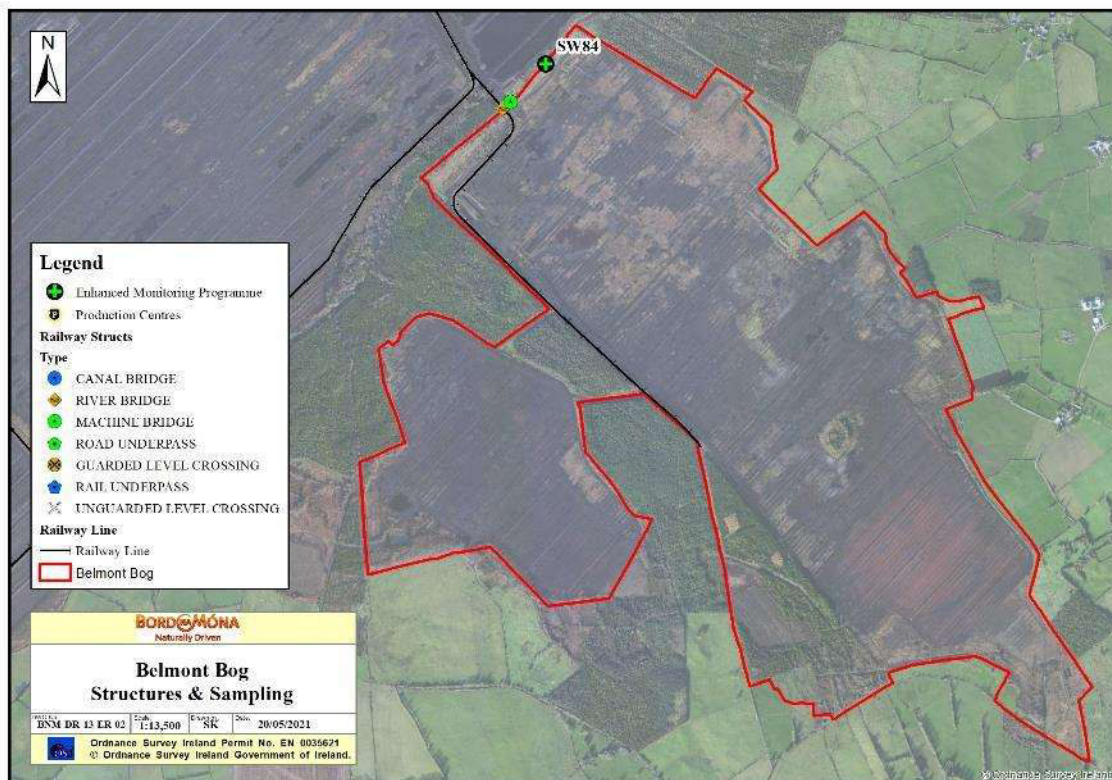
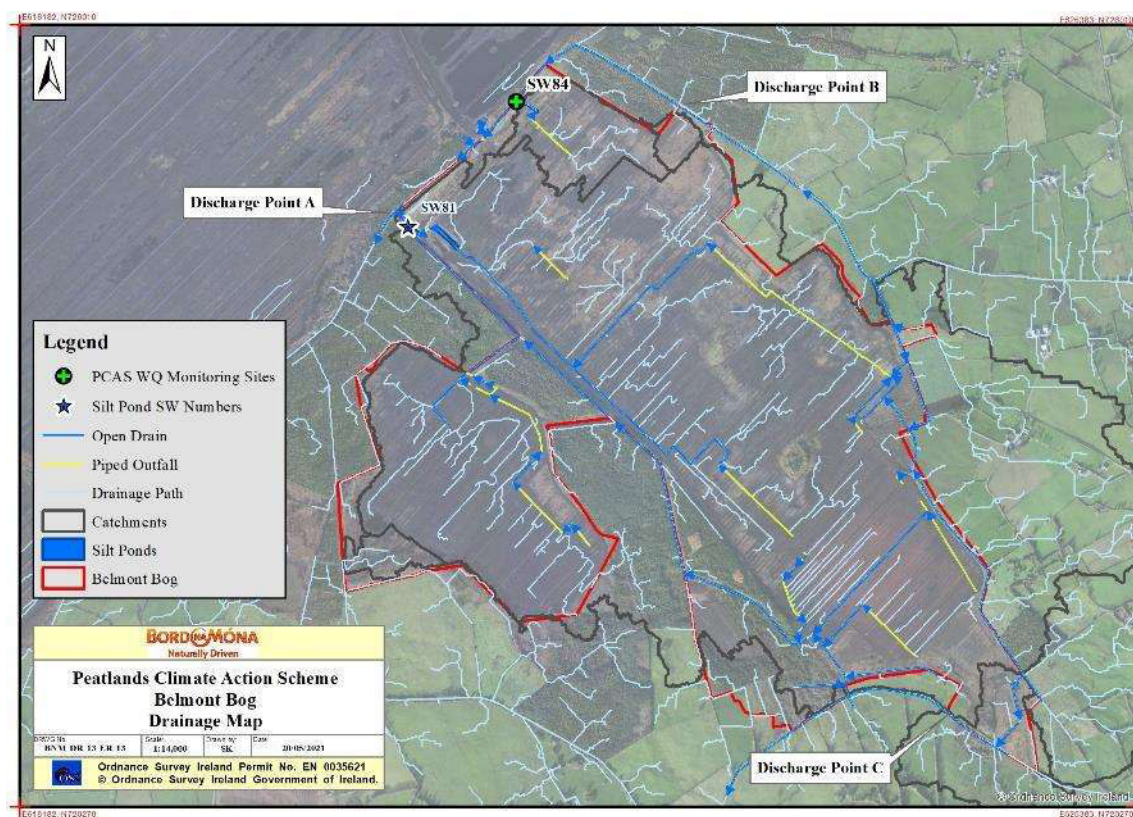


Figure 3.7. Map of Belmont Bog showing structures and designated emission points.



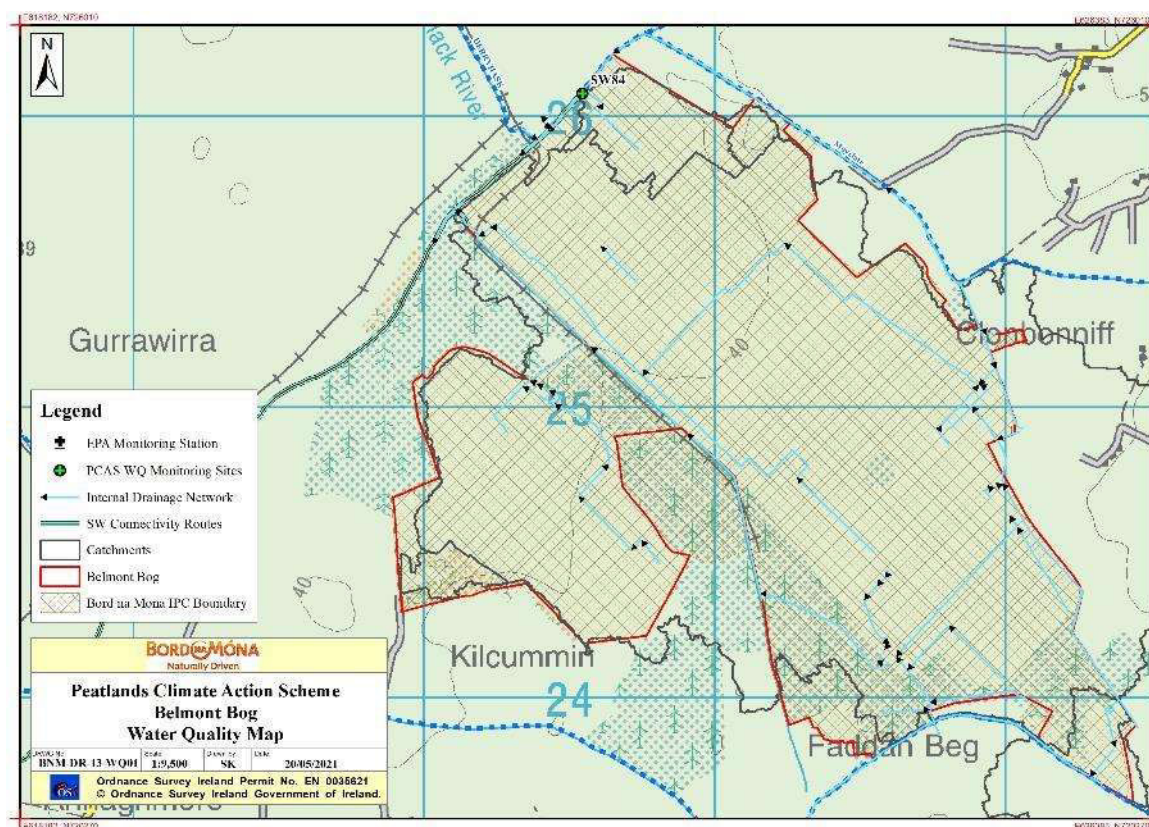


Figure 3.8. Maps of Belmont Bog showing water management features and water quality monitoring points.

3.7 Fugitive Emissions to air

Belmont 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 carbon 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 Belmont Bog will become a reduced Carbon source following rehabilitation. The site does have potential to become a carbon sink in part, in the longer-term. This depends on the success of the rehabilitation measures, the extent of development of *Sphagnum*-rich habitats, the balance of carbon fluxes from different cutaway habitats (some of the cutaway is expected to develop Reed Swamp and fen habitats with alkaline emission factors) and future climatic conditions. This site is expected to develop embryonic *Sphagnum*-rich peat-forming habitats along with scrub, some fen and some wetland habitats such as Reed Swamp. Birch woodland is expected to further develop on the drier mounds and peripheral headlands

3.9 Current ecological rating

Current ecological rating ranges from **(C) County Value** to **(E) Local Importance (lower value)**. Sections of the site which were in recent peat production can be rated as having **(E) low local ecological value** as it is dominated by bare peat.

Some parts of the site, although primarily bare peat, have a rating of **D/E High/Low Local Value Mosaic**. Areas of very disturbed raised bog, wet grassland, scrub and cutover bog/scrub/heath and fen around the margins of Belmont are also assigned this rating. Areas of pioneer heath and gorse scrub are assigned a rating of **(D) High Local Value**, whilst a large section of pioneering communities in the northwest of the bog is appraised as of **(C) County Value**, as they support wintering and breeding water-birds.

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 wetland/peat forming communities. The recently discovered small colony of Marsh Fritillary is also expected to benefit from further re-vegetation.

3.10 Belmont Bog Characterisation Summary

Belmont Bog is in Co. Offaly, 1km north-west of Belmont Village (see Figure 2.1). It is part of the Blackwater Bog group and is located on the east side of the Blackwater River, adjacent to Blackwater Bog, with a railway bridge and travel bridge connecting the two sites.

Belmont Bog has been in peat production since the 1960's. The peat was harvested for fuel peat to be used in Longford and West Offaly Power in Shannonbridge, Offaly. Industrial peat extraction has now completely ceased at Belmont Bog (2018). The majority of the bog is therefore classed as shallow peat cutawaybog, with residual peat depths of generally <1 m.

Belmont Bog is located in the Lower Shannon Catchment (WFD Sub Catchment Shannon [Lower]_SC_030). It is drained by the Blackwater (Shannonbridge) River and its tributaries, the Moyclare River to the north and the Lisdaly_25 to the south.

Belmont Bog is located in proximity to several designated conservation sites including Moyclare Bog SAC (Site Code 000581), the Middle Shannon Callows SPA (Site Code 004096) and the River Shannon Callows SAC (Site Code: 000216). The River Suck Callows SPA (Site Code 004097) is ca.7km west.

The bog can be broadly divided into four categories: (1) Wetland cutaway bog (2) Deep residual peat (3) Dry cutaway and marginal areas of the former production area (4) 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.

- (1) Due to the topography of the site, modelled as two basins, 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 and Reedswamp habitats are expected to develop in these areas.
- (2) A significant part of the former production area is residual deep peat. Ground-water is unlikely to have a significant influence on the development of vegetation. If this peat can be re-wetted, and a stable water level developed close to the peat surface, it is expected to develop an embryonic *Sphagnum*-rich vegetation. The topography of this area is variable. Some of this area is modelled as wet and should be relatively straight-forward to re-wet once drains are blocked. Some of this area is modelled as dry and more intensive deep peat measures with bunding, re-profiling and cell berms are proposed to optimise hydrological conditions for the development of embryonic *Sphagnum*-rich vegetation.
- (3) The dry cutaway and marginal areas of the former production area are located in both sections of the site. Drain-blocking and some fertiliser application is proposed for these areas. A small amount of dry cutaway habitat is expected to develop in the smaller, southern unit. A larger portion of the northern unit will develop in this way post rehabilitation. This part of the former production area has a raised topography and is generally developing scrub or birch woodland habitat. 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.
- (4) Some parts of the former production area are constrained from rehabilitation to prevent unintended consequences from occurring on neighbouring lands. There is a minor amount of former production area that is constrained from rehab due to the presence of archaeology or public rights of way.

4. CONSULTATION

Consultation to date

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

There has been ongoing consultation about rehabilitation and other general issues over the years about Belmont 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).

To inform the current Plan, both national and local stakeholders, including neighbours whose land adjoins Belmont 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 Belmont 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 Belmont 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 *Sphagnum* inoculation

NPWS raised the idea of inoculating some of the rehabilitated deep peat areas with *Sphagnum* if the site did not naturally see *Sphagnum* re-colonisation after 2-3 years. A potential donor site of Fisherstown Bog was indicated during discussions.

4.2.3 *Restoration scope*

Restoration/rehabilitation of marginal habitats was raised by IPCC and BCI as worthy of consideration within the rehabilitation measures to support carbon sequestration and biodiversity objectives.

4.2.4 *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.

4.2.5 *Flooding*

The IFA and ICMSA queried likely impacts arising from the proposed re-wetting associated with the rehabilitation in relation to flooding on adjoining lands and, specifically, with regards to the maintenance of drains. The IFA also raised the issue of Health and Safety in relation to raising water levels as well as possible impacts on land and property prices.

4.2.6 *Other issues*

Other issues (raised by IPCC) included after use of the bog and turf cutting on the margins of the bog (outside of the area owned by Bord na Móna).

Archaeological end of life survey of all the bogs were requested by National Museum of Ireland and National Monuments Unit.

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

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

4.3.1 *Assessments of rehabilitation*

AA screening will be undertaken on all the bogs as part of PCAS and this is currently being undertaken by external consultants for Belmont 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. 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.

4.3.2 *Sphagnum inoculation*

Sphagnum inoculation has been proposed at Belmont Bog as part of PCAS measures

4.3.3 *Restoration scope*

As part of the PCAS, all restoration/rehabilitation options have been developed to support climate action and biodiversity objectives.

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

4.3.5 *Flooding*

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

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

The rehabilitation measures proposed at Belmont Bog will generally result in reduced runoff and drainage from the existing peat fields through a mixture of techniques including drain blocking, cell bunding and re-profiling. It is intended that these measures will not significantly alter the existing topographical catchments and that the spine of the drainage networks, those which the upstream catchments drain through, will be retained by Bord na Móna. Based on evidence from other bogs, rehabilitation measures will reduce the run-off from the bog by returning the peatlands towards its natural water retention function.

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

4.3.6 *Other issues*

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

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

4.3.7 *Concluding statement.*

- 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. A drain will be left open through the site to continue to facilitate water movement through the site from adjacent land. This does not change the overall rehabilitation goals and outcomes and can be integrated with the other rehabilitation measures to allow cutaway re-wetting.

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.

- It will take some time for stable naturally functioning habitats to fully develop at Belmont 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 Mona).

- Re-wetting in general will benefit the future preservation of most known and unknown archaeological features.

6. SCOPE OF REHABILITATION

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

- The area of Belmont Bog (Figure 3.1).
- EPA IPC Licence - Ref. P0502-01. 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. Belmont Bog is part of the Blackwater Bog Group (Blackwater sub-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 Belmont Bog, in particular, optimising **climate action benefits**. The proposed interventions will mean that environmental stabilization is achieved (meaning IPC obligations are met) and, in addition, significant other ecosystem service benefits particularly for climate action will be accrued.
- The local environmental conditions of Belmont Bog identify wetland creation and deep peat re-wetting as the most suitable rehabilitation approach for this site.
- The key objective of rehabilitation, as defined by this licence, is **environmental stabilisation** of the bog. Bord na Moña have defined the key goal and outcome of rehabilitation at Belmont Bog as **environmental stabilisation** and **optimising deep peat re-wetting, and setting the site on a trajectory towards the development of embryonic peat-forming (*Sphagnum*-rich) vegetation communities on deep peat, and the development of Reed Swamp and fen on shallow more alkaline peat and other subsoils**.
- Enhanced Rehabilitation of Belmont 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. The cutover bog mainly consists of active 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 sites where there has not been significant industrial peat extraction and the peat body is largely intact (deep peat sites that are drained). At other sites, most of the peat mass has been removed, the environmental characteristics of these areas have therefore changed radically (peat depths, hydrology, water chemistry, substrate type, nutrient status, etc.) and there will therefore be different habitat outcomes (wetlands, fen, heathland, grassland and Birch woodland). At Belmont Bog, peat depths of over 4 m only occur within the south-eastern portion of both the northern and southern bog units. By contrast, the smaller remaining sections contains shallower residual peat. These two areas will therefore require different approaches to rehabilitation. Furthermore, there are local factors (such as topography and drainage) that will influence the future trajectory of this bog. At Belmont Bog, a larger proportion of the site has existing habitat cover of pioneering vegetation (some of which is already on a trajectory towards fen-forming habitat), and only the most recently utilised portions for peat extraction have an un-vegetated surface over deep peat deposits. These need to be considered as part of the wider rehabilitation work.

- Part of the northern basin at Belmont Bog is under the influence of springs, has traditionally been difficult to drain and is still quite quaky. Enhanced rehabilitation measures, using excavators for example, may not be feasible in these areas due to ground conditions.
- **Surrounding landscape and neighbours.** Another key constraint is the interaction between the Bord na Móna sites and the surrounding landscape. Care has to be taken that no active rehabilitation management is carried out that could negatively and knowingly impact on surrounding land. This includes any hydrological management on neighbouring farmland, as well as potential changes to the hydrology of surrounding designated sites. 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. While the rehabilitation will optimise hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future, any new archaeology may require rehabilitation measures will be reviewed and adapted. If this occurs, rehabilitation measures will be reviewed and adapted. An archaeological impact assessment of the proposed rehabilitation at Belmont Bog is being carried out (Appendix XII). There are several known archaeological features on the site. Rehabilitation in these zones will be avoided or amended (e.g. location of peat barriers adjusted) to avoid or minimise impact to any archaeological features (Figure 8.1 & Appendix XII).
- **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. A single right of way exists at Belmont.

6.2 Key Assumptions

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

6.3 Key Exclusions

The scope of this rehabilitation plan does not cover:

- The longer-term raised bog restoration trajectory of the site. The plan covers the short-term rehabilitation **actions** and a **monitoring and after-care programme** to monitor the rehabilitation during the Scheme and to respond to any needs. It is expected that this rehabilitation plan will set the site on an enhanced and accelerated trajectory towards stabilisation and deep peat re-wetting. The plan does not set any goals or outcomes, for example, the extent (specific area) of active raised bog habitat (ARB) that may develop at this site in the long-term. This is beyond the scope of this rehabilitation plan.
- This plan is not intended to be an after-use or future land-use plan for Belmont Bog.
- The longer-term management of this site, potentially as a nature conservation site, or for amenity, or for other uses in the future.

7. CRITERIA FOR SUCCESSFUL REHABILITATION

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

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

Rehabilitation is generally defined by Bord na Móna as

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

In addition, Bord na Móna wish to optimise climate action and other ecosystem service benefits via enhanced rehabilitation measures. Enhanced rehabilitation will significantly go beyond what is required to meet rehabilitation and decommissioning obligations under existing EPA IPC licence conditions. The proposed interventions will mean that environmental stabilization is achieved (meaning IPC obligations are met) and, in addition, significant other benefits particularly for climate action will be accrued.

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 establishment of embryonic *Sphagnum*-rich peat-forming habitats on suitable residual deep peat areas and optimise water levels in the shallow cutaway areas for the development of Reed swamp and fen habitats.

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

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

(See Table 7.1 for a summary of the criteria for successful rehabilitation and associated monitoring.)

As the monthly monitoring program at Belmont 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.



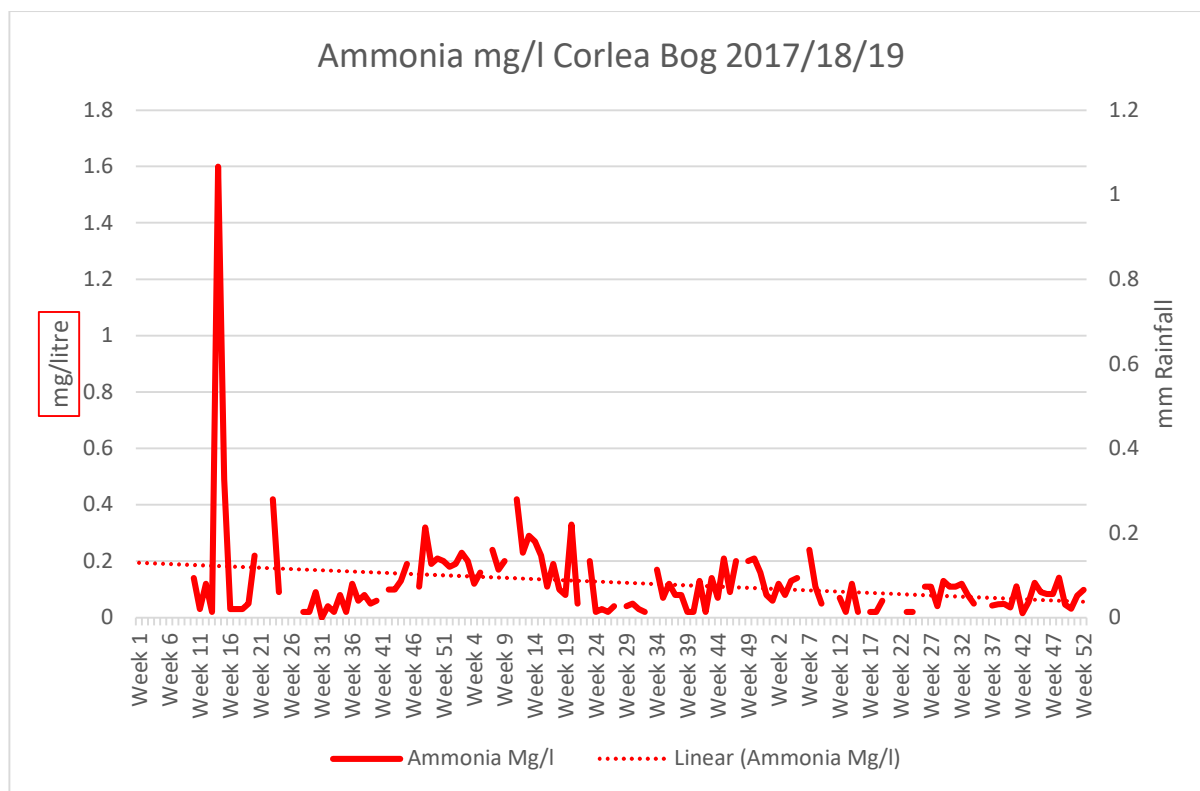


Figure 7.1. Ammonia levels over the period 2015-2019 at Longfordpass and Corlea.

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

- Optimising the extent of suitable hydrological conditions to optimise climate action and other ecosystem service benefits (optimising deep peat re-wetting). This will be measured by an aerial survey after rehabilitation has been completed.
- Accelerating the trajectory of the site towards becoming a reduced carbon source/carbon sink. This will be measured through habitat mapping and the development of cutaway bog condition assessment. This cutaway bog condition assessment will include assessment of environmental and ecological indicators such as vegetation cover, vegetation communities, presence of key species, *Sphagnum* cover, bare peat cover and water levels (similar to ecotope mapping). Baseline monitoring will be carried after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.
- Reduction in carbon emissions. This will be estimated via a combination of habitat condition assessment and application of appropriate carbon emission factors derived from other sites. Baseline monitoring (habitat condition) will be carried after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.
- Improvement in biodiversity and ecosystem services. This will be demonstrated by metrics outlined in Section 9.1 that can be used to measure changes in ecosystem services (e.g. water quality parameters, development of pioneer habitats, breeding bird monitoring). This will be measured by collecting a range of scientific data that can then quickly be adapted and into metrics that can be used to measure changes in various ecosystem services. Baseline monitoring will be carried after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future. These

metrics will be defined in the context of the overall Scheme resources and after consultation with stakeholders.

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

Criteria type	Criteria	Target	Measured by	Expected Time-frame
IPC validation	Rewetting in the former area of industrial peat production	Delivery of rehabilitation measures Reduction in bare peat.	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.	2021-2023
IPC validation	Reducing pressure from peat production on the local water body catchment (WFD)	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	EPA WFD monitoring programme	WFD schedule

		quality from the peat extraction associated with activities at this bog.		
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
Climate action verification	Setting the site on a trajectory towards establishment of a mosaic of compatible habitats	Establishment of compatible cutaway habitats	Habitat map, Cutaway bog condition map Baseline monitoring to be carried out during the scheme when rehabilitation is complete. Sites can be re-monitored in the future and compared against this baseline.	2021-2025
Climate action verification	Biodiversity and ecosystem services. Habitat establishment Presence of key species – Sphagnum Breeding 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 scheme has been completed is dependent on support from the Climate Action Fund or other sources of funding. Note that monitoring and verification of the overall scheme will be stratified – not all these criteria will be measured at each individual site.

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

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

- **Funding to pay for resources required to deliver the planned rehabilitation (Bord na Móna and external).** Bord na Móna maintains a Provision on its balance sheet to pay for these future costs when industrial peat extraction ceases. Bord na Móna is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence. It is expected that additional costs of enhanced rehabilitation will be supported by Government through the Climate Action Fund.
- **Bord na Móna to have sufficient resources (staff and training) to deliver the planned rehabilitation with required associated skills and competencies.**
- **Bord na Móna to have sufficient resources (suitable machinery) and staff to maintain this machinery.**
- **Weather conditions to be within normal limits over the rehabilitation plan timeframe.** Long periods of wet weather have the capacity to significantly affect ground conditions and constrain the delivery of rehabilitation. The potential impact of wet weather on ground conditions can be reduced by appropriate planning and management. Bord na Móna have significant experience of managing these issues through 70 years of working in these peatland environments.
- **Rehabilitation measures to be effective.** The rehabilitation measures proposed in this plan are based on 40 years of Bord na Móna experience of peatland management and best practise applied internationally in peatland management. Measures proposed in this plan have already been shown to be 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 may take 20-30 years to develop. However, it may take 50 years for active raised bog vegetation to re-develop on ground that was previously cutaway. Different environmental conditions will have a significant impact on the rate of natural colonisation, and as a result of the combination of different environmental conditions and the application of different rehabilitation measures, there will be a variety of habitat outcomes.
- Rehabilitation measures have been designed to accelerate and work with natural colonisation and other natural processes. Bord na Móna experience of rehabilitation has shown that re-wetting improves conditions for natural colonisation and that natural colonisation is accelerated where the environmental conditions are most suitable. Rehabilitation measures have been designed to modify the conditions of areas within sites where conditions are less suitable for natural colonisation (modifying hydrology, topography, nutrient status or availability of potential seed sources).
- **Monitoring to be robust and effective.** Rehabilitation Monitoring will be established to validate the success of rehabilitation as required by Condition 10 of the IPC Licence and to verify the benefits of the proposed enhanced measures to optimise climate action. This will focus on 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 Belmont Bog will include:

- Re-wetting some deep peat areas of the bog through more intensive field drain blocking using an excavator to create seven peat blockages every 100 m along each field drain;
- Field re-profiling on deep peat fields using a screw leveller, along with drain blocks, drain infilling and keyed berms across the fields, in conjunction with outfall management and followed with sphagnum inoculation;
- Re-wetting some areas of the bog through regular field drain blocking using a dozer/excavator to create three peat blockages every 100 m along each field drain;
- The construction of berms to create wetlands;
- Intensive drain blocking to create wetlands;
- Management of water levels with overflow pipes;
- Re-alignment of piped drainage;
- Optimising water retention in wetland areas, including placement of berms where required;
- Inoculation of *Sphagnum* on compatible residual deep peat areas;
- Targeted fertiliser applications on bare peat areas to accelerate vegetation establishment on headlands and high fields. (It is noted that the application of fertiliser may need additional assessment and approval as per the IPC Licence),
- Regular drain blocking (3/100) on dry cutaway adjacent to wetland mosaics, along with the blocking of outfalls and management of water levels;
- Silt ponds will be retained and maintained during the rehabilitation phase. During the monitoring and verification phase silt ponds will be continually inspected and maintained, where appropriate. When it is deemed that silt ponds are not required, as the bog has been successfully stabilised and there is no silt run-off, the condition of the silt ponds will be reviewed. Silt ponds will either be de-watered (water levels lowered to a level where the silt pond will naturally develop as a small wetland feature), left in situ, or infilled (where discharges do not require silt control).

An indication of the areas for these various measures is shown in Table 8.1 and in Figure 8.1.

Table 8.1 Enhanced rehabilitation measures and target area at Belmont Bog.

Type	Code	Description	Area (Ha)
Deep peat cutover bog	DPT1	Regular drain blocking (3/100 m) + blocking outfalls and managing water levels with overflow pipes	0
	DPT2	More intensive drain blocking (7/100 m) + blocking outfalls and managing overflows	4.2
	DPT3	More intensive drain blocking (7/100 m), + field reprofiling + blocking outfalls and managing overflows	0
	DPT4	Berms and field re-profiling (45m x 60m cell) + blocking outfalls and managing overflows + drainage channels for excess water + <i>Sphagnum</i> inoculation	45.2
	DPT5	Cut and Fill cell bunding (30m x 30m cell) + blocking outfalls and managing overflows + drainage channels for excess water + <i>Sphagnum</i> inoculation	8.7
Dry cutaway	DCT1	Blocking outfalls and managing water levels with overflow pipes	4.7
	DCT2	Regular drain blocking (3/100 m) + blocking outfalls and managing water levels with overflow pipes + targeted fertiliser treatment	54.5
	DCT3	More intensive drain blocking (7/100 m) + blocking outfalls and managing overflows + targeted fertiliser treatment	0
Wetland cutaway	WLT1	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes	0
	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	8.4
	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	8.1
	WLT4	More intensive drain blocking (7/100 m), + blocking outfalls and managing overflows + transplanting Reeds and other rhizomes	104.4
	WLT5	More intensive drain blocking (7/100 m), + field reprofiling + blocking outfalls and managing overflows + transplanting Reeds and other rhizomes	0
Marginal land	MLT1	No work required	57.5
	MLT2	More intensive drain blocking (7/100 m)	6
	MLT3	More intensive drain blocking (7/100 m) + blocking outfalls and managing overflows with + boundary berm	0
Other		Silt-ponds	0.2
Other		Constrained Areas	16
Total			317.8

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

- Seek formal approval of the enhanced plan, noting the alternative 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 (within the proposed PCAS) will be applied to Belmont Bog. This will take account of peat

depths, topography, drainage and hydrological modelling. (See Figure 8.1 for an indicative view of the application of different rehabilitation methodologies);

- Carry out a hydrology and drainage management assessment of the proposed enhanced rehabilitation measures;
- Carry out a review of known archaeology and an archaeological impact appraisal of the proposed rehabilitation. Incorporate the results of this assessment into the rehabilitation plan to minimise known archaeological disturbance, where possible;
- Carry out a review of issues that may constrain rehabilitation such as known rights of way, archaeology, turbary, and existing land agreements
- Carry out a review of remaining milled peat stocks. It is expected that all peat stocks will eventually be removed or decommissioned.
- Carry out an ecological appraisal of the potential impacts of the planned rehabilitation, if needed, such as the presence of sensitive ground-nesting bird breeding species (e.g. breeding waders) or larval webs of Marsh Fritillary butterfly, etc. The scheduling of rehabilitation operations will be adapted, as mitigation; and
- Ensure all activities comply with the environmental protection requirements of the IPC Licence.
- 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. (Note that an AA screening of Belmont has been carried out and the rehab plan has screened out at Stage 1).
- See Belmont Decommissioning and Rehabilitation Plan – Addendum 1 for more details of the 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 pump management, drain blocking, peat field re-profiling, cell-bunding and fertiliser applications targeting headlands, high fields and other areas. All rehabilitation will be carried out with regard to environmental control measures (Appendix IV);
- Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions;
- Carry out the proposed monitoring, as outlined.
- While natural colonisation is expected to commence almost immediately once peat production ceases, Phase 2 actions will be carried out in targeted areas to accelerate re-vegetation and colonisation of target species. Phase 2 actions may include seeding of targeted vegetation and inoculation of *Sphagnum*;
- Silt ponds will be monitored during this period and there will be continued maintenance and cleaning to prevent silt run-off from the site during the rehabilitation phase; and

- Submit an *ex post* report to the Scheme regulator to verify the eligible measures to be carried out in year 1 of the Scheme, and an *ex ante* estimate for year 2 of the Scheme; and so on for each year of the proposed Scheme

8.3 Long-term (>3 years)

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

8.4 Timeframe

- **2020-2021:** Short-term planning actions.
- **2021:** Short-term practical actions.
- **2021-2024:** Long term practical actions. Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- **2024:** Decommission silt-ponds, if necessary

8.5 Budget and costing

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

The 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 different types of cutaway across the site (See Appendix I).

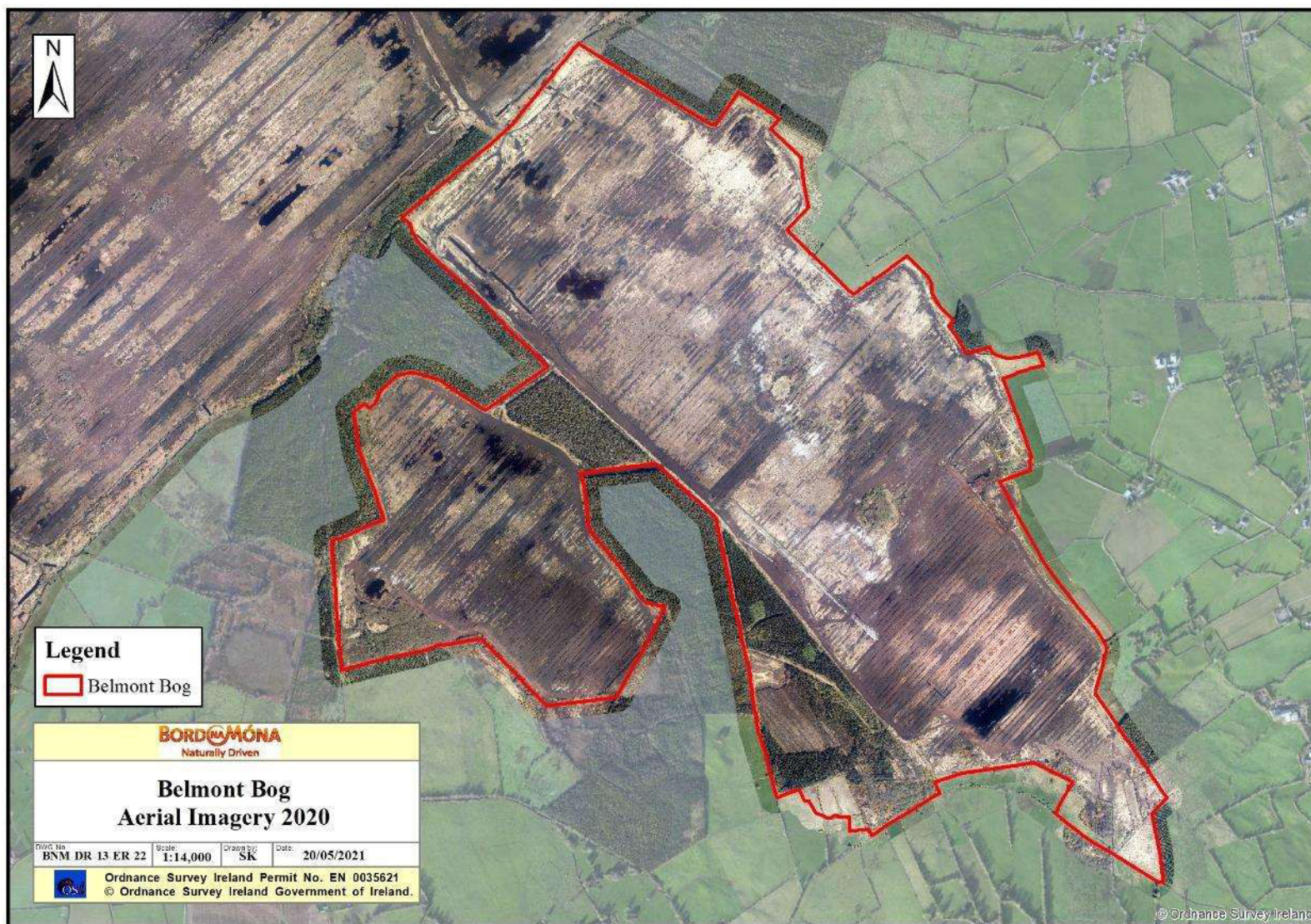


Figure 8.1. Aerial photo of Belmont Bog. Extant bare peat and pioneering vegetation are visible.

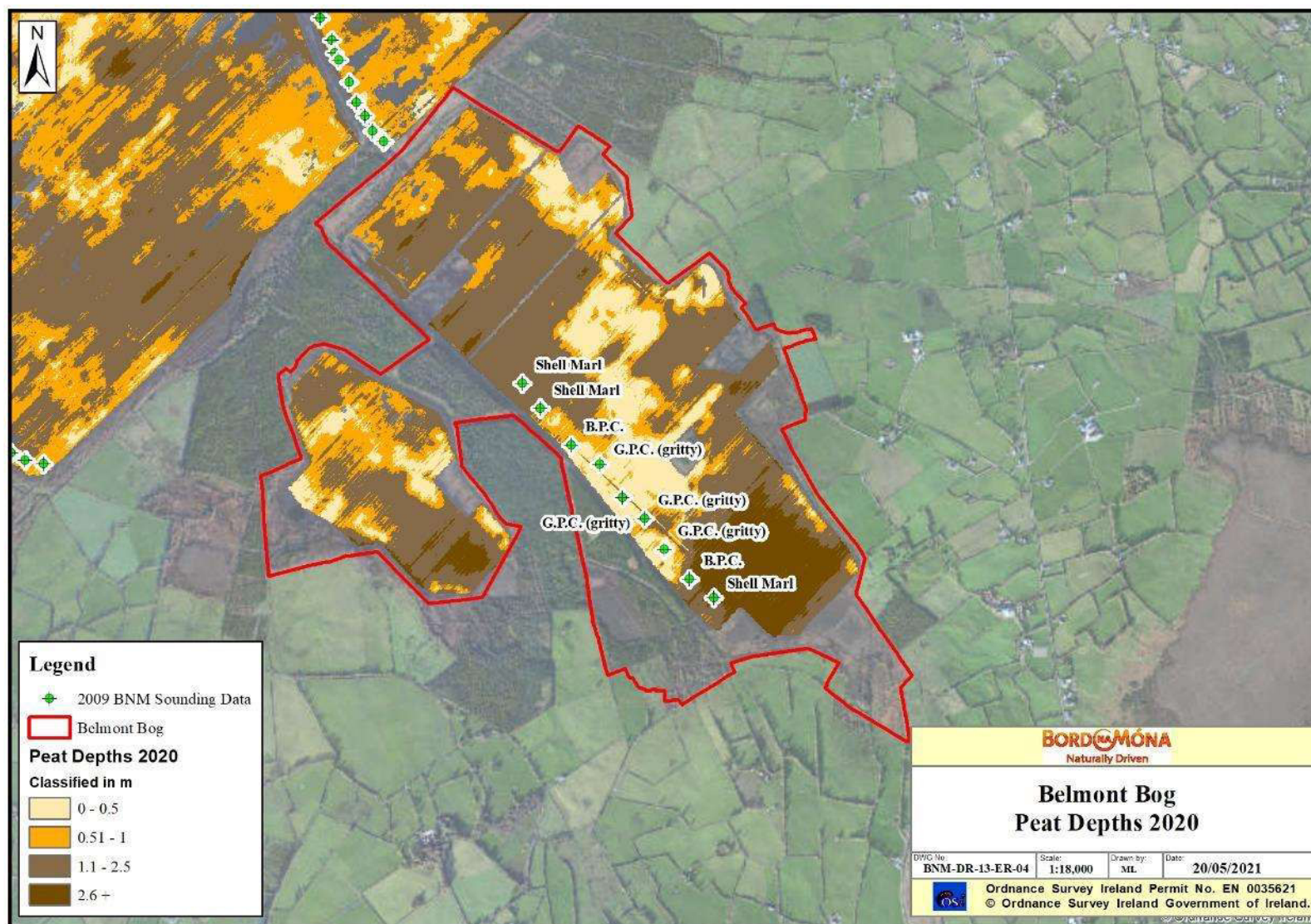


Figure 8.2. Peat depth map for Belmont Bog. The majority of the south east of each bog unit is characterised as deep peat cutover bog.

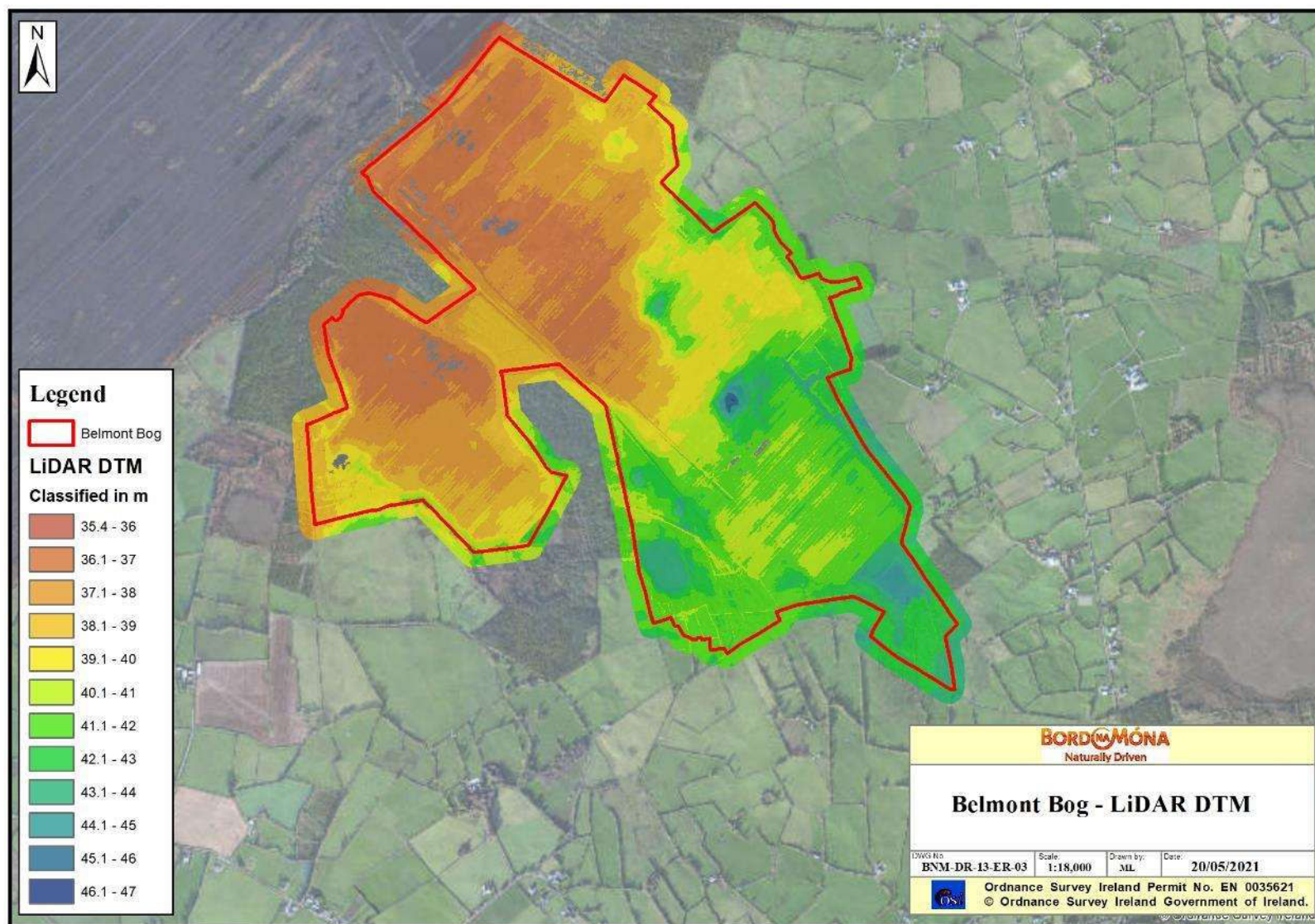


Figure 8.3. LIDAR topography map of Belmont Bog. Low areas and basins are orange-yellow, more elevated areas are blue-green. The majority of the bog slopes towards the NW to the Blackwater River.

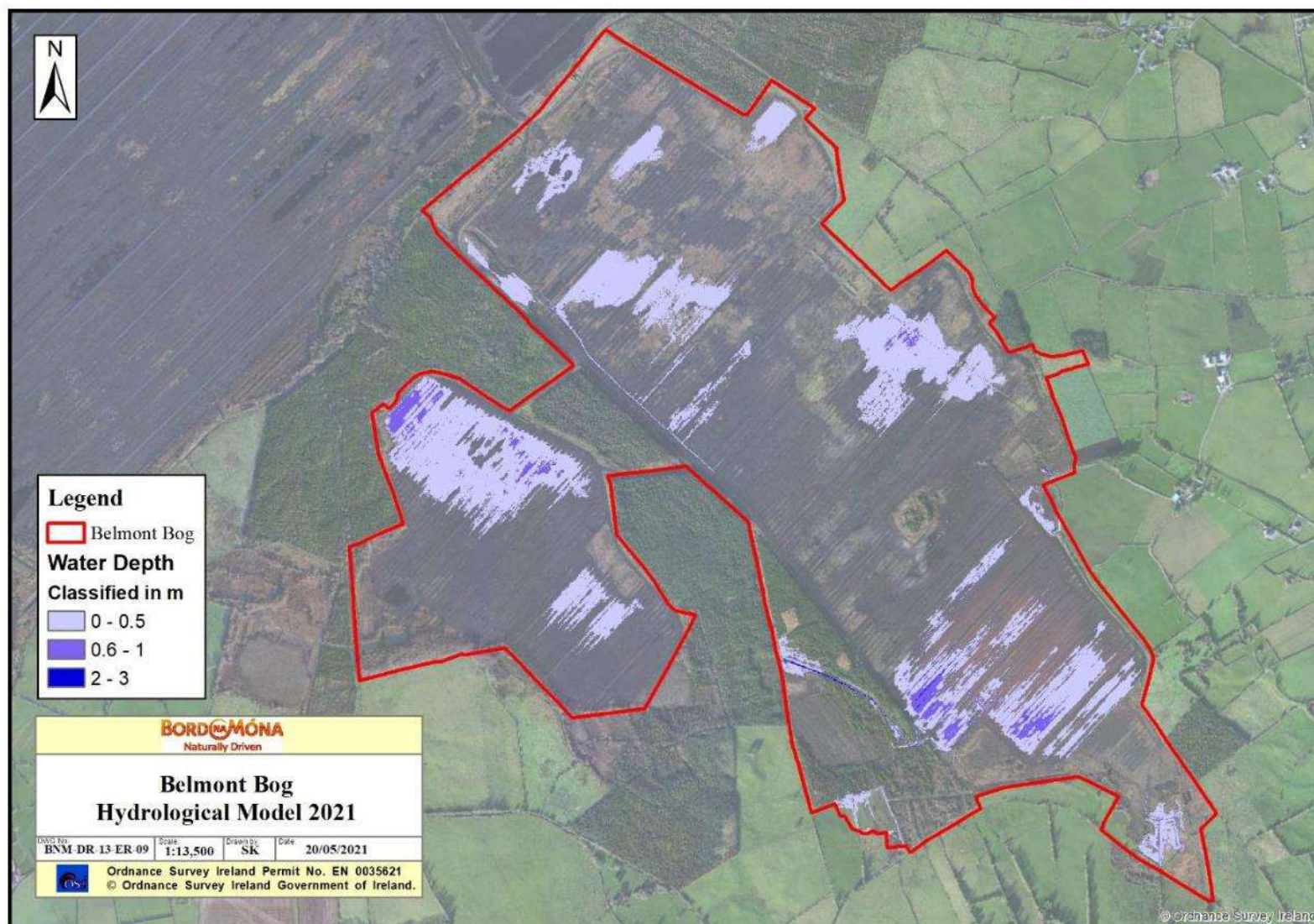


Figure 8.4. Hydrological modelling for Belmont Bog showing range of expected water depths and flow paths based on current topography, when drains are blocked.

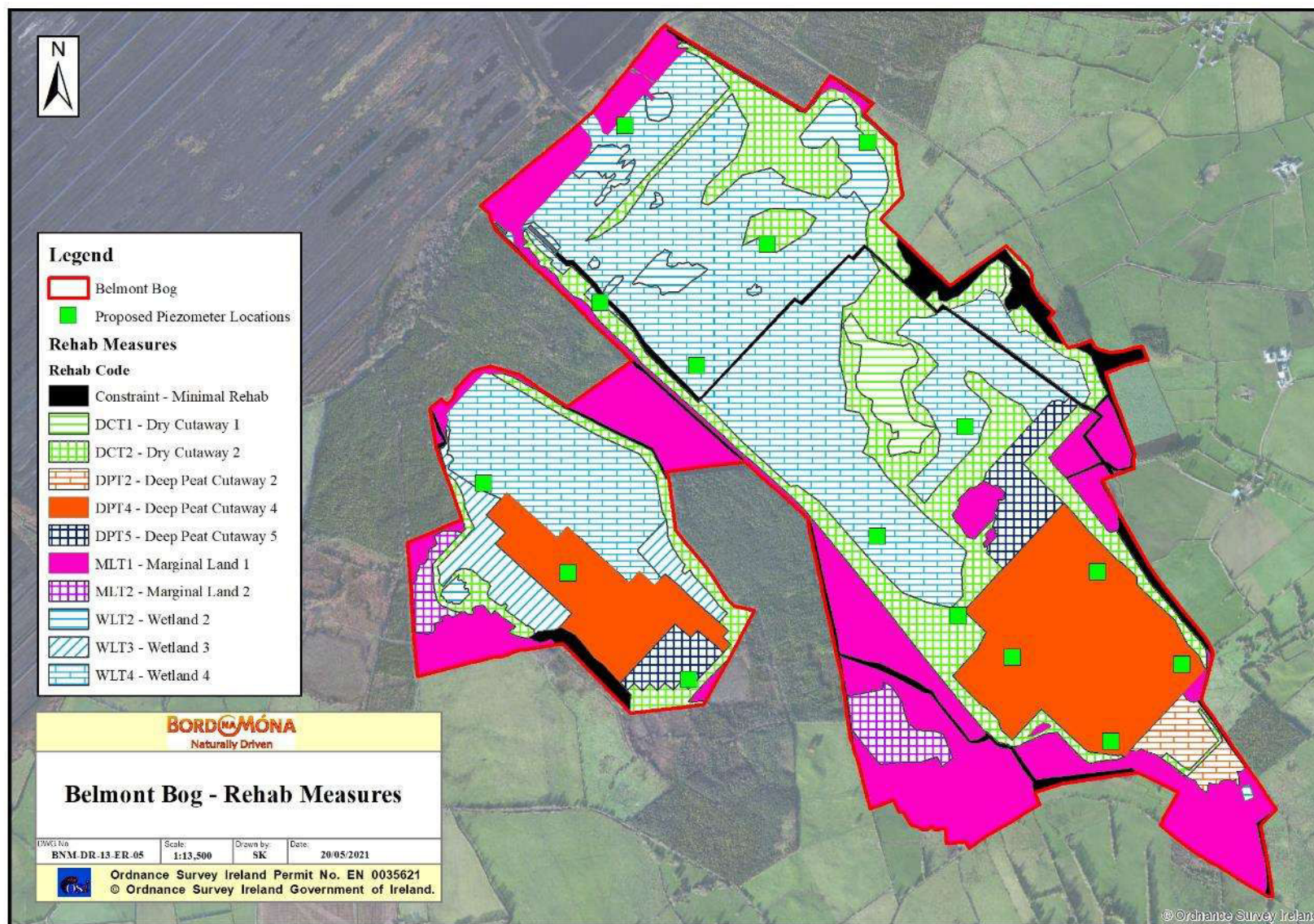


Figure 8.5. Indicative Enhanced Rehabilitation Plan for Belmont Bog. Note that the actual distribution of these measures may be subject to change in response to stakeholder consultation and refinement of the enhanced rehabilitation measures.

9. AFTERCARE AND MAINTENANCE

9.1 Programme for monitoring, aftercare and maintenance

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

- There will be **initial quarterly monitoring assessments** of the site to determine the general status of the site, the condition of the silt ponds, assess the condition of the rehabilitation work, monitoring of any potential impacts on neighbours land, general land security, boundary management, dumping and littering.
- The number of these site visits will reduce after 2 years to bi-annually and then after 5 years to annual visits.
- These monitoring visits will also consider any requirements for further practical rehabilitation measures.
- The **baseline condition of the site will be established** post-rehabilitation implementation by using an aerial survey to take an up to date aerial photo, when rehabilitation is completed. This will be used to verify completion of rehabilitation measures. The extent of bare peat will be assessed using this baseline data, and habitat maps will be updated, if needed.
- **Water quality monitoring** at the bog will be established. The main objective of this water quality monitoring will be to establish a baseline and then monitor the impact of peatland rehabilitation on water quality from the bog.
- In order to assist in monitoring surface water quality from this bog, it is planned to increase the existing licence monitoring requirements to sampling for the same parameters to every month during the scheduled activities and for a period up to three years. post rehabilitation, depending on the period required to confirm that the main two parameters, suspended solids and ammonia are remaining compliant with the licence emission and trigger limit values and there is an improving trajectory in these two parameters i.e. reduction in concentration.
- Enhanced water quality monitoring will aim to include up to 70% of a bogs drainage catchments.
- Monitoring results will be maintained, trended and reported on each year as part of the requirement to report on Condition 10.1 of the IPC Licence on Bog Rehabilitation in the Annual Environmental Report, which will be available in April each year at www.epa.ie.
- The parameters to be included (as per condition 6.2 of the IPC Licence) include monthly monitoring for pH, 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 enhanced rehabilitation. In addition, DOC will be included as a parameter to try and identify any changes in carbon in the surface water.
- If, after two years, key criteria for successful rehabilitation are being achieved and key targets are being met, then the water quality monitoring will be reviewed, with consideration of potential ongoing research on site. The water quality data, the aerial surveys and the habitat mapping will be collated and will be submitted to the EPA as part of the final validation report.
- If, after two years, key criteria for successful rehabilitation have **not** been achieved and key targets have **not** been met, then the rehabilitation measures and status of the site will be evaluated and enhanced, where required. This evaluation may indicate no requirement for additional enhancement of rehabilitation measures, but may demonstrate that more time is required before key criteria for

rehabilitation has been achieved. Monitoring of water quality will then also continue for another period to be defined.

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

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

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

9.2 Rehabilitation plan validation and licence surrender – report as required under condition 10.4

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

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

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

10. REFERENCES

- Atherton, I, Bosanquet, SDS & Lawley, M (2010). Mosses and liverworts of Britain and Ireland - a field guide. British Bryological Society.
- Anderson, R., Farrell, C., Graf, M., Muller, F., Calvar, E., Frankard, P., Caporn, S., Anderson, P. (2017). An overview of the progress and challenges of peatland restoration in Western Europe. *Restoration Ecology*, Issue 2 Pages 271-282.
- Bord na Móna 2014. Blocking Drains in Irish raised bogs. The Bord na Móna Raised Bog Restoration Project. Cris, R. Buckmaster, S. Bain, C. Reed, M. (Eds) (2014) Global Peatland Restoration demonstrating SUCCESS. IUCN UK National Committee Peatland Programme, Edinburgh. <http://www.iucn-uk-peatlandprogramme.org/sites/www.iucn-uk-peatlandprogramme.org/files/IUCNGlobalSuccessApril2014.pdf>
- Bord na Móna. 2016. Bord na Móna Biodiversity Action Plan 2016-2021. Brosna Press, Ferbane. <http://www.bordnamona.ie/wp-content/uploads/2016/04/Biodiversity-Action-Plan-2016-2021.pdf>.
- Bord na Móna (2020). Bord na Móna Annual Report 2020. https://www.bordnamona.ie/wp-content/uploads/2020/07/M12822-BORD-NA-MONA_Annual-Report-2020_WEB2.pdf
- Bonn, A., Allott, T., Evans, M., Joosten, H. & Stoneman, R. (2017) Peatland restoration and ecosystem Services- science, policy and practice. Cambridge University Press.
- Carroll, J., Anderson, P., Caporn, S., Eades, P., O'Reilly C. & Bonn, A. 2009. Sphagnum in the Peak District. Current Status and Potential for Restoration. Moors for the Future Report No 16. Moors for the Future Partnership.
- Clark, D. and Rieley, J. 2010. Strategy for responsible peatland management. International Peat Society, Finland.
- Clark, D. (2010). Brown Gold. A history of Bord na Móna and the Irish peat industry. Gill Books.
- Cross, J.R. (2006). The Potential Natural Vegetation of Ireland. *Biology and Environment: Proceeding of the Royal Irish Academy*, Vol. 106B, No. 2, 65-116 (2006).
- Department of Communications, Climate Action and Environment 2019. National Climate Action Plan 2019. <https://www.dccae.gov.ie/en-ie/climate-action/publications/Pages/Climate-Action-Plan.aspx>
- Department of Housing, Planning, Community and Local Government 2017. Public consultation on the River Basin Management Plan for Ireland. Department of Housing, Planning, Community and Local Government. https://www.housing.gov.ie/sites/default/files/public-consultation/files/draft_river_basin_management_plan_1.pdf
- Department of Arts, Heritage and the Gaeltacht 2015. National Peatland Strategy. Department of Arts, Heritage and the Gaeltacht. <http://www.npws.ie/sites/default/files/general/Final%20National%20Peatlands%20Strategy.pdf>
- Eades, P., Bardsley, L., Giles, N. & Crofts, A. (2003). The Wetland Restoration Manual. The Wildlife Trusts, Newark.
- Environment Agency (2013). The Knotweed code of practise. Managing Japanese Knotweed on development sites. Environment Agency, Bristol, UK. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/536762/LIT_2695.pdf

- European Commission (2013). Interpretation manual of European Union Habitats. European Commission DG Environment Nature ENV B.3.
- EPA (2019). <http://gis.epa.ie/Envision>. EPA Envision Map Viewer. (Last Viewed: 31/12/2019).
- EPA (2020). Guidance on the process of preparing and implementing a bog rehabilitation plan. <http://www.epa.ie/pubs/reports/enforcement/guidanceontheprocessofpreparingandimplementingabogrehabilitationplan.html>.
- Farrell, C. A. and Doyle, G. J. 2003. Rehabilitation of Industrial Cutaway Atlantic Blanket Bog, NW Mayo, Ireland. *Wetlands Ecology and Management*, 11, 21-35.
- Fernandez, F., Connolly K., Crowley W., Denyer J., Duff K. & Smith G. (2014) Raised Bog Monitoring and Assessment Survey (2013). Irish Wildlife Manuals, No. 81. National Parks and Wildlife Service, Department of Arts, Heritage and Gaeltacht, Dublin, Ireland.
- Gann, G.D., McDonald, T., Walder, B., Aronson, J., Nelson, C.R., Jonson, J., Hallett, J.G., Eisenberg, C., Guariguata, M.R., Liu, J., Hua, F., Echeverría, C., Gonzales, E., Shaw, N., Decleer, K. & Dixon, K.W. (2019). International Principles and Standards for the practice of Ecological Restoration. *Restoration Ecology* 27(S1): S1–S46.
- Grand-Clement, E., Anderson, K., Smith D., Angus, M., Luscombe D.J., Gatis, N., Bray L.S., Brazier R.E. (2015). New approaches to the restoration of shallow marginal peatlands *Journal of Environmental Management* 161.
- Fossitt, J. (2000). A guide to habitats in Ireland. Kilkenny. The Heritage Council.
- Hinde, S., Rosenburgh, A., Wright, N., Buckler, M. and Caporn, S. 2010. Sphagnum re-introduction project: A report on research into the re-introduction of Sphagnum mosses to degraded moorland. *Moors for the Future Research Report 18*. Moors For The Future Partnership.
- Holden, J., Walker, J., Evans, M.G., Worrall, F., Bonn, A., 2008. In: DEFRA (Ed.), *A Compendium of Peat Restoration and Management Projects*.
- Joosten, H. and Clarke, D. 2002. *Wise Use of mires and peatlands – Background and Principles including a framework for Decision-making*. I.M.C.G. – I.P.S., Jyväskylä, Finland.
- Lindsay, R., 2010. *Peatbogs and Carbon: a Critical Synthesis to Inform Policy Development in Oceanic Peat Bog Conservation and Restoration in the Context of Climate Change* (Report to RSPB Scotland, Edinburgh).
- Mackin, F., Barr, A., Rath, P., Eakin, M., Ryan, J., Jeffrey, R. & Fernandez Valverde, F. (2017) Best practice in raised bog restoration in Ireland. Irish Wildlife Manuals, No. 99. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.
- McBride, A., Diack, I., Droy, N., Hamill, B., Jones, P., Schutten, J., Skinner, A. and Street, M. 2011. *The Fen Management Handbook*, (2011), Scottish Natural Heritage, Perth.
- Minayeva, T. et al. (2017). Towards ecosystem-based restoration of peatland biodiversity. *Mires and Peat*, Volume 19 (2017), Article 01, 1–36, <http://www.mires-and-peat.net>
- McDonagh, E. (1996). Drain blocking by machines on Raised Bogs. Unpublished report for National Parks and Wildlife Service. https://www.npws.ie/sites/default/files/publications/pdf/McDonagh_1996_Drain_Blocking_Raised_Bogs.pdf.
- NPWS. (2014). Review of the raised bog Natural Heritage Area network. Department of Arts, Heritage and the Gaeltacht.

- NPWS. (2017a). National Raised bog Special Areas of Conservation management plan. Department of Arts, Heritage and the Gaeltacht.
[https://www.npws.ie/sites/default/files/files/FOR%20UPLOAD%20Plan\(WEB_English\)_05_02_18%20\(1\).pdf](https://www.npws.ie/sites/default/files/files/FOR%20UPLOAD%20Plan(WEB_English)_05_02_18%20(1).pdf)
- NPWS. (2017b). Actions for biodiversity 2017-2021. Ireland's 3rd national biodiversity plan. Department of Arts, Heritage and the Gaeltacht.
<https://www.npws.ie/sites/default/files/publications/pdf/National%20Biodiversity%20Action%20Plan%20English.pdf>
- NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill.
https://www.npws.ie/sites/default/files/publications/pdf/NPWS_2019_Vol2_Habitats_Article17.pdf
- NRA (2009). Guidelines for Assessment of Ecological Impacts of National Road Schemes (Revision 2). National Roads Authority.
- NRA (2010). Guidelines on The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads. National Roads Authority.
<https://www.tii.ie/technical-services/environment/construction/Management-of-Noxious-Weeds-and-Non-Native-Invasive-Plant-Species-on-National-Road-Schemes.pdf>.
- Quinty, F. and L. Rochefort, 2003. Peatland Restoration Guide, second edition. Canadian Sphagnum Peat Moss Association and New Brunswick Department of Natural Resources and Energy. Québec, Québec.
- Regan, S., Swenson, M., O'Connor, M. & Gill, L. (2020). Ecohydrology, Greenhouse Gas Dynamics and Restoration Guidelines for Degraded Raised Bogs. EPA RESEARCH PROGRAMME 2014–2020. Report No.342. (2014-NC-MS-2). EPA Research Report. Prepared for the Environmental Protection Agency by Trinity College Dublin. www.epa.ie.
- Renou-Wilson F., Bolger T., Bullock C., Convery F., Curry J. P., Ward S., Wilson D. & Müller C. (2011). BOGLAND - Sustainable Management of Peatlands in Ireland. STRIVE Report No 75 prepared for the Environmental Protection Agency. Johnstown Castle, Co. Wexford.
- Renou-Wilson, F., Wilson, D., Rigney, D., Byrne, K., Farrell, C. and Müller C. (2018). Network Monitoring Rewetted and Restored Peatlands/Organic Soils for Climate and Biodiversity Benefits (NEROS). Report No. 238. Report prepared for the Environmental Protection Agency. Johnstown Castle, Co. Wexford.
- Schouten, M.G.C. 2002. Conservation and Restoration of Raised Bogs: Geological, Hydrological and Ecological Studies. Dúchas - The Heritage Service of the Department of the Environment and Local Government, Ireland; Staatsbosbeheer, the Netherlands; Geological Survey of Ireland; Dublin.
- Smith, G., O'Donoghue, P., O'Hora, K. & Delaney, E. (2011). Best Practice Guidance for Habitat Survey and Mapping. The Heritage Council.
- Stace, C. A. (1997). New Flora of the British Isles. Cambridge: Cambridge University Press.
- Thom, T., Hanlon, A., Lindsay, R., Richards, J., Stoneman R. & Brooks, S. (2019). Conserving Bogs – Management Handbook. <https://www.iucn-uk-peatlandprogramme.org/sites/default/files/header-images/Conserving%20Bogs%20the%20management%20handbook.pdf>
- Wilson, D., Renou-Wilson, F., Farrell, C., Bullock, C. and Muller, C. (2012). Carbon Restore – the potential of restored Irish peatlands for carbon uptake and storage; CCRP Report. EPA Wexford.

- Wilson, D., Dixon, S.D., Artz, R.R., Smith, T.E.L., Evans, C.D., Owen, H.J.F., Archer, E., & Renou-Wilson, F. (2015). Derivation of greenhouse gas emission factors for peatlands managed for extraction in the Republic of Ireland and the UK. *Biogeosciences Discuss.*, 12, 7491–7535.
- Wheeler, B. D., & Shaw, S. C. (1995). *Restoration of Damaged Peatlands – with Particular Reference to Lowland Raised Bogs Affected by Peat Extraction*. London: HMSO.
- Wittram, B. W., Roberts, G., Buckler, M., King, L., & Walker, J. S. (2015). *A Practitioners Guide to Sphagnum Reintroduction*. Edale: Moors for the Future Partnership.

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

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

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

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

Scope of rehabilitation

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

- The area of Belmont Bog (Figure 3.1).
- EPA IPC Licence - Ref. P0502-01. 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. Belmont bog is part of the Blackwater Bog group.
- The current condition of Belmont Bog. Pioneer cutaway vegetation is developing across parts of the site whilst other remain unvegetated.
- The key objective of rehabilitation, as defined by this licence, is **environmental stabilisation** of the bog.
- To minimise potential impacts on neighbouring land. Some boundary drains around Belmont Bog will be left unblocked as blocking boundary drains could affect adjacent land.

Rehabilitation goals and outcomes

The key rehabilitation goal and outcome for Belmont Bog is environmental stabilisation of the site via wetland creation and deep peat re-wetting. This is defined as:

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

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

Criteria for successful rehabilitation:

- Rewetting of residual peat in the former area of industrial peat production to offset potential silt run off and to encourage development of vegetation cover via natural colonisation, and reducing the area of bare exposed peat.

- That there is a stabilising/improving concentration of suspended solids and ammonia associated with the measures undertaken to stabilise the peat surface by the blocking of the internal drainage system and the maximised rewetting of the peat surface. This will be demonstrated by developing a stable or downward trajectory of water quality indicators (suspended solids and ammonia) towards what would be typical of a re-wetted cutaway bog. This will be measured via water quality monitoring (suspended solids and ammonia).
- That the main watercourses associated with surface water from this bog are excluded in the EPA's list of peat pressure water bodies as reported in the River Basin Management Plans. Where the watercourse has been identified as under pressure from peat extraction, that the intervening EPA monitoring programme associated with its Programme of Measures for this water body shows positive improvements in water quality impacts that were attributable to the original peat extraction activity.

Rehabilitation targets

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

Rehabilitation measures: (see Figure Ap-1)

- Blocking field drains in the former industrial production area to create regular peat blockages (three blockages per 100 m) along each field drain;
- Re-alignment of piped drainage; and management of water levels to create wetlands;
- No measures are planned for the other surrounding marginal peatland habitats.
- Silt ponds will continue to be maintained during the rehabilitation and decommissioning phase.
- Evaluate success of short-term rehabilitation measures and enhance where necessary.
- Decommissioning of silt-ponds will be assessed and carried out, where required.

Timeframe:

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

Table AP-1. Rehabilitation measures and target area.

Type	Code	Description	Area (Ha)
Deep peat	Deep Peat Dozer	Regular drain blocking (3/100 m) + blocking outfalls and managing water levels with overflow pipes	58.0
Dry cutaway	Dry cutaway	Blocking outfalls and managing water levels with overflow pipes	59.0
Wetland	Wetland	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes	120.9
Marginal Land	Marginal	No work required	63.5
Other	Other	Silt ponds and right of way	16.0
Total			317.8

Monitoring, after-care and maintenance

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

Validation and IPC Licence surrender

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

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

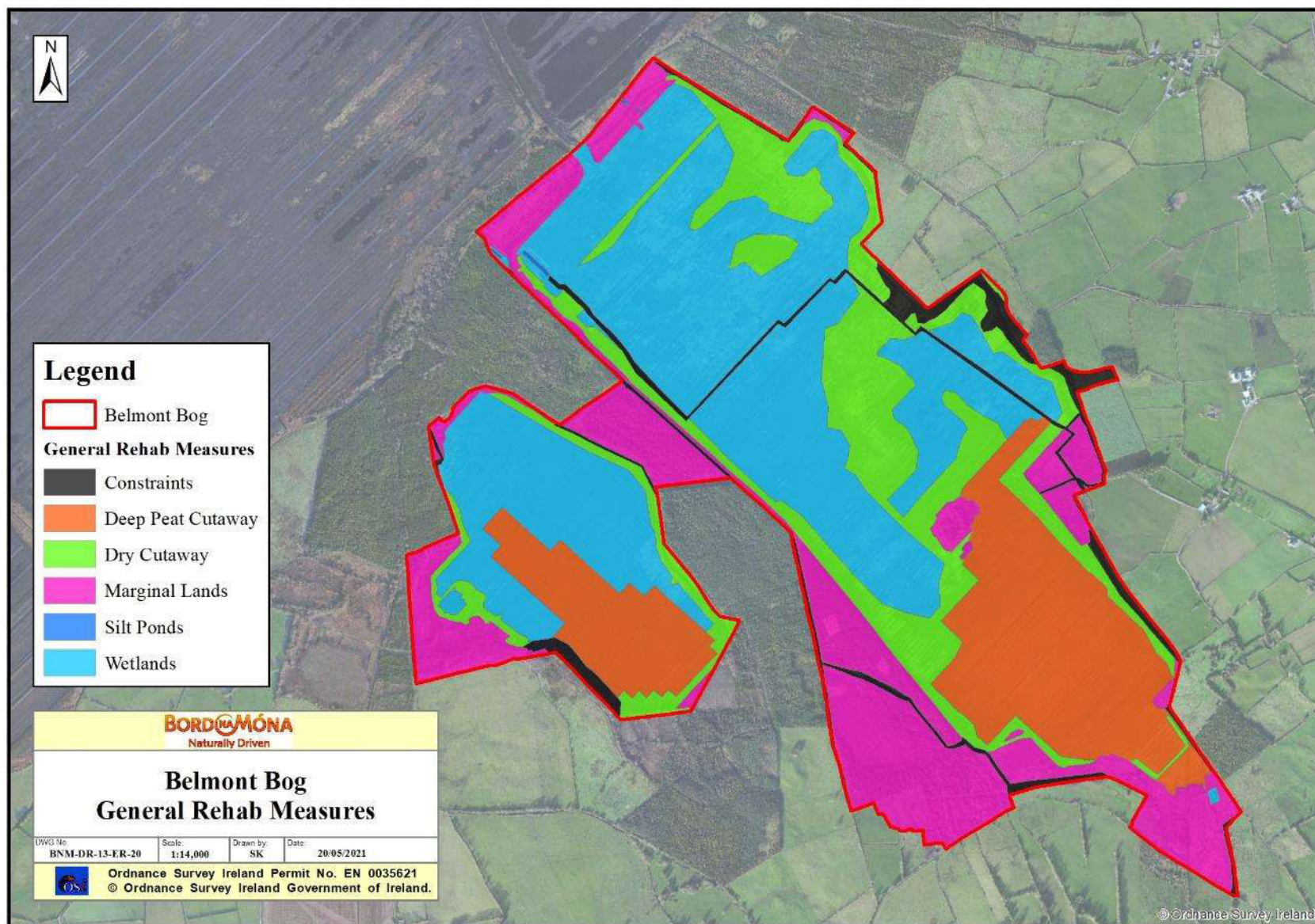


Figure Ap-1. Indicative standard rehabilitation plan for Belmont Bog.

APPENDIX II: BOG GROUP CONTEXT

The Blackwater Bog Group IPC Licensed area is made up of three sub-groups (Attymon, Blackwater and Derryfadda) and have been in industrial peat production for several decades. The majority of sites are situated alongside the Shannon and Suck Rivers within counties Roscommon, Galway, Westmeath and Offaly and cover an overall area of 15,515 ha. Each bog area further comprises a range of habitats from bare milled peat production areas to re-colonising cutaway to workshops areas and transport infrastructure. Industrial peat extraction from these sites mainly supplied ESB power stations at Shannonbridge (WOP) and Lanesborough (LRP).

Industrial peat extraction in the Blackwater Bog Group has permanently ceased on the majority of sites. It is planned to supply remaining milled peat stocks to Shannonbridge (WOP) and Lanesborough (LRP) during 2020. Both power stations will cease using peat by the end of 2020. Decommissioning and rehabilitation for the Blackwater Bog Group is expected to start in 2020/2021.

A number (6) of bogs were initially drained but have never been used for industrial peat production (three former development bogs (Kellysgrove, Tirrur-Derrymore and Newtown-Loughgore), Clonboley, Killeglan and Derrydoo-Woodlough). The latter three bogs are classed as restored raised bogs, still contain active bog habitat (that qualifies as the Annex I EU Habitats Directive habitat) and now form the core of the Bord na Móna Raised Bog Restoration Project due to their high biodiversity value and bog restoration potential. NPWS have identified the Clonboley bog cluster as having high ecological value within the recent assessment of raised bog SACs, NHAs and non-designated sites (NPWS 2014⁷).

Several sections of Tirrur-Derrymore bog have been leased to NPWS for domestic turf cutting as part of the SAC turf-cutting compensation scheme. Turf-cutters from neighbouring SACs have been relocated to this site by NPWS. Several other bogs are being assessed for similar use.

The depth of remnant peat within Blackwater bog units will have a very significant impact on the development of these sites, with deeper peat (Derryfadda milled peat production bogs) having potential for the establishment of embryonic peat-forming (*Sphagnum*-rich) vegetation communities. Milled peat cutaway (such as at Blackwater) develops in a somewhat different way as in places the underlying gravel is exposed, there is significant alkaline influence on the water chemistry and in many of these cutaway bogs will develop fen and wetlands due to the local topography, hydrology and water chemistry.

⁷ <http://www.npws.ie/peatlandsturf-cutting/nationalraisedbogsacmanagementplan/>

A breakdown of the component bog areas for the Blackwater Bog Group IPC License Ref. P0502-01 is outlined in Table Ap-2.

Table Ap-2a: Blackwater Bog Group names, area and indicative status (Attymon sub-group)

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Attymon	336	Cutover Bog Industrial peat production commenced at Attymon Bog in 1941 and ceased in 2017. Attymon is considered a deep peat cutover bog.	Attymon Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat. Coillte have developed a portion of the former production area for conifer forestry.	2017	Draft 2018
Cloonkeen	252	Cutover Bog Industrial peat production commenced at Cloonkeen Bog in 1953 and ceased in 2018. Cloonkeen Bog is considered a deep peat cutaway bog.	Cloonkeen Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat. Coillte have developed a portion of the former production area for conifer forestry.	2018	Draft 2017
Derrydoo-Woodlough	452	Development Bog Derrydoo-Woodlough Bog was drained in the 1980s in anticipation of industrial peat production. No peat harvesting ever took place.	Derrydoo-Woodlough was never in peat production. Rehabilitation (bog restoration) now complete	N/A	N/A

Table Ap-2b: *Blackwater Bog Group names, area and indicative status (Blackwater sub-group)*

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Ballaghurt	597	Cutover Bog Industrial peat production commenced at Ballaghurt Bog in 1981 and ceased in 2020. Long-term peat extraction has reduced commercially viable peat reserves on this bog. Ballaghurt is considered a shallow peat cutaway bog.	Ballaghurt Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat. Pioneer cutaway vegetation communities are naturally developing on some cutaway areas.	2020	Draft 2017
Belmont	316	Cutaway Bog Industrial peat production commenced at Belmont Bog during the 1950's and ceased in 2020. Long-term peat extraction has exhausted commercially viable peat reserves on this bog. Belmont is considered a shallow peat cutaway bog.	Cutaway Bog There are some areas of pioneer cutaway vegetation communities naturally colonising cutaway sections. Coilte have developed some of the former production area for conifer forestry.	2020	Draft 2021
Blackwater	2,303	Cutaway Bog Industrial peat production commenced at Blackwater Bog during the 1950's and ceased in 2020. Long-term peat extraction has reduced commercially viable peat reserves on this bog. Blackwater Bog is considered a shallow peat cutaway bog with some pockets of deep peat remaining.	There is extensive development of emergent cutaway vegetation communities across the former production area. Coilte have developed a portion of the bog for forestry.	2020	Draft 2017
Bloomhill	883	Cutover Bog Industrial peat production commenced at Bloomhill Bog during 1981 and ceased in 2020. Peat extraction has reduced commercially viable peat reserves on this bog. Bloomhill Bog is considered a shallow peat cutover bog.	Bloomhill Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat. Much of the former peat production area is bare peat. There are some areas where emerging vegetation is naturally colonising the cutaway.	2020	Draft 2017
Bunahinly-Kilgarvan	389	Cutover Bog Industrial peat production commenced at Bunahinly-Kilgarvan Bog during the 1990's and ceased in 2020. Deep peat reserves remain on this bog. Bunahinly-Kilgarvan	Much of the former production area or cutaway is bare peat. There is a small area of deep peat rehabilitation on site.	2020	Draft 2017

		Bog is considered a deep peat cutover bog.			
Glebe	132	Cutover Bog Industrial peat production commenced at Glebe Bog during the 1990's and ceased in 2020. Deep peat reserves remain on this bog. Glebe Bog is considered a deep peat cutover bog.	Glebe Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat. Much of the former production area or cutaway is bare peat.	2020	Draft 2017
Clooniff	523	Cutover Bog Industrial peat production commenced at Clooniff Bog during the 1970's and ceased in 2020. Some parts of this bog are cutaway but deep peat reserves remain in places on this bog. Clooniff Bog is considered a cutover bog with variable peat depths.	Clooniff Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat. Much of the former production area or cutaway is bare peat. Some emergent vegetation communities are naturally colonising cutaway areas.	2020	Draft 2021
Cornafulla	460	Cutover Bog Industrial peat production commenced at Cornafulla Bog in 1987 and ceased in 2020. Deep peat reserves remain on this bog. Cornafulla Bog is considered a deep peat cutover bog.	Cornafulla Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat. Much of the former production area or cutaway is bare peat.	2020	Draft 2017
Cornaveagh	492	Cutover Bog Industrial peat production commenced at Cornaveagh Bog in 1970's and ceased in 2020. Deep peat reserves remain on this bog. Cornaveagh Bog is considered a deep peat cutover bog	Cornaveagh Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat. Much of the former production area footprint or cutaway is bare peat.	2020	Draft 2017
Culliaghmore	442	Cutover Bog Industrial peat production commenced at Culliaghmore Bog in 1960's and ceased in 2020. Peat reserves on this bog have been depleted through extraction. Culliaghmore Bog is considered a shallow peat cutover bog	Culliaghmore Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat. Much of the former production area footprint or cutaway is bare peat. Some pioneer cutaway vegetation communities are naturally colonising cutaway areas.	2020	Draft 2017
Garryduff	970	Cutaway Bog Industrial peat production commenced at Garryduff Bog in 1960's and ceased in 2020. Peat reserves on this bog have been depleted through extraction. Garryduff Bog is considered a shallow peat cutaway bog	Much of the former production area footprint or cutaway is bare peat. Extensive development of pioneer cutaway vegetation communities is present on cutaway areas. This is due to natural colonisation.	2020	Draft 2021
Kellysgrove	201	Development Bog Kellysgrove Bog was drained in the 1980s in anticipation of industrial peat production. No peat harvesting ever took place. Kellysgrove is a deep peat development bog.	The site is located adjacent to the River Suck and several designated conservation sites. The site retains degraded raised bog vegetation.	2020	Draft 2021

			The drains across Kellysgrove Bog have become infilled in places, although there are some drains still carrying water off the site.		
Kilmacshane	1,294	<p>Cutaway Bog</p> <p>Industrial peat production commenced at Kilmacshane Bog in 1960's and ceased in 2014. Peat reserves on this bog have been depleted through extraction. Kilmacshane Bog is considered a shallow peat cutaway bog with some pockets of deeper peat remaining.</p>	<p>Kilmacshane Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat.</p> <p>Much of the former production area footprint or cutaway is bare peat.</p> <p>Some pioneer cutaway vegetation communities are naturally colonising cutaway areas.</p>	2014	Draft 2021
Lismanny	449	<p>Cutaway Bog</p> <p>Industrial peat production commenced at Lismanny Bog in 1960's and ceased in 2019. Peat reserves on this bog have been depleted through extraction and peat depths vary across the site. Lismanny Bog is considered a shallow peat cutaway bog with some pockets of deeper peat remaining.</p>	<p>Lismanny Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat.</p> <p>Much of the former production area footprint or cutaway is bare peat.</p> <p>Some pioneer cutaway vegetation communities are naturally colonising cutaway areas.</p>	2020	Draft 2021

Table Ap-2c: Blackwater Bog Group names, area and indicative status (Derryfadda sub-group)

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Derryfadda	610	<p>Cutover bog</p> <p>Industrial peat production commenced at Derryfadda Bog in 1980's and ceased in 2020. Peat reserves on this bog have been depleted through extraction but deep peat reserves persist across the site. Derryfadda Bog is considered a deep peat cutover bog.</p>	<p>Derryfadda Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat.</p> <p>Much of the former production area footprint or cutaway is bare peat.</p> <p>Some pioneer cutaway vegetation communities are naturally colonising cutaway areas.</p>	2020	Draft 2017
Boughill	415	<p>Cutover bog</p> <p>Industrial peat production commenced at Boughill Bog in 2008 and ceased in 2020. Peat reserves on this bog remain relatively deep. Derryfadda Bog is considered a deep peat cutover bog.</p>	<p>Boughill Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat.</p> <p>Much of the former production area footprint or cutaway is bare peat.</p>	2020	Draft 2017
Castlegar	517	<p>Cutover bog</p> <p>Industrial peat production commenced at Castlegar Bog in 2004 and ceased in 2019. Peat reserves on this bog remain relatively deep. Castlegar Bog is considered a deep peat cutover bog.</p>	<p>Castlegar Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat.</p> <p>Much of the former production area footprint or cutaway is bare peat.</p>	N/A	N/A

			The adjacent Annaghbeg Bog NHA is an intact undrained raised bog		
Gowla	650	<p>Cutover bog</p> <p>Industrial peat production by BnM commenced at Gowla Bog in 1970's. Development for other purposes was in pace at Gowla since the 1950's. Peat production ceased in 2020. Peat reserves on this bog remain relatively deep.</p> <p>Gowla Bog is considered a deep peat cutover bog.</p>	<p>Gowla Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat.</p> <p>Much of the former production area footprint or cutaway is bare peat.</p> <p>Some pioneer cutaway vegetation communities are naturally colonising cutaway areas.</p>	2020	Draft 2017

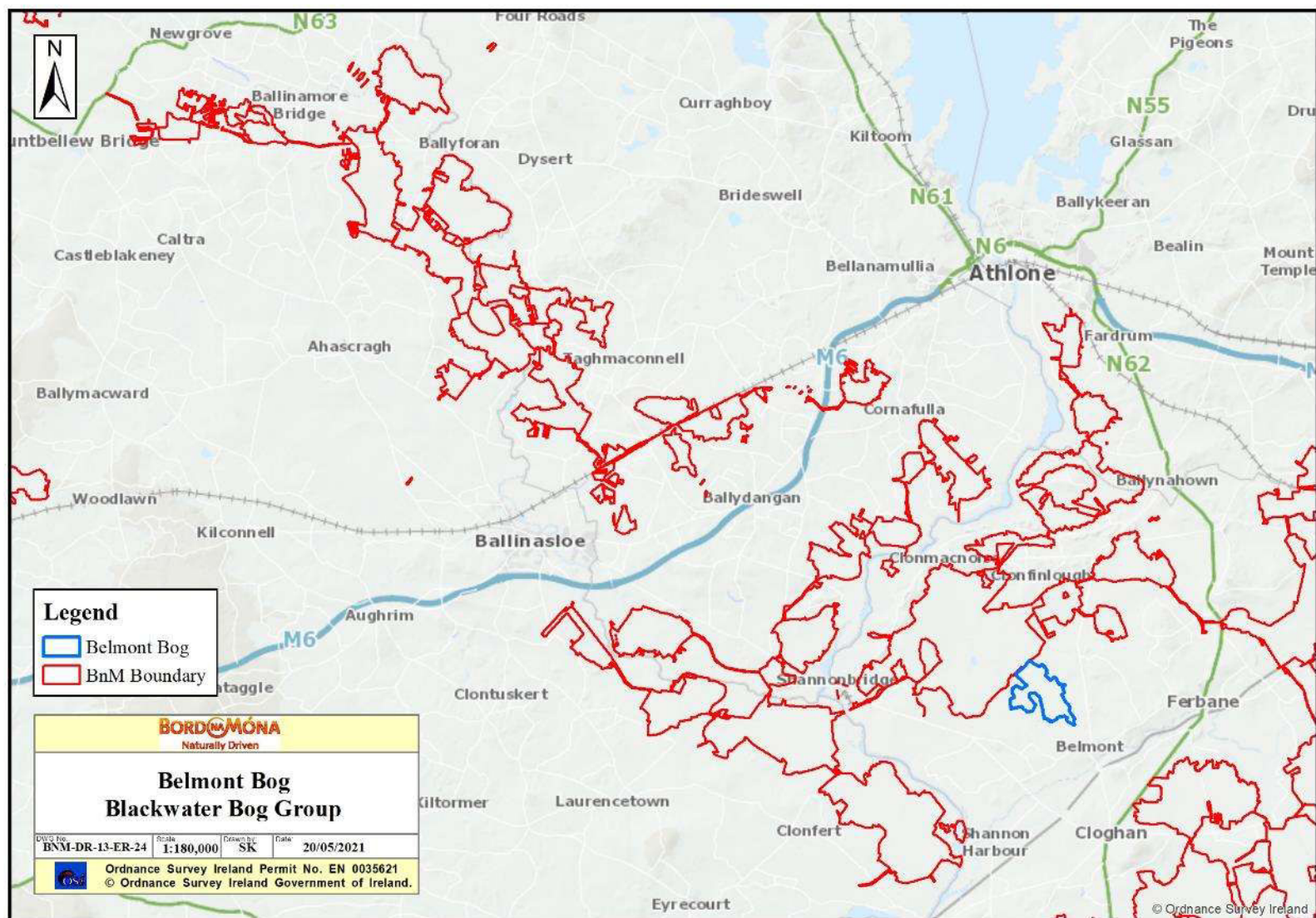


Figure Ap-2: Blackwater Bog Group

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:	Belmont	Area (ha):	317.8ha
Works Name:	Blackwater	County:	Offaly
Recorder(s):	DF	Survey Date(s):	27 th March 2012
<p>Habitats present (in order of dominance)</p> <p>The most common habitats present at this site include:</p> <ul style="list-style-type: none"> • Bare peat (BP) (Codes refer BnM classification of pioneer habitats of production bog. . • Pioneer poor fen communities dominated by Bottle Sedge and Bog Cotton (pRos, pEang) towards the Blackwater River. • Emerging Birch scrub (eBir) • Small patches of open water (OW) with surrounding emergent poor fen vegetation (pEang, pRos) and some Reedbeds with Common Reed (pPhrag). • Dry heath (dHeath) dominated by Heather in mosaic with Purple Moorgrass-dominated grassland (gMol) on gravel mounds. • Pioneer Soft Rush-dominated poor fen (pJeff) in association with gMol and pEang on drier ground with some gravel • Pioneer dry grassland (gAg) with Bent grasses. • Rank grassland with Cocksfoot (gDa-An) • Potential rich fen communities with Black Bog-rush (pSchon) in association with gMol • Riparian zones (RIP) • Pioneer Purple Moorgrass-dominated grassland (gMol) with Gorse-dominated scrub (eGor) • Silt ponds (Silt) with associated habitats <p>The most common habitats found around the margins of the site include:</p> <ul style="list-style-type: none"> • Conifer plantation (WD4) (Codes refer to Heritage Council habitat classification, Fossitt 2000), • Marginal raised bog (PB1) • Cutover bog (PB4) • Scrub (WS1) • Birch woodland (WN7) • Dry meadows and grassy verges (GS2) (marginal grassy areas) • Wet grassland (GS4) (privately managed farmland) • Improved grassland (GA1) (privately managed farmland) 			
Description of site			

Belmont Bog is located in Co. Offaly, 1km north-west of Belmont Village. It is part of the Blackwater Bog group and is located on the east side of the Blackwater River, adjacent to Blackwater Bog, with a railway bridge and travel bridge connecting the two sites. There is also access to the bog via a farmyard in Clonbonniff.

Belmont Bog has developed in two connecting basins, with the northern basin being much larger. These basins, or bog units are separated by a ridge of high ground that has been developed as a conifer plantation by Coillte. Both bog units are situated quite close to the Blackwater River, adjacent to the western margin, although there is a narrow band of marginal habitats between the river and the bog. Part of the conifer plantation is still in BnM ownership, although it is considered that it was all developed around the same time. There are two connecting travel paths within the conifer plantation.

The northern bog unit is the largest section of high bog. It is orientated NW-SE with the river flowing along the NW margin. There is a fall in the bog from the SE to NW and all of the bog drains towards the Blackwater River. The north-western half of the bog can be described as a typical basin bog with high ground around the margins and lower ground towards the centre (see LIDAR map). The majority of the pioneer cutaway vegetation has developed in the NW half of the bog, while the other half is largely active milled peat production. One feature of Belmont is the appearance of two relatively large gravel mounds through the centre of the site, as well as several smaller lower mounds. One of these mounds (Derries Hill) was planted with Oak (*Quercus* sp.) and Sitka Spruce (*Picea sitchensis*) in the 1960's-1970's. Gravel is also exposed around the site in several places, particularly along the north-west margin.

The pioneer cutaway vegetation developing in the lower parts of the NW half of the bog is largely characterised by wetland communities. The vegetation is generally dominated by either Bog Cotton or Bottle Sedge on peat. Soft Rush is quite rare in this area. Emergent swards or patchy vegetation that form mosaics with bare peat are developing in association with various shallow pools of permanent open water. Some of the slightly more elevated sections of Bog Cotton (*Eriophorum* sp.) sward are also colonised by emergent Birch (*Betula* sp.) and Willow (*Salix* sp.). A review of ortho base maps (www.osi.ie) reveals that the site frequently becomes inundated with surface water ponding during winter months especially during periods of high rainfall. There are also several areas where reedbed has established. Purple Moor-grass and Yellow Sedge dominate some smaller sections. There appears to be a significant calcareous influence on the area (as indicated by the extent and presence of Bottle Sedge (*Carex rostrata*)) where shell marl underlies the lower parts of the bog. Black Bog Rush (*Schoenus nigricans*) was noted along drainage channels at several outfall locations in proximity to the Blackwater River. This area is similar in development to the banded area of Blackwater adjacent to Fin Lough where there is some potential for the establishment of rich fen habitat. Much of this vegetation seems to be developing for at least 12 years (the 2000 series aerial photos indicates that there was some vegetation and pools present at this time; www.osi.ie).

Gravel is exposed towards the north-west margin and this section as developed pioneer dry heath and a Purple Moor-grass (*Molinia caerulea*) sward. Gravel is still exposed in several places. There are small patches where there is additional scrub with Birch forming open Birch. This ridge or mound has cut off a small sub-basin along the northern margin where there is also some development of Bottle Sedge-dominated emergent vegetation, forming mosaics with open water.

Further SE there is a tall gravel mound with exposed bog on both sides. This mound is un-wooded and supports dry grassland and some pioneer dry heath. The grassland habitat is variable and to some extent, rank in condition, dominated by Cocksfoot (GS2) with Bent-grass (*Agrostis* sp.). Of particular interest is the appearance of Wood Anemone (*Anemone nemorosa*), an indicator of old woodlands. The species has colonised relatively recently as this section was likely covered in a thin layer of peat prior to the development of the bog. There is some exposed gravel and unvegetated peat to the south of this mound. The area to the north and west of the mound has some scattered gravel and is lightly vegetated with Purple Moor-grass, Soft Rush (*Juncus effusus*) and Bentgrass (*Agrostis* sp.).

The Derries Hill towards the centre of the site has been planted with Oak and Sitka Spruce. There are indications from the old OSI 6 inch map (www.osi.ie) that this area was grazed in the past. The Oak is mature enough to have formed a canopy and was probably planted during the first phase of forestry development/research in 1950's-1960's. The ground cover is dominated by Ivy (*Hedera helix*) and scattered brambles (*Rubus fruticosus* agg.). Other typical Oak-ash-hazel Woodland (WN2) species present include Wood Anemone, Lords and Ladies (*Arum maculatum*), Hogweed (*Heracleum mantegazzianum*), Pignut (*Conopodium majus*) and Lesser Celandine (*Ranunculus ficaria*). Hawthorn (*Crataegus monogyna*), Blackthorn (*Prunus spinosa*) and Privet (*Ligustrum vulgare*) are present in the understorey and Gorse (*Ulex* sp.) is also present where the Oak has performed poorly. Birch has colonised around the margins of the woodland.

A sub-basin has developed in the area to the north of the two mounds. This area is currently unavailable for production. The area is wet with relatively deep remnant peat still present. Conditions are characterised as quaking

underfoot. . The colonising pioneer vegetation of this area is patchy and comprises Bog Cotton and Bog Sedges (*Carex* sp.). Of particular interest is the appearance of Black Bog-rush as part of the pioneer cutaway vegetation. The species was recorded at a particular zone (level) along the margin of the developing wetland growing in association with Purple Moor-grass. It is also relatively widely distributed (probably the largest area colonised by the species so far). There are no other indications of potential rich fen development (i.e. brown mosses) as the vegetation development is still in pioneer stages. Stoneworts were also noted in some of the drainage channels. Local peat staff have reported that this section is fed by a spring and a natural drainage channel can be detected on ortho base maps of the site. The area is also fed by a drain from the north-east margin of the bog and there are some indications of nutrient enrichment as indicated by the presence of Creeping Bent (*Agrostis stolonifera*).

The majority of the south-eastern section of the bog comprises bare peat in active milled peat production. This is the deepest remnant peat and is also higher in elevation. There are some small gravel mounds and ridges exposed south of Derries Hill that are colonising with pioneer poor fen communities including Soft Rush and Bog Cotton. . Other species recorded include Purple Moor-grass.

A section of remnant high bog occurs at the south-eastern section of the bog. The high bog is disturbed and has been impacted by drainage operations. However, it still retains typical raised bog characteristic bryophyte communities such as hummocks of *Sphagnum imbricatum*. *Sphagnum cuspidatum* has started to regenerate in drainage channels that traverse the high bog. Bog Myrtle (*Myrica gale*) occurs around the margins of the high bog. There is some active private sod peat cutting along the margins of this section of high bog. There is also some active private sod peat cutting close to the entrance to the bog via the farm.

The southern bog unit (Kilcommin) is mostly in active milled peat production and is dominated by bare peat. The driest and deepest part is towards the SE of the bog while the north-west was wet and quaking in parts. Local staff report that this section is fed by a spring. There are indications that part of this bog also becomes wet during the winter season. There is a small permanent pool towards the southern margin that is cut off from the rest of the bog by a gravel ridge. Other features of this section include some marginal areas of Bog woodland (WN7) dominated by Birch stands.

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

None

The nearest designated area is Moyclare Bog (0.75 km from the site).

Adjacent habitats and land-use

Much of the margin is planted with conifer plantation (WD4). Other sections are managed as improved grassland (GA1) or wet grassland (GS4) and grazed. There are also some typical unmanaged marginal peatland habitats such as Birch woodland (WN7), scrub (WS1) and abandoned cutover (PB4) and remnant high bog (PB1).

Watercourses (major water features on/off site)

- Belmont is drained by the Blackwater River, which is part of the mid-Shannon catchment.
- The whole of the bog drains to one silt pond adjacent to the river.
- Part of Belmont becomes quite wet during the winter during high water levels. There are some permanent pools of water on the site.

Peat type and sub-soils

Fen peat is exposed at Belmont. Shell marl underlies the peat in the silt pond and under the lowest part of the basin. Gravel is exposed around the margins of the bog in places and in mounds through the centre.

Fauna biodiversity

Birds

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

- A Buzzard was hunting along the River Blackwater.
- Lapwing (8) noted on the bog and at least 1 pair were displaying typical territorial behaviour.
- Mallard (8) were roosting in the wetland.
- Ringed Plover (1) was noted around the exposed gravel area, displaying territorial behaviour.
- Golden Plover (7) were roosting on the bog.
- Skylark (1) was displaying over some Purple Moorgrass grassland on the cutaway.
- More common birds include Heron, Hooded Crow (2), Pheasant, Snipe (5) and Rook. Goldcrest, Chaffinch, Coal Tit, Robin, Wren, Dunnock, Chiffchaff, Mistle Thrush, Redpoll, and Blackbird were noted in the conifer plantations in several places. Mistle Thrush (2), Wood Pigeon (2), Coal Tit, Wren and Pheasant were noted on the Derries Hill.
- Whooper Swan (up to 100) and other wildfowl such as Mallard and Greylag Geese (up to 50) have been recorded in the wetland close to the Blackwater River during the winter.
- Local staff also report that the river and some of the outfalls around the site (in the forestry) are used by Kingfishers, and that they regularly nest along the Blackwater River close to the railway bridge.

Mammals

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

- Hares (3) were observed on the bog.
- Tracks of both Badger and Fox were noted on the bog
- A Pine Marten had been observed by local staff recently.
- Deer (Fallow) are known to use the conifer plantations and tracks were noted on the bog in various places.

Other species

- Tortoiseshell (3), Peacock (2).

References

Cross, J.R. The Potential Natural Vegetation of Ireland. Biology and Environment: Proceeding of the Royal Irish Academy, Vol. 106B, No. 2, 65-116 (2006).

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

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

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

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

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

APPENDIX V. BIOSECURITY

No invasive flora species have been recorded at Belmont Bog. Zebra Mussel *Dreissena polymorpha*, has been recorded in the 10km square N02, as have 6 no. species of vascular plants classified as Invasive Species, 4 no. species of terrestrial mammal classified as Invasive species and 2 no. species of bird classified as Invasive species.

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

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

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

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

In addition to the above, Best Practise measures around the prevention and spread of Crayfish plague⁸ /other aquatic invasive species will be adhered with throughout all rehabilitation measures and activities.

⁸ <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 Blackwater Bog Group (Ref. P0502-01). As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. The bog is part of the Blackwater 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 scheme, (PCAS), across a footprint of 33,000 ha. This proposed scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations under existing EPA IPC licence conditions. Interventions and measures supported by the Scheme will ensure that environmental stabilisation is achieved (meaning IPC obligations are met), and importantly, significant additional benefits, particularly relating to climate action and

other ecosystem services, will also be delivered. However, only the costs associated with the additional and enhanced measures, i.e., those which go beyond the existing decommissioning and rehabilitation requirements arising from Condition 10, will be eligible for support under the proposed Scheme.

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

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 (PCAS)**.

The development of site rehabilitation plans and the delivery of peatland rehabilitation by Bord na Móna is expected to have a positive impact on water quality and will help the 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 2016-2021

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

7 National conservation designations

Bord na Móna operates in a wider landscape that also includes a network of European and National nature conservation sites (Special Areas of Conservation (SACs), Special Protection Areas (SPAs), National Heritage Areas (NHAs, cNHAs) and National Nature Reserves). Bord na Móna will take account of this network of conservation objectives and their conservation objectives when developing these rehabilitation plans. It is expected that peatland rehabilitation will, in general, benefit the conservation objectives of this network of nature conservation sites.

Belmont Bog is located adjacent to the River Blackwater [ShannonBridge]⁹ and in close proximity to several designated conservation sites including Moyclare Bog SAC (Site Code 000581), the Middle Shannon Callows SPA (Site Code 004096) and the River Shannon Callows SAC (Site Code: 000216). The River Suck Callows SPA (Site Code 004097) is ca.7km west.

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

⁹ IE_SH_25B270200. EPA Code 25B27. Source: <https://gis.epa.ie/EPAMaps/>

(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.

Belmont Bog is located in an area zoned by Offaly County Council as open countryside¹⁰.

11 National Archaeology Code of Practise

Bord na Móna operates under an agreed Code of Practice regarding archaeology with the Department of Arts, Heritage and the Gaeltacht and the National Museum of Ireland which provides a framework to enable the Company to progress peat extraction whilst carrying out archaeological mitigation. The Code replaced a set of Principles agreed with the Department of Arts, Heritage and the Gaeltacht in the 1990s. Under the Code Bord na Móna, the Minister and Director work together to ensure that appropriate archaeological mitigation is carried out in advance of peat extraction.

¹⁰ <https://www.offaly.ie/eng/Services/Planning/Development-Plans/County-Development-Plan-2014-2020/Volume-1-9-10-14-FINAL-pdf.pdf>

- 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 EUs headline target for progress by 2020 is to:

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

The Esker 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 any remaining, unconsolidated plant, equipment and attachments, waste materials, unused raw materials such as land drainage pipes, remaining peat stockpiles, stock pile covering, pumps, septic tanks and fuel tanks.

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

Item	Description	Belmont Bog Decommissioning Plan
1	Clean-up of remaining or unconsolidated waste or materials located in Bogs, Yards, Buildings and Offices	Clean-up of Bog
2	Cleaning Silt Ponds	Cleaning Silt Ponds
3	Decommissioning Peat Stockpiles	Peat Stockpile Management via Levelling
4	Decommissioning or Removal of Buildings and Compounds	Not relevant
5	Decommissioning Fuel Tanks and associated facilities	Decommissioning and De-Gassing Mobile Fuel Tanks
6	Decommissioning and Removal of Bog Pump Sites	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.

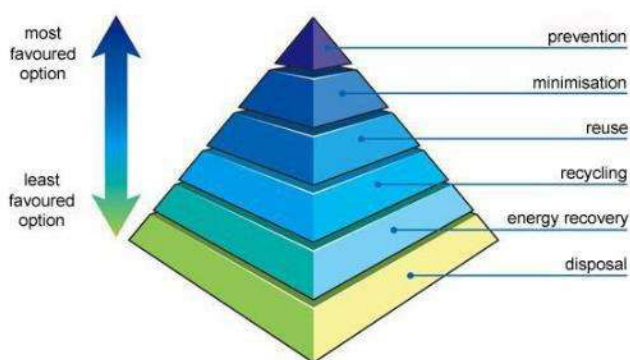
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

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

2. Enhanced Decommissioning.

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

Item	Enhanced Decommissioning Type	Belmont Bog 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 heterogeneous 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 heterogeneous 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 is 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 be 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. P0502-01, Blackwater Group of Bogs in Counties Roscommon, Offaly and Galway,

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 Blackwater 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 Blackwater 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 Blackwater IPPC Licence Ref. P0502-01.

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
Belmont	Offaly County Council - Chief Executive	General E-mail Contact	26/01/2021	E-mail		
Belmont	Offaly County Council - Senior Planner	General E-mail Contact	26/01/2021	E-mail		
Belmont	Offaly County Council - Director of Services	General E-mail Contact	26/01/2021	E-mail		
Belmont	Offaly County Council -	General E-mail Contact	26/01/2021	E-mail		
Belmont	Offaly County Council - Heritage Officer	General E-mail Contact	26/01/2021	E-mail		
Belmont	Offaly County Councillors - Edenderry District	Cllr. Mark Hackett	26/01/2021	E-mail		
Belmont	Offaly County Councillors - Edenderry District	Cllr. Noel Cribbin	26/01/2021	E-mail		
Belmont	Offaly County Councillors - Edenderry District	Cllr. Eddie Fitzpatrick	26/01/2021	E-mail		
Belmont	Offaly County Councillors - Edenderry District	Cllr. John Foley	26/01/2021	E-mail		
Belmont	Offaly County Councillors - Edenderry District	Cllr. Robert McDermott	26/01/2021	E-mail		
Belmont	Offaly County Councillors - Edenderry District	Cllr. Liam Quinn	26/01/2021	E-mail		
Belmont	Offaly County Councillors - Birr District	Cllr. John Carroll	26/01/2021	E-mail		
Belmont	Offaly County Councillors - Birr District	Cllr. John Clendennon	26/01/2021	E-mail		
Belmont	Offaly County Councillors - Birr District	Cllr. Eamonn Dooley	26/01/2021	E-mail		
Belmont	Offaly County Councillors - Birr District	Cllr. John Leahy	26/01/2021	E-mail		
Belmont	Offaly County Councillors - Birr District	Cllr. Clare Claffey	26/01/2021	E-mail		

Belmont	Offaly County Councillors - Birr District	Cllr. Peter Ormond	26/01/2021	E-mail		
Belmont	Offaly County Councillors - Tullamore District	Cllr. Neil Feighery	26/01/2021	E-mail		
Belmont	Offaly County Councillors - Tullamore District	Cllr. Tony McCormack	26/01/2021	E-mail		
Belmont	Offaly County Councillors - Tullamore District	Cllr. Declan Harvey	26/01/2021	E-mail		
Belmont	Offaly County Councillors - Tullamore District	Cllr. Sean O'Brien	26/01/2021	E-mail		
Belmont	Offaly County Councillors - Tullamore District	Cllr. Ken Smollen	26/01/2021	E-mail		
Belmont	Offaly County Councillors - Tullamore District	Cllr. Frank Moran	26/01/2021	E-mail		
Belmont	Offaly County Councillors - Tullamore District	Cllr Danny Owens	26/01/2021	E-mail		
Belmont	TD Laois/Offaly	Barry Cowen TD	26/01/2021	E-mail		
Belmont	TD Laois/Offaly	Charlie Flanagan TD	26/01/2021	E-mail		
Belmont	TD Laois/Offaly	Sean Fleming TD	26/01/2021	E-mail		
Belmont	TD Laois/Offaly	Carol Nolan TD	26/01/2021	E-mail		
Belmont	TD Laois/Offaly	Brian Stanley TD	26/01/2021	E-mail		
Belmont	Eastern and Midland Regional Assembly	General E-mail Contact	26/01/2021	E-mail		
Belmont	Environmental Protection Agency	General E-mail Contact	26/01/2021	E-mail		
Belmont	National Parks and Wildlife Service	General E-mail Contact	26/01/2021	E-mail	Ongoing Dialogue	E-mail
Belmont	NPWS Regional Network	District Conservation Officer	26/01/2021	E-mail		
Belmont	Dept of the Housing Local Government and Heritage	Malcom Noonan (Minister of State at the Department of Housing, Local Government and Heritage)		E-mail		
Belmont	National Monuments Service	General E-mail Contact	26/01/2021	E-mail		
Belmont	National Museum of Ireland (Irish Antiquities Division)	General E-mail Contact	26/01/2021	E-mail	28/12/2020	E-mail

Belmont	Minister for Environment, Climate and Communications	Minister - Eamon Ryan		E-mail		
Belmont	Minister of state for Agriculture with responsibility for Land use and Biodiversity	Pippa Hackett Minister of State for Land Use and Biodiversity)		E-mail		
Belmont	Inland Fisheries Ireland	General E-mail Contact	26/01/2021	E-mail		
Belmont	Waterways Ireland	General E-mail Contact	26/01/2021	E-mail		
Belmont	The Heritage Council	General E-mail Contact	26/01/2021	E-mail		
Belmont	An Forum Uisce (The Water Forum)	General E-mail Contact	26/01/2021	E-mail		
Belmont	OPW	General E-mail Contact	26/01/2021	E-mail	Ongoing Dialogue	E-mail
Belmont	Inland Waterways Association Offaly	General E-mail Contact	26/01/2021	E-mail		
Belmont	An Taisce	General E-mail Contact	26/01/2021	E-mail		
Belmont	Friends of the Earth	General E-mail Contact	26/01/2021	E-mail		
Belmont	Friends of the Irish Environment	General E-mail Contact	26/01/2021	E-mail		
Belmont	Birdwatch Ireland	General E-mail Contact	26/01/2021	E-mail		
Belmont	Irish Peatlands Conservation Council	General E-mail Contact	26/01/2021	E-mail	Ongoing Dialogue	E-mail
Belmont	Irish Wildlife Trust	General E-mail Contact	26/01/2021	E-mail		
Belmont	Bat Conservation Ireland	General E-mail Contact	26/01/2021	E-mail		
Belmont	Woodlands of Ireland	General E-mail Contact	26/01/2021	E-mail		
Belmont	Butterfly Conservation Ireland	General E-mail Contact	26/01/2021	E-mail	13/02/2021	E-mail
Belmont	Community Wetlands Forum (part of Irish Rurallink)	General E-mail Contact	26/01/2021	E-mail		
Belmont	Turf Cutters and Contractors Association	Postal Communication	15/01/2021	Post		
Belmont	Offaly Public Participation Network (PPN)	General E-mail Contact	26/01/2021	E-mail		
Belmont	Sustainable Water Action Network (SWAN)	General E-mail Contact	26/01/2021	E-mail		

Belmont	Irish Farmers Association (Laois Offaly and Westmeath Office)	General E-mail Contact	26/01/2021	E-mail	Ongoing Dialogue	E-mail
Belmont	Irish Farmers Association (Head Office)	General E-mail Contact	26/01/2021	E-mail		
Belmont	National Association of Regional Game Councils	nargc@nargc.ie	02/01/2021	E-mail	01/02/2021	E-mail
Belmont	ICMSA (Irish Creamery Milk Suppliers Association)	General E-mail Contact	26/01/2021	E-mail	Ongoing Dialogue	E-mail
Belmont	ICSA (Irish Cattle and Sheep Farmers Association)	General E-mail Contact	26/01/2021	E-mail		
Belmont	Midlands & East Regional WFD Operational Committee	General E-mail Contact	26/01/2021	E-mail		
Belmont	Shannon Flood Risk State Agency Co-ordination Working Group	General E-mail Contact	26/01/2021	E-mail		
Belmont	CARO (Climate Action Regional Office) Eastern and Midlands	General E-mail Contact	26/01/2021	E-mail		
Belmont	Irish Raptor Study Group	General E-mail Contact	26/01/2021	E-mail		
Belmont	Coillte	Multilple Staff Members	26/01/2021	E-mail		

Table APXI -2 Response summary from Consultees contacted

Organisation	Summary of Response by Stakeholder	BnM Response
Irish Peatlands Conservation Council	<p>Responded to consultation regarding Belmont 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. Also, BnM advised;</p> <ol style="list-style-type: none"> 1) BnM have included DOC as an additional parameter on our suite of water monitoring analysis. 2) BnM are working with LAWCO and WFD to align the BNM monitoring programme with the EPA's 2021 Monitoring programme 3) BnM have an extensive community consultation process ongoing with a dedicated Community Liaison Officer communicating to affected and interested parties
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 Belmont.</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 Belmont Bog. A virtual meeting on PCAS between BnM and NMI was held on 18/01/2021</p>

Irish Farmers Association	<p>Responded to consultation regarding Belmont 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. 	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.
The Heritage Council	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.	BnM responded via phone conversation on 11/01/2021. Dialogue is ongoing.
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. 	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.
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 	BnM acknowledged and will give due cognisance to all points raised in the submission by Trinity College Researcher in the rehabilitation plan for Belmont Bog and other PCAS projects. BnM raised responded via e-mail.
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. 	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.

Butterfly Conservation Ireland	Responded to consultation via e-mail with submission on Belmont. Concerns raised were: 1) Alterations to the text of the rehab plan. 2) Request for all turf cutting on BnM land to end. 4) Suggest monitoring for Large Heath Butterfly or food plant Hare's-tail Cottongrass. 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 6) Advised BnM to ensure that quality habitats already found on site are not damaged by PCAs activities.	BnM acknowledged via e-mail; Phone conversation with BCI on 19/01/2021.
ICMSA (Irish Creamery Milk Suppliers Association)	Virtual meeting/PCAS presentation organised for 03/03/2021.	A meeting was held by BnM on 03/03/2021 to present details on PCAS to the ICMSA and members. Dialogue is ongoing.
University College Dublin	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.	BnM acknowledged and will give due cognisance to all points raised in the submission by UCD Researcher in the rehabilitation plan for Belmont Bog and other PCAS projects.
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 an explanation via e-mail on 01/12/2020.

APPENDIX XII. ARCHAEOLOGY

Archaeological Impact Assessment of Proposed Bog Rehabilitation at Belmont Bog. Dr. Charles Mount.



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

Report For

Bord Na Móna Energy Ltd.

Author

Dr. Charles Mount

Bord Na Móna Project Archaeologist



Introduction

The EPA (2020) *Guidance on the process of preparing and implementing a bog rehabilitation plan* notes that the licensee should characterise the bog prior to embarking on detailed planning and implementation. This characterisation should detail how the land is classified in terms of statutory protections, e.g. as European sites, world heritage sites, RAMSAR sites, National Heritage Areas, national monuments, archaeological heritage, etc. This archaeological impact assessment report was prepared by Dr. Charles Mount for Bord na Móna Energy Ltd, 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.318 hectares at Belmont 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 Belmont Bog will include:

- Blocking field drains in the former industrial production area to create regular peat blockages (three blockages per 100 m) along each field drain;
- Re-alignment of piped drainage; and management of water levels to create wetlands;
- No measures are planned for the other surrounding marginal peatland habitats.
- Silt ponds will continue to be maintained during the rehabilitation and decommissioning phase.
- Evaluate success of short-term rehabilitation measures and enhance where necessary.
- Decommissioning of silt-ponds will be assessed and carried out, where required.

Belmont Bog is located c.1kmm north of Belmont, Co. Offaly, and north of the L3009 road. The overall rehabilitation area occupies the townlands of Clonbonniff, Derryhask, Derrylahan, Faddan Beg, Faddan More, Kilcummin and Lisduff on OS 6 inch sheet Offaly No. 14.

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

- The IAWU Peatland Survey
- The Record of Monuments and Places
- 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.



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 Belmont Bog before that date. This review established that there are no RMPs situated in the proposed rehabilitation area or the vicinity (see Fig. 1).

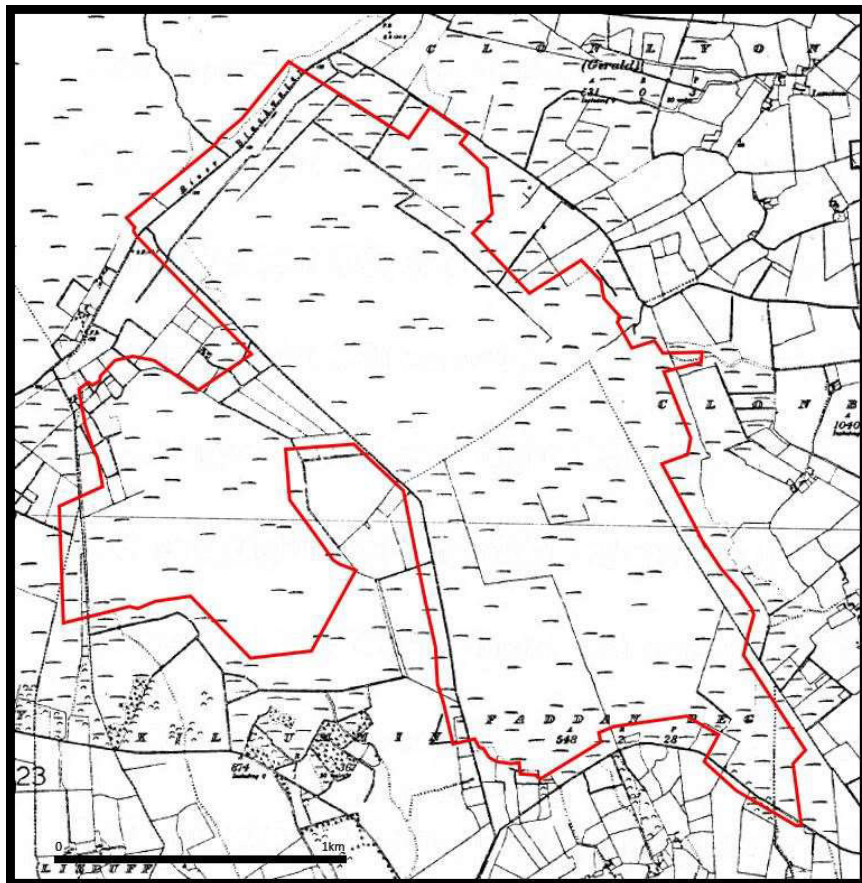


Fig. 1. Belmont Bog, Co. Offaly, detail of the Record of Monuments and Places map sheet No. 14. The proposed rehabilitation area is outlined with the red line. There are no Recorded Monuments in the rehabilitation area.

Peatland survey

Belmont Bog was surveyed by the Irish Archaeological Wetland Unit (IAWU) in 1992 as part of the Archaeological Survey of Ireland Peatland Survey (Unlicensed). There was one sighting of archaeological material recorded during the survey in Clonbonniff townland. This was described as an irregular spread (Wth 1.6m; D 0.15m) of brushwood, roundwoods (diam. 0.07-0.18m) and pegs with no discernible structure. Some pockets of charcoal were located amongst the wood. Several species were recorded including ash, birch and hazel and large growth rings were noted on the ash and birch timbers. Two of the pegs (L 0.35m) had worked ends, one of which was hazel. The site was destroyed before its location could be surveyed and there were no locational coordinates recorded (see table 1).



SMR_NO	SMR Class	IAWU Cat._No.	IAWU Class	Townland	N.G.R. E	N.G.R. N	Depth BS m
OF014-051----	Road - class 3 togher	OF-CBN 0001	TOGH	Clonbonniff	-	-	-

Table 1. List of sites recorded by the IAWU in Belmont 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 28th 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 is one sighting in the SMR in the proposed rehabilitation area. SMR OF014-051---- is a Road - class 3 togher identified by the IAWU in 1992 but destroyed before its location could be surveyed (see table 1). There were no locational coordinates recorded and the location of the siting is not marked on the SMR mapping.

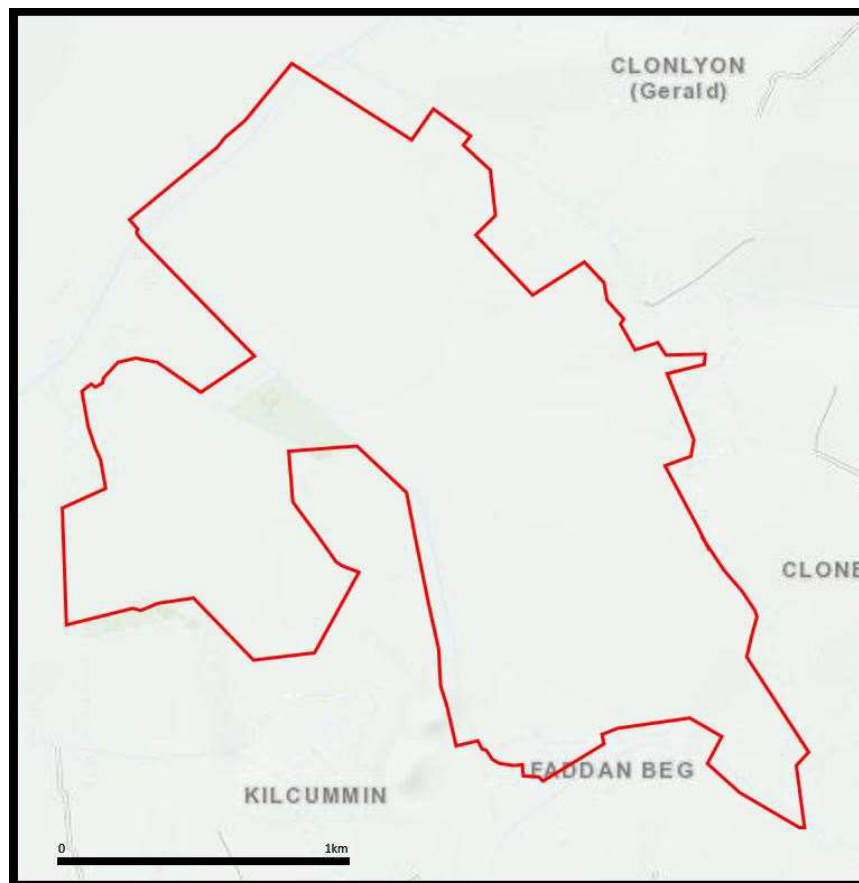
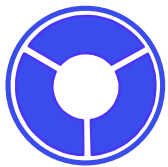


Fig. 2. Belmont Bog, Co. Offaly, detail of the Sites and Monuments Record. The proposed rehabilitation area is outlined with the red line. There is one SMR (now destroyed) in the rehabilitation area but its original location was not recorded and it is not marked on the SMR mapping.

Reported finds

The topographical files of the National Museum of Ireland were searched for records of finds from the bog and vicinity in April 2021 (thanks to Isabella Mulhall) and the finds are included below in Table 1. Note the burials and ring (1945:144 -144.8) were found during ploughing of a field on a farm at Faddan Beg, Ferbane, Co. Offaly and not in Belmont Bog.



Townland	Museum No.	Description
Clonbonniff	1990:110	Roughout for a wooden churn
Faddan Beg	1945:144	Bronze ring
Faddan Beg	1945:144.1	Human remains
Faddan Beg	1945:144.2	Human remains
Faddan Beg	1945:144.3	Human remains
Faddan Beg	1945:144.4	Human remains
Faddan Beg	1945:144.5	Human remains
Faddan Beg	1945:144.6	Human remains
Faddan Beg	1945:144.7	Human remains
Faddan Beg	1945:144.8	Human remains
Kilcummin	RIA1913:3.	Leather shoe. "Found in a bog near Kilcummin

Table 2. List of archaeological finds from Belmont Bog and vicinity 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

Belmont 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 1992 and noted that there was a moderate potential for archaeological features to be uncovered during the course of any future development works in Belmont Bog.

Impact assessment

There are no known surviving archaeological sites in the rehabilitation area. A single known archaeological find from the bog is a Roughout for a wooden churn (see Table 1).

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.

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 surviving archaeological sites in the rehabilitation area. A single known archaeological find from the bog is a Roughout for a wooden churn. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it should be avoided and reported to the Bord na Móna Archaeological Liaison Officer and the National Museum of Ireland.



References

DAHGI 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
5 May 2021

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	13/19/2020	First release	EMcD
2			

Appendix C Site Synopses

SITE SYNOPSIS

SITE NAME: MIDDLE SHANNON CALLOWS SPA

SITE CODE: 004096

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

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Whooper Swan, Wigeon, Corncrake, Golden Plover, Lapwing, Black-tailed Godwit and Black-Headed Gull. It is also of special conservation interest for holding an assemblage of over 20,000 wintering waterbirds. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

The Middle Shannon Callows qualifies as a site of international importance as it regularly supports in excess of 20,000 wintering waterbirds (23,656 – four year mean peak for four of the winters between 1995/96 and 1999/2000). The site also supports internationally important populations of Whooper Swan (305 – five year mean peak for the period 1995/96 to 1999/2000) and Black-tailed Godwit (485 – four year mean peak for four of the winters between 1995/96 and 1999/2000). Four further species of wintering waterbird occur in numbers of national importance, i.e. Wigeon (3,059), Golden Plover (4,133), Lapwing (13,240) and Black-headed Gull (1,209) – all figures are four year mean peaks for four of the winters between 1995/96 and 1999/2000.

The Shannon Callows is the largest site monitored as part of I-WeBS and many parts of it are inaccessible on the ground. Annual monitoring of the wintering waterbirds of the Shannon Callows is undertaken by aerial surveys in January/February with some areas also covered by ground counts. The importance of the site for some species may have been underestimated if count coverage missed the brief spring peaks for these species, e.g. peak counts of Lapwing (23,409) and Black-tailed Godwit (1,096) recorded in the baseline period (1995/96 to 1999/2000) have been considerably higher than the four year means. A wide range of other species occurs within the site, including Mute Swan (407), Teal (88), Tufted Duck (41), Dunlin

(335), Curlew (162) and Redshank (39). Small numbers of Greenland White-fronted Goose use the Shannon Callows (peak 55 in 1998/99) and these are generally associated with larger flocks which occur on the adjacent Little Brosna Callows and River Suck Callows. The callow grasslands provide optimum feeding grounds for these various species of waterfowl, while many of the birds also roost or rest within the site.

The Shannon Callows is also an important site for breeding waders with the total population on the Shannon and Little Brosna Callows being one of three major concentrations in Ireland and Britain in 1987. Numbers of some species have declined since then but a survey of the Shannon Callows in 2002 recorded the following breeding waders - Lapwing (63 pairs), Redshank (116 pairs), Snipe (139 drumming birds) and Curlew (8 pairs). Black-tailed Godwit, a very rare breeding species in Ireland, nests or attempts to nest in small numbers each year within the site. A further scarce breeding species, Shoveler, also nests in small numbers each year (an estimated 12 pairs in 1987).

The Middle Shannon Callows SPA supports a breeding population of Corncrake (19 pairs - five year mean peak between 2003 and 2007, based on records of calling males).

Corncrake winter in southern and eastern Africa, migrating northwards to arrive on their breeding grounds from early April onwards, departing again in August and September. They require the cover of tall vegetation throughout their breeding cycle and are strongly associated with meadows which are harvested annually, where they nest and feed. Annual cutting of these meadows creates a sward which is easy for the birds to move through. Other habitats, which can provide cover for Corncrake in the early and late stages of the breeding season, are also important for this species.

Corncrake is listed on the 2010 International Union for Conservation of Nature (IUCN) Red List of Threatened Species. This is due to population and range declines of more than 50% in the last 25 years across significant parts of its range.

Quail, a related, scarce species, is also known to breed within the callow grasslands.

A good variety of other bird species are attracted to the site. Birds of prey, including scarce species such as Merlin and wintering Hen Harrier have been recorded hunting over the callows. A range of passerine species associated with grassland and swamp vegetation breed, including Sedge Warbler, Grasshopper Warbler, Skylark and Reed Bunting. Kingfisher is also known to occur within the site. Whinchat, an uncommon breeding species, occurs in small numbers.

The Middle Shannon Callows SPA is an internationally important site that supports an assemblage of over 20,000 wintering waterbirds. It holds internationally important populations of two species - Whooper Swan and Black-tailed Godwit. In addition, there are four species that have wintering populations of national importance. The site also supports a nationally important breeding population of Corncrake. Of particular note is that several of the species which occur regularly are listed on Annex I of the E.U. Birds Directive, i.e. Whooper Swan, Corncrake and Golden Plover.

10.1.2012



Site Name: River Shannon Callows SAC

Site Code: 000216

The River Shannon Callows is a long and diverse site which consists of seasonally flooded, semi-natural, lowland wet grassland, along and beside the river between the towns of Athlone and Portumna. It is approximately 50 km long and averages about 0.75 km wide (reaching 1.5 km wide in places). Along much of its length the site is bordered by raised bogs (many, but not all, of which are subject to large-scale harvesting), esker ridges and limestone-bedrock hills. The soils grade from silty-alluvial to peat. This site has a common boundary, and is closely associated, with two other sites with similar habitats, River Suck Callows and Little Brosna Callows.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[6410] <i>Molinia</i> Meadows
[6510] Lowland Hay Meadows
[7230] Alkaline Fens
[8240] Limestone Pavement*
[91E0] Alluvial Forests*
[1355] Otter (<i>Lutra lutra</i>)

The River Shannon Callows is mainly composed of lowland wet grassland. Different plant communities occur, depending on elevation, and therefore flooding patterns. Two habitats listed on Annex I of the E.U. Habitats Directive are well-represented within the site – *Molinia* meadows and lowland hay meadows. The former is characterised by the presence of the Meadow Thistle (*Cirsium dissectum*) and Purple Moor-grass (*Molinia caerulea*), while typical species in the latter include Meadow Fescue (*Festuca pratensis*), Rough Meadow-grass (*Poa trivialis*), Downy Oat-grass (*Avenula pubescens*), Common Knapweed (*Centaurea nigra*), Ribwort Plantain (*Plantago lanceolata*) and Common Sorrel (*Rumex acetosa*). In places these two habitats grade into one another.

Low-lying areas of the callows with more prolonged flooding are characterised by Floating Sweet-grass (*Glyceria fluitans*), Marsh Foxtail (*Alopecurus geniculatus*) and wetland herbs such as Yellow-cress (*Rorippa* spp.), Water Forget-me-not (*Myosotis scorpioides*) and Common Spike-rush (*Eleocharis palustris*). Most of the callows consist of a plant community characterised by Creeping Bent (*Agrostis stolonifera*), Brown Sedge (*Carex disticha*), Common Sedge (*Carex nigra*), and herbs such as Marsh-marigold (*Caltha palustris*) and Marsh Bedstraw (*Galium palustre*), while the more

elevated and peaty areas are characterised by low-growing sedges, particularly Yellow Sedge (*Carex flava* agg.) and Star Sedge (*Carex echinata*). All these communities are very diverse in their total number of plant species, and include the scarce species Meadow-rue (*Thalictrum flavum*), Summer Snowflake (*Leucojum aestivum*) and Marsh Stitchwort (*Stellaria palustris*).

A further two Annex I habitats, both listed with priority status, have a minor though important presence within the site. Alluvial forest occurs on a series of alluvial islands just below the ESB weir near Meelick. Several of the islands are dominated by well-grown woodland consisting mainly of Ash (*Fraxinus excelsior*) and Willows (*Salix* spp.). The islands are prone to regular flooding from the river.

At Clorhane, an area of limestone pavement represents the only known example in Co. Offaly. It is predominantly colonised by mature Hazel (*Corylus avellana*) woodland, with areas of open limestone and calcareous grassland interspersed. The open limestone pavement comprises bare or moss-covered rock, or rock with a very thin calcareous soil cover supporting a short grassy turf. The most notable plant in the grassy area is a substantial population of Green-winged Orchid (*Orchis morio*), which occurs with such species as Sweet Vernal-grass (*Anthoxanthum odoratum*), Quaking-grass (*Briza media*), sedges (*Carex caryophyllea*, *C. flacca*), Common Bird's-foot-trefoil (*Lotus corniculatus*), Common Knapweed (*Centaurea nigra*), and Ribwort Plantain (*Plantago lanceolata*). Ferns associated with the cracks in the pavement include *Asplenium trichomanes*, *A. ruta-muraria*, *A. adiantum-nigrum* and *Polypodium australe*. Bryophytes include *Grimmia apocarpa* and *Orthotrichum* cf. *anomalum*. Anthills are common within the open grassland. The Hazel wood is well-developed and has herbaceous species such as Primrose (*Primula vulgaris*), Common Dog-violet (*Viola riviniana*), Wood-sorrel (*Oxalis acetosella*) and Herb-Robert (*Geranium robertianum*). The wood is noted for its luxuriant growth of epiphytic mosses and liverworts, with such species as *Neckera crispa* and *Hylocomium brevirostre*. Yew (*Taxus baccata*) occurs in one area.

Other habitats of smaller area but also of importance within the site are lowland dry grassland, drainage ditches, freshwater marshes and reedbeds. The dry grassland areas, especially where they exist within hay meadows, are species-rich, and of two main types: calcareous grassland on glacial material, and dry grassland on levees of river alluvium. The former can contain many orchid species, Cowslip (*Primula veris*), abundant Adder's-tongue (*Ophioglossum vulgatum*) and Spring-sedge (*Carex caryophyllea*), and both contain an unusually wide variety of grasses, including False Oat-grass (*Arrhenatherum elatius*), Yellow Oat-grass (*Trisetum flavescens*), Meadow Foxtail (*Alopecurus pratense*), and Meadow Brome (*Bromus commutatus*). In places Summer Snowflake also occurs.

Good quality habitats on the edge of the callows included in the site are wet broadleaved semi-natural woodland dominated by both Downy Birch (*Betula pubescens*) and Alder (*Alnus glutinosa*), and dry broadleaved woodland dominated by Hazel. There are also areas of raised bog, fen on old cut-away bog with Black Bog-rush (*Schoenus nigricans*), and a 'petrifying stream' with associated species-rich

calcareous flush which supports Yellow Sedge (*Carex lepidocarpa*), Blunt-flowered Rush (*Juncus subnodulosus*) and Stoneworts (*Chara* spp.).

Immediately south of Portumna Bridge and south east of the town of Portumna the area of low-lying terrestrial land west of the river comprises a large area of the Annex I habitat alkaline fen. The fen comprises a complex of rich-fen plant communities. Sedges (*Carex lasiocarpa*, *Carex acutiformis*) and Bogbean (*Menyanthes trifoliata*) dominate parts of the fens while other small sedges are common throughout. The orchids Early Marsh Orchid (*Dactylorhiza incarnata*), Western Marsh Orchid (*D. majalis*) and Marsh Helleborine (*Epipactis palustris*) and the red-listed plant species Marsh Pea (*Lathyrus palustris*) have been recorded within the fen.

Two species which are legally protected under the Flora (Protection) Order, 2015, occur in the site - Opposite-leaved Pondweed (*Groenlandia densa*) in drainage ditches, and Meadow Barley (*Hordeum secalinum*) on dry alluvial grassland. This is one of only two known inland sites for Meadow Barley in Ireland. The Red Data Book plant Green-winged Orchid is known from dry calcareous grasslands within the site.

The site is of international importance for wintering waterfowl as numbers regularly exceed the 20,000 threshold (mean of 34,985 for five winters 1994/94-1998/99). Of particular note is an internationally important population of Whooper Swans (287). A further five species have populations of national importance (all figures are means for five winters 1995/96-1999/00): Mute Swan (349), Wigeon (2972), Golden Plover (4254), Lapwing (11578) and Black-tailed Godwit (388). Species which occur in numbers of regional or local importance include Bewick's Swan, Tufted Duck, Dunlin, Curlew and Redshank. The population of Dunlin is notable as it is one of the few regular inland flocks in Ireland. Small flocks of Greenland White-fronted Goose use the Shannon Callows; these are generally associated with larger flocks which occur on the adjacent Little Brosna Callows and River Suck Callows.

Shoveler (an estimated 12 pairs in 1987) and Black-tailed Godwit (Icelandic race) (one or two pairs in 1987) breed within this site. These species are listed in the Red Data Book as being threatened in Ireland. The scarce bird Quail is also known to breed within the area. The callows has at times held over 40% of the Irish population of the globally endangered Corncrake, although numbers have declined in recent years. A total of 66 calling birds were recorded in 1999, but numbers have dropped significantly since then. The total population of breeding waders (Lapwing, Redshank, Snipe and Curlew) in 1987 was one of three major concentrations in Ireland and Britain. The population of breeding Redshank in the site was estimated to be 10% of the Irish population, making it nationally significant. Also, the Annex I species Merlin and Hen Harrier are regularly reported hunting over the callows during the breeding season and in autumn and winter.

This site holds a population of Otter, a species listed on Annex II of the E.U. Habitats Directive, while the Irish Hare, which is listed in the Irish Red Data Book, is a common sight on the callows.

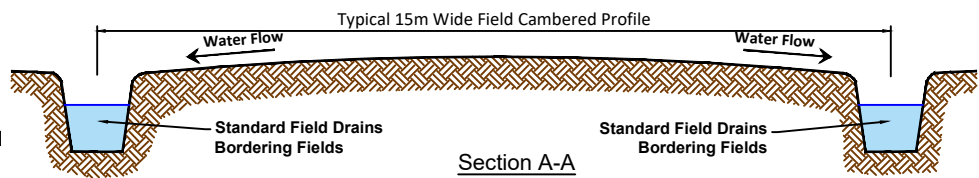
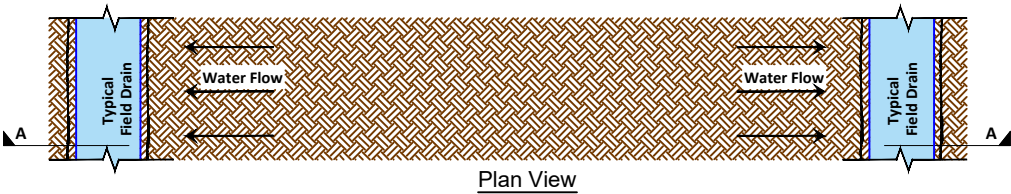
The Shannon Callows are used for summer dry-stock grazing (mostly cattle, with some sheep and a few horses), and permanent hay meadow. About 30 ha is a nature reserve owned by voluntary conservation bodies. The River Shannon is used increasingly for recreational purposes with coarse angling and boating accounting for much of the visitor numbers. Intermittent and scattered damage to the habitats has occurred due to over-deepening of drains and peat silt deposition, water-skiing, ploughing and neglect of hay meadow (or reversion to pasture). However, none of these damaging activities can yet be said to be having a serious impact. Threats to the quality of the site may come from the siting of boating marinas in areas away from centres of population, fertilising of botanically-rich fields, the use of herbicides, reversion of hay meadow to pasture, neglect of pasture and hay meadow, disturbance of birds by boaters, anglers, birdwatchers and the general tourist. The maintenance of generally high water levels in winter and spring benefits all aspects of the flora and fauna, but in this regard, summer flooding is a threat to breeding birds, and may cause neglect of farming.

The Shannon Callows has by far the largest area of lowland semi-natural grassland and associated aquatic habitats in Ireland, and one in which there is least disturbance of natural wetland processes. Botanically, it is extremely diverse with two legally protected species of plants and many scarce species. Excellent examples of two habitats listed on Annex I of the E.U. Habitats Directive occur within the site – *Molinia* meadows and lowland hay meadows with good examples of a further three Annex habitats (two with priority status). In winter the site is internationally important for numbers and species of waterfowl. In spring it feeds large numbers of birds on migration, and in summer it holds very large numbers of breeding waders, rare breeding birds and the endangered Corncrake, as well as a very wide variety of more common grassland and wetland birds. The presence of Otter, an Annex II species, adds further importance to the site.

Appendix D: Methodology Drawings

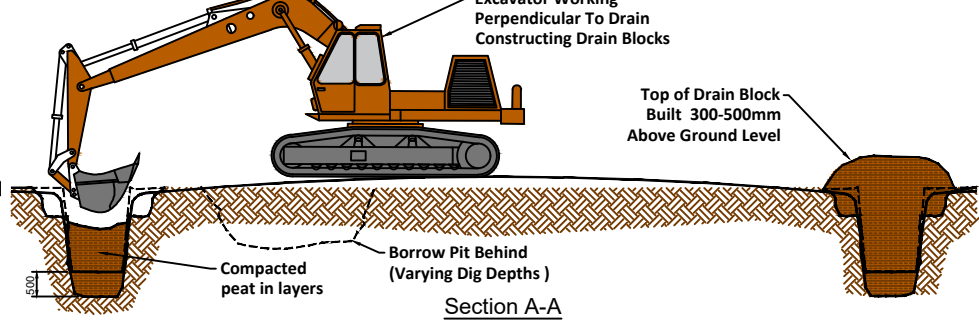
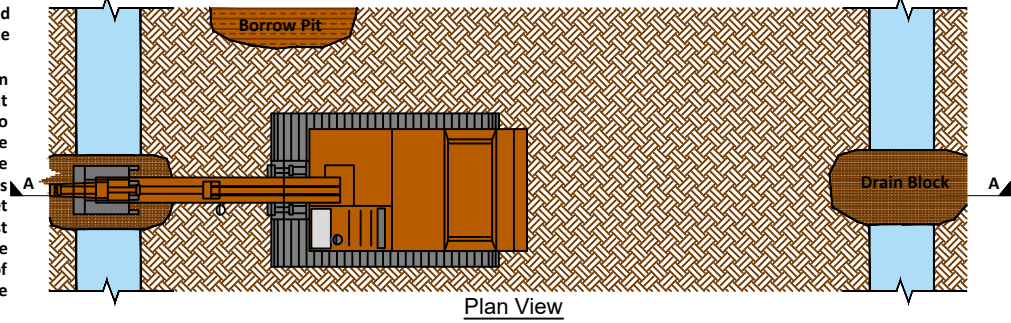
Existing Layout:

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



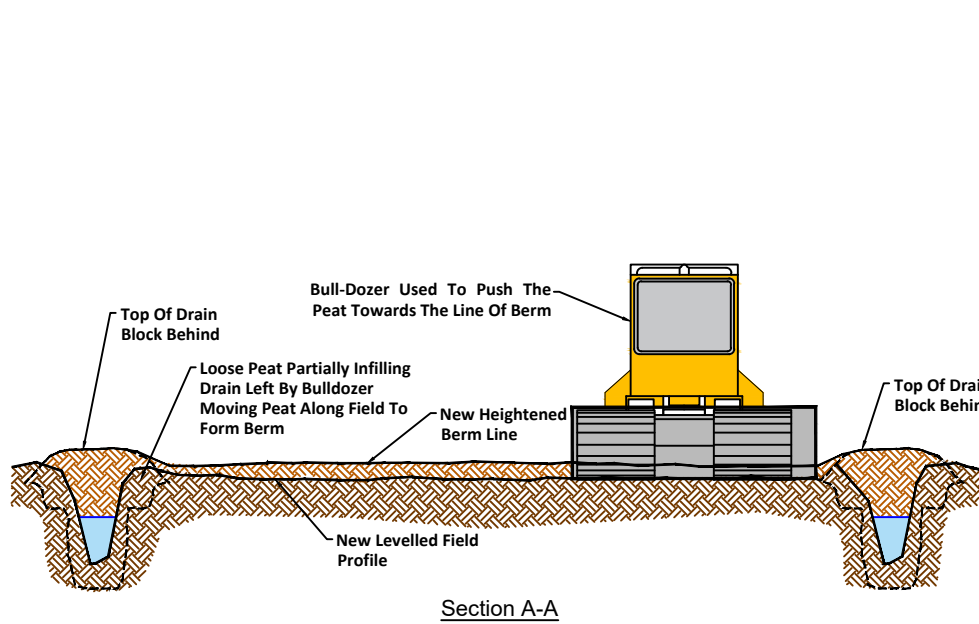
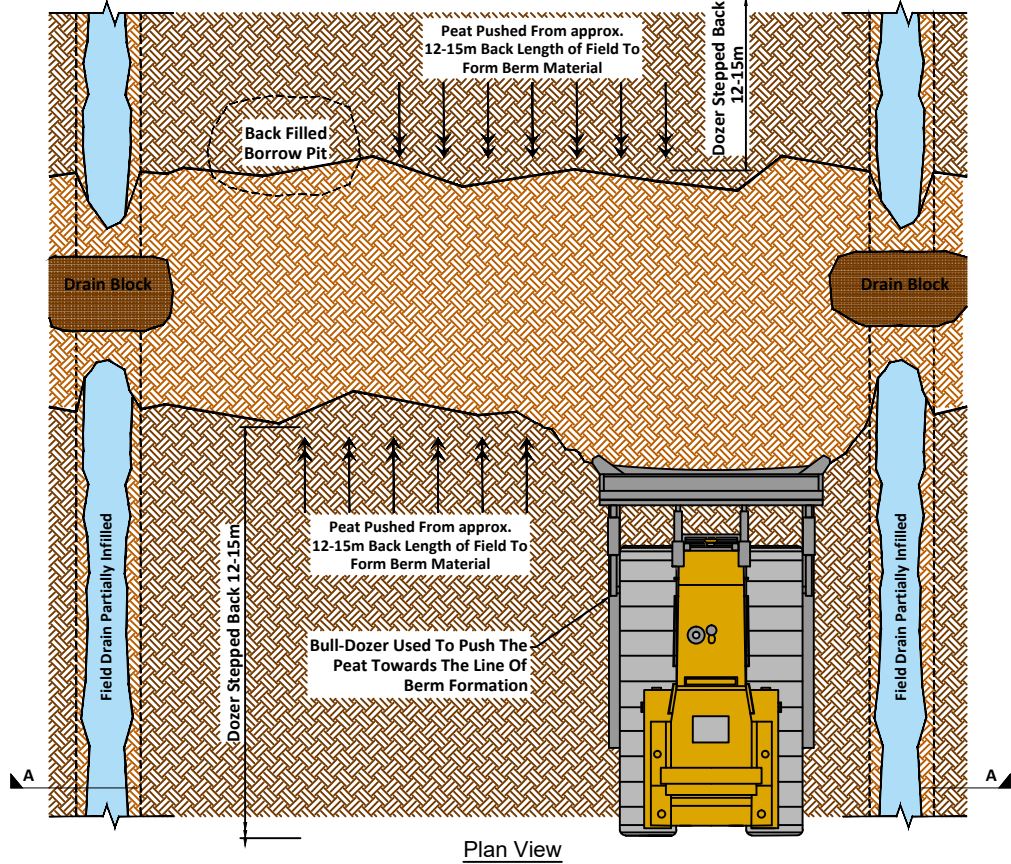
Phase 1
Drain Blocking

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



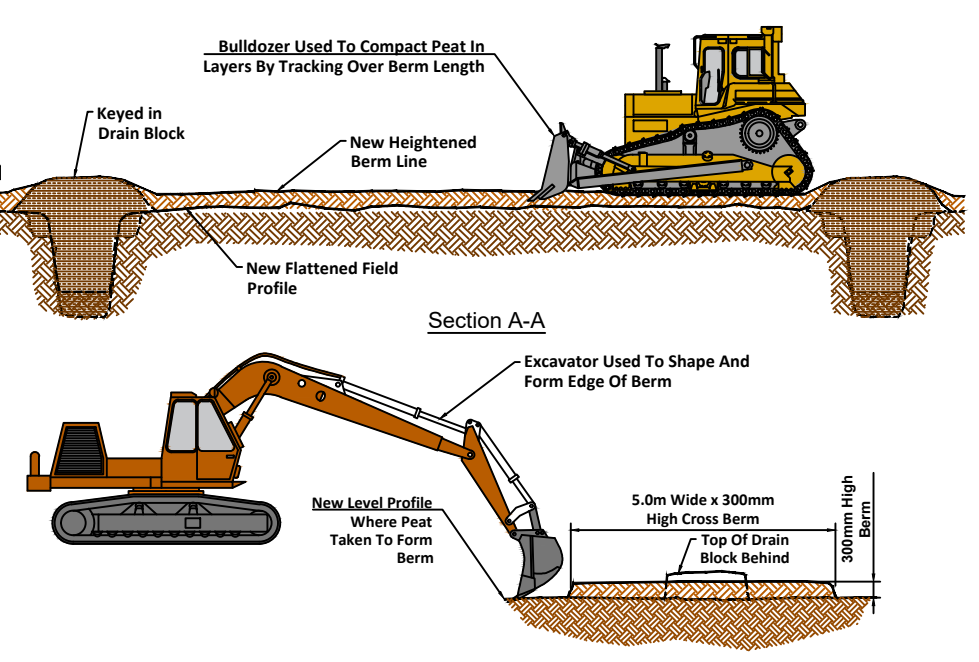
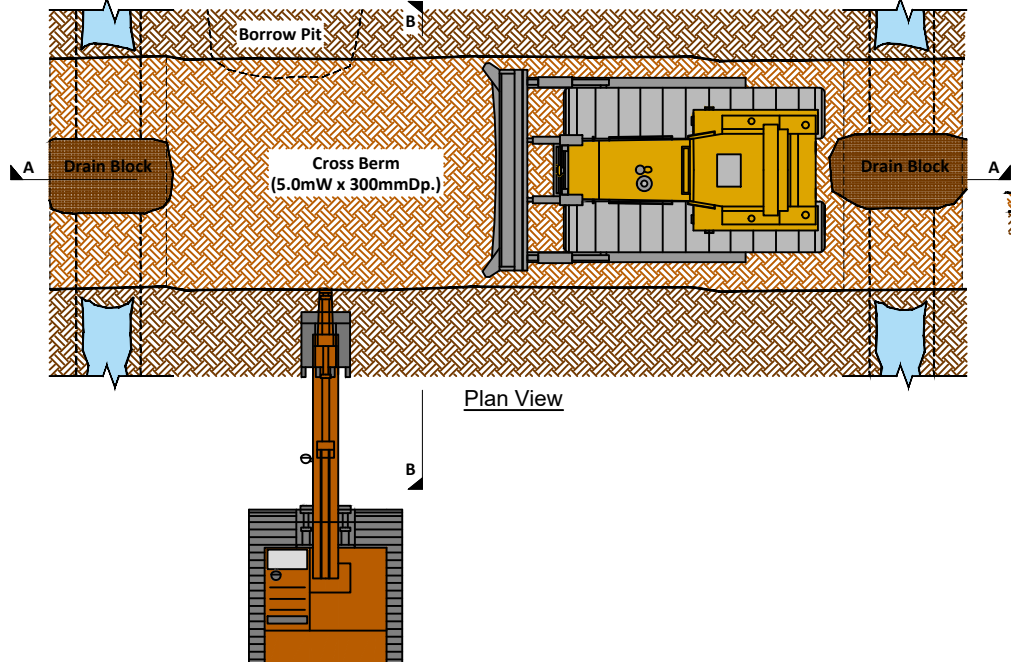
Phase 2
Field Re-profiling And Levelling

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



Phase 3
Cross Berm

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



NOTES:

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

STATUS

00	Issued For Information	P.K.	77/04/21	
Rev	Description	Issued By	Date	

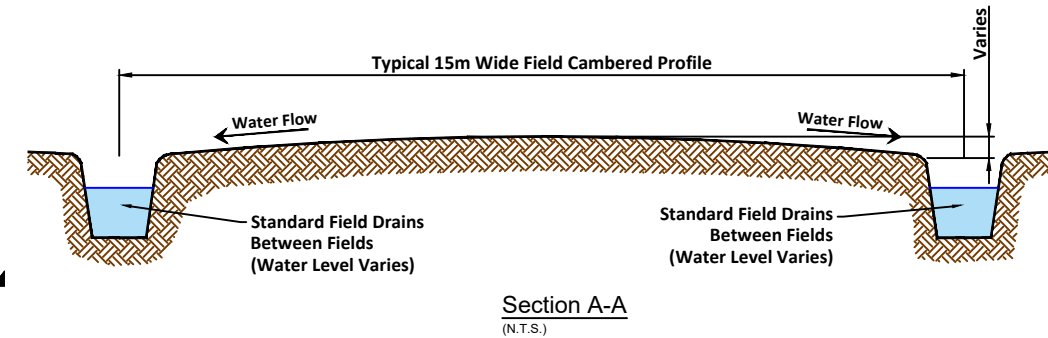
BORD NA MONA
Naturally Driven
Bord Na Móna Engineering Department
LEABEG, TULLAMORE CO. OFFALY
Tel. 057 9345900
Fax. 057 9345160

PROJECT:
Peatland Climate Action Scheme
PCAS

TITLE:
Rehabilitaion Method DPT 4B
Field Re-profiling

Drawn By:	Checked By:	Approved:
CAD Designer	Discp. Lead	Design Lead
P.K.	D.K.	P.N.
Date: 24/03/21	Scale: Not to Scale	A3
Drawing No.: PCAS-0100-016	Stage: For Approval	Rev:
		00

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.

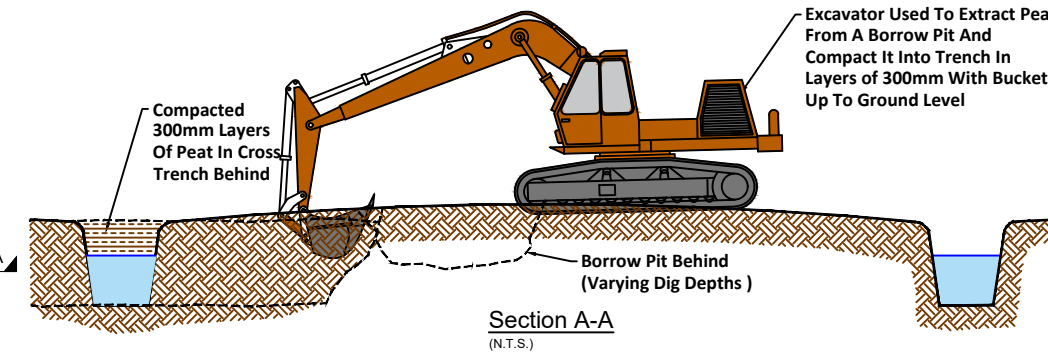
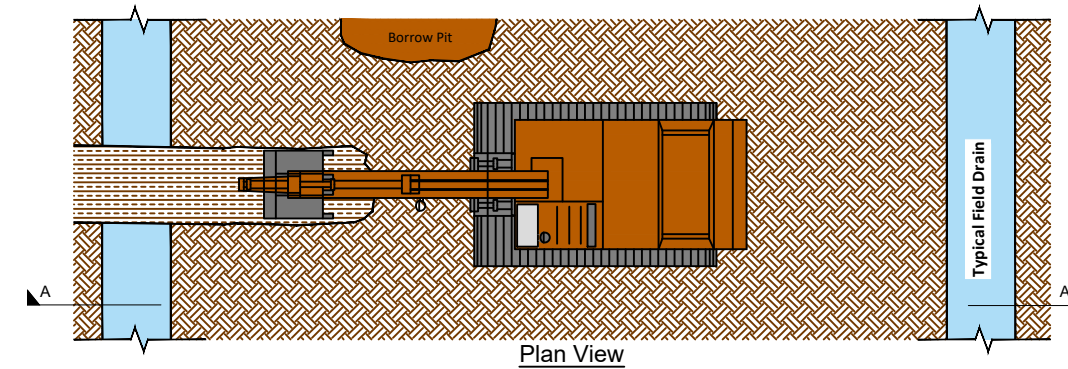


- ### **NOTES:**
1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
 2. REFER TO RELEVANT SITE PLAN TO ENSURE SPECIFIC DRAIN BLOCKS HAVE BEEN INSTALLED DOWNSTREAM PRIOR TO COMMENCING ANY RE-PROFILING WORKS, TO RETAIN ANY SILT THAT MAY ENTER THE DRAINS.
 3. REFER TO RELEVANT SITE PLAN FOR No. OF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

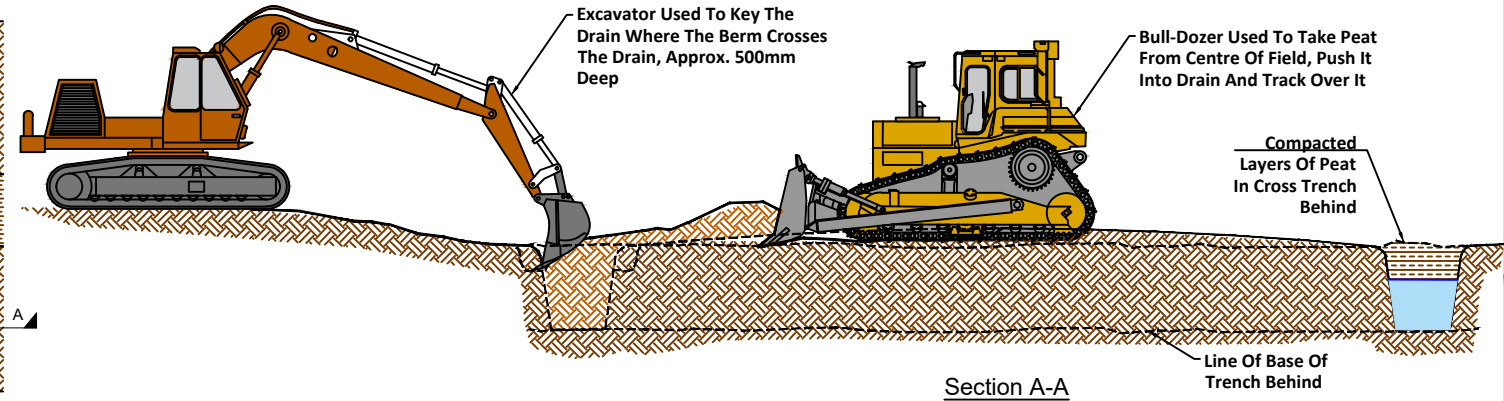
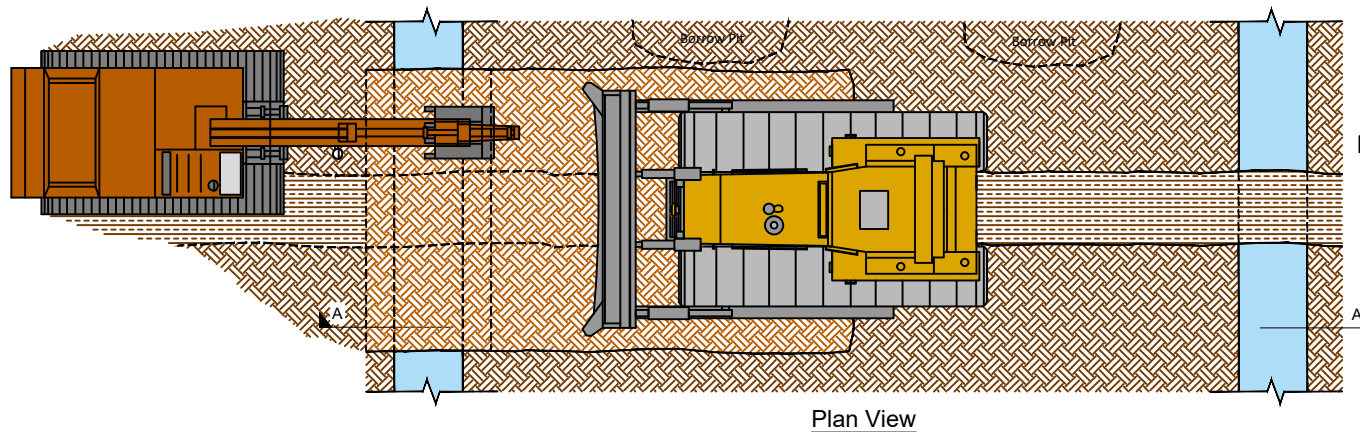
An Excavator is used to dig a trench approx. 1.2m Wide (4ft. wide excavator bucket) and up to 1.5m Deep where ground conditions allow, along the proposed location of the Berm. If good 'clay like' ombrotrophic peat exists in trench the peat is turned over and compressed back into trench.

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.



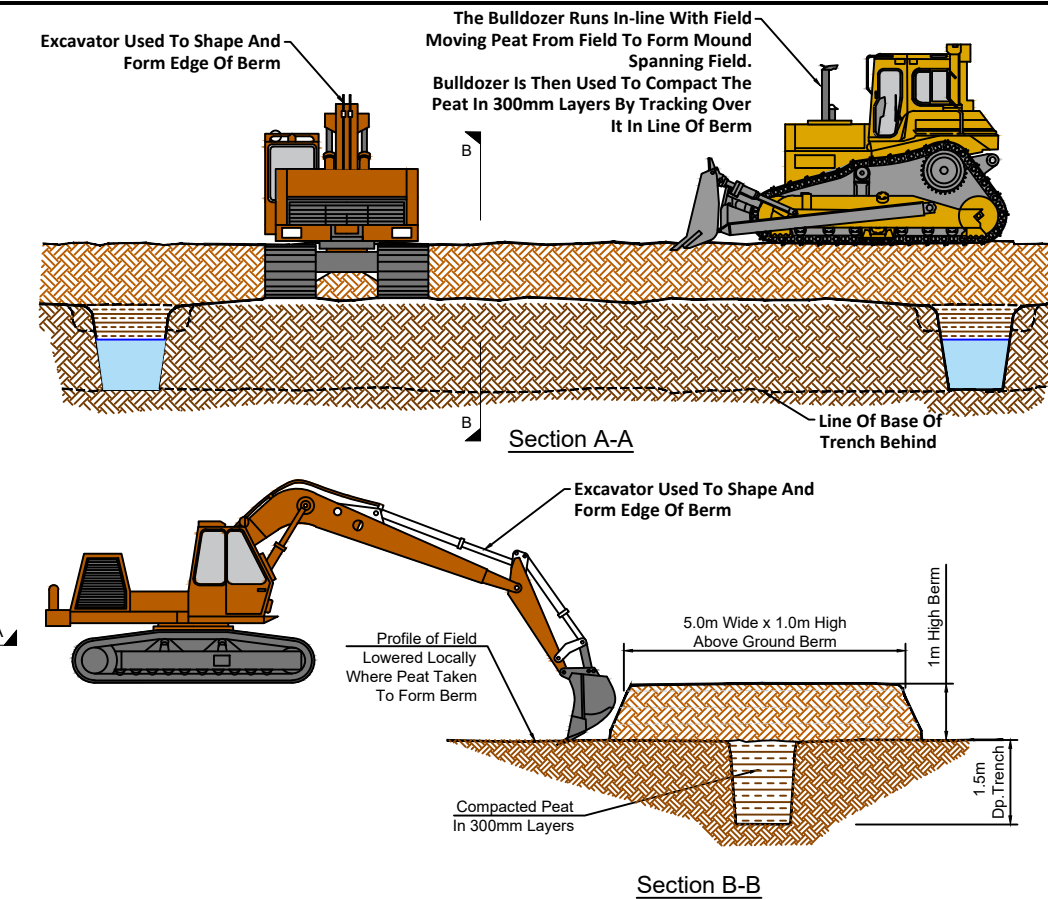
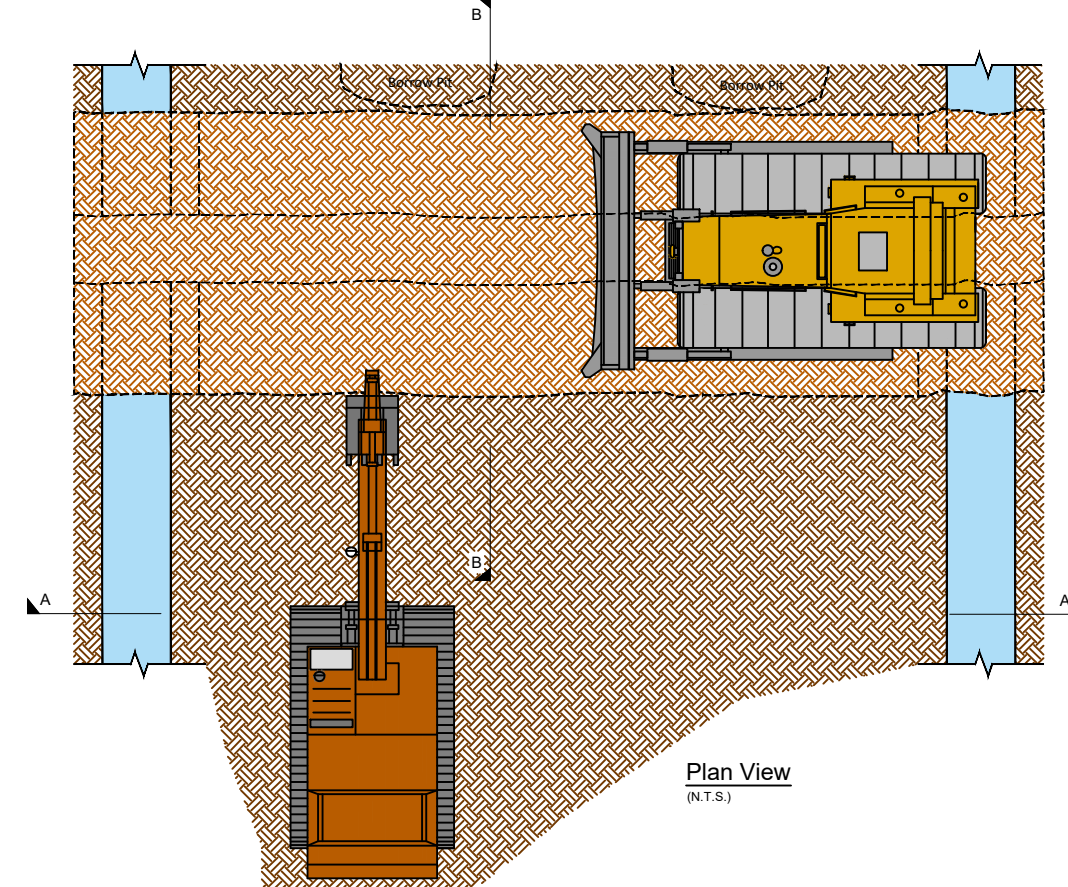
An Excavator is used to form a key(5m long) in the drain's edges where the berm crosses.
A strip of peat(5m wide) is taken from the central camber of the field, pushed into the drain and compacted by the bull-dozer tracking over the drain block.



Next the bull-dozer is used to complete the central cross section of Berm by taking peat from the centre of the field and pushing it in line with the field to form an approximately 5m Wide x 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			
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
8	Issued For Approval	P.K.	12/03/21
Rev	Description	Issued By	Date

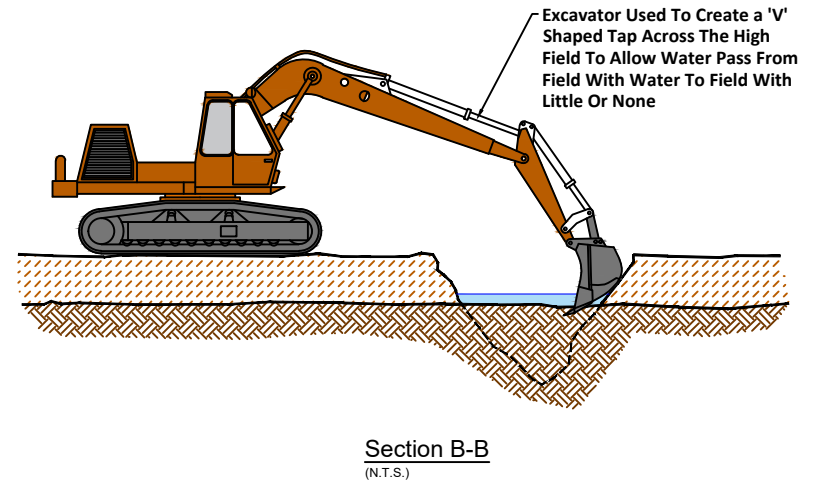
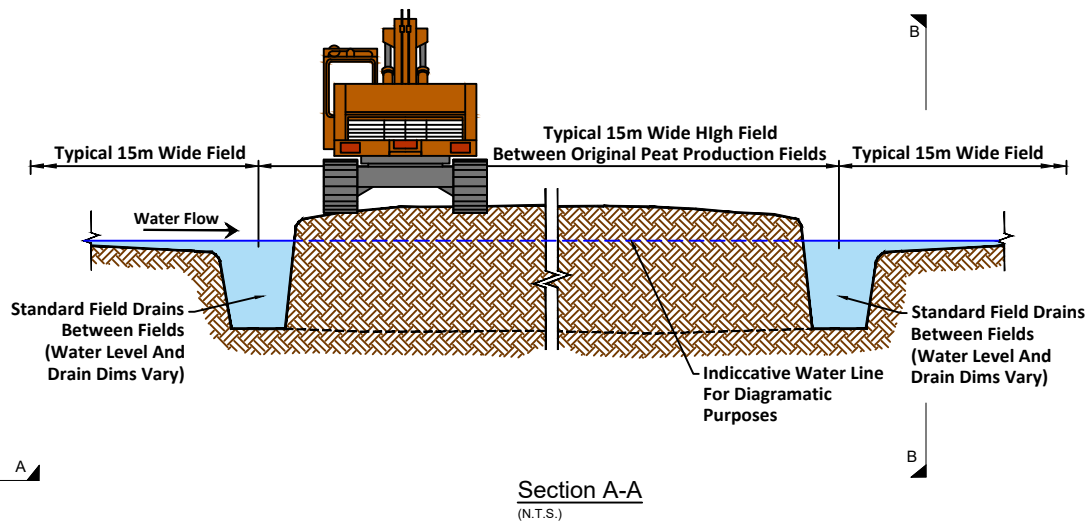
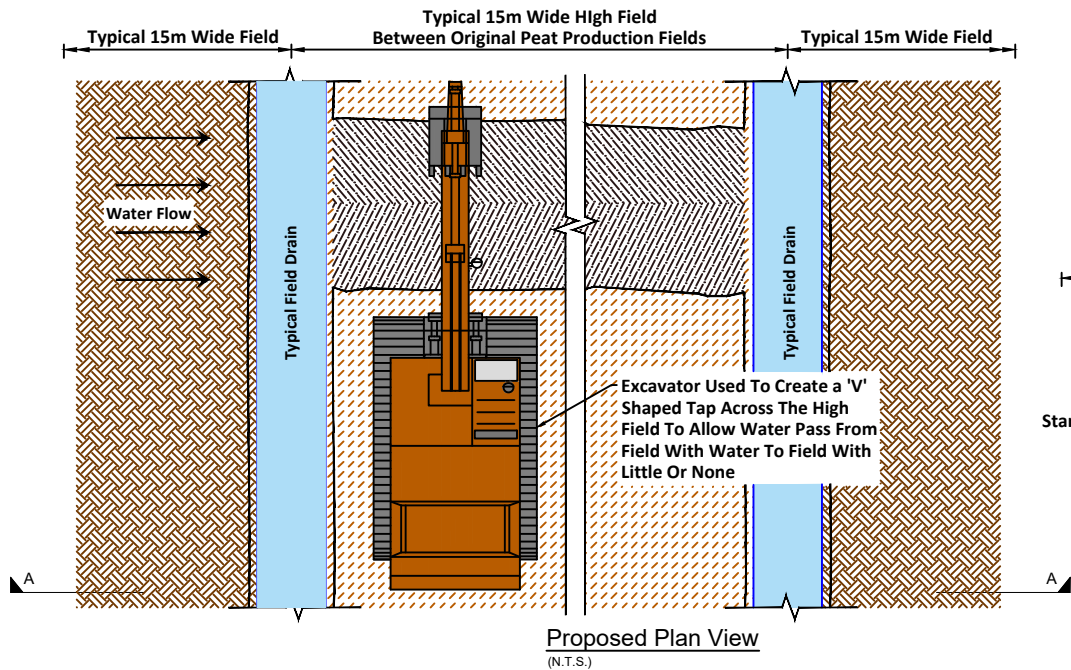
BORD NA MÓNA
Naturally Driven
Bord Na Móna Engineering Department
LEABEG, TULLAMORE CO. OFFALY
Tel. 057 9345900
Fax. 057 9345160

PROJECT:
Peatland Climate Action Scheme
PCAS

TITLE: Rehabilitation Method
Boundary Berm

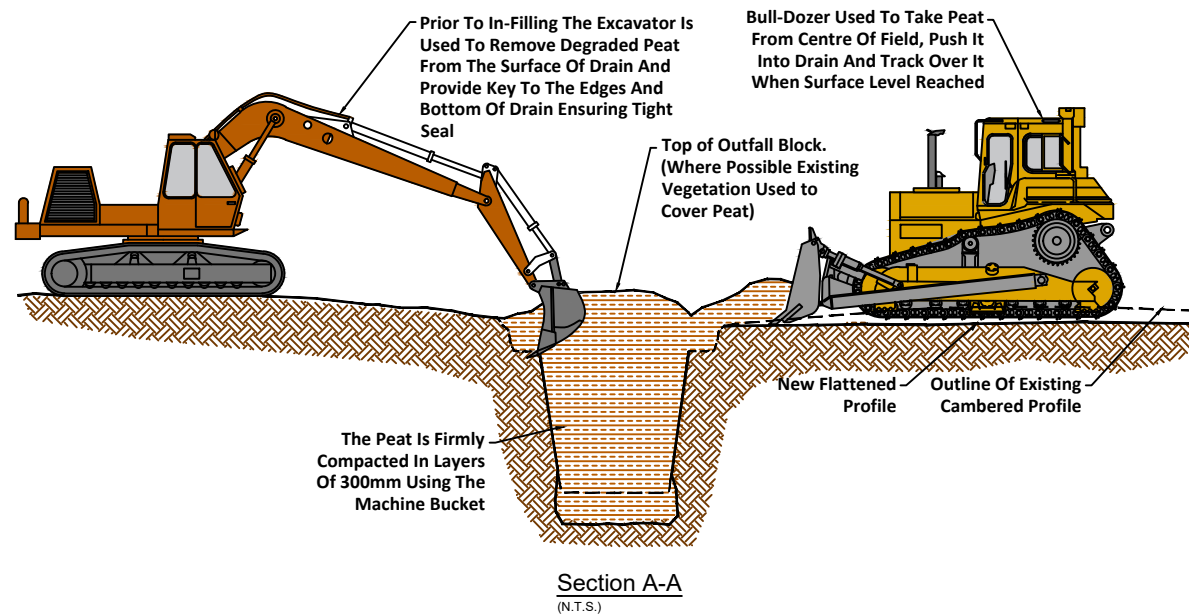
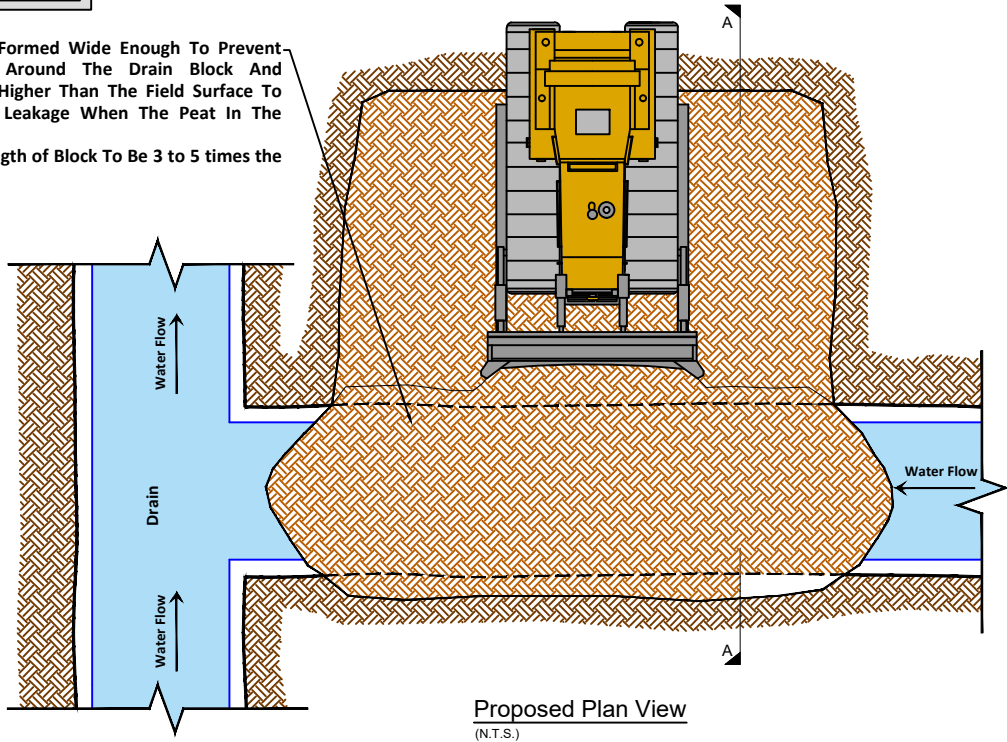
Drawn By:		Checked By:		Approved:
CAD	Designer	Discip. Lead	Design Lead	Design Manager
P.K.	-	D.K.	P.N.	P.N.
Date: 28/01/21		Scale : Not to Scale		A3
Drawing No.:		Stage: For Approval		
PCAS-0100-015		Rev:		
		a		

'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

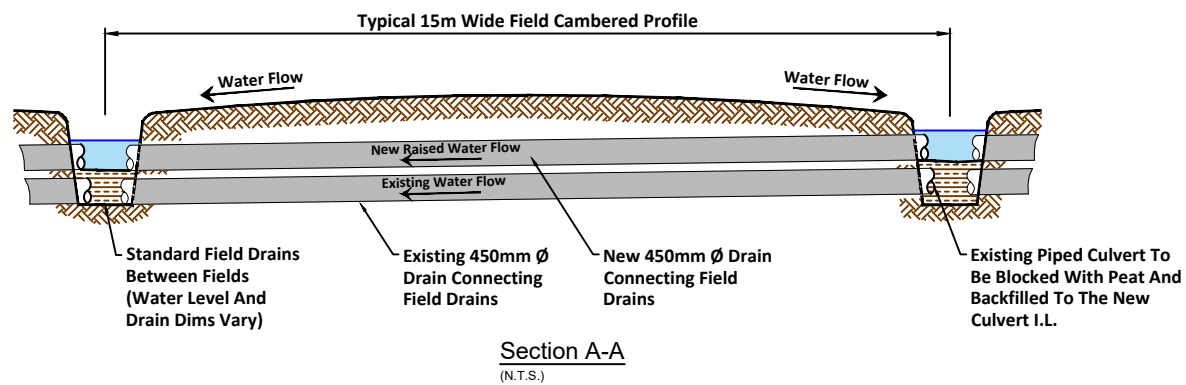
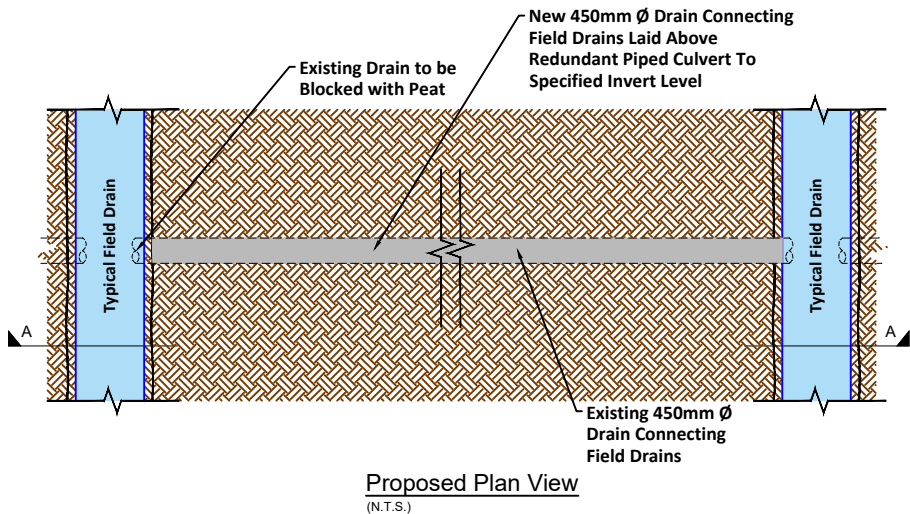
Bord Na Móna Engineering Department
LEABEG, TULLAMORE CO. OFFALY
Tel. 057 9345900
Fax. 057 9345160

PROJECT:
Peatland Climate Action Scheme
PCAS

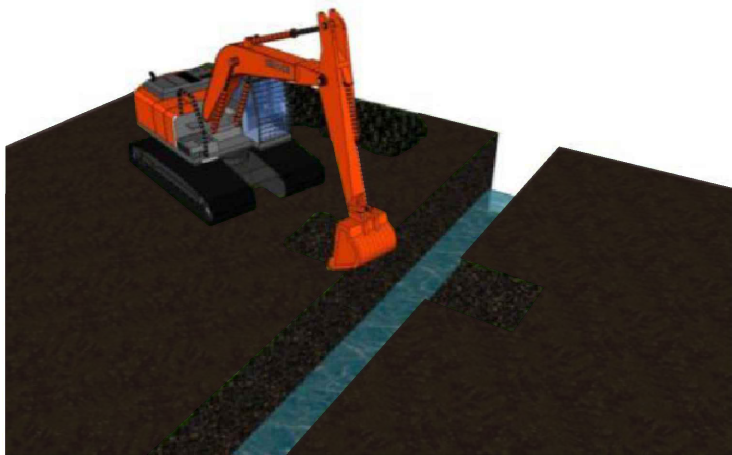
TITLE:
Modifying of Outfalls
& Managing Water Levels

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	

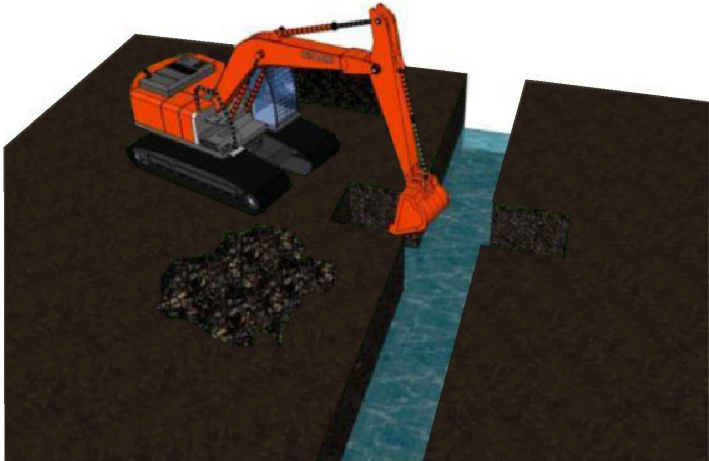
Raise Piped Culverts To Control Water Levels



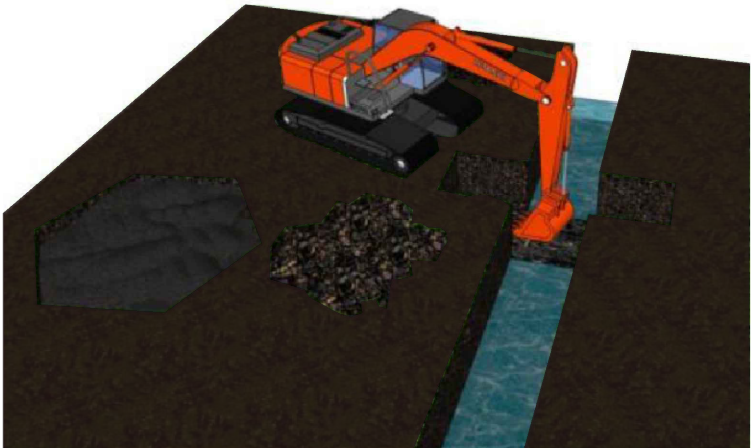
1. Before building of drain blocks, the sides and bottom of the ditch is cleaned using the excavator to remove dry degraded peat, to ensure a good peat-to-peat contact.
(If any vegetation present, it should be carefully removed and left aside for replacement at the end of the process.)



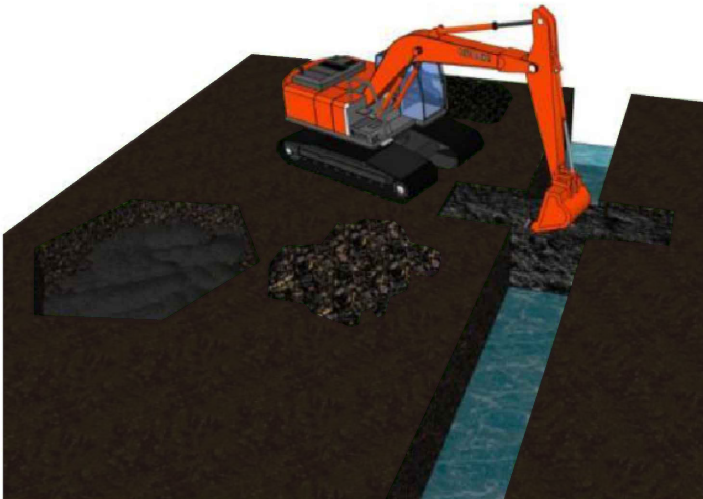
2. Cut key in either side of the drain approximately 500mm deep, and ensure that it is wider than the actual drain. Remove 500mm of peat from bottom of the drain also and place behind the machine for replacement later.



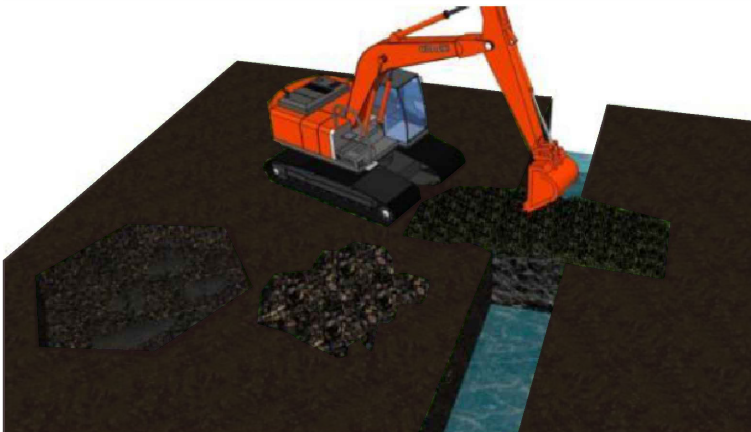
3. Open an area behind machine to be used as a borrow pit. Avoid using the surface layer of peat (top 100-200mm) which is likely to be very permeable. Only use the deeper, more compacted peat to build the drain block.
(If any vegetation present, it should be carefully removed and left aside for replacement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



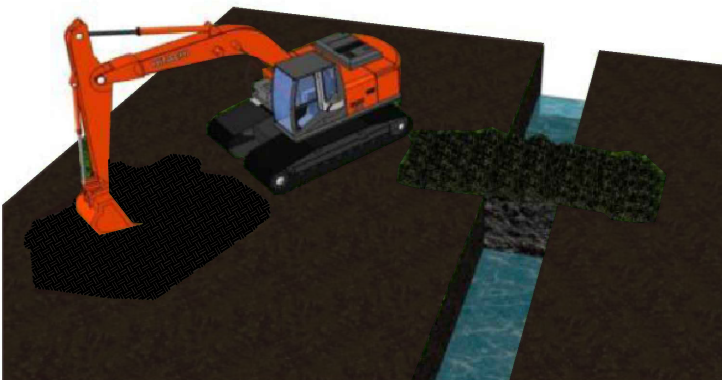
4. Dig out peat from the borrow pit and place into the drain compacting in 300mm layers. Compact the peat firmly using the excavator bucket before laying more peat from the borrow pit.



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



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



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

NOTES:

1. FIGURED DIMS ONLY TO BE TAKEN FROM THIS DRAWING.

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

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

PROJECT:

Peatland Climate Action Scheme
PCAS

TITLE:

Rehabilitation Method WLT 4
Peat Drain Blocking

Drawn By:

Checked By:

Approved:

CAD Designer

Discip. Lead

Design Lead

Design Manager

P.K.

D.K.

P.N.

P.N.

Date:

13/01/21

Scale :

N.T.S.

A3

Stage: For Approval

Drawing No.:

PCAS-0100-011

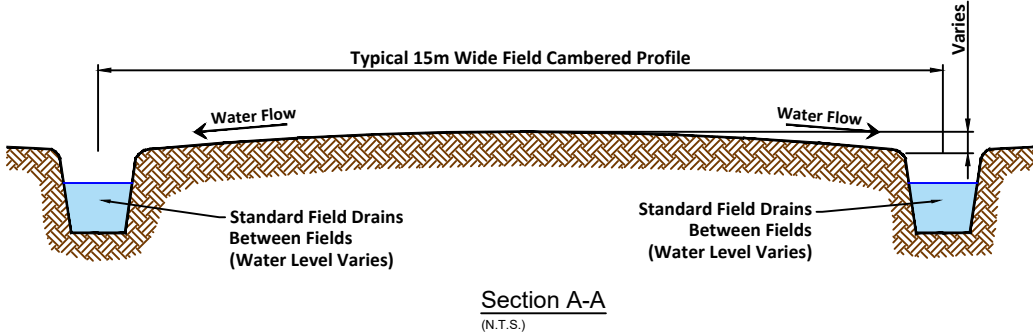
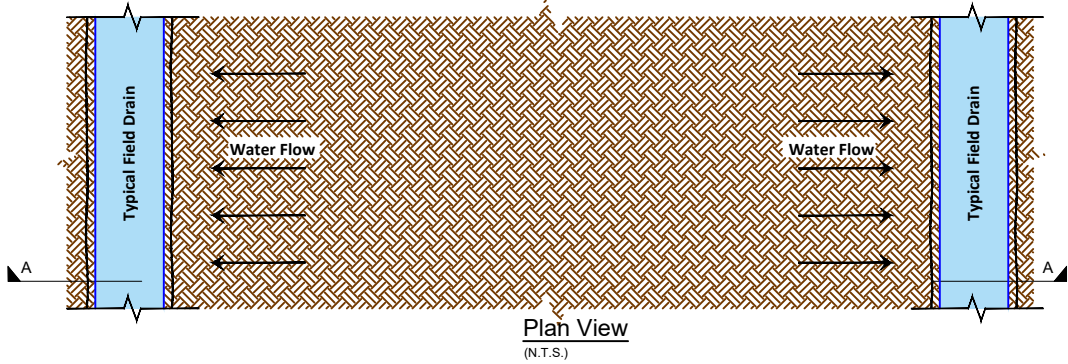
Rev:

b

C:\Users\Kierman\PI\Desktop\Castlegar\DR\PCAS-0100-011b_WLT_4_PeatDrainBlock.dwg

Existing Layout:

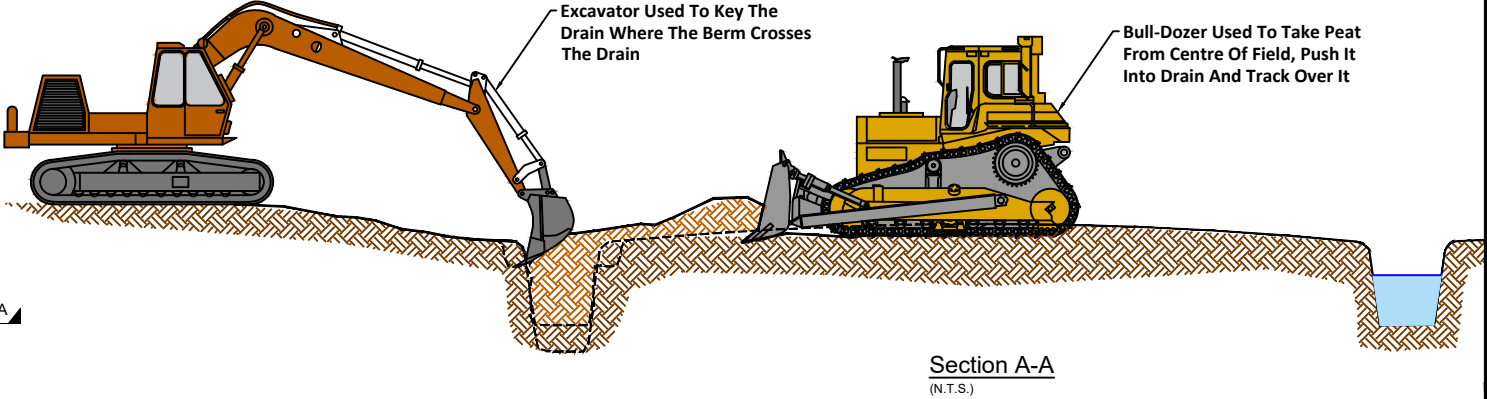
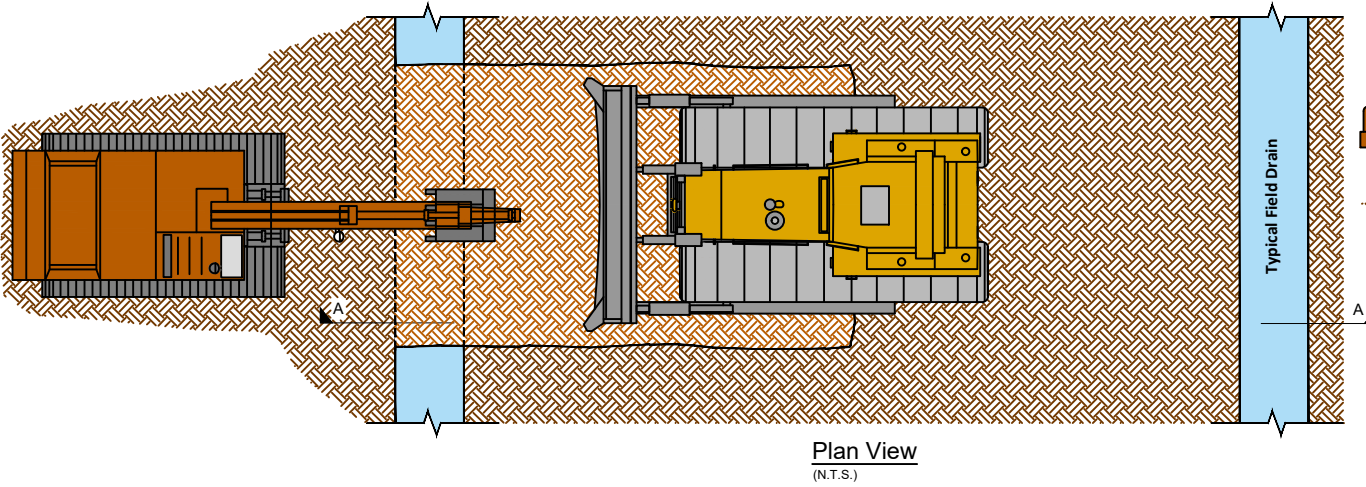
Typical existing bare peat fields are cambered (higher) in the centre and lower towards the drains, helping drainage of the fields but limiting the re-wetting of the central area. The concept of Cross berms is to slow the water movement through the bog.



- 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.

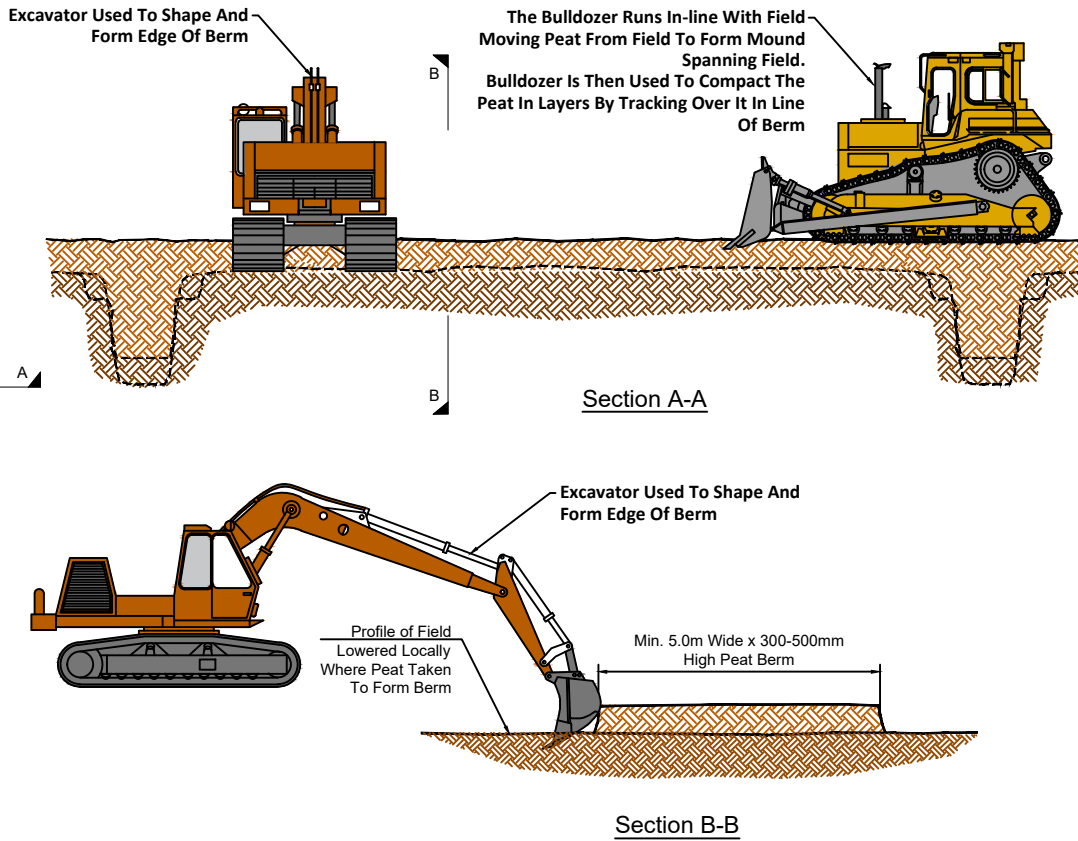
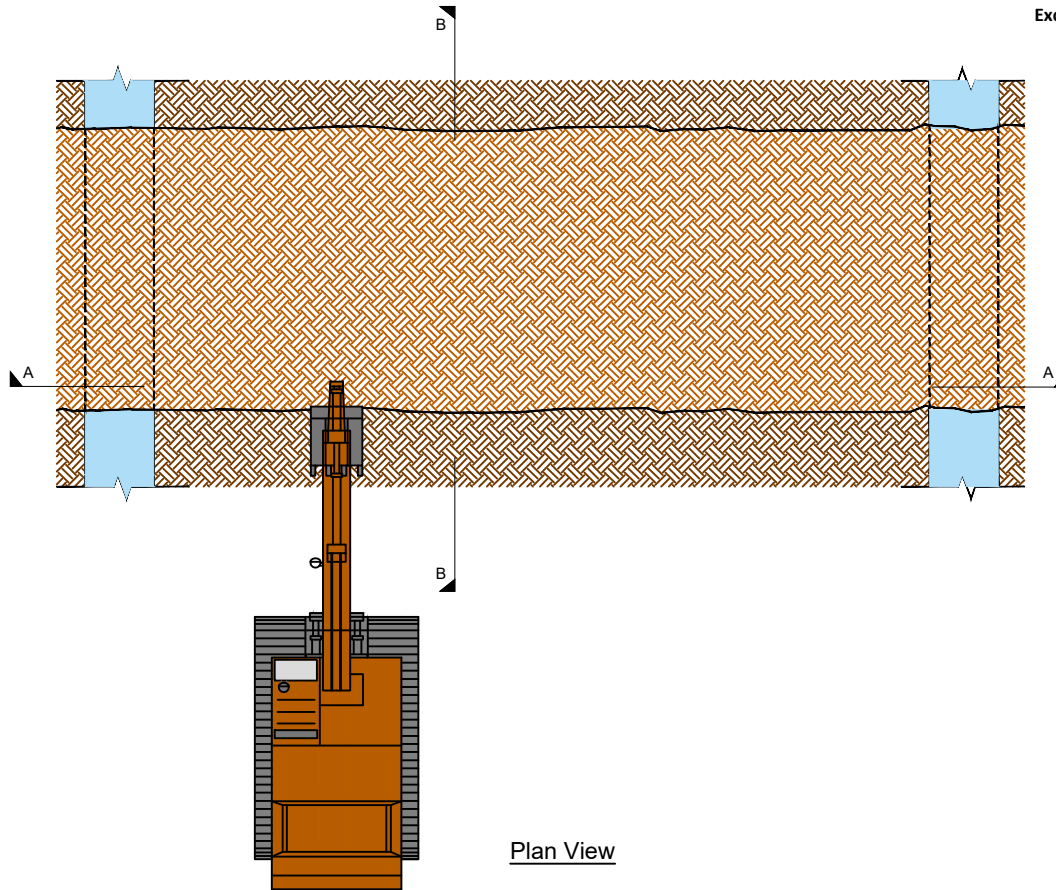
Phase 1 Forming Peat Berm

An Excavator is used to form a key in the drain where the berm crosses. A strip of peat is taken from the central camber of the field, pushed into the drain and compacted by the bull-dozer tracking over the drain block.



Phase 2 Forming Peat Berm

Next the bull-dozer is used to complete the central cross section of Berm by taking peat from the centre of the field and pushing it in line with the field to form a minimum 5m Wide x 300-500mm High Cross Berm. The peat material in the berm is compacted in layers by the dozer tracking over it. The excavator bucket is used to form and shape the edges of the compacted berm.



STATUS			
c	Berm Dimensions And Details Revised	P.K.	11/03/21
b	Berm Height Increased And Trench Detail Added	P.K.	25/02/21
a	Issued For Information	P.K.	29/01/21
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

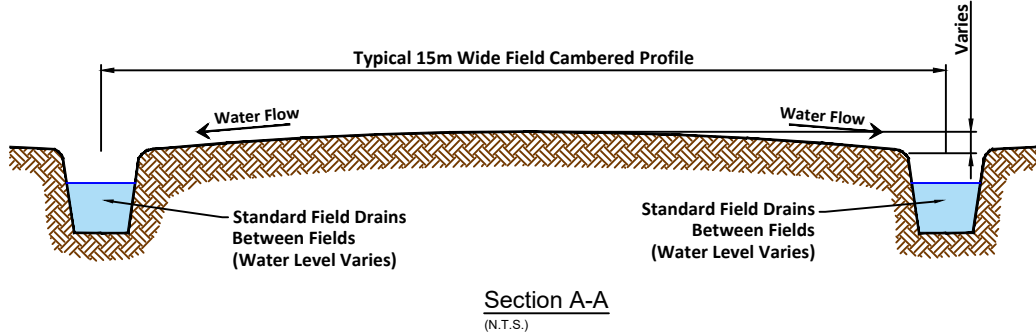
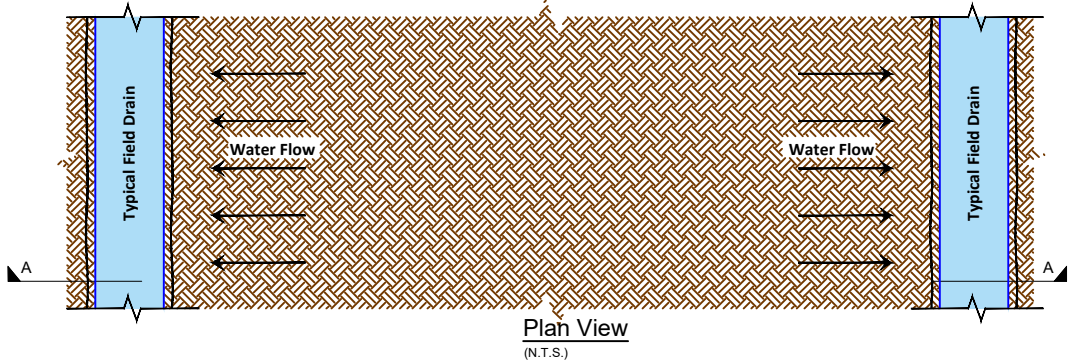
PROJECT:
Peatland Climate Action Scheme
PCAS

TITLE:
Rehabilitation Method WLT 3
Peat Berm

Drawn By:		Checked By:		Approved:
CAD	Designer	Discip. Lead	Design Lead	Design Manager
P.K.	-	D.K.	P.N.	P.N.
Date:	28/01/21	Scale :	Not to Scale	A3 Stage: Information
Drawing No.: PCAS-0100-010				Rev: c

Existing Layout:

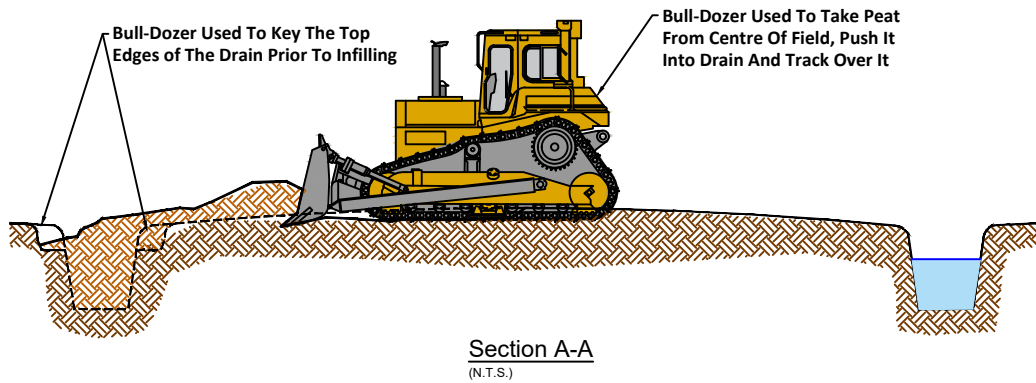
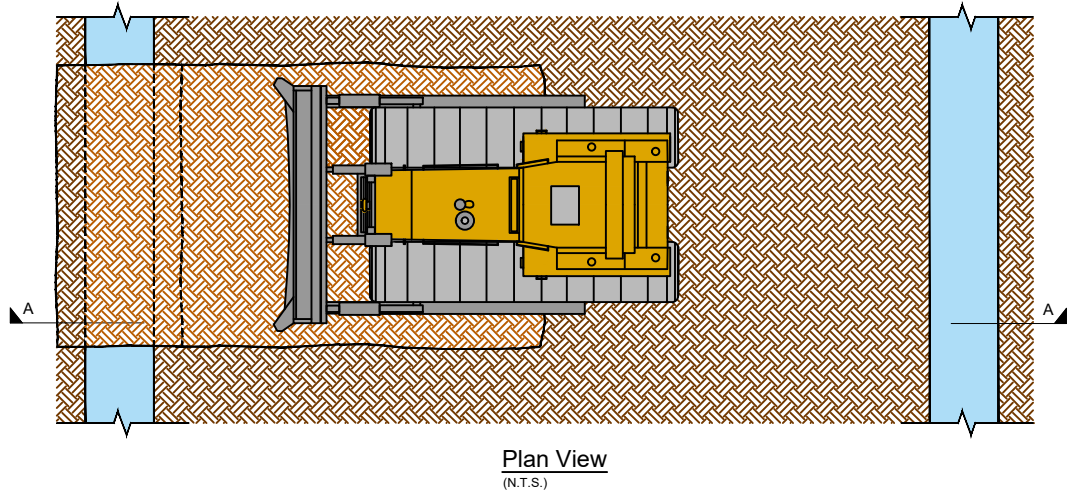
Typical existing bare peat fields are cambered (higher) in the centre and lower towards the drains, helping drainage of the fields but limiting the re-wetting of the central area. The concept of drain blocking is to raise the water levels in the drains to re-wet the cutaway and slow the water movement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

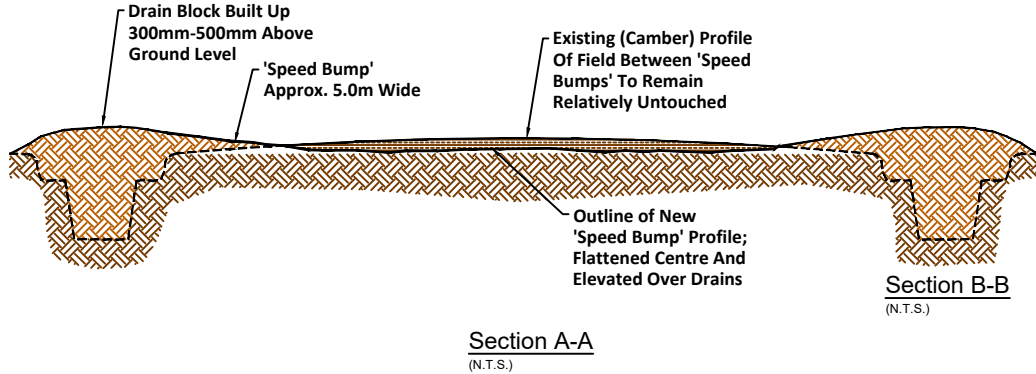
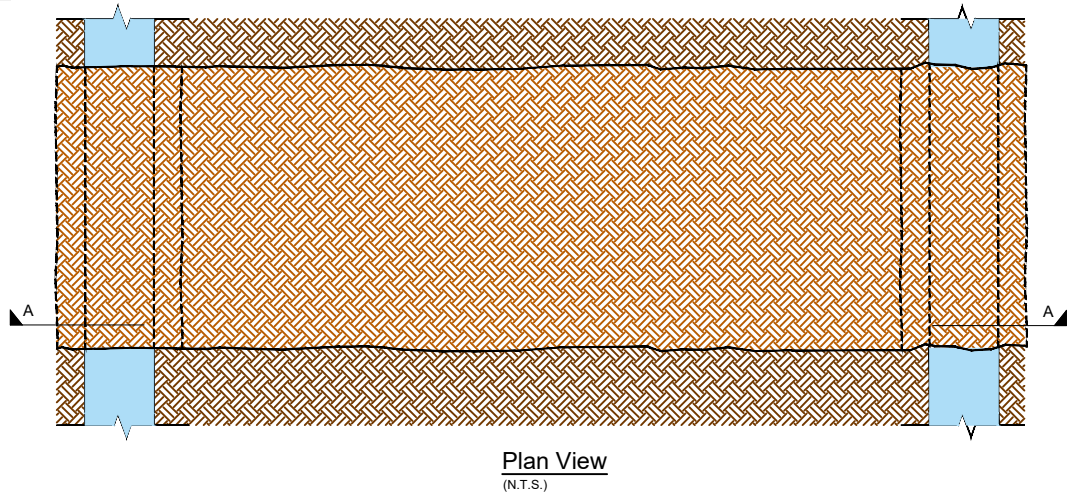
Phase 1
Forming 'Speed Bump'

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

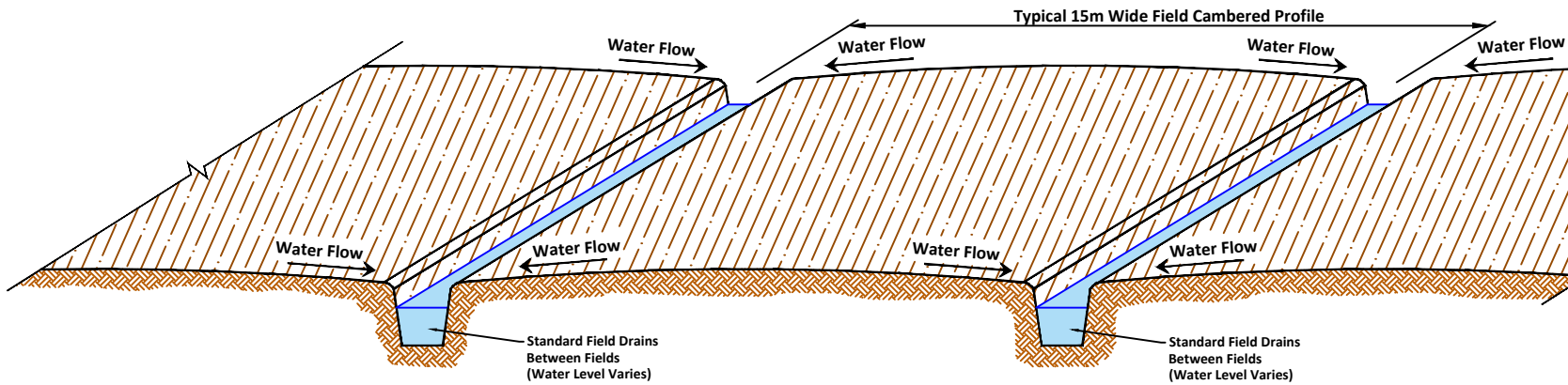
PROJECT:
Peatland Climate Action Scheme
PCAS

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.

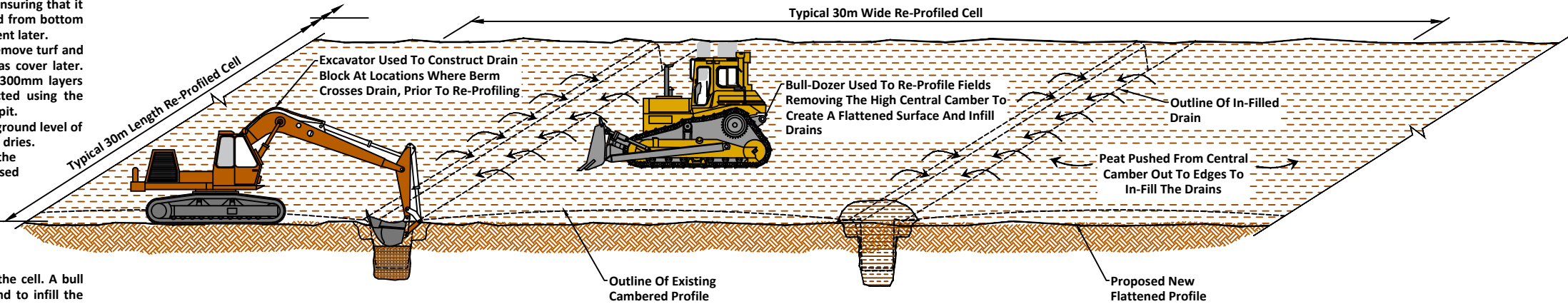


Phase 1

Drain Blocking And Re-Profiling of Fields Surface

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

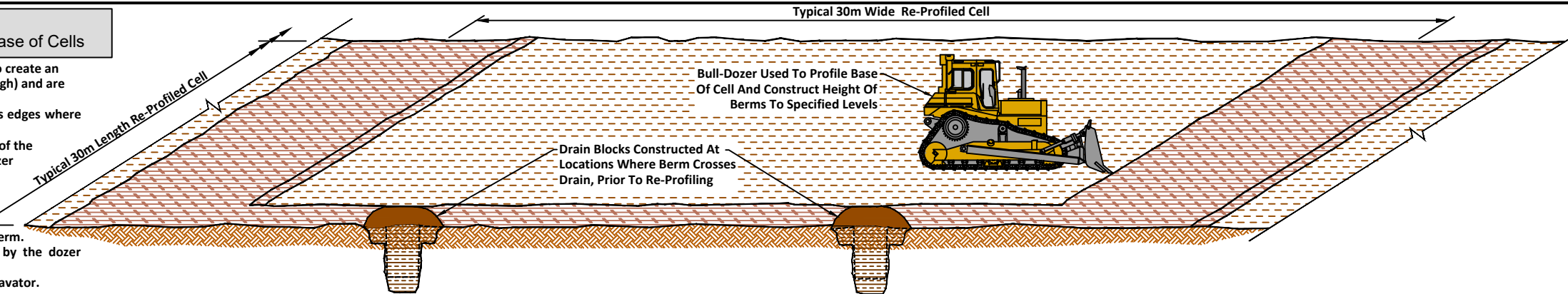
The centre of the cambered field is used as one side of the cell. A bull dozer is used to level and flatten the base of the cell and to infill the drains by removing the camber from the fields. Laser levels are mounted on bull-dozers to allow the machine drivers to move peat and create flat surfaces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



Phase 2

Formation of Surface Berms And Levelling Base of Cells

Berms are formed 30m in length and 30m across 3 fields to create an enclosed cell. The berms are relatively shallow (300mm high) and are 5.0 m wide. An Excavator is used to form a key(5m long) in the drain's edges where the berm crosses. A strip of peat(5m wide) is taken from the central camber of the field, pushed into the drain and compacted by the bull-dozer tracking over the drain block. Next the bull-dozer is used to complete the central cross section of Berm by taking peat from the centre of the field and pushing it in line with the field to form an approximately 5m Wide x 300mm High Cross Berm. The peat material in the berm is compacted in layers by the dozer tracking over it. Berm edge profile is shaped by using the bucket of the excavator.

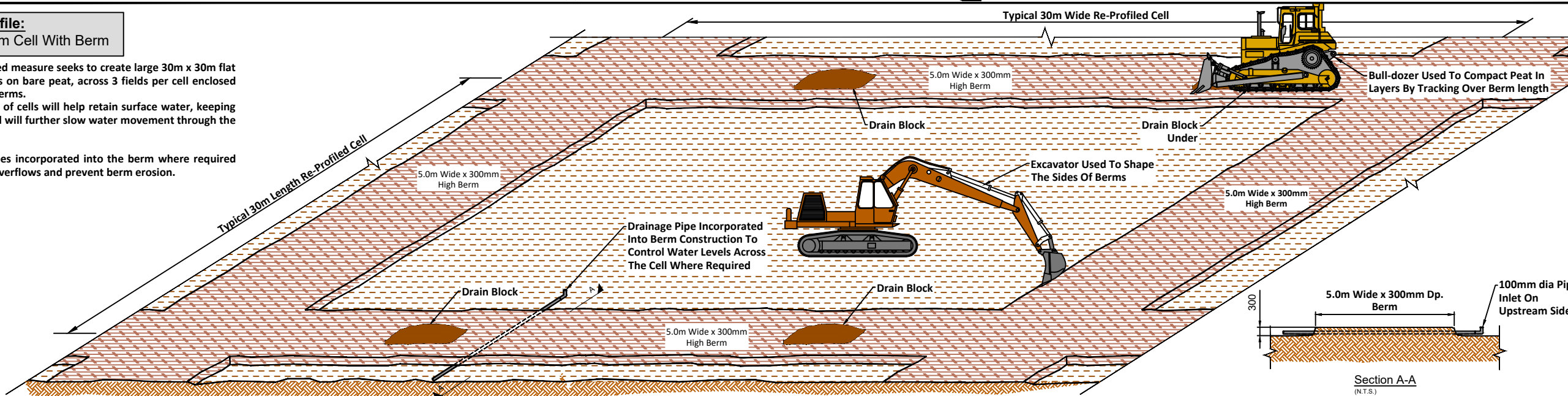


Final Profile:

30m x 30m Cell With Berm

This enhanced measure seeks to create large 30m x 30m flat areas or cells on bare peat, across 3 fields per cell enclosed by shallow berms. The creation of cells will help retain surface water, keeping peat wet and will further slow water movement through the bog.

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



NOTES:

- 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	Typo Error in Phase 2 Description Regarding Cell Size Call Up	P.K.	13/05/21
b	For Approval	P.K.	25/02/21
a	Issued For Information	P.K.	28/01/21

BORD NA MONA

Naturally Driven

Bord Na M6na Engineering Department
LEABEG, TULLAMORE CO. OFFALY
Tel. 057 9345900
Fax. 057 9345160

PROJECT:

Peatland Climate Action Scheme
PCAS

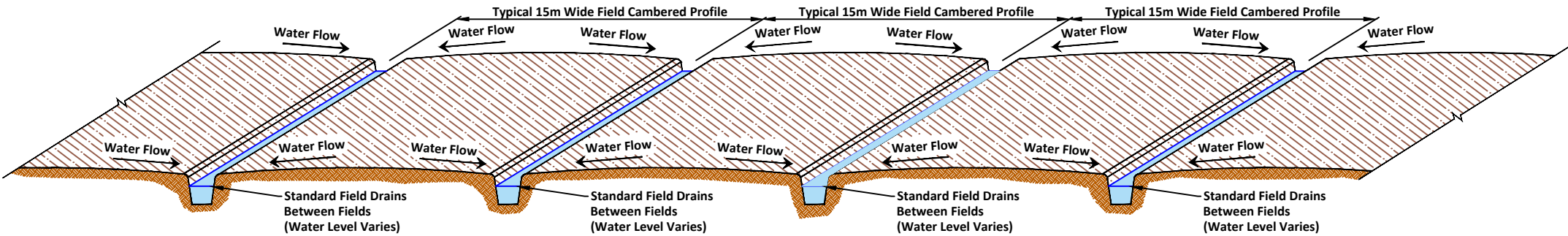
TITLE:

Rehabilitation Method DPT 5
30m x 30m Cell With Berms

Drawn By:	Checked By:	Approved:
CAD Designer	Discip. Lead	Design Lead
P.K.	D.K.	P.N.
Date: 18/12/20	Scale: Not to Scale	A3
Drawing No.: PCAS-0100-007	Rev:	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.

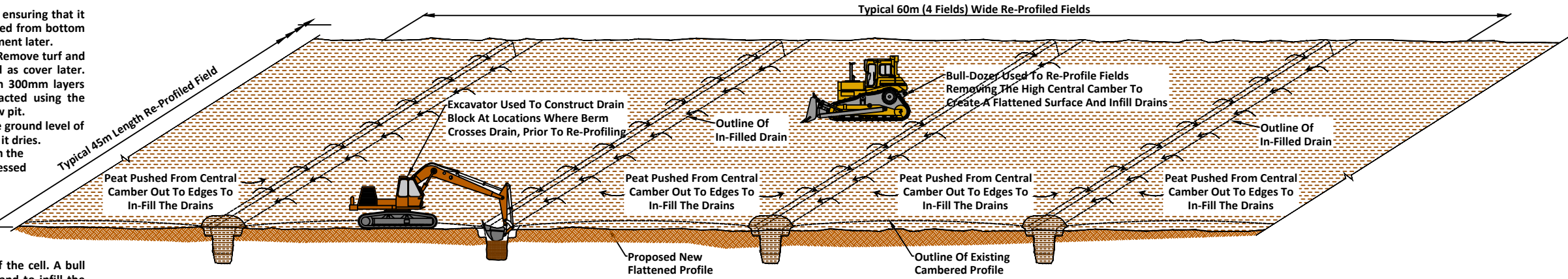


- NOTES:**
1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
 2. REFER TO RELEVANT SITE PLAN TO ENSURE SPECIFIC DRAIN BLOCKS HAVE BEEN INSTALLED DOWNSTREAM PRIOR TO COMMENCING ANY RE-PROFILING WORKS, TO RETAIN ANY SILT THAT MAY ENTER THE DRAINS.
 3. REFER TO RELEVANT SITE PLAN FOR NO. OF DRAIN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

Phase 1
Drain Blocking And Re-Profiling of Fields Surface

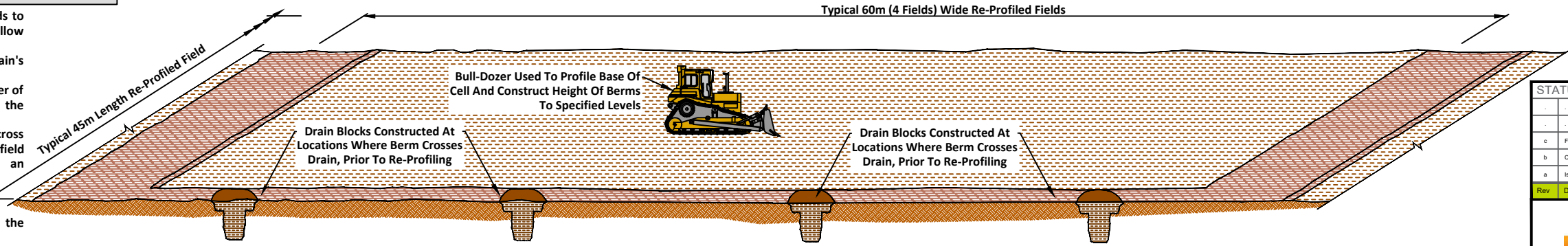
Drain blocks are constructed using an Excavator operating at a perpendicular direction to the field drains. Key is cut in the drain approximately 500mm deep, and ensuring that it is wider than the actual drain. 500mm of peat is removed from bottom of drain also and placed behind the machine for replacement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

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



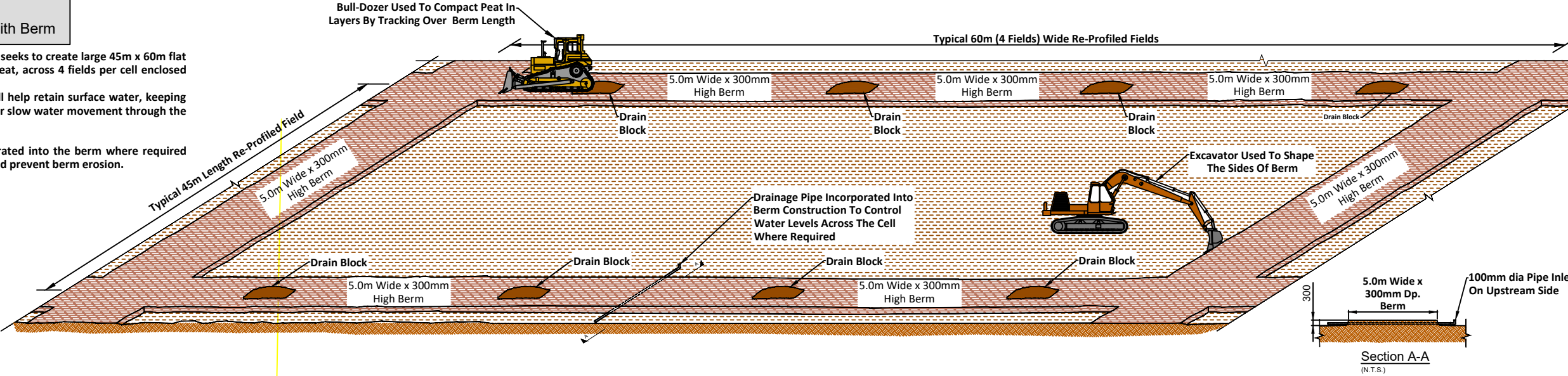
Phase 2
Formation of Surface Berms And Levelling Base of Cells

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



Final Profile:
45m x 60m Cell With Berm

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



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

BORD NA MONA
Naturally Driven
Bord Na M6na Engineering Department
LEABEG, TULLAMORE CO. OFFALY
Tel. 057 9345900
Fax. 057 9345160

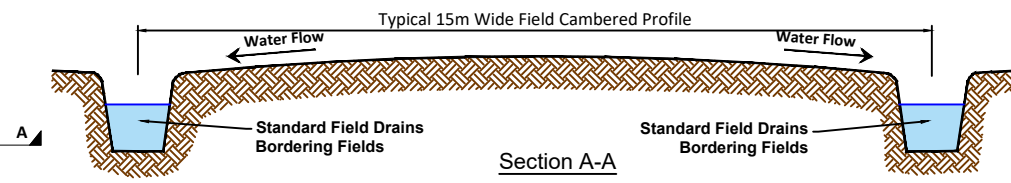
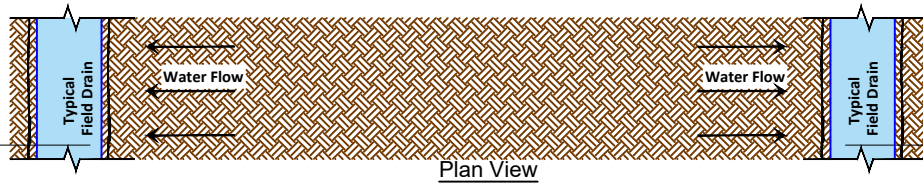
PROJECT:
Peatland Climate Action Scheme (PCAS)

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

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

Existing Layout:

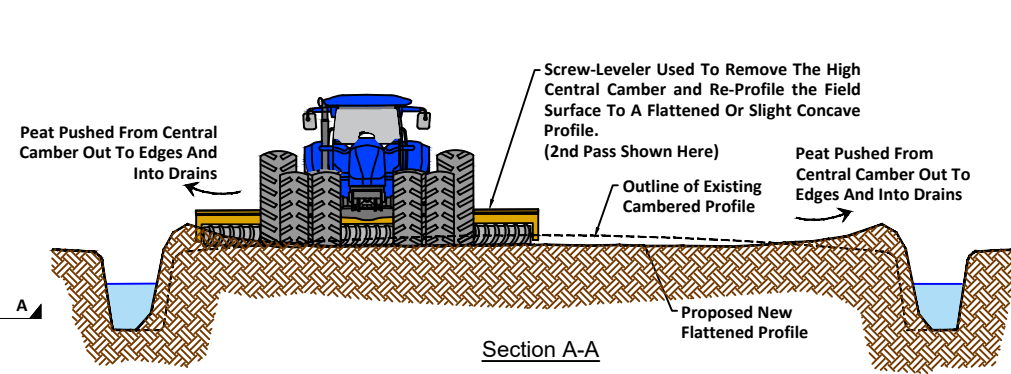
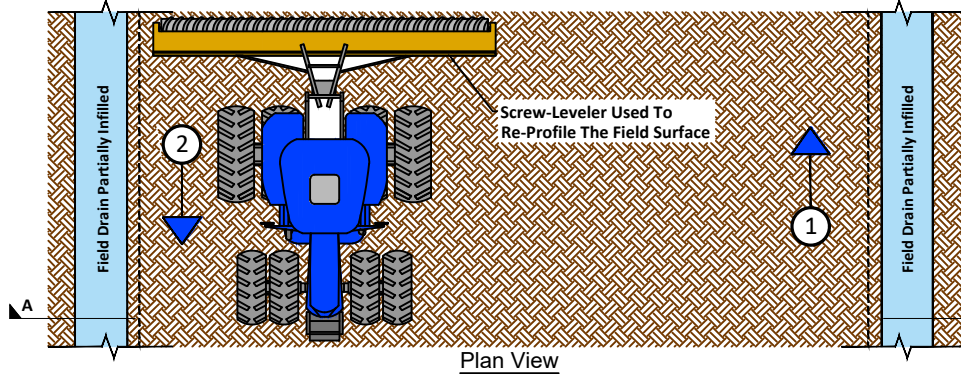
Typical existing bare peat fields are cambered (higher) in the centre and lower towards the drains, helping drainage of the fields but limiting the re-wetting of the central area.
The concept of field re-profiling is to level the surface of the individual peat production fields to retain surface water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



Phase 1

Re-Profiling of Field Surface

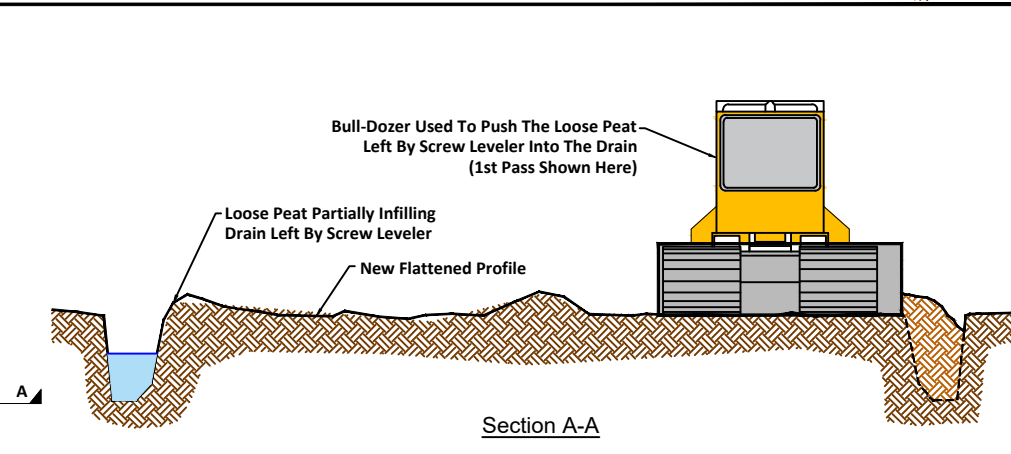
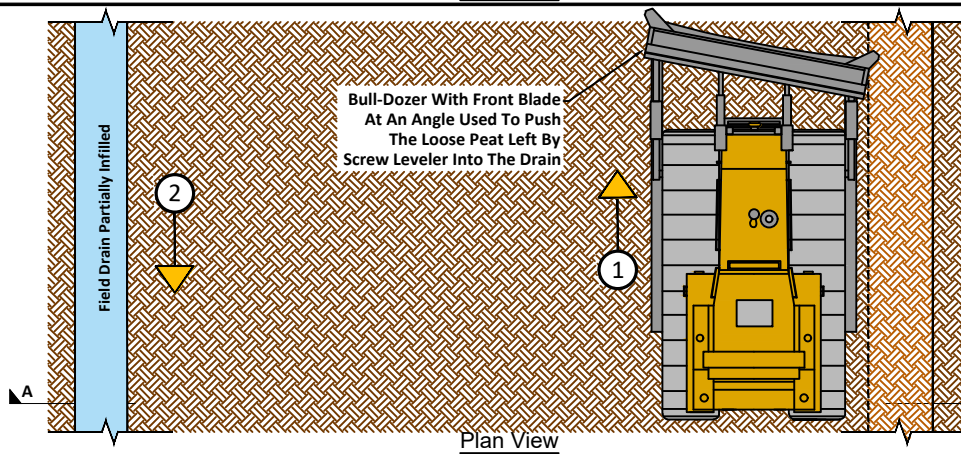
The first operation in the re-profiling process begins with using a Screw-Leveler to remove the high central camber from individual production fields and deposit the peat on the lower-lying edges of the same production field.
The Screw-Leveler, with a level axis, will run up the first side ① of the production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



Phase 2

Infilling Of Drains

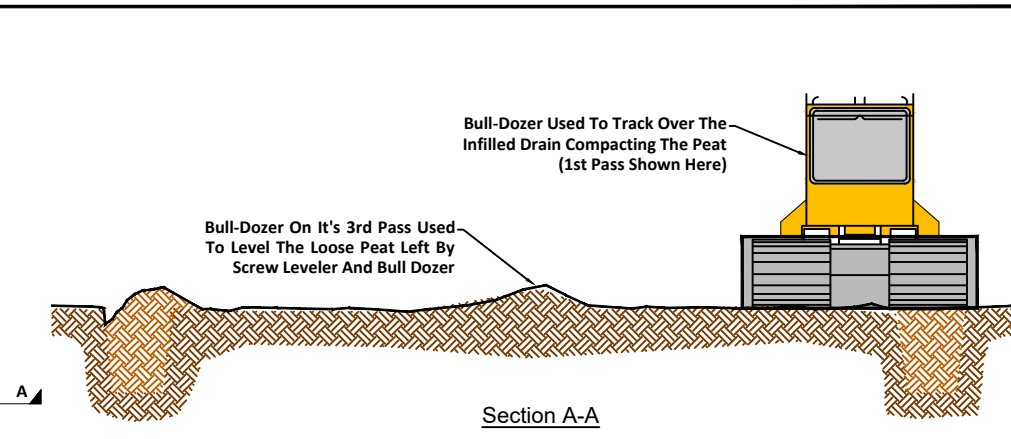
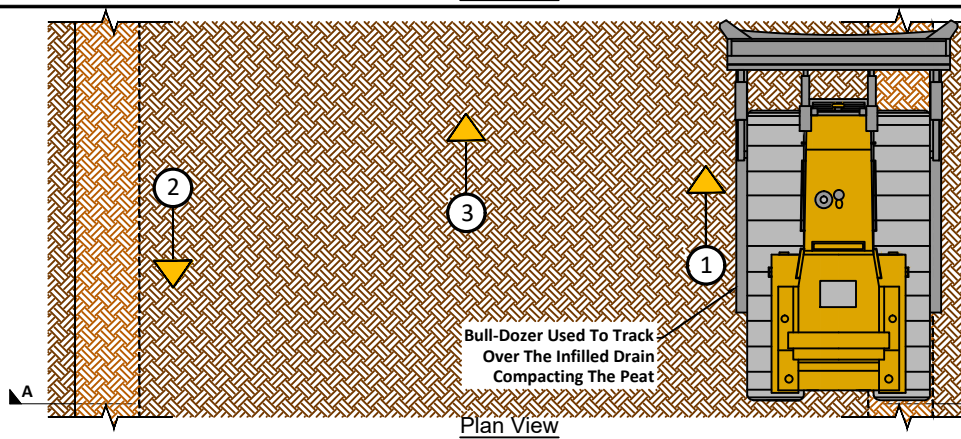
Next the Bull-dozer will run up the first side ① of the production field and down the other side ② with the front blade at an angle placing the peat in the drain.



Phase 3

Final Leveling Of Drains & Field

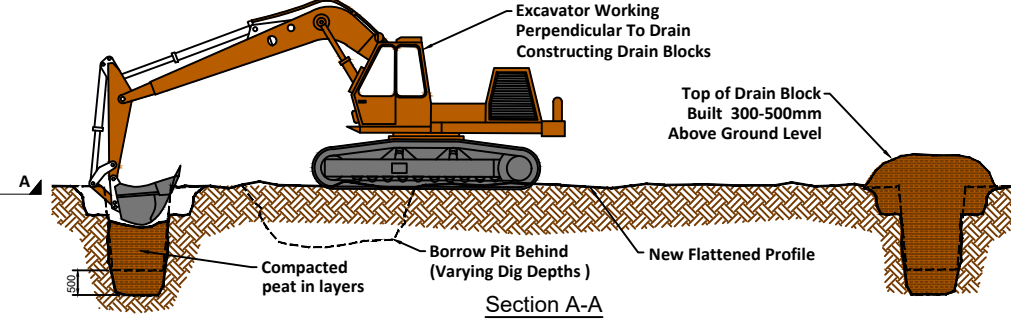
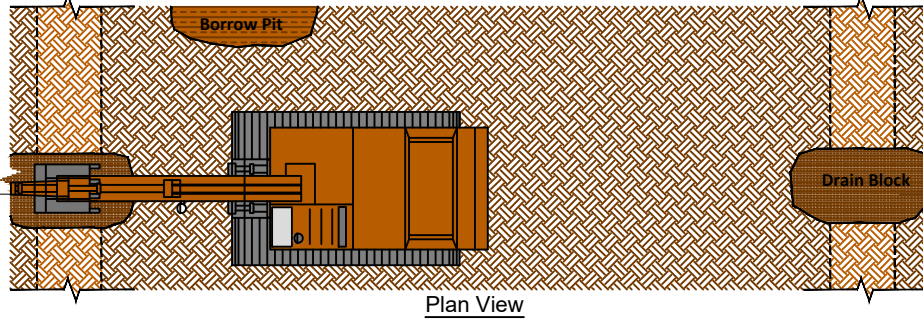
Next the Bull-dozer will track over the first of the infilled drains ① and then back down the other drain ② compacting and leveling the peat.
It will also make a pass down the middle of field ③ flattening peat mounds left between Screw Leveler and Bull dozer runs.



Phase 4

Drain Blocking

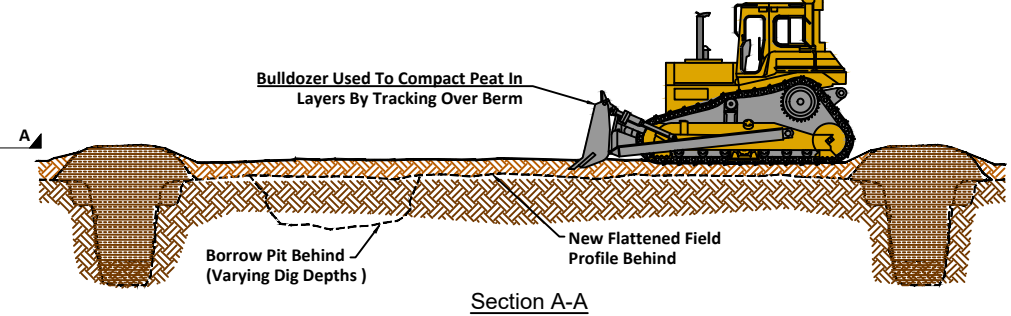
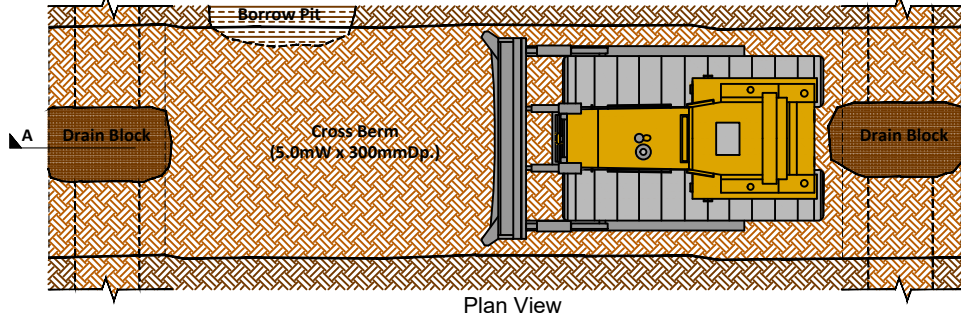
(NOTE: If any vegetation present, it should be carefully removed at the start and left aside for replacement at the end of the process, to help bind and stabilise the top of the drain block.)
Drain blocks are constructed using an Excavator operating at a perpendicular direction to the field drains. Key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



Phase 5

Cross Berm

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



NOTES:

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

STATUS

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

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:

Rehabilitaion Method DPT 4A
Field Re-profiling

Drawn By:	Checked By:	Approved:
CAD Designer	Discp. Lead	Design Lead
P.K.	D.K.	P.N.
Date: 18/12/20	Scale : Not to Scale	A3
Drawing No.:		Stage: For Approval
PCAS-0100-005		Rev:

