Delichon Ecology

Cutaway Bog Decommissioning and Rehabilitation Plan

Screening for Appropriate Assessment and Natura Impact Statement

Blackwater Bog, Co. Offaly

Prepared For[1]

Bord na Móna

[1] Document drafted and published 22.06.2022

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1 INTRODUCTION

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

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

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the 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. Blackwater bog is part of the Blackwater bog group and is located in Co. Offaly.

It is proposed by Government that Bord na Móna carry out a Peatlands Enhanced Decommissioning, Rehabilitation and Restoration Scheme on its peatlands. Note this proposal is also known colloquially as the 'Peatlands Climate Action Scheme' (PCAS). The additional costs of the Scheme will be supported by Government through the Climate Action Fund and Ireland's National Recovery and Resilience Plan, administered by the Department of Environment, Climate and Communications (DECC), while the National Parks and Wildlife Service (NPWS) will act as the Scheme regulator. Bord na Móna have previously identified a footprint of 33,000 ha as peatlands suitable for this scheme. This Scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations (Appendix VII & IX) under existing EPA IPC licence conditions. Improvements supported by the Scheme will ensure that environmental stabilisation is achieved (meaning IPC obligations are met), and importantly, significant additional benefits, particularly relating to climate action and other ecosystem services, will also be delivered. The Scheme commenced in 2021.

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

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

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

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

hydrological conditions and more intensive intervention means that the extent of suitable hydrological conditions can be optimised.

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

Blackwater Bog is proposed to be part of this Scheme (PCAS), which commenced in 2021.

This Screening for Appropriate Assessment Report / Natura Impact Statement Report has been prepared by Delichon Ecology on behalf of Bord na Móna, and contains sufficient objective scientific information to facilitate Bord na Móna 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. Should a Natura Impact Statement be required, the impact of the project on the integrity of the Natura 2000 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.

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 2011-2021,
- 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,
- Office of the Planning Regulator (OPR) (2021) Practice Note PN01 - Appropriate Assessment Screening for Development Management,
- EC (2021) Assessment of Plans and Projects in relation to Natura 2000 sites - Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC.
- *Blackwater Bog Cutaway Bog Decommissioning and Rehabilitation Plan 2022* and accompanying GIS mapbook as prepared by BnM – see **Appendix B** and **Appendix H** of this document.

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

1.1 Appropriate Assessment Process

Under Article 6(3) of the Habitats Directive, an Appropriate Assessment of the implications of any plan or project on a European Site is required before a project is approved/adopted. This must include all the aspects of the plan or project which can, either individually or in combination with other plans or projects, affect the

conservation objectives of that European Site, in the light of the best scientific knowledge in the field. The competent national authorities are to authorise a plan, project or activity only if they have made certain that it will not adversely affect the integrity of any European Site.

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

In the current context, where significant effects are considered likely, in view of the qualifying interests or special conservation interests and the respective conservation objectives of any European site, the Screening identifies that Appropriate Assessment is required. Therefore, this NIS report provides mitigation to avoid adverse effects on European site integrity. This report is conducted in line with the requirements of Article 6(3) of the EU Habitats Directive (92/43/EEC) and the National Parks and Wildlife Service (NPWS) Guidance for Planning Authorities (2010), and it is intended that the information contained within this document will form the basis for the Article 6(3) Appropriate Assessment process completed by the Competent Authority.

1.1.1 Stages of the Appropriate Assessment Process

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

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

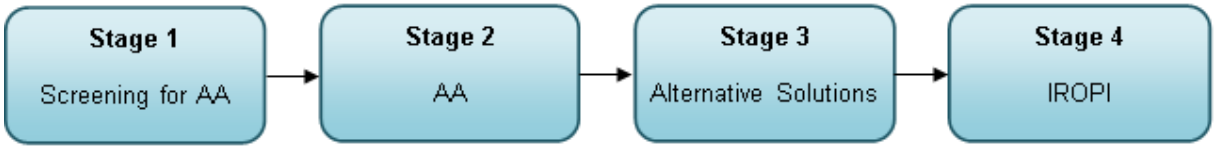


Image 1: The Appropriate Assessment Process (from: Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities, DEHLG, 2009).

Stage 1 - Screening for AA

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

Stage 2 – Appropriate Assessment

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

Stage 3 - Alternative Solutions

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

Stage 4 - IROPI

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

1.1.2 Statement of Authority

Eamonn Delaney BSc, MSc, MCIEEM, CECOL prepared this Natura Impact Statement. Eamonn has fifteen years consultancy experience and has prepared Screening for Appropriate Assessment and Natura Impact Statements for various projects, including residential, amenity, renewable energy and transport developments in addition to strategic policy and planning proposals. Eamonn conducted field visits to the Blackwater Bog site in April 2022. Eamonn's initial years in ecological consultancy involved botanical and habitat surveys for the purposes of EIA, EcIA and large scale habitat surveys for local authorities. This included plant species identification and habitat classification in a wide range of rural, urban and peri-urban environments. Eamonn is a member of the Botanical Society of Britain and Ireland (BSBI) and regularly attends local and regional BSBI field meetings in addition to carrying out recording for the proposed BSBI 2020 Atlas, in north Co. Galway and south Co. Mayo.

Eamonn has extensive experience in the Ecological Clerk of Works (ECoW) role for Flood Relief Schemes, roads and pipeline developments which requires weekly site visits, monitoring of mitigation measures, reviewing contactors method statements in addition to ongoing liaison with site operational staff and the design team. Eamonn has also been involved in the preparation and review of numerous Screening for Appropriate Assessment reports, Natura Impact Statements, Ecological Impact Assessments and Invasive Species Management Plans for a range of project types including roads, water infrastructure, solar farms, wind farms and peatland rehabilitation works. Through his involvement in all of these projects, Eamonn has honed his skills in field based assessments and the subsequent reporting and interpretation of information yielded from desk and field based resources.

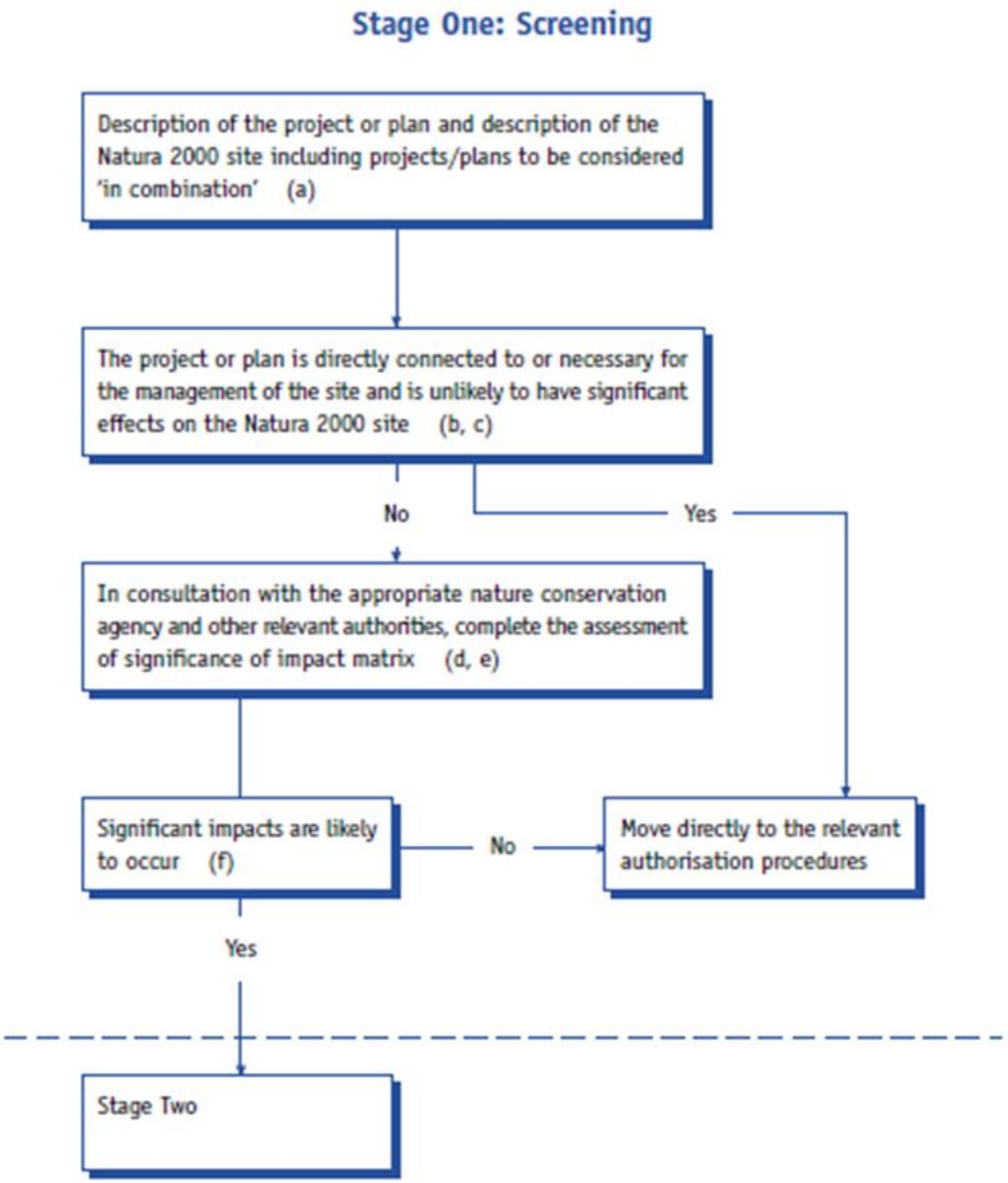
Eamonn routinely drafts, reviews and completes AA's for numerous projects. As the project design is developed, Eamonn seeks to influence the project design and refine the AA process to avoid and reduce potential impacts to the habitats and species for which the potentially impacted European site is designated. The outcome ensures that the finalised AA has been developed through an iterative process where the findings of the AA inform and are being informed by the project design throughout.

2 Stage 1: Screening

2.1 Screening Evaluation Process

The Screening process examines the likely effects of the described Blackwater 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 below figure outlines the assessment pathways and considerations held in the Stage One Screening for Appropriate Assessment process.



2.2 Overview of Blackwater 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. PO-502-01). 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 group. This regulatory requirement is the main driver of the development of this rehabilitation plan.

A document titled '*Blackwater Bog Cutaway Bog Decommissioning and Rehabilitation 2022*' has been prepared specifically to describe the proposed decommissioning and rehabilitation measures at Blackwater Bog and is appended to this document as **Appendix B**.

It is proposed by Government that Bord na Móna carry out a Peatlands Enhanced Decommissioning, Rehabilitation and Restoration Scheme (PCAS) on peatlands previously used for energy production. The additional costs of the proposed Scheme will be supported by Government through the Climate Action Fund. Bord na Móna have identified a footprint of 33,000 ha (a subset of the BnM estate that has been used for energy production) as peatlands suitable for enhanced rehabilitation – including Blackwater 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. PO502-01, 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. PO502-01, 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. PO502-01:

"*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.*"

Blackwater Bog was drained and developed for industrial peat production in the 1950s. Industrial peat production ceased in 2020. The primary rehabilitation goal and outcome for Blackwater 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 Blackwater 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

Blackwater Bog is located approximately 1 km north-east of Shannonbridge in Co. Offaly (Grid reference: N 02634 27356). It is part of the Blackwater group of bogs (Blackwater sub-group).

The bog is accessed to the north via the R444 Shannonbridge to Clonmacnoise public road which lies outside the western/north-western boundary of the site, and via local roads off the R357 Shannonbridge to Cloghan road, to the south of the bog.

The rehabilitation area consists of three discrete parcels of land within the wider Blackwater Bog boundary, with a total footprint of 562 ha. These rehabilitation parcels include:

- Tullaghbeg: An area of 121.3 ha of land in the northern part of the site, which lies adjacent to the boundary of Fin Lough (Offaly) SAC.
- Clondelara-Blackwater: an area of 170 ha of land located in the southern part of the site, with its eastern boundary formed by the Gowlan River, and its western boundary extending to the main access road.
- Derrylahan-Blackwater: an area of 270.9 ha lies east of the Gowlan River, extending to the eastern boundary of the site, where the River Blackwater is located

Blackwater Bog is considered a shallow peat cutaway bog with some small pockets of deep peat remaining. The bog is an older production bog and there is extensive development of pioneer cutaway vegetation communities and wetlands across the former production area where peat has been cutaway.

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

Figure 2: Aerial photo of Blackwater Bog (over).

Figure 3: Water Quality Map for Blackwater Bog

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

2.4.1.2 Size, Scale, Current and Future Landuse

Size and Scale: The proposed rehabilitation area is 562ha.

Site history

Blackwater bog was drained and developed for industrial peat production in the 1950's. Peat production ceased in 2020. The peat was harvested for fuel peat to be used in West Offaly Power in Shannonbridge, Offaly.

Current land-use

- Industrial peat production has now permanently ceased at Blackwater Bog.
- The EU Designated site Fin Lough Offaly SAC lies partially within the north-western part of Blackwater bog, although this designated area was never developed for peat extraction.
- A Bord na Móna workshop and grounds is located in the south of the bog, removed from the currently proposed PCAS extent.
- Ash Repository Facility: Bord na Móna operate an Ash Repository Facility for ESB for the waste ash generated from the power station in Shannonbridge (West Offaly Power). This facility is owned by the ESB. It is licensed by the IPC licences of both ESB (P0611-01) and Bord na Móna (Ref. IPC Licence 502). The ash disposal facility located on the site is likely to be in operation up to 2023 and is similarly outside the lands where rehabilitation is proposed.

- ESB have applied for planning permission (March 2022) for the development of an Integrated Constructed Wetland for the treatment and management of leachate derived from the Ash Disposal Facility. It is proposed that leachate, which is currently collected through a series of collection wells and pumped to an existing storage lagoon before discharging from the site, will be treated through a multi-cell constructed wetland. Leachate entering the Integrated Constructed Wetland will flow sequentially through the treatment cells and discharge to an existing surface water drain on-site, ahead of final discharge to the Gowlan River via an existing licenced discharge location. The treated leachate from the ICW will be substantially reduced in volume, particularly during drier periods and the quality of any discharge will comply with the existing EPA IE licence prior to discharge to the Gowlan River. This development is located within the Ash facility boundary and is outside the lands where rehabilitation is proposed.
- There are two rehabilitated constructed wetlands within the site that are maturing and developing into semi-natural habitats (89.4 ha).
- Parts of Blackwater Bog, along the southern margins (partly within the areas owned and under the control of Bord na Móna) are currently being used by domestic turf cutters to harvest peat.
- Some of the cutaway has been developed for forestry and has been used for Coillte/Bord na Móna BOGFOR forestry research trials (44.32 ha), these lands do not overlap the currently proposed PCAS extent.
- Clonmacnoise-Blackwater Railway. This former tourist amenity, which operated in the 1990s, is now closed.

Future Landuse

- Bord na Móna are proposing to develop a solar farm at Blackwater Bog. The proposed footprint of the solar farm has been mapped as a constraint for this rehabilitation plan. In advance of this development, it is proposed to rehabilitate areas within Blackwater Bog in 2022 that are not currently constrained (see Figure: BNM-DR-23-14-05: Enhanced Rehab Measures). The peatland rehabilitation will either be in association with a potential renewable energy project, with peatland rehabilitation integrated into the proposed project, or will be completed in the absence of any proposed renewable energy project. It is expected that Bord na Móna will revise and update rehabilitation plan for Blackwater when this renewable energy review project has been considered by the planning process.
- There are several different proposals and feasibility studies ongoing for amenity development on Blackwater Bog. Bord na Móna are reviewing each of these various proposals from local communities, private groups, the local authority and Failte Ireland.

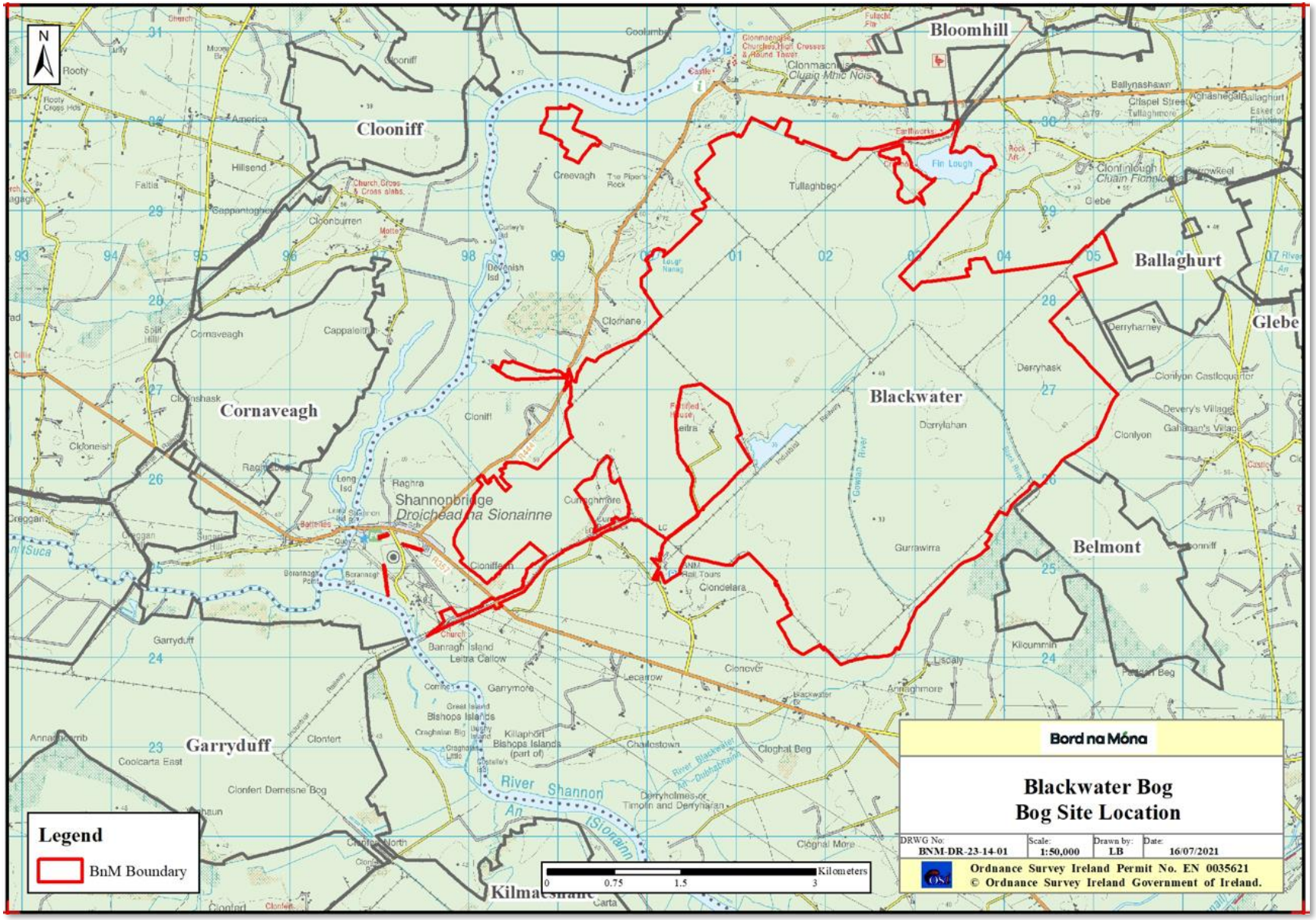


Figure 1: Site Location of Blackwater Bog

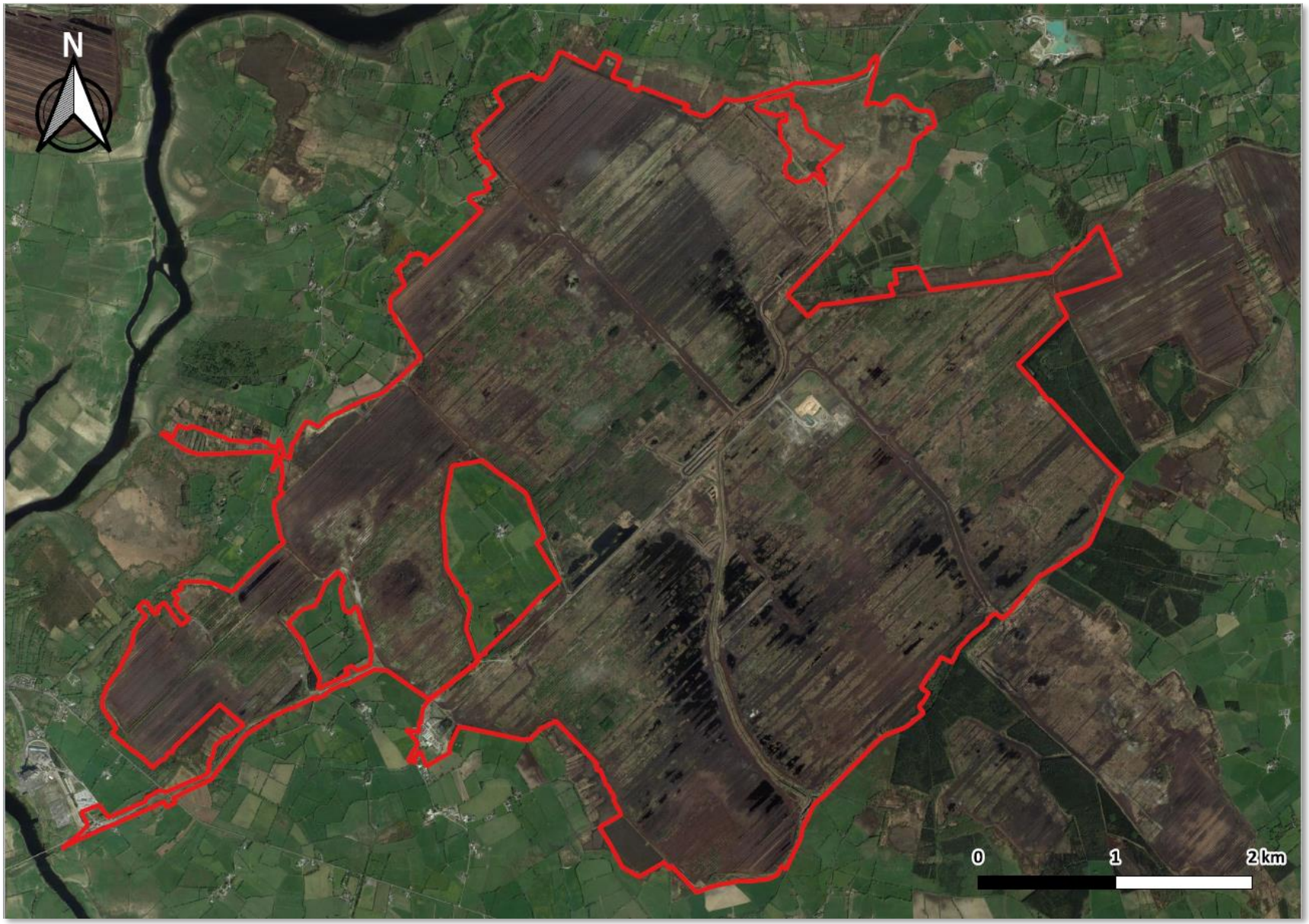


Figure 2: Aerial photo of Blackwater Bog

2.5 Description of the Receiving Environment

2.5.1 Desk Based Assessments

2.5.1.1 National Biodiversity Data Centre

A search was undertaken on the National Biodiversity Data Centre[2] for Protected and Invasive Species presence in the vicinity of the proposed development. Blackwater Bog is located within hectads M92 and N02[3]. The protected and invasive species records available for these hectads are shown in **Table 1**.

Table 1: NBDC records of protected and invasive species in M92 and N02 10km grid squares (hectads)

Common Name (Species Name)	Date(s) of Record	Hectad(s)	Designation
Common Frog (*Rana temporaria*)	06/04/2019 26/08/2019	N02, M92	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts
Barn Owl (*Tyto alba*)	25/02/2018 31/12/2011	N02, M92	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Barn Swallow (*Hirundo rustica*)	10/07/2021 31/12/2011	N02, M92	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Barnacle Goose (*Branta leucopsis*)	31/12/2001	N02	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Bewick's Swan (*Cygnus columbianus* subsp. *bewickii*)	31/12/2001	N02	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Black-headed Gull (*Larus ridibundus*)	31/12/2011 31/12/2011	N02, M92	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Black-tailed Godwit (*Limosa limosa*)	31/12/2001 29/02/1984	N02, M92	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern ||

[2] Available at https://www.biodiversityireland.ie/. Accessed in April 2022

[3] 10x10km Irish Grid Square

Common Name (Species Name)	Date(s) of Record	Hectad(s)	Designation
			Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Canada Goose (*Branta canadensis*)	31/12/2001	N02	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland) || Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species
Common Coot (*Fulica atra*)	31/12/2001	N02, M92	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Goldeneye (*Bucephala clangula*)	31/12/2001	N02	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Grasshopper Warbler (*Locustella naevia*)	31/12/2011	N02, M92	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Greenshank (*Tringa nebularia*)	31/12/2001	N02	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Kestrel (*Falco tinnunculus*)	31/12/2011	N02	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Kingfisher (*Alcedo atthis*)	10/07/2021	N02	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List

Common Name (Species Name)	Date(s) of Record	Hectad(s)	Designation
Common Linnet (*Carduelis cannabina*)	31/12/2011	N02, M92	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Pheasant (*Phasianus colchicus*)	31/12/2011	N02	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species
Common Pochard (*Aythya ferina*)	31/12/2001 29/02/1984	N02, M92	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Redshank (*Tringa totanus*)	31/12/2011	N02, M92	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Common Sandpiper (*Actitis hypoleucos*)	31/12/2001	N02	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Shelduck (*Tadorna tadorna*)	31/12/2001	N02	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Snipe (*Gallinago gallinago*)	31/12/2011	N02	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Starling (*Sturnus vulgaris*)	31/12/2011	N02, M92	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Swift (*Apus apus*)	31/07/1991	N02	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern ||

Common Name (Species Name)	Date(s) of Record	Hectad(s)	Designation
			Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Wood Pigeon (*Columba palumbus*)	31/12/2011	N02, M92	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species
Corn Crake (*Crex crex*)	31/07/1991	N02	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Dunlin (*Calidris alpina*)	31/12/2011	N02	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Eurasian Curlew (*Numenius arquata*)	31/12/2011 01/04/2020	N02, M92	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Eurasian Teal (*Anas crecca*)	31/12/2011	N02, M92	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Eurasian Wigeon (*Anas penelope*)	31/12/2011	N02	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Eurasian Woodcock (*Scolopax rusticola*)	29/02/1984 31/12/2011	N02, M92	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species ||

Common Name (Species Name)	Date(s) of Record	Hectad(s)	Designation
			Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
European Golden Plover (*Pluvialis apricaria*)	31/12/2011	N02	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
European Nightjar (*Caprimulgus europaeus*)	31/07/1972	N02	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Gadwall (*Anas strepera*)	31/07/1991 29/02/1984	N02, M92	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Garganey (*Anas querquedula*)	31/12/2011	N02	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Great Black-backed Gull (*Larus marinus*)	31/12/2001	N02	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Great Cormorant (*Phalacrocorax carbo*)	22/04/2019 31/12/2011	N02, M92	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Great Crested Grebe (*Podiceps cristatus*)	31/12/2011	N02	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern ||

Common Name (Species Name)	Date(s) of Record	Hectad(s)	Designation
			Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Greater Scaup (*Aythya marila*)	31/12/2001	N02	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Greater White-fronted Goose (*Anser albifrons*)	31/12/2001	N02	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Grey Partridge (*Perdix perdix*)	29/02/1984 31/07/1972	N02, M92	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Greylag Goose (*Anser anser*)	31/12/2011	N02	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland) || Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Hen Harrier (*Circus cyaneus*)	17/11/2019 31/12/2011	N02, M92	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List

Common Name (Species Name)	Date(s) of Record	Hectad(s)	Designation
Herring Gull (*Larus argentatus*)	31/12/2001	N02	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
House Martin (*Delichon urbicum*)	10/07/2021 31/12/2011	N02, M92	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
House Sparrow (*Passer domesticus*)	31/12/2011	N02	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Jack Snipe (*Lymnocryptes minimus*)	31/12/2011	N02	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species
Lesser Black-backed Gull (*Larus fuscus*)	31/12/2001	N02	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Little Egret (*Egretta garzetta*)	31/12/2011	M92	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species
Little Grebe (*Tachybaptus ruficollis*)	31/12/2011	N02	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Mallard (*Anas platyrhynchos*)	22/04/2019 31/12/2011	N02, M92	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species
Merlin (*Falco columbarius*)	27/10/2016	N02	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Mew Gull (*Larus canus*)	31/12/2001	N02	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern ||

Common Name (Species Name)	Date(s) of Record	Hectad(s)	Designation
			Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Mute Swan (*Cygnus olor*)	31/12/2011	N02	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Northern Lapwing (*Vanellus vanellus*)	11/05/2019 31/12/2011	N02, M92	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Northern Pintail (*Anas acuta*)	31/12/2011	N02	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Northern Shoveler (*Anas clypeata*)	31/12/2011	N02	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Northern Wheatear (*Oenanthe oenanthe*)	31/12/2011	M92	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Peregrine Falcon (*Falco peregrinus*)	31/12/2011	N02	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species
Pink-footed Goose (*Anser brachyrhynchus*)	31/12/2001	N02	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species
Red Grouse (*Lagopus lagopus*)	31/07/1991 31/07/1972	N02, M92	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species:

Common Name (Species Name)	Date(s) of Record	Hectad(s)	Designation
			Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Ringed Plover (*Charadrius hiaticula*)	31/12/2001 31/12/2011	N02, M92	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Rock Pigeon (*Columba livia*)	31/12/2011	N02	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species
Ruff (*Philomachus pugnax*)	31/12/2001	N02	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Sand Martin (*Riparia riparia*)	10/07/2021 01/07/2017	N02, M92	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Short-eared Owl (*Asio flammeus*)	29/02/1984	N02	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Sky Lark (*Alauda arvensis*)	31/12/2011	N02	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Spotted Crake (*Porzana porzana*)	22/06/2001	M92	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Spotted Flycatcher (*Muscicapa striata*)	31/12/2011	N02	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Stock Pigeon (*Columba oenas*)	31/07/1991	N02	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List

Common Name (Species Name)	Date(s) of Record	Hectad(s)	Designation
Tufted Duck (*Aythya fuligula*)	31/12/2011	N02, M92	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Water Rail (Rallus aquaticus)	31/12/2011	N02	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Whinchat (Saxicola rubetra)	26/07/2012 13/06/2012	N02, M92	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Whooper Swan (*Cygnus cygnus*)	25/10/2018 31/12/2011	N02, M92	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Yellowhammer (*Emberiza citrinella*)	31/12/2011 31/07/1991	N02, M92	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Freshwater White-clawed Crayfish (*Austropotamobius pallipes*)	22/06/2017	N02	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Protected Species: EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts
Blue Fleabane (*Erigeron acer*)	05/08/2019	M92	Threatened Species: Endangered
Canadian Waterweed (*Elodea canadensis*)	18/05/2014	N02	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
Green-winged Orchid (*Orchis morio*)	12/05/2019	N02	Threatened Species: Endangered
Japanese knotweed (*Reynoutria japonica*)	19/08/2015	M92	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive

Common Name (Species Name)	Date(s) of Record	Hectad(s)	Designation
			Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
Nuttall's Waterweed (*Elodea nuttallii*)	18/05/2014	N02, M92	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
Pitcherplant (*Sarracenia purpurea*)	15/07/2017	M92	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species
Rhododendron (*Rhododendron ponticum*)	16/03/2012	M92	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
Sycamore (*Acer pseudoplatanus*)	18/05/2014	N02, M92	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species
Three-cornered Garlic (*Allium triquetrum*)	18/04/2020	N02	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
Turkey Oak (*Quercus cerris*)	11/09/2003	N02	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species
Wall Cotoneaster (*Cotoneaster horizontalis*)	17/05/2014	N02	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species
Macroplea appendiculata	31/12/1992	N02	Threatened Species: Near threatened
Ochthebius (*Asiobates*) *bicolon*	08/08/1996	M92	Threatened Species: Vulnerable
Dingy Skipper (*Erynnis tages*)	25/05/2018 19/05/2021	N02, M92	Threatened Species: Near threatened
Grayling (*Hipparchia semele*)	05/08/2019 12/08/1986	N02, M92	Threatened Species: Near threatened
Marsh Fritillary (*Euphydryas aurinia*)	26/05/2020	N02	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Threatened Species: Vulnerable

Common Name (Species Name)	Date(s) of Record	Hectad(s)	Designation
Small Blue (*Cupido minimus*)		M92	Threatened Species: Endangered
Small Heath (*Coenonympha pamphilus*)	26/05/2020 08/06/2018	N02, M92	Threatened Species: Near threatened
Wall (*Lasiommata megera*)	04/08/2020 28/05/1987	N02, M92	Threatened Species: Endangered
Andrena (*Leucandrena*) *barbilabris*	01/06/2003	N02	Threatened Species: Near threatened
Andrena (*Micrandrena*) *semilaevis*	16/06/2000	N02	Threatened Species: Vulnerable
Gooden's Nomad Bee (*Nomada goodeniana*)	23/04/2019	N02	Threatened Species: Endangered
Large Red Tailed Bumble Bee (*Bombus* (*Melanobombus*) *lapidarius*)	08/06/2018	M92	Threatened Species: Near threatened
Moss Carder-bee (*Bombus* (*Thoracombus*) *muscorum*)	18/05/2018	M92	Threatened Species: Near threatened
Blind Snail (*Cecilioides* (*Cecilioides*) *acicula*)	18/09/1977	N02	Threatened Species: Vulnerable
Common Garden Snail (*Cornu aspersum*)	18/09/1977	N02, M92	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species
Common Whorl Snail (*Vertigo* (*Vertigo*) *pygmaea*)	18/09/1977	N02	Threatened Species: Near threatened
Desmoulin's Whorl Snail (*Vertigo* (*Vertigo*) *moulinsiana*)	07/03/2005	N02	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Protected Species: Wildlife Acts || Threatened Species: Endangered
Duck Mussel (*Anodonta* (*Anodonta*) *anatina*)	23/03/2003	N02	Threatened Species: Vulnerable
Ear Pond Snail (*Radix auricularia*)	18/09/1977	N02	Threatened Species: Vulnerable

Common Name (Species Name)	Date(s) of Record	Hectad(s)	Designation
English Chrysalis Snail (*Leiostyla* (*Leiostyla*) *anglica*)	07/03/2005	N02	Threatened Species: Vulnerable
Geyer's Whorl Snail (*Vertigo* (*Vertigo*) *geyeri*)	24/08/2005	N02	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Protected Species: Wildlife Acts || Threatened Species: Vulnerable
Globular Pea Mussel (*Pisidium hibernicum*)	23/03/2003 18/09/1977	N02, M92	Threatened Species: Near threatened
Heath Snail (*Helicella itala*)	18/09/1977 11/09/1986	N02, M92	Threatened Species: Vulnerable
Jenkins' Spire Snail (*Potamopyrgus antipodarum*)	22/06/2017 14/09/2017	N02, M92	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species
Marsh Whorl Snail (*Vertigo* (*Vertigo*) *antivertigo*)	07/03/2005 18/09/1977	N02, M92	Threatened Species: Vulnerable
Moss Chrysalis Snail (*Pupilla* (*Pupilla*) *muscorum*)	18/09/1977	N02	Threatened Species: Endangered
Point Snail (*Acicula fusca*)	07/03/2005	N02	Threatened Species: Vulnerable
Prickly Snail (*Acanthinula aculeata*)	18/09/1977	N02	Threatened Species: Near threatened
Pygmy Pea Mussel (*Pisidium moitessierianum*)	23/03/2003	N02	Threatened Species: Endangered
Smooth Grass Snail (*Vallonia pulchella*)	07/03/2005 18/09/1977	N02, M92	Threatened Species: Vulnerable
Striated Whorl Snail (*Vertigo* (*Vertigo*) *substriata*)	07/03/2005	N02	Threatened Species: Near threatened
Tree Snail (*Balea* (*Balea*) *perversa*)	18/09/1977 11/09/1986	N02, M92	Threatened Species: Vulnerable
Wall Whorl Snail (*Vertigo* (*Vertigo*) *pusilla*)	11/09/1986	M92	Threatened Species: Endangered

Common Name (Species Name)	Date(s) of Record	Hectad(s)	Designation
Whirlpool Ramshorn (*Anisus* (*Disculifer*) *vortex*)	18/09/1977	M92	Threatened Species: Vulnerable
Zebra Mussel (*Dreissena* (*Dreissena*) *polymorpha*)	31/08/2006	N02, M92	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
Waved Fork-moss (*Dicranum bergeri*)	31/12/1960	N02	Threatened Species: Regionally Extinct
Common Lizard (*Zootoca vivipara*)	07/06/2018	M92	Protected Species: Wildlife Acts
American Mink (*Mustela vison*)	26/04/2012	N02, M92	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
Bank Vole (*Myodes glareolus*)	14/01/2011	N02	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species
Brown Long-eared Bat (*Plecotus auritus*)	26/08/2014	M92	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Daubenton's Bat (*Myotis daubentonii*)	02/09/2014	N02	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Eurasian Badger (*Meles meles*)	31/12/2015	N02, M92	Protected Species: Wildlife Acts
Eurasian Pygmy Shrew (*Sorex minutus*)	31/10/2010	N02	Protected Species: Wildlife Acts
Eurasian Red Squirrel (*Sciurus vulgaris*)	10/09/2015	N02	Protected Species: Wildlife Acts
European Otter (*Lutra lutra*)	29/11/2012 22/02/2010	N02, M92	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
European Rabbit (*Oryctolagus cuniculus*)	27/03/2012	N02	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species
Fallow Deer (*Dama dama*)	27/03/2012	N02	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive

Common Name (Species Name)	Date(s) of Record	Hectad(s)	Designation
			Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland) || Protected Species: Wildlife Acts
Greater White-toothed Shrew (*Crocidura russula*)	29/07/2017	N02	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species
House Mouse (*Mus musculus*)	29/07/2018	N02	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species
Pine Marten (*Martes martes*)	24/07/2016 03/10/2021	N02, M92	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts
Pipistrelle (*Pipistrellus pipistrellus* sensu *lato*)	26/05/2009	N02	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Red Deer (*Cervus elaphus*)	26/04/2012	N02	Protected Species: Wildlife Acts
Soprano Pipistrelle (*Pipistrellus pygmaeus*)	26/05/2009	N02	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
West European Hedgehog (*Erinaceus europaeus*)	17/04/2021 26/06/2021	N02, M92	Protected Species: Wildlife Acts

2.5.1.2 National Parks and Wildlife Service Data Request

Table 2 presents protected species records held for hectads M92 and N02 by the National Parks and Wildlife Service.

Table 2: NPWS records of protected and invasive species in M92 and N02 10km grid squares

Species Name	Common Name	Record Date	Hectad	Location(s)
Austropotamobius pallipes	White-clawed Crayfish	1988 & 1993	N02	Blackwater (Shannonbr) / Br ENE Derryharry Blackwater (Shannonbr) / Br ENE Derryharry
Cladonia ciliata var. ciliata	Cladonia tenuis	1983	N02	Clonlyon Bog

Species Name	Common Name	Record Date	Hectad	Location(s)
Cladonia portentosa	Cladonia portentosa	1983	N02	Clonlyon Bog Moyclare Bog
Erinaceus europaeus	West European Hedgehog	1979 & 1981	N02	Cloghan, Co. Offaly
Fissidens monguillonii	Atlantic Pocket-moss	Near Devenish Island, Co. Roscommon	M92	2007
Gentianella amarella subsp. hibernica	Gentianella amarella subsp. hibernica	near Fin Lough	N02	2005
Lepus timidus subsp. *hibernicus*	Irish Hare	Various locations, including Blackwater Bog	N02	Various dates
Lutra lutra	Eurasian Otter	Numerous	M92, N02	Blackwater / Blackwater Bridge, Co. Offaly Garryduff, Co. Galway Suck / Correen Ford, Co. Galway Blackwater, Co. Offaly Shannon Harbour, Co. Offaly
Martes martes	Pine Marten	2000, 2005 & 2010	N02	Kilmacshane, Co. Galway Garryduff, Co. Galway Lismanny, Co. Galway Blackwater, Co. Offaly
Meles meles	Eurasian Badger	1980, 1982 & 1992	N02, M92	Clonfert, Co. Galway Moneenaheeltia, nr. Laurencetown Clonony, Co. Offaly
Mustela erminea	Stoat	1982	M92	Shannonbridge, Co. Offaly

Species Name	Common Name	Record Date	Hectad	Location(s)
Neotinea maculata	Dense-flowered Orchid	1972	M92	SE of esker ridge
Oenanthe fistulosa	Tubular Water-dropwort	1998	N02	Newtown, Shannon Callows, Co. Offaly
Orchis morio	Green-winged Orchid	Various	M92, N92	Clonmacnoise, SW of Shannonbridge Clorhane, near Clonmacnoise, Co. Offaly Clonburren, Shannonbridge Leitra Callow, Shannonbridge Cloghane, Clonmacnoise, Co. Offaly Clonfinlough, Clonmacnoise, Co. Offaly
Rana temporaria	Common Frog	Various	N02, M92	The Glebe / Clonfanlough Blackwater Ballycullen / Tallaght
Rhynchospora fusca	Brown Beak-sedge	1983	N02	Moyclare Bog
Sciurus vulgaris	Eurasian Red Squirrel	2010	M92	Garryduff, Co. Galway Lismanny, Co. Galway
Sphagnum denticulatum	Cow-horn Bog-moss	1983	N02	Moyclare Bog
Tyto alba	Barn Owl	2009	N02	Belmount, Co. Offaly
Vertigo geyeri	Geyer's Whorl Snail	1998, 2005	N02	Bishops palace, Co. Galway
Vertigo moulinsiana	Desmoulin's Whorl Snail	2005	N02	Blackwater / Fin Lough Co. Offaly

2.5.1.3 Baseline Water Quality Data for Blackwater Bog

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 Blackwater 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. All current and existing 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.

Blackwater bog has two treated surface water outlets to the Blackwater River (E_SH_25B270200 BLACKWATER (SHANNONBRIDGE)_020, and one to the Shannon Lower (IE_SH_25S012000 SHANNON (LOWER)_010 and one direct to Shannon Upper (IE_SH_26S021920 SHANNON (Upper)_130), all via a silt pond network.

The Blackwater River or receiving Shannon Upper/Lower are not indicated as being under pressure from peat or peat extraction in the third cycle River Basin Management Plan, currently under preparation.

Details of silt ponds, associated surface water emission points and those being monitored and sampled as part of the PCAS scheme are detailed on the accompanying structures map along with water quality map, see below **Figure 3 Blackwater Bog: Water Quality Map**, which illustrate the various drainage and water quality infrastructure present at Blackwater Bog.

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

The main emission limit value associated with this bog is 35mg/l suspended solids, with trigger levels for ammonia of 3.7 mg/l and COD 100mg/l. Initial monthly ammonia concentrations from November 2020 to October 2021 have a range of 0.021 to 0.213 mg/l with an average of 0.128 mg/l. Results for suspended solids for the same period indicate a range of >2 to 33mg/l with an average o of 3.31mg/l.

From an analysis of any monitoring over the past 6 years of the IPC licence environmental monitoring of some of the discharges from this bog, indicate that results were under the ELV for SS and Ammonia and broadly under the trigger levels for COD (see **Table 3**).

Table 3: Decommissioning and Rehabilitation Programme Water Quality Monitoring.

Bog	SW	Monitoring	pH	SS mg/l	TS mg/l	Ammonia mg/l	TP mg/l	COD mg/l	Colour
Blackwater Bog	SW-74	Q2 21	7.4	3	172	0.176	<0.05	44	191
Blackwater Bog	SW-75	Q2 21	7.5	2	337	0.126	<0.05	45	184
Blackwater Bog	SW-76	Q2 21	7.5	7	245	0.179	<0.05	70	347
Blackwater Bog	SW-80	Q2 21	7.5	7	304	0.127	<0.05	44	182
Blackwater Bog	SW-74	Q1 19	7.7	<5	384	0.56	<0.05	48	94
Blackwater Bog	SW-75	Q1 19	7.8	<5	414	0.2	<0.05	36	68
Blackwater Bog	SW-76	Q1 19	7.7	<5	266	0.03	0.05	70	202
Blackwater Bog	SW-78	Q4 19	6.5	7	128	0.432	<0.05	79	497
Blackwater Bog	SW-79	Q4 19	7	4	198	2.36	<0.05	66	327
Blackwater Bog	SW-80	Q1 19	7.8	<5	416	0.09	<0.05	36	72
Blackwater Bog	SW-83	Q4 19	6	4	148	1.09	<0.05	106	594
Blackwater Bog	SW-78	Q3 18	7.6	5	326	5.1	0.05	72	164
Blackwater Bog	SW-79	Q3 18	7.7	5	470	0.11	0.05	26	50
Blackwater Bog	SW-83	Q3 18	7.2	5	248	1.5	0.05	107	282
Blackwater Bog	SW-81	Q4 18	7.9	5	226	0.72	0.05	50	134
Blackwater Bog	SW-82	Q4 18	7.4	5	206	2.5	0.05	81	250
Blackwater Bog	SW-84	Q4 18	6.6	5	270	3.4	0.05	85	283
Blackwater Bog	SW-86	Q4 18	7.5	36	210	1.1	0.08	113	152
Blackwater Bog	SW-74	Q2 15	7.8	5	374	1.3	0.05	51	85
Blackwater Bog	SW-77	Q2 15	8	6	372	0.36	0.05	20	60
Blackwater Bog	SW-78	Q2 15	7.7	5	328	0.49	0.05	49	108
Blackwater Bog	SW-80	Q3 15	8.1	5	362	0.02	0.05	43	69
Blackwater Bog	SW-81	Q3 15	8.1	5	410	0.16	0.05	23	99
Blackwater Bog	SW-82	Q3 15	8	9	272	0.29	0.05	57	175
Blackwater Bog	SW-83	Q3 15	7.4	5	226	1.6	0.05	120	5
Blackwater Bog	SW-84	Q3 15	7.7	5	354	0.21	0.05	66	206
Blackwater Bog	SW-86	Q3 15	7.8	5	342	0.19	0.05	60	178

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

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

Depending on the period required to confirm that the main two parameters, suspended solids and ammonia as remaining compliant with the licence emission and trigger limit values and there is an improving trajectory in these two parameters i.e. reduction in concentration, the monitoring programme and intensity will be periodically reviewed and amended.

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

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

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

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

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

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

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

Water will still discharge from designated emission points when rehabilitation at Blackwater 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 the key water body receptors; the Blackwater (Shannonbridge) River (EPA code: 25B27); the River Shannon (lower) (EPA code: 25S01) and the Shannon Upper (EPA code: 26S02) and is expected to support the future status of the waterbody as being of Good Status.

Details of the internal drainage network and surface water emission points and those being monitored and sampled as part of the PCAS scheme are detailed on the attached Water Quality Map (See **Figure 3**).

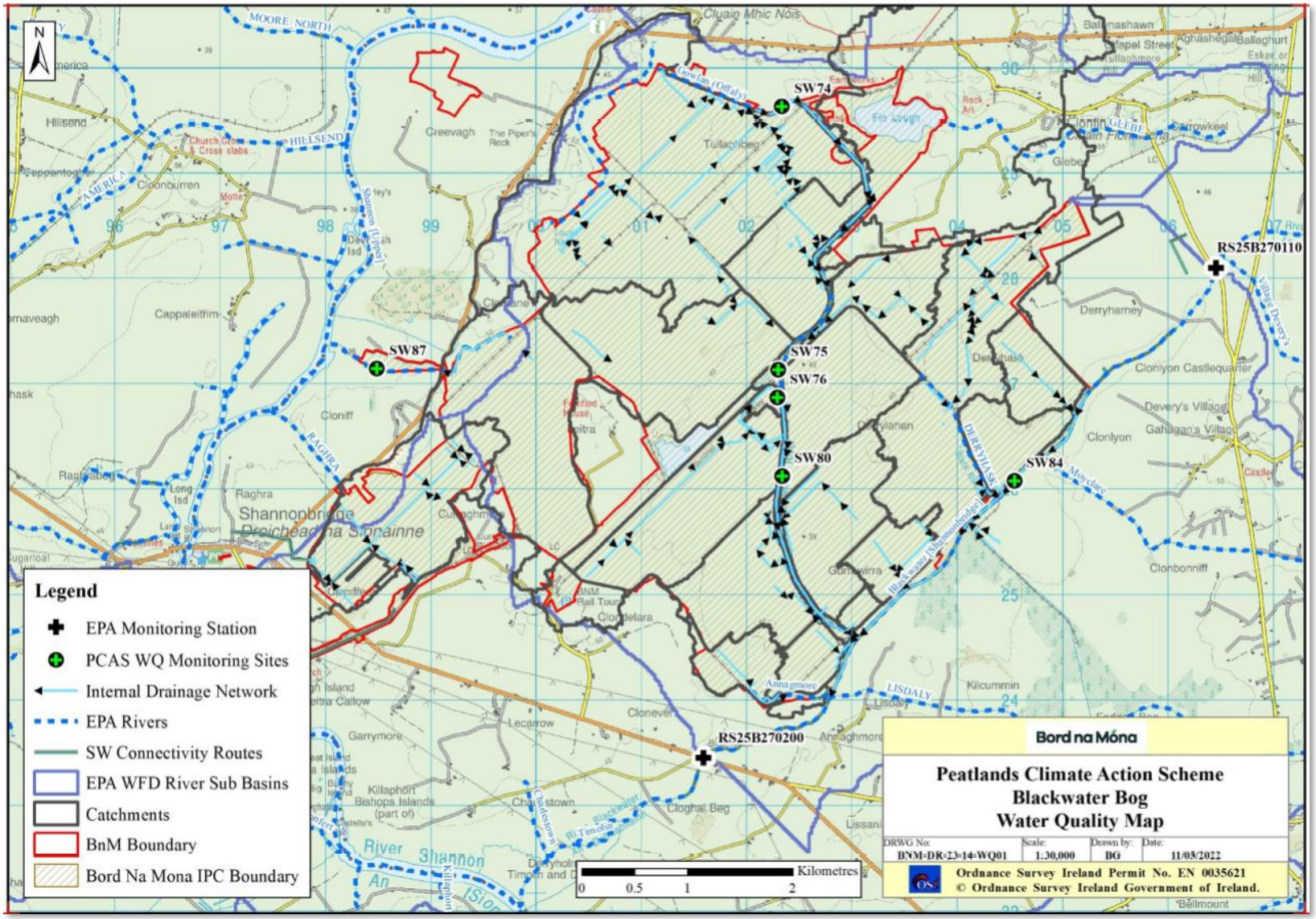


Figure 3: Water Quality Map for Blackwater Bog

Decommissioning and Rehabilitation Programme Water Quality Monitoring.

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

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

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

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

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

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

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

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

The water quality emission limit values (under condition 6.2 of the Integrated Pollution Control (IPC) licence issued for Blackwater Bog) are unique to the water quality impacts from peat extraction, and as requested by the EPA. These values are not appropriate to use as a measures of success with regard to the expected water quality improvements that will arise from ceasing the annual peat extraction activity, removal of all stock and the associated rehabilitation of this bog. Existing water quality results from Blackwater Bog indicate that suspended solids are well under the ELV that are applied during peat extraction, with ammonia also well under the associate trigger level. Silt ponds are an IPC Licence requirement to manage expected suspended solids that can arise from peat extraction and are not solely relied upon to mitigate impacts from rehabilitation of the peatlands. The silt pond locations are highlighted on (Figure 16), and all silt ponds are sized as required under condition 6.10 of the associated IPC Licence with regard to expected impact from the activity of milling peat and associated production processes, and maintained as required under condition 6.7 and 6.8. To that end, it is considered that silt ponds within Blackwater Bog are sufficiently sized to attenuate any silt or particulate matter received during or following the proposed rehabilitation works.

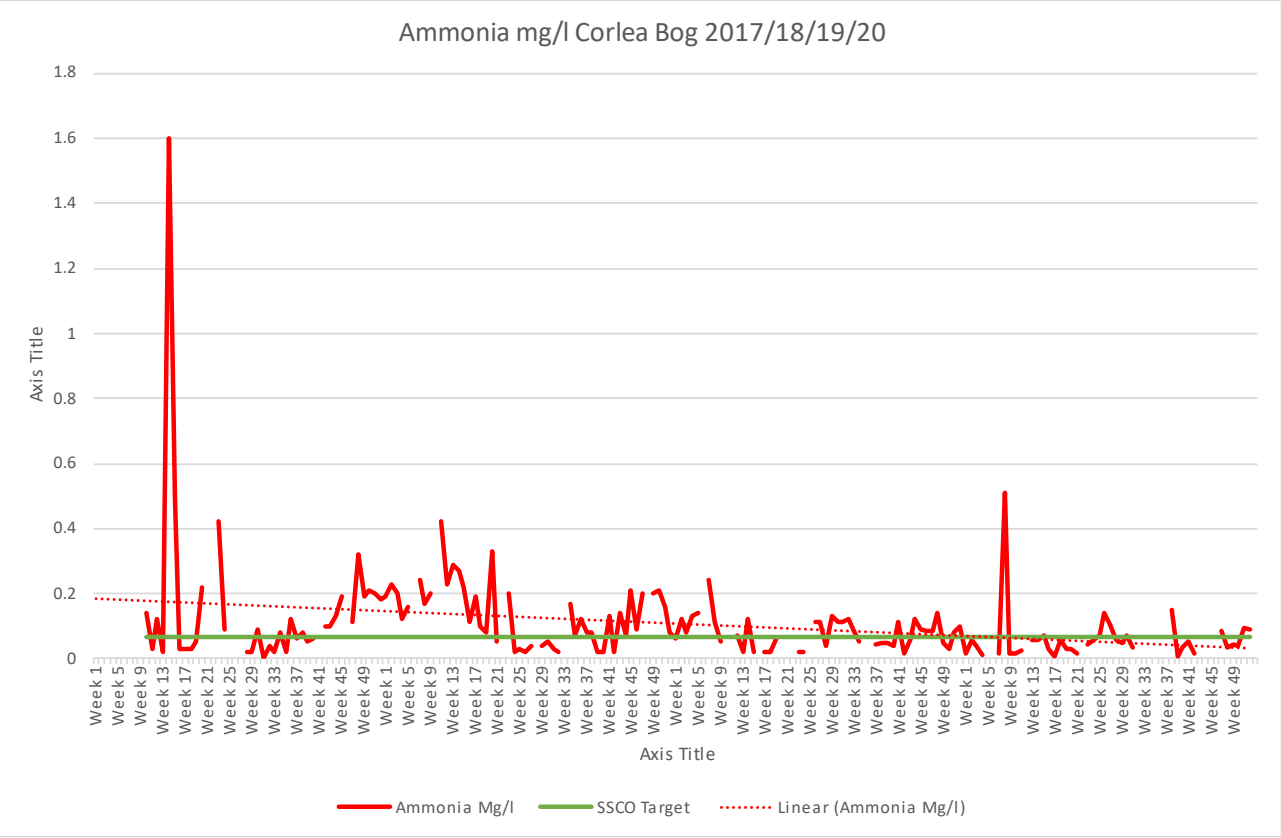
Forecasted Water Quality Trends following the PCAS Works

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

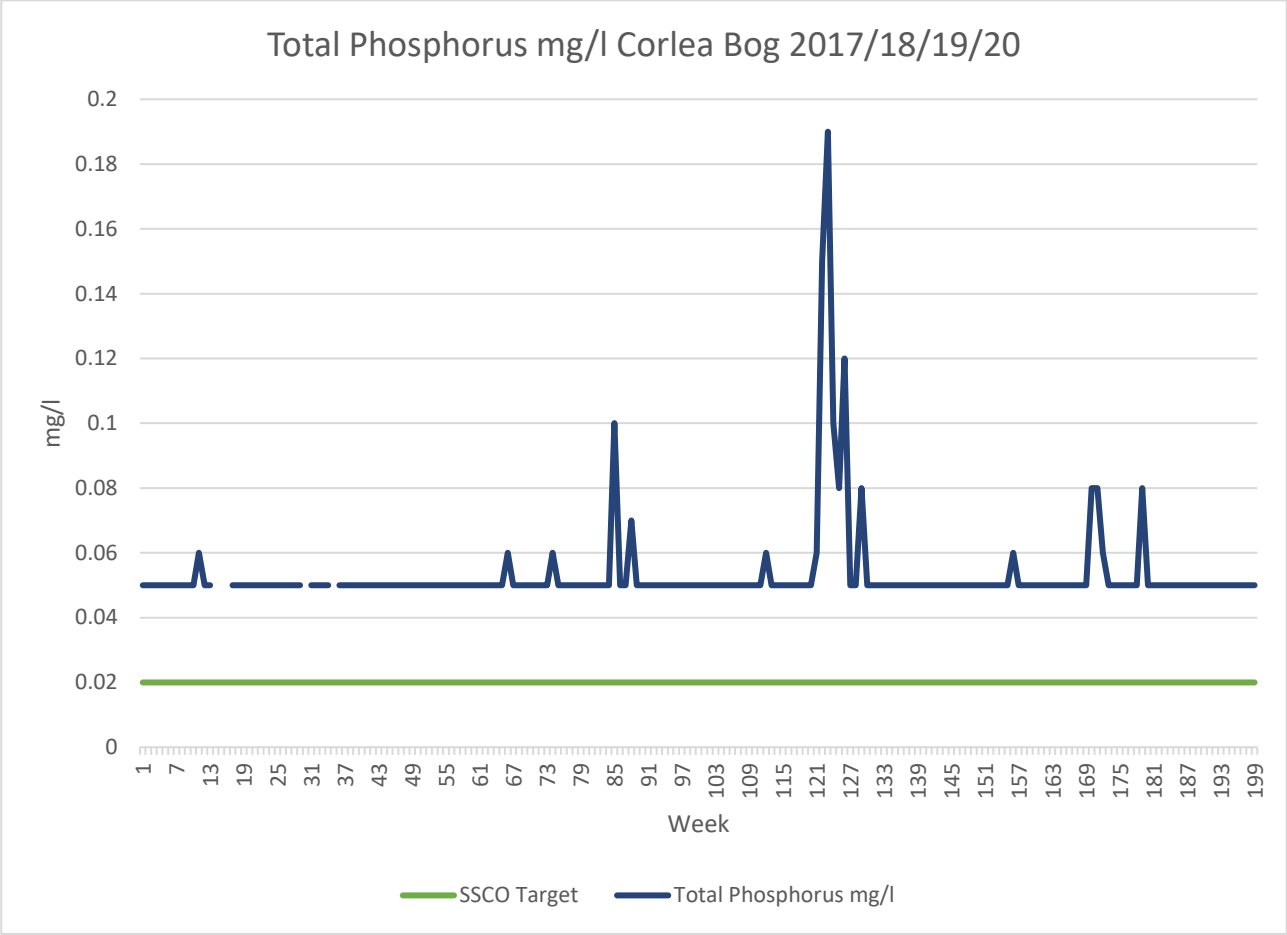
This projection is supported by water quality monitoring of 2 other similar raised bogs (Longfordpass Bog, Co Tipperary and Corlea Bog, Co Longford) that were previously subject to industrial peat extraction and that have since been subject to peatland rehabilitation.

Graph 1 below shows the downward trend for ammonia at Corlea Bog, which is also located within Bilberry _SC_010 sub-catchment. Corlea Bog is located >30km north of Blackwater 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 5ml/l up until July 2019. The laboratory was changed in July 2019 and a new detection limit for SS of 2mg/l was applied. The SS concentrations were consistently below the 5mg/l and the 2mg/l at both laboratories, indicating very low SS concentrations in silt pond outfalls. Rehabilitation measures continue to establish at Corlea Bog and it has yet to stabilise, but the downward trend for ammonia found during the stabilisation of rehabilitation measures shows that once stabilised, the re-wetted bog will reduce ammonia emissions to meet the SSCO parameters / limits. It is also reasonable to predict a downward trend for SS and TP as the rehabilitation measures become established.

Following commencement, and as the monthly monitoring program at Blackwater continues in 2022 during the rehabilitation works, and data from the 2020 monitoring program is compiled, further trending will be produced to verify any ongoing trends.



Graph 1: Ammonia Concentrations and Trend at Corlea Bog



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

2.5.2 Field Assessments

2.5.2.1 Current Habitats

Habitats present (in order of dominance)

The most common habitats present on Blackwater Site include:

- Bare peat (BP). The majority of the site in active production or is production-related cutaway. Areas mapped as BP can contain some minor recolonisation along the drains with pioneer Poor fen communities (pJeff, pEang), Scrub (eBir) and Reedbeds (pPhrag, pTyph) most common. (Codes refer BnM classification of pioneer habitats of industrial cutaway and production bog.
- Areas considered as production-related cutaway are re-colonising with some vegetation cover. Pioneer Poor fen communities, birch scrub and dry grassland are most common habitats found. Some depressions contain small amounts of open water and Poor Fen. Reedbeds also appear in various places in conjunction with the above habitats.
- Reedbeds are more extensive in low-lying areas along the River Gowlan. Some of this bog is cutaway (that is out of production).
- There are two constructed wetlands on the site. The southern wetland contains a significant area of open water and is surrounded by reedbeds and pioneer poor fen communities. The northern wetland is dominated by Reedbeds (pPhrag) and pioneer poor fen communities (pRos, pEang) with much less open water. There are also some high fields with dry heath dominated by Heather (dHeath) and Birch scrub (eBir). There is a small area of Wet Willow-dominated woodland (WN6) with Reedbeds within the northern wetland that was never developed.
- There are several BOGFOR forestry plots on the site that contain a mixture of conifer forestry (WD4) and immature broad-leaved woodland (WS2). Several mounds contain more mature conifer forestry (WD4). (Codes refer to Heritage Council habitat classification, Fossitt 2000),)
- A small abandoned quarry associated with an esker is present on the fringes of the western Blackwater site boundary. This area contains some dry calcareous grassland (GS1) along with exposed esker gravel and till (ED1), revegetating ground (ED3), scrub (WS1) and Bracken (HD1).
- The Gowlan River (FW2) flows through the site. This river is canalised and riparian development is poor.
- The site contains an area used for disposal of ash produced by West Offaly Power (ED5). Some compartments are already filled and have been landscaped while other compartments are open.
- Two areas west of the Shannonbridge-Clonmacnoise Road contain some Raised bog (PB1) along with cutover bog (PB4) and fringe habitats (WS1) such as scrub and wet grassland (GS4). There is also a minor amount of conifer plantation and Birch woodland associated with these sections.
- The Fin Lough area contains a mosaic of Rich Fen (PF1), Raised bog (PB1), Reedbeds (FS1), Scrub (WS1) and some wet grassland (GS4) around a Limestone Lake (FL3).
- Fringe habitats around the margins of the site include raised bog remnants (PB1, PB4) scrub developing on high bog (WS1), Bracken (HP1) and Birch woodland (WN7).

Bird Surveys

Winter bird surveys were completed by Bord na Mona staff during the overwintering season 2021 / 2022. The surveys focused on the ephemeral wetland habitats either side of the Gowlan River, in addition to a large ephemeral wetland areas located near the south-eastern boundary of the Blackwater Bog site. The findings of the bird surveys are presented in full in **Appendix J**. The findings of the survey included the intermittent occurrence of small numbers of over-wintering bird species using the ephemeral wetland sites and include;

Whooper Swan, Wigeon, Common Snipe, Coot, Cormorant, Grey Heron, Greylag Goose, Jack Snipe, Kingfisher, Lapwing, Mallard, Mute Swan, Moorhen, Ringed Plover, Pochard, Teal and Water Rail.

The Blackwater Bog site was visited on April 12th 2022. Bird Survey methodology included a series of spot-counts vantage points across the bog affording good views. These spot counts were supplemented by walkovers of habitats and targeted survey areas. All bird species encountered (seen or heard) during the surveys were recorded, together with the abundance of each species. Birds flying over the site were also included as part of the observations. Casual records of birds encountered during the spot counts and field walkovers, but outside of dedicated survey period were also noted.

The site walkover survey identified located ephemeral wetland areas that have established on areas of extensive cutover bog. These areas are in varying stages of recolonisation and support varying cover of reed and large sedge swamp, emergent bottle sedge swamp and drier areas of recolonising bog under ongoing recolonisation of cotton grasses. Large ephemeral wetland areas are located to the west and north of the ESB ash deposition facility and support small numbers of wildfowl, particularly duck species. Of note, it the presence of Ringed Plover exhibiting potential breeding activity west of the ESB ash deposition facility and Lapwing located to the north of this facility.

Bird species identified during the April 2022 walkover survey are presented in **Table 4** below.

Table 4: Bird Species identified during the site walkover survey in April 2022

Common Name	Species Name	Activity within the site
Blackbird	*Turdus merula*	Foraging within treeline, scrub and woodland habitats fringing the larger areas of expansive cutover bogs.
Robin	*Erithacus rubecula*	Foraging within treeline, scrub and woodland habitats fringing the larger areas of expansive cutover bogs.
Dunnock	*Prunella modularis*	Foraging within treeline, scrub and woodland habitats fringing the larger areas of expansive cutover bogs.
Chaffinch	*Fringilla coelebs*	Foraging within treeline, scrub and woodland habitats fringing the larger areas of expansive cutover bogs.
Blackbird	*Turdus merula*	Foraging within and flushed from marginal scrub and woodland habitats.
Song Thrush	*Turdus philomelos*	Flushed from marginal scrub and woodland habitats.
Snipe	*Gallinago gallinago*	Flushed from the marginal wetland areas and silt pond margins.
Pied Wagtail	*Motacilla alba*	Foraging along bog access tracks.
Reed Bunting	*Emberiza schoeniclus*	Foraging along marginal wetland areas and drainage channels.
Meadow Pipit	*Anthus pratensis*	Calling and displaying over regenerating cutover bog habitats.
Skylark	*Alauda arvensis*	Calling and displaying over regenerating cutover bog habitats.

Common Name	Species Name	Activity within the site
Long Tailed-Tit	*Aegithalos caudatus*	Foraging in scrub / young birch woodland.
Willow Warbler	*Phylloscopus trochilus*	Calling from marginal scrub and wetland habitats.
Blackcap	*Sylvia atricapilla*	Calling from marginal scrub and wetland habitats.
Sand Martin	*Riparia riparia*	Foraging over ephemeral wetland habitats established on cutover bog habitats
Kingfisher	*Alcedo atthis*	Kingfisher pair seen on Blackwater (Shannonbridge)_020 watercourse upstream of the ESB Ash deposition facility. Birds seemed to display territorial characteristics, indicating that this watercourse may support breeding habitat for Kingfisher.
Linnet	*Linaria cannabina*	Foraging along marginal wetland areas and drainage channels.
Wren	*Troglodytes troglodytes*	Foraging within treeline, scrub and woodland habitats fringing the larger areas of expansive cutover bogs.
Mallard	*Anas platyrhynchos*	Flushed from the marginal wetland areas and silt pond margins.
Shoveler	*Anas clypeata*	Using ephemeral wetland facility north of the ESB ash mine facility.
Teal	*Anas crecca*	Foraging with ephemeral wetland habitats that have established on extensive cutover bog areas.
Little Grebe	*Tachybaptus ruficollis*	Foraging with ephemeral wetland habitats that have established on extensive cutover bog areas.
Lapwing	*Vanellus vanellus*	Lapwing pair identified on exposed cutover bog habitats located west and north of the ESB ash deposition facility.
Mute Swan	*Cygnus olor*	Using ephemeral waterbody located west of the ESB ash deposition facility.
Ringed Plover	*Charadrius hiaticula*	Breeding pair identified on exposed cutover bog habitats located west of the ESB ash deposition facility.
Rook	*Corvus frugilegus*	Overflying the bog site and margins.
Moorhen	*Gallinula chloropus*	Utilising ephemeral wetland area located north of the ESB ash deposition facility.
Pheasant	*Phasianus colchicus*	Heard calling distantly from scrub and woodland habitats.
Buzzard	*Buteo buteo*	Calling and soaring over the study area.

Common Name	Species Name	Activity within the site
Woodpigeon	*Columba palumbus*	Foraging over marginal bog habitats.

2.5.2.2 Mammal Surveys

A mammal survey of Blackwater Bog was undertaken on April 12th 2022. An otter survey was completed along silt ponds and drainage channels within and adjoining Blackwater Bog. As well as the silt ponds and drainage channels used for past peat harvesting works, the watercourses adjoining and being fed by the silt ponds were also surveyed for the presence of otter and other semi-aquatic mammals. It should be noted that pathways for otter injury and mortality as a result of the proposed rehabilitation works primarily exist only at silt ponds. Therefore, survey emphasis was concentrated, but not confined, to these features.

In addition, Blackwater Bog and environs were also surveyed for the presence and usage of non-volant mammal species including badger, fox, Irish hare, mink etc.

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

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

The mammal survey undertaken on April 12th 2022 at the Blackwater Bog site identified the signs of Badger and Fox. The findings of the survey are presented in **Table 5** below and illustrated in **Figure 5**.

Table 5: Findings of the April 2022 mammal survey

Common Name	Species Name	Grid Co-ordinates (in ITM)		Description
		X	Y	
Otter	*Lutra lutra*	602938	724654	Otter scat on railway bridge over the Blackwater (Shannonbridge)_020 watercourse.
		603068	728982	Otter scat and slide on culvert over the Blackwater (Shannonbridge)_020 watercourse.
		602812	729330	Otter slide and scat on culvert over the Blackwater (Shannonbridge)_020 watercourse.

Common Name	Species Name	Grid Co-ordinates (in ITM) X	Y	Description
Mink	*Neovison vison*	602291	726650	Mink scat located along the margins of the Blackwater (Shannonbridge)_020 watercourse.
Irish Hare	*Lepus timidus hibernicus*	603632	726993	Hare droppings on bare cutover bog habitat.
Fox	*Vulpes vulpes*	603068	728982	Fox scat and slide on culvert over the Blackwater (Shannonbridge)_020 watercourse.
Badger	*Meles meles*	602812	729330	Badger latrine and guard hair seen on the margins of the Blackwater (Shannonbridge)_020 watercourse near the northern boundary of the site. No signs of badger sett in the immediate vicinity of these features.

Silt ponds and watercourses at and in the vicinity of Blackwater Bog were surveyed for signs of otter usage. There were no signs of ongoing or recent usage of these silt pond features, drainage channels or

watercourses during the April 2022 walkover surveys. However, as outlined in Table 5 above, the Blackwater (Shannonbridge)_020 watercourse supports signs of otter activity in a number of locations, and it is likely that otter regularly utilise this watercourse as a foraging and commuting habitat.

No evidence of other mammals such pine marten or red squirrel were identified during the site walkover surveys. These mammals are highly unlikely to utilise the expansive cutover bog areas. However, there is suitable habitat for these mammals outside of the proposed works footprint on the marginal bog areas, woodland and scrub areas located along the site bounds and outside of the proposed works footprint.

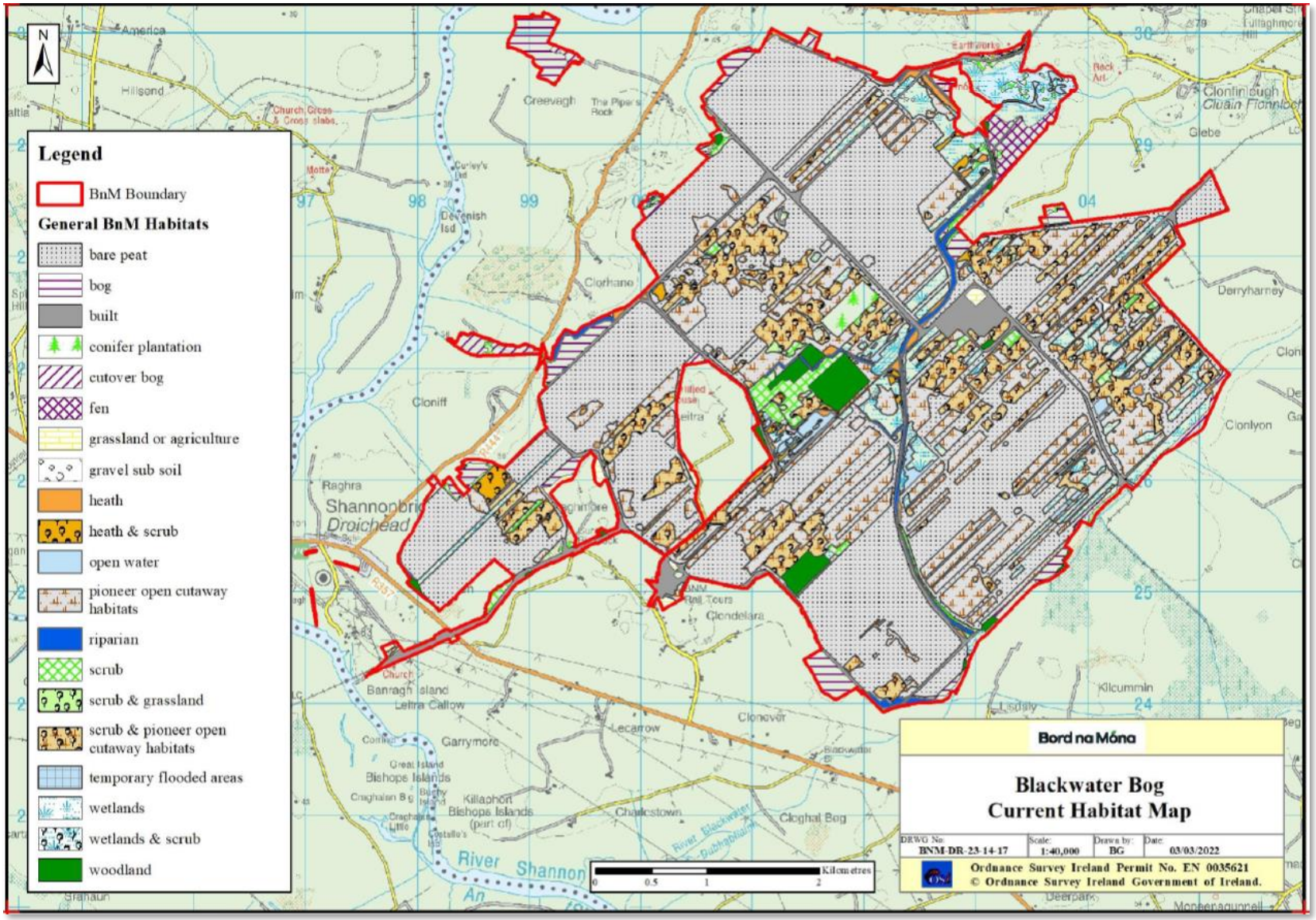


Figure 4: Current Habitats at Blackwater Bog

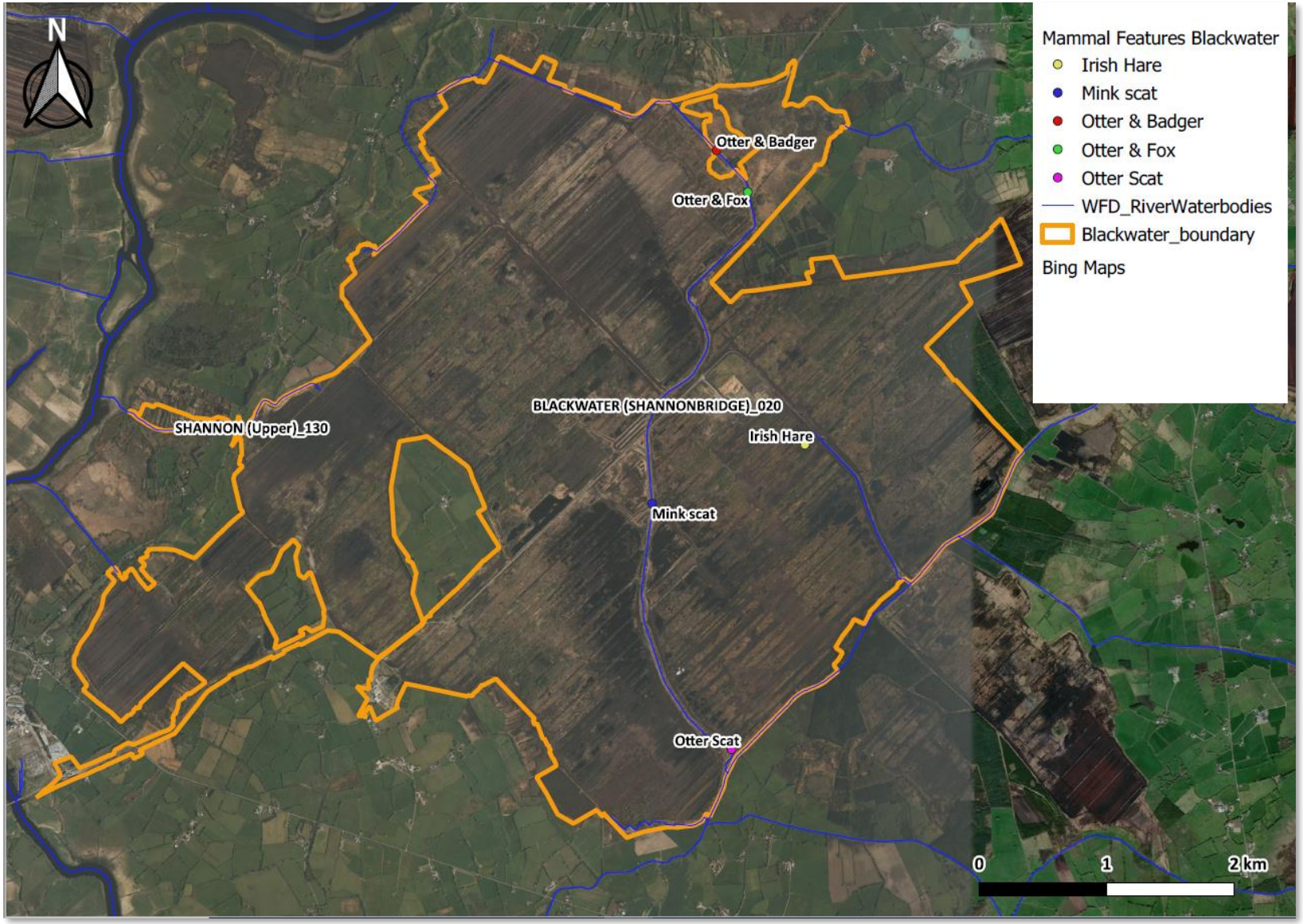


Figure 5: Mammal Signs and Features within the Blackwater Bog

Image 1: Silt pond 161 located west / south-west of the ESB Ash deposition site

Image 2: Proposed rehabilitation area located west of the ESB Ash deposition site

Image 3: Proposed rehabilitation area located near the southern boundary of the site

Image 4: Regenerating cutover bog located south of the ESB Ash deposition site

Image 5: Blackwater (Shannonbridge)_020 watercourse located near the southern boundary of the site	Image 6: Blackwater (Shannonbridge)_020 watercourse located near the northern boundary of the site
	
Image 7: Proposed rehabilitation area located near the northern boundary of th site	**Image 8: Nearby / adjoining area of Fin Lough (Offaly) SAC**

2.5.3 Species of Conservation Interest

A number of species of conservation concern utilize the habitats available at Blackwater Bog. The following is a summary of the records of these species available within both BnM records (covering the whole of Blackwater Bog) and those of the National Biodiversity Centre.

A review of available Biodiversity records from the National Biodiversity Data Centre (hereafter NBDC) of flora and fauna recorded within a polygon including Blackwater Bog found records for several terrestrial mammal species, including records for Badger (Meles meles), Eurasian Pygmy Shrew (Sorex minutus), Eurasian Red Squirrel (Sciurus vulgaris), European Otter (Lutra lutra), Pine Marten (Martes martes), Red Deer (Cervus elaphus), West European Hedgehog (Erinaceus europaeus), Irish Hare (Lepus timidus subsp. hibernicus) and Irish Stoat (Mustela erminea subsp. hibernica).

A number of bat species have also been recorded on or within 5 km of Blackwater bog including; Common Pipistrelle (*Pipistrellus pipistrellus sensu lato*), Soprano Pipistrelle (*Pipistrellus pygmaeus*) Daubenton's Bat (Myotis daubentonii).

The rehabilitation footprint within Blackwater Bog intersects one 10 km square (N02), which has records of 70 species of birds (2007-2011 Bird Atlas period), 358 species of flowering plant, 27 species of moss, 1 amphibian species, 19 butterfly species, 67 moth species and 77 mollusc species.

Recent NBDC records (2018-2020) for lepidopteran species of conservation interest at Backwater bog and within 2 km of the bog boundary include the near threatened species Dingy Skipper (Erynnis tages), Grayling (Hipparchia semele), Small Heath (Coenonympha pamphilus), endangered species Wall (Lasiommata megera) and the Annex II protected species Marsh Fritillary (Euphydryas aurinia). The presence of the rare snail, Vertigo geyeri, a species listed on Annex II of the E.U. Habitats Directive, at Fin Lough is of considerable conservation significance.

Numerous bird species are known to use the cutover bogs in Ireland's midlands as breeding grounds, wintering grounds or both. Blackwater contains several semi-natural wetland habitats and a substantial part of the bog as a whole can be subject to inundation during winter periods (although this can vary inter-annually). Based on previous BNM commissioned surveys these areas have the potential to attract substantial amounts of Whooper Swans (Cygnus cygnus) (Annex I Birds Directive species) and waterfowl during the winter months As recently as 2015, Blackwater supported a nationally important population of non-breeding Teal (Anas crecca)(i.e. >340) and smaller numbers of Mallard (Anas platyrhynchos), Wigeon (Anas penelope) and Pintail (Anas acuta), and was considered a potential sub-site of the Mid Shannon Callows SPA (in the

Whooper Swan context) based on the occurrence of internationally important numbers of this species on at least one occasion (BES 2015). Two areas within Blackwater Bog (outside the current proposed rehabilitation extent) were previously counted as 'Blackwater Railway Lakes' as part of the Irish Wetland Bird Survey (IWeBS) and published reporting describes the occurrence of nationally important numbers of Teal and Pintail , along with occasionally nationally important numbers of Whooper Swan (Crowe et al. 2005).

Foraging Hen Harrier (Circus cyaneus) are regularly recorded at Blackwater during the winter or non-breeding period, and are known to roost at one location outside the currently proposed rehabilitation extent. Individuals may also be recorded foraging occasionally during the breeding period.

Blackwater (as a whole) is a notable location for breeding waders. Surveys carried out in 1997 recorded 25 pairs of Lapwing (*Vanellus vanellus*), 17 pairs of Ringed Plover (*Charadrius hiaticula*), 6 pairs of Common Sandpiper (*Actitus hypoleucos*), 5 pairs of Redshank (Tringa totanus) and 2 pairs of Common Snipe (*Gallinago gallinago*) (Cooney, 1997). A follow up survey carried out in 1998, recorded 55 breeding pairs of waders, which included 29 pairs of Lapwing, 5 pairs of Common Snipe, 5 pairs of Redshank, 12 pairs of Ringed Plover and 4 pairs of Common Sandpiper (Cooney, 1998). About half of the breeding wader pairs were located around the artificial lakes, with the remainder found in low lying areas to the north-east, that had numerous shallow pools. During breeding wader surveys carried out at Blackwater in 2014 (Copland & Gallagher, 2014) the following breeding pairs were recorded: 3 pairs of Lapwing, 1 pair of Redshank, 1 pair of Ringed Plover, 1 pair of Common Sandpiper and 1 pair of Common Snipe. Whilst breeding numbers of some wader species have likely decreased due to habitat succession, in the period since the mid to late 1990s, it is still considered that suitable habitats across Blackwater Bog are used by breeding waders.

Multiple signs of terrestrial mammal species have been recorded on or in close proximity to the bog during BNM ecology surveys including Deer, Badger, Hare, Red Fox, Pine Marten and Squirrel. Otter signs have been recorded at the wetlands within the site. The Annex II species (EU Habitats Directive) Whorl Snail (Vertigo geyeri), was recorded in 1998 (Moorkens 1998), in the northern part of Fin Lough SAC.

2.5.4 Invasive species

Invasive alien species known to occur at Blackwater Bog (or desktop review suggests presence is likely), and for which reasonably foreseeable source impact pathways for dispersal may result from the proposed PCAS are described here.

There are NBDC records and BNM records for Pitcherplant (*Sarracenia purpurea*) from marginal habitat close to the western boundary of Blackwater, however there are no records for this species within the footprint of the proposed rehab areas.

No aquatic invasive species are described in available EPA documentation in respect of WFD Cycle 2 sub-catchment reporting.

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.

2.5.5 Certainty and Sufficiency of Data

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

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

In addition, where required, or possible, specific data requests have been made to NPWS via the online data request facility[4], specifically with regards to records of sensitive species; and, to BirdWatch Ireland in respect of the results of IWeBS surveys, which are available upon request.

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

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

In the most part, due the continuation of industrial Peat Extraction by Bord na Móna up to and including the year 2020 at Blackwater, it was considered that habitats at the bog remained relatively unchanged from the point at which many prior baseline surveys were undertaken, and therefore, it is considered that data presented in prior baseline reporting was of relevance, with exceptions noted. Nonetheless reliance is focussed primarily on the most recently available or collected data.

[4] https://www.npws.ie/maps-and-data/sensitive-data-access

2.6 Decommissioning and Rehabilitation Stage

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

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

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

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

The proposed Blackwater Bog **rehabilitation** comprises a series of bespoke (to Blackwater 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 4 no. broad categories,

1) those associated with (exposed) Deep Peat; drain blocking (different intensities), berms and field reprofiling and cut and fill cell bunding;

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

3) measures associated with Wetland Cutaway, including restricting and reducing pumping regimes and associated drain blocking.

4) those associated with remnant high bog namely drain blocking.

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

2.6.1.1 Decommissioning and Rehabilitation Access

Access will be through the existing entrances from the local road network accessing existing infrastructure in place via access tracks and railway lines to facilitate the previous peat extraction. No change to baseline conditions to facilitate access for either decommissioning or rehabilitation is required.

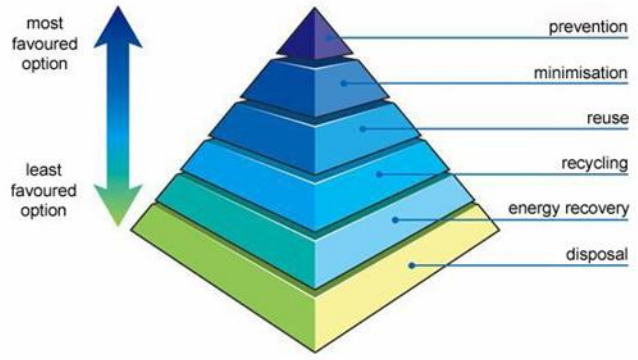
2.6.1.2 Standard Methodology for Decommissioning

Decommissioning at Blackwater Bog will involve the deployment of a work crew to collect and oversee the removal of any remaining plant or potentially contaminating waste left *in situ* in line with Condition 7 of License Ref. P0-502-01. 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 Blackwater Bog. This record shall as a minimum contain details of the following:

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

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

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

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

Decommission and Removal of Porto-cabin and materials store: Tea-centres were used to provide canteen and welfare facilities for bog operations and are either a concrete building, a portacabin or older prefabricated older bee hive units and typically contain tables and chairs, a fridge, lockers, cabinets, sinks and other fixtures and fittings. All basic fixtures and fittings will be retained with all other general waste or unused items removed and disposed to skips for removal off-site.

Bog area clean up: These bog areas include the parking spaces for production plant and equipment, locations for storing rail line, drainage pipes and stockpile covering. All remaining or unconsolidated old and unused polythene will be collected for recycling or disposal, depending on condition. Any remaining older and

immobile plant will be brought in from bog and removed off site. Any remaining hazardous waste oils, fluids and batteries will be removed off site by qualified appropriate hazardous waste contractors. All remaining unused drainage pipes will be gathered up for reuse, recycling or disposal. All remaining, unconsolidated unused rail line sections will be collected from the bog and stored at the main access location for dismantling.

2.6.1.3 Standard Methodology for Rehabilitation Activities

The proposed Blackwater **Rehabilitation** will be undertaken using standard Best Practices in peatland restoration. These are based on published information in the Irish context, Methodologies developed through Rehabilitation trials, Best Practices employed elsewhere in Europe on peatland rehabilitation and restoration but also the experience of 40 years of research on the after-use development and rehabilitation of the Bord na Móna cutaway bogs (Clarke, 2010; Bord na Móna, 2016), including examples such as the BnM Raised Bog Restoration Project[5] -see also **Section 2.8.2** Sources of Information. The development of rehabilitation activities also considered recently published guidance issued by the EPA in 2020 – *Guidance on the process of preparing and implementing a bog rehabilitation plan*.

In terms of rehabilitation the ecological and site information collected during Bord na Móna ecological baseline surveys, additional site visits, stakeholder input, and monitoring and desktop analysis forms the basis for the planning of peatland rehabilitation at Blackwater 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),
- Significant international engagement during this period with other countries in relation to best-practise regarding peatland rehabilitation and after-use through the International Peatland Society and the Society for Ecological Restoration (Joosten & Clarke, 2002; Clarke & Rieley, 2010; Gann et al., 2019); and
- Consultation and engagement with internal and external stakeholders.
- GIS Mapping
- BnM drainage surveys
- Bog topography
- Hydrological modelling

Bog Rehabilitation Techniques or Methods

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

Several different approaches can be taken to this type of restoration/rehabilitation, and the rehabilitation packages with different rehabilitation/restoration intensities to managing suitable hydrological conditions are proposed (see **Table 6, Table 7** and **Table 8**) with detailed drawings presented in **Appendix D**.

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

[5] 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

Table 6: Rehabilitation Categories

Cutover Bog	
DCT2	Regular drain blocking (3/100 m) + blocking outfalls and managing water levels with overflow pipes + targeted fertiliser treatment
DPT4	Berms and field re-profiling (45m x 60m cell) + blocking outfalls and managing overflows + drainage channels for excess water + Sphagnum inoculation
WLT2	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes
WLT3	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes + Targeted blocking of outfalls within a site + constructing larger berms to re-wet cutaway + transplanting Reeds and other rhizomes
WLT4	More intensive drain blocking (max 7/100 m), + blocking outfalls and managing overflows + transplanting Reeds and other rhizomes
MLT1	No work required
MLT2	More intensive drain blocking (max 7/100 m)
Silt Ponds	Silt Ponds
Constraint	Other Constraints
Additional Works	Additional Works – Targeted Drain Blocking

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

1. Deep Peat measures including field re-profiling, resulting in bunded areas suitable for *Sphagnum* inoculation, on deeper peat;
2. Intensive drain blocking around shallow peat areas / modelled depressions on little or no peat to create/promote the spread of fen and Reedbed habitats,
3. Modifying outfalls, and management of water levels with overflow pipes and blocking of internal outfalls;
4. Regular drain blocking (3/100) on dry cutaway along with the blocking of outfalls and management of water levels, along with organic fertiliser application;
5. Intensive drain blocking (up to 7/100m) on targeted Marginal land drains;
6. Intensive blocking of drains in targeted marginal (degraded) raised bog remnants around the margins of Blackwater Bog and re-wetting, where possible, using an excavator to install peat blockages.
7. Outfall management and/or further drain blocking in one area at least which was formerly subject to rehabilitation, as additional works;
8. Targeted fertiliser applications to accelerate vegetation establishment on areas of bare peat on headlands and high fields, and within certain areas of dry cutaway. Areas where vegetation has established do not need fertiliser application.
9. Seeding of vegetation and inoculation of *Sphagnum* will be undertaken where required.
10. Initial hydrological modelling indicates that a part of the site will develop a mosaic of wetland habitats with the potential for some deeper water. Hydrological management will look to optimise summer water levels to maximise the development of wetland vegetation (by looking to set water depths at < 0.5 m, where possible. It is inevitable that some small sections will naturally have deeper water due to the topography at this site). Water-levels will be adjusted at outfalls and by adjusting piped drainage.

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

1.Regular Drain Blocking (3/100m)

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

The number of peat blockages per 100m is determined by the topography of the site, but an allowance has been estimated at on average 3 blocks per 100m of field drain. The methodology follows NPWS guidelines published by the National Parks and Wildlife Service (Mackin *et al.,* 2017[6]) 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.

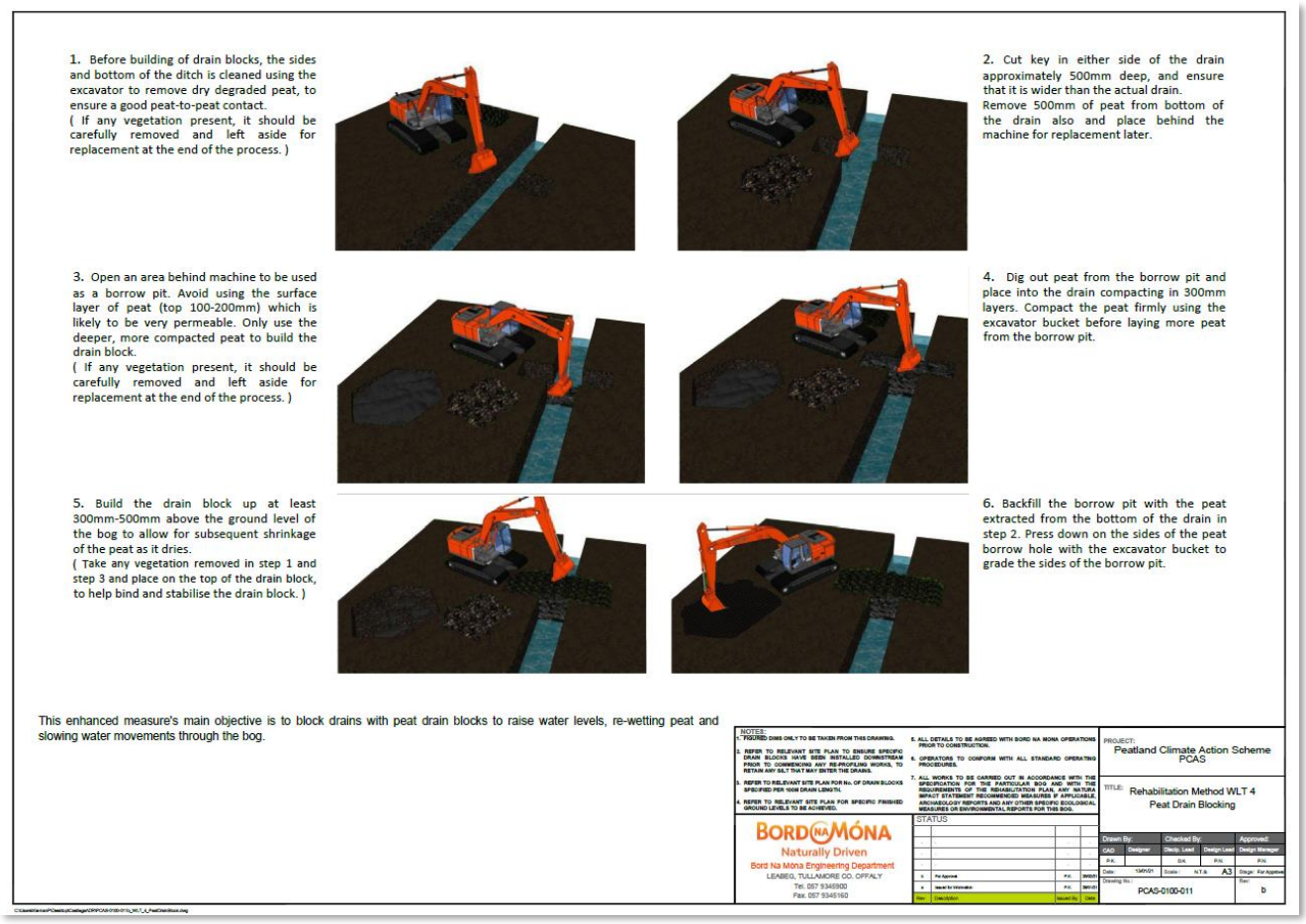


Figure 6: Completed Peat blockage (reproduced from Mackin *et al.*, 2017)

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

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.

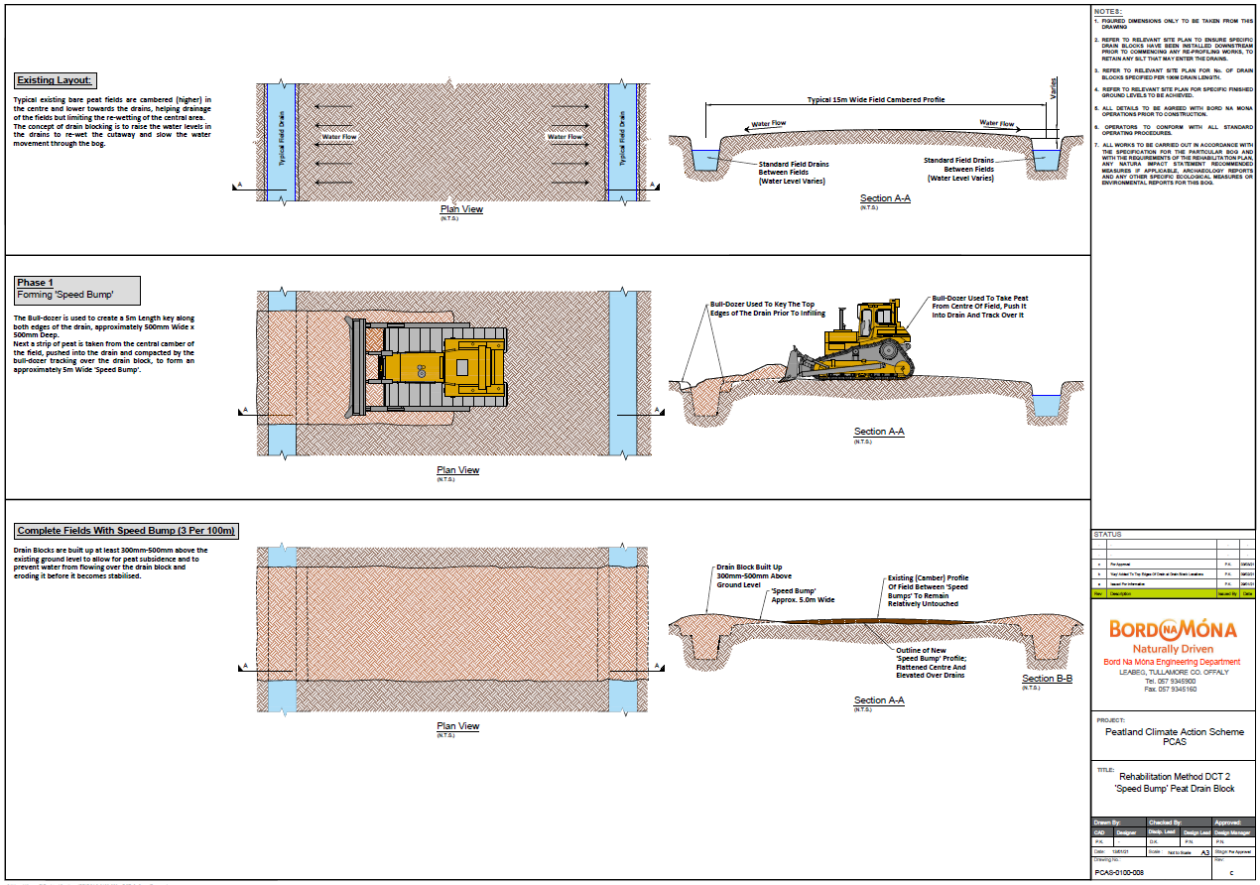


Figure 7: Rehabilitation Method DCT2 'Speed Bump' Drain Block

3.Blocking Outfalls

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

Targeted blocking of outfalls is suitable for bogs or portions of bogs that have already had a period of natural colonisation, minimising disturbance to pioneer habitats that are already developing. It is also appropriate

for locations where there is establishing habitats and where former drainage infrastructure is already starting to break down. Hydrological modelling and an understanding of site drainage is required to identify appropriate locations for targeted drain-blocking to maximise re-wetting. Drains are blocked at these locations using an excavator by lifting pipes and filling holes with peat or local sub-soils.

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

4. Managing water levels with overflow pipes

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

Overflow pipes are installed using an excavator.

Figure 8: Examples of installed overflow pipes

5.Field Reprofiling

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

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

This method uses a bull dozer or screw leveller to remove the high central camber from individual production fields and deposit the peat on the lower-lying edges of the same production field and partially in the drains. It is not intended to completely infill the drains but the drains will be blocked with peat dams. It is planned

to create a final profile with a largely flat or slightly concave surface. This will depend on the general topography and slope. On cutaway with increased slopes it will be more advantageous to create shallow depressions. Any depressions will be 10-20cm deep, and a maximum of 20m long (although natural topography may require flexibility in sizing). Depressions can be separated by a strip of undisturbed peat 1-2 m wide.

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

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

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

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

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

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

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

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

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

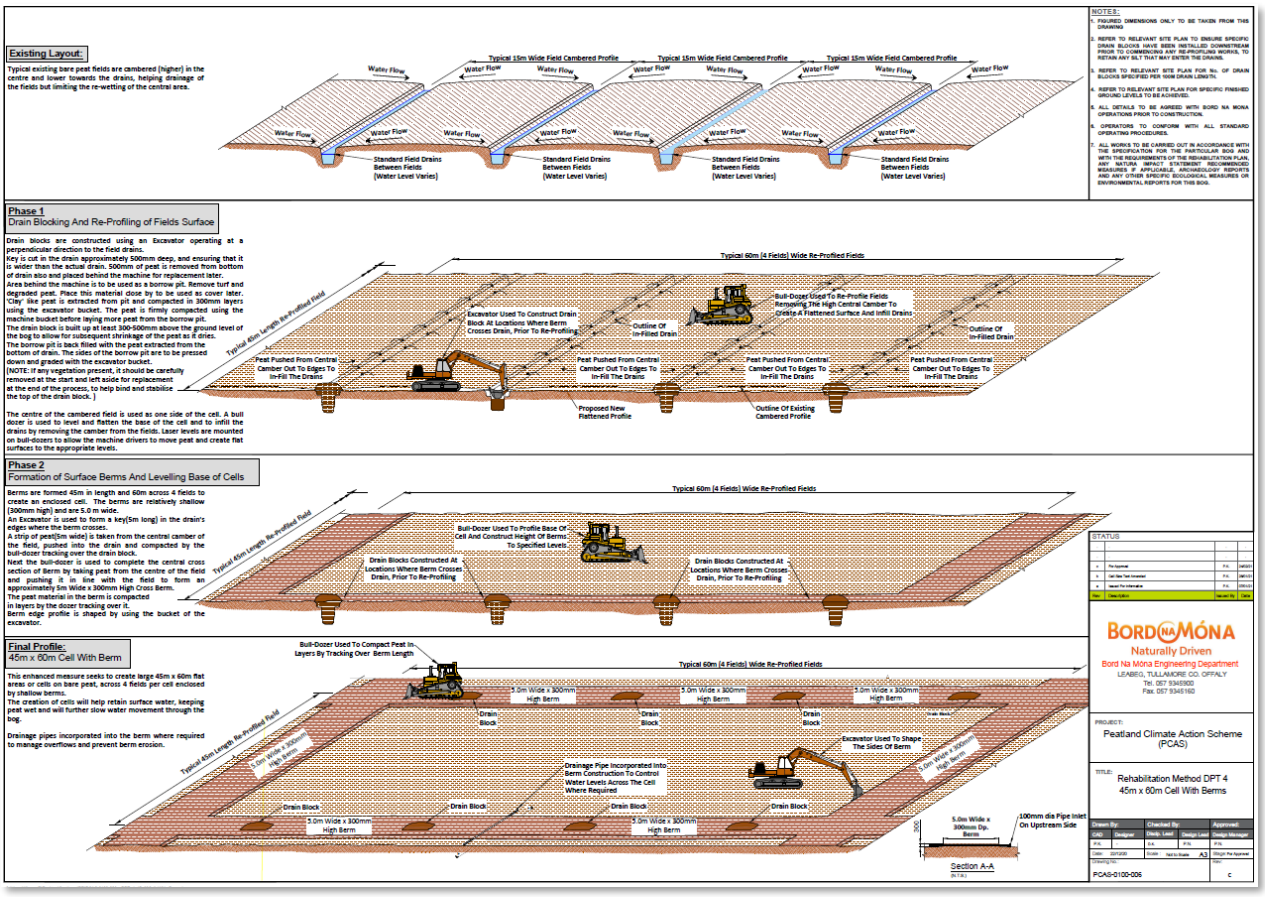


Figure 9: Indicative methodology for DPT4

7. Drainage channels for excess water

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

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

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

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

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

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

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

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

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

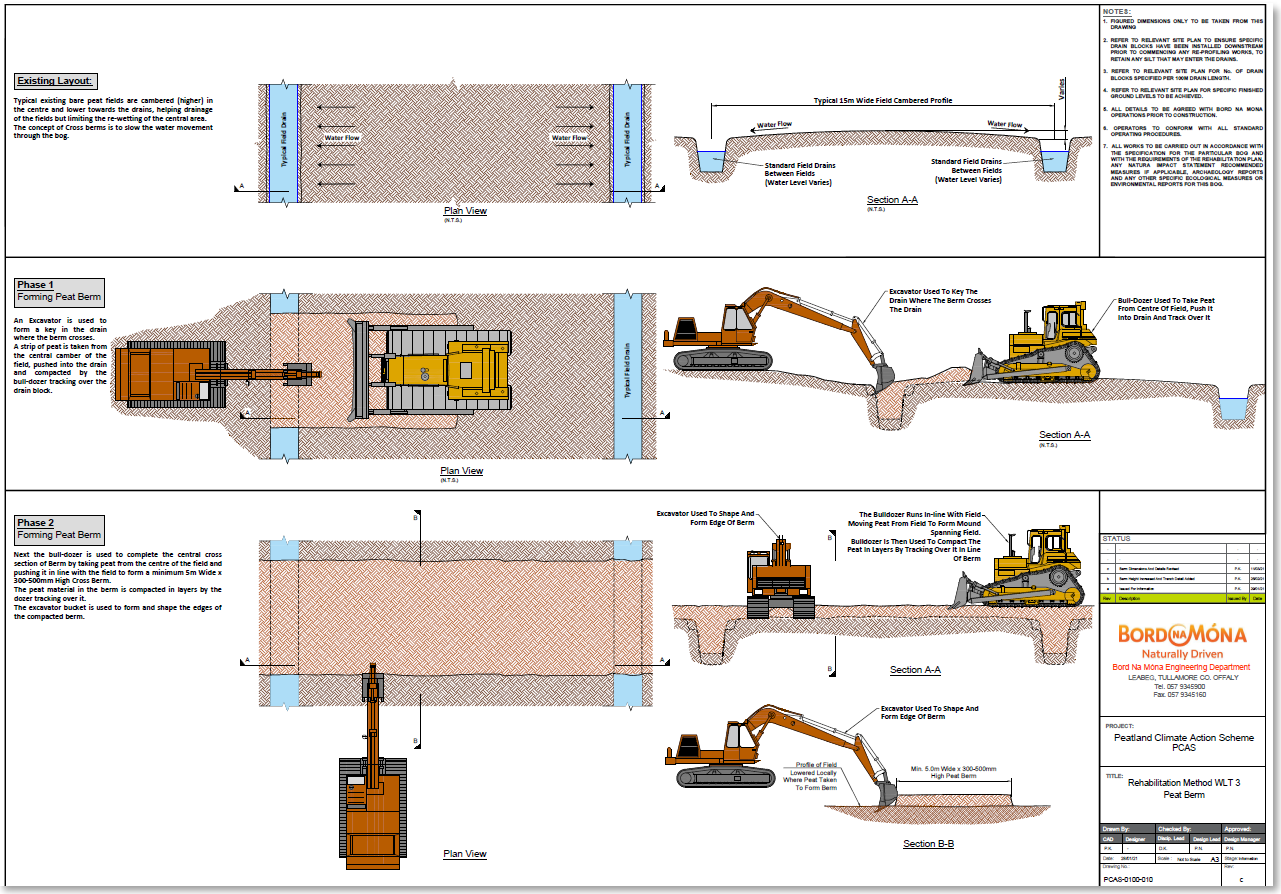


Figure 10: Rehabilitation Method WLT3 Peat Berm

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

9. *Sphagnum* Inoculation

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

There is potential to use *Sphagnum* inoculation to establish and diversify selected small areas on target sites with *Sphagnum* species, which in turn, and in combination with natural colonisation, can then naturally colonise the remaining deep peat cutover bog area. *Sphagnum* inoculation should only be used in

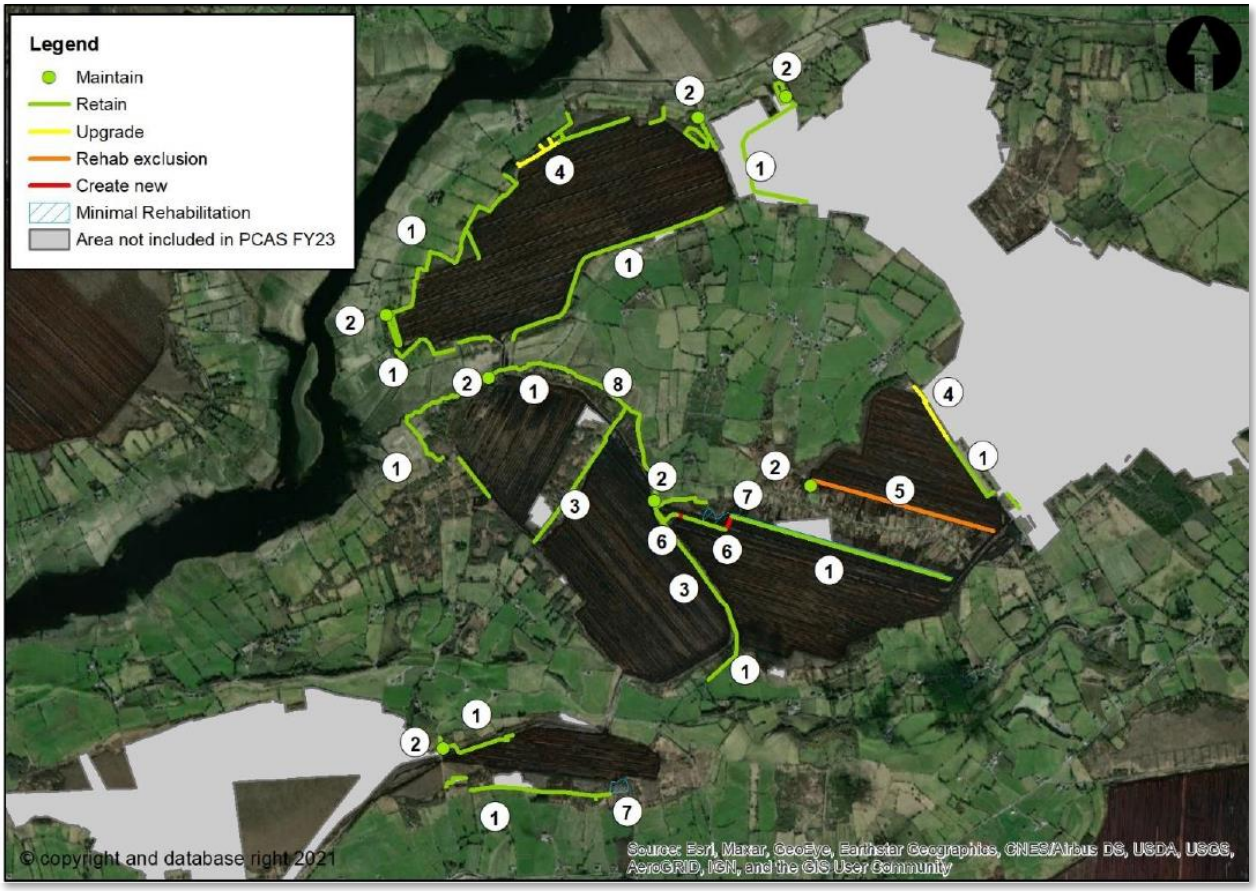
appropriate environmental conditions (water-logged, deep peat with stable water levels and with more acidic water chemistry).

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

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

10. Retention of Hydraulic Breaks

To sustain hydrological continuity through the margins of the proposed rehabilitation and decommissioning site and to avoid flooding of adjacent lands, it is proposed to retain certain key hydraulic breaks (drains) along the margins of the bog site and to regrade some drains along the boundaries of the site. These works will be completed to retain peripheral surface water drainage around the margins of the bog rehabilitation sites allowing hydrological flow from lands upstream of the site to areas downstream of the rehabilitation site. These works may require localised instream excavation, widening and regrading of existing drains with tracked excavators. The retention of boundary drains (peripheral drains) around the margins of the bog site do not require further intervention or excavation, their capacity and condition has been assessed from a desk top study and also through a ground truthing exercise which has verified the drains required to be retained are suitable to continue to conduct flow and act as a hydraulic break to adjoining lands. This hydraulic break essentially cut the hydraulic gradient from the bog to the adjoining lands limiting the rise in ground water. The boundary drains will have a minor impact in terms of drying out peat along the edges of the bog, however it is observed from experience of BnM engineering and drainage specialists that the zone of influence of the drain is limited with positive impacts occurring in very close proximity to the drains. To modify these boundary drains would create the potential for unacceptable negative impact to adjoining lands. See **Appendix D** for the full suite of Methodology Drawings and **Appendix G** (Figure 5-2, reproduced below) which provides drainage management procedures for Blackwater Bog.


Legend
Maintain
Retain
Upgrade
Rehab exclusion
Create new
Minimal Rehabilitation
Area not included in PCAS FY23
© copyright and database right 2021
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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

Deep Peat Cutover Bog		Extent (Ha)
DPT 4	Berms and field re-profiling (45x60m cell), blocking outfalls and managing overflows & drainage channels for excess water & Sphagnum Inoculation	23.58

Table 7 Extent of Deep Peat Rehabilitation proposed at Blackwater.

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

Dry Cutaway and Wetland		Extent (Ha)
DCT2	Regular drain blocking (3/100m) +blocking outfalls and managing water levels with overflow pipes + targeted fertiliser treatment	166.09
WLT2	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes	129.1
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	44.3
WLT4	More intensive drain blocking (max 7/100 m), + blocking outfalls and managing overflows + transplanting Reeds and other rhizomes	190.4
MLT1	No work required	30.4
MLT2	Targeted Drain Blocking	3.2
Silt pond	Silt ponds	6.11
Constraint	Other Constraints	1759.3
AW2	Additional Works – Targeted Drain Blocking	27.6

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

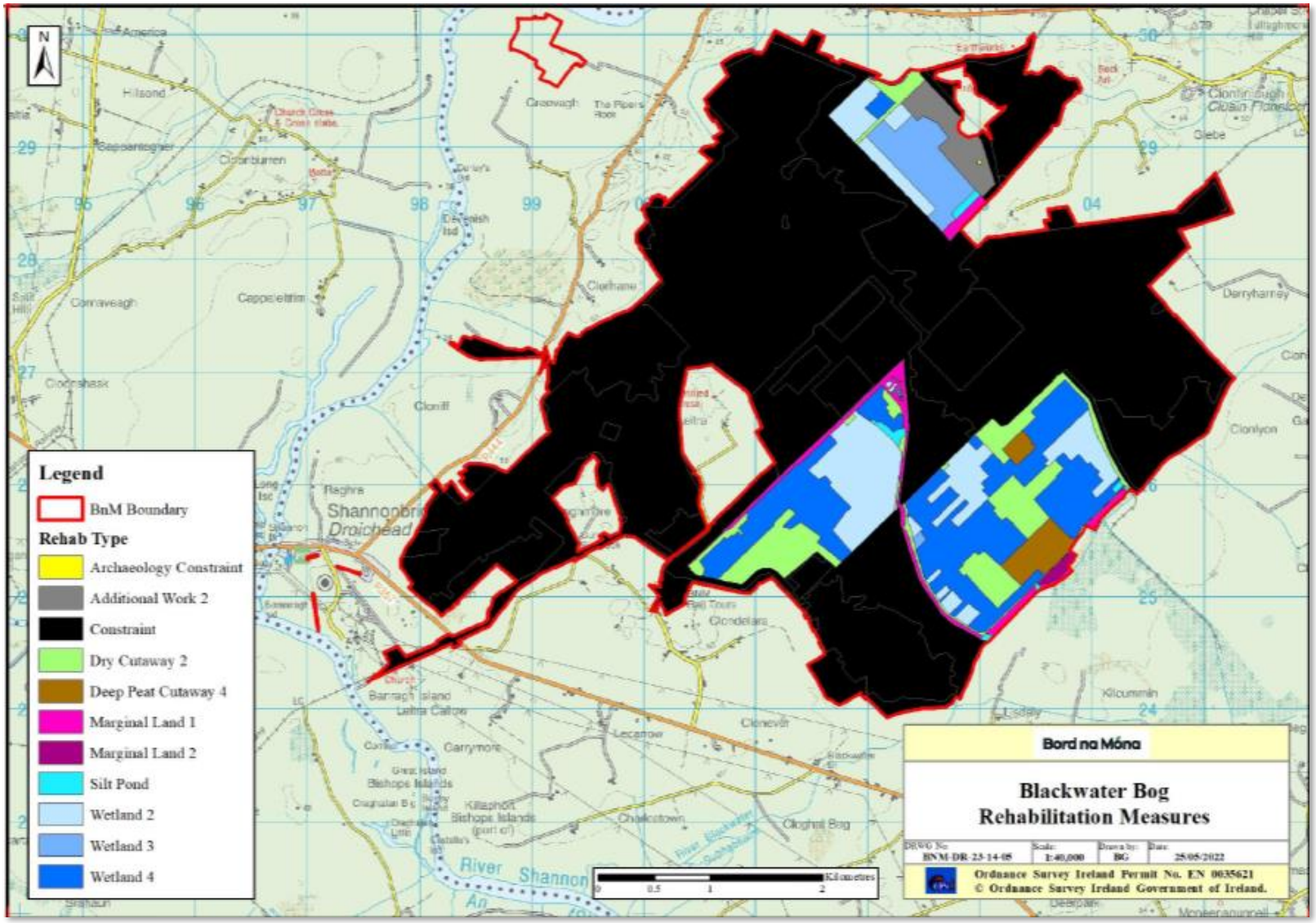


Figure 11: Blackwater Bog Rehabilitation Measures

2.6.1.4 Decommissioning and Rehabilitation Timescale and Resource Requirements

Duration

Decommissioning activities will be completed within a period of 12 months and are scheduled to be completed before the end of 2023. Decommissioning activities will likely commence when rehabilitation has been completed, with basic rehabilitation completed by the end of 2023.

Rehabilitation activities will be completed within a period of approximately 12 months. In general activities proposed for FY22 i.e. 2022 will be carried out between the months of April and October inclusive.

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

2.6.1.4.1 Hours of Work

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

2.6.1.5 Use of Natural Resources

Land Requirement: There is no land requirement in respect of **decommissioning**. In total **rehabilitation** activities will take place on three discrete parcels of land within the wider Blackwater Bog boundary, with a total footprint of 562 ha. As rehabilitation through stabilisation and land cover change is the primary objective, no 'negative quality' land take is associated with Rehabilitation. No land take is required for e.g. the storage of vehicles – vehicles are typically left in situ at points of work or on 'headlands'.

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

Soils/Peat:

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

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

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

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

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

2.6.1.6 Emissions & Wastes during Rehabilitation

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

Regarding rehabilitation, the extent of dust, noise and localised vibration from individual machines creating peat dams to block drains or blocking outfalls is momentary in duration and therefore considered negligible in magnitude. Reprofiling the surfaces of exposed peat using a 'dozer' or 'screw leveller' and creating 'speed bump' blockages or infilling drains produces a higher potential for the release of dust during drier periods, 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 Blackwater Bog or until rehabilitation is complete.

Fuel and drainage pipes will 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 will be available at Blackwater Bog. Where required, Portaloos and additional welfare facilities may be added to the Blackwater Bog. This may be required to accommodate guests or additional workers during the summer months and to assist with social distancing requirements, should be they required.

2.6.2 Operational Stage

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

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

Operational Access: Operational access will be through the local road network, where existing infrastructure is already in place via access tracks and railway to facilitate the previous peat extraction.

Timing of Operational Activities: It is expected that scheduled inspection and maintenance activities will be carried out by a 2-4 person team, typically for 1 day per month, for the foreseeable future. Limited access may occur to inspect and manage water levels within the rewetted peatland areas.

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 Blackwater Bog may continue to be a carbon source, however as habitats stabilise following intervention, the bog is expected to, over time, become a carbon sink in part.

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

The location of the proposed Blackwater 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. This has the potential to result in in-combination effects from the release of hydrocarbons, emissions to air and water.

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

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

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

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

Operational phase disturbance or mortality/barrier effect pathways to avifaunal species are not predicted from the proposed rehabilitation works. Therefore there is no source for in-combination effects with other future developments which may themselves result in potential mortality / barrier effects.

2.6.3.1 Other BnM Bog Group Decommissioning and Rehabilitation

Other BnM bogs within the larger Blackwater group[7] 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 Blackwater group is at the following bogs:

- Ballaghhurt - Located 2.2km north-east of Blackwater Bog. Ballaghurt Bog supports connectivity to the downstream sections of Middle Shannon Callows SPA and River Shannon Callows SAC via Blackwater (Shannonbridge)_010 watercourse, Blackwater (Shannonbridge)_020 watercourse and the Shannon (Upper)_130 watercourse.
- Belmont Bog – Adjoins the eastern / south-eastern boundary of Blackwater Bog. This bog supports connectivity to the downstream sections of Middle Shannon Callows SPA and River Shannon Callows SAC via Blackwater (Shannonbridge)_020 watercourse.
- Bunahinly-Kilgarvan Bog – Located 2.3km north-east of Ballaghurt Bog. This bog supports connectivity to the upstream sections of Middle Shannon Callows SPA and River Shannon Callows SAC via Boor and the Shannon (Upper)_120 and Boor_020 watercourses.

[7] The Blackwater Bog Group IPC Licensed area is made up of three sub-groups (Attymon, Blackwater and Derryfadda). Blackwater Bog is within the Blackwater sub-group.

- Glebe – Located 1.9km east / south-east of Blackwater Bog. Glebe Bog supports connectivity to the downstream sections of Middle Shannon Callows SPA and River Shannon Callows SAC via Blackwater (Shannonbridge)_020 watercourse and the Shannon (Lower)_010 watercourse.
- Clooniff - Located 1.2km north-west of Blackwater Bog. Clooniff Bog supports connectivity to the adjacent and upstream sections of Middle Shannon Callows SPA and River Shannon Callows SAC via Ballydangan_020 watercourse and the Shannon (Upper)_120 watercourse.
- Cornafulla - Located 2.7km north-west of Blackwater Bog. Cornafulla Bog supports connectivity to the upstream sections of Middle Shannon Callows SPA and River Shannon Callows SAC via the Shannon (Upper)_120 watercourse.
- Cornaveagh - Located 1.2km west of Blackwater Bog. Cornaveagh Bog supports connectivity to the adjacent sections of Middle Shannon Callows SPA and River Shannon Callows SAC via the Shannon (Upper)_130 watercourse.
- Culliaghmore - Located 6.8km west north-west of Blackwater Bog. Adjoins the northern boundary of the River Suck Callows SPA, which in turn provides connectivity to downstream sections of the Middle Shannon Callows SPA and River Shannon Callows SAC. Culliaghmore Bog supports connectivity to the downstream sections of Middle Shannon Callows SPA and River Shannon Callows SAC via the River Suck Callows and River Suck catchment.
- Garryduff - Located 900m west of Blackwater Bog. Adjoins the southern boundary of the River Suck Callows SPA, which in turn provides connectivity to downstream sections of the Middle Shannon Callows SPA and River Shannon Callows SAC. The north-western and south-eastern boundaries of Garryduff Bog Complex adjoin the Middle Shannon Callows SPA and River Shannon Callows SAC.
- Kellysgrove - Located 10km west / south-west of Blackwater Bog. Adjoins south-western boundary of River Suck Callows SPA, which in turn provides connectivity to downstream sections of the Middle Shannon Callows SPA and River Shannon Callows SAC.
- Kilmacshane - Located 2.5km south / south-east of Blackwater Bog. Adjoins south-western boundary of the Middle Shannon Callows SPA and River Shannon Callows SAC.
- Lismanny – Located 5.km west of Blackwater Bog. Adjoins the southern boundary of the River Suck Callows SPA, which in turn provides connectivity to downstream sections of the Middle Shannon Callows SPA and River Shannon Callows SAC.

The proposed rehabilitation works at each of these sites will be subject to Screening for Appropriate Assessment and where required, Appropriate Assessment.

The construction phase of decommissioning and rehabilitation at these bogs may overlap those proposed for Blackwater Bog. Rehabilitation works for Blackwater Bog are likely to run concurrently for Bunahinly-Kilgarvan and Clooniff bogs in 2022. In addition, some remaining rehabilitation and decommissioning works may be carried out at Belmont, Kilmacshane and Garryduff bogs while rehabilitation works at Blackwater rehabilitation works are ongoing. All of the above bog sites within the Blackwater Group support connectivity with the downstream areas of the Middle Shannon Callows SPA and River Shannon Callows SAC.

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

As outlined, bog sites within the Blackwater Group proposed for decommissioning and rehabilitation in 2022, support connectivity with the downstream areas of the Middle Shannon Callows SPA and the River Shannon Callows SAC. The decommissioning and rehabilitation of any other bogs within the greater Blackwater Group will be subject to Appropriate Assessment and it is considered the requisite mitigation will be in place should the potential for any adverse effects on European site integrity be identified as part of the Appropriate

Assessment process. This should also identify the potential for any sequential in-combination pathways, in particular should temporal overlap exist.

2.6.3.2 Turbary

Licensed turbary occurs at various locations within 15km of Blackwater Bog, including several locations where the pathways for downstream in combination effects on European Sites may exist, primarily via drainage to EPA blue line watercourses to facilitate turbary. Unauthorised private turbary also occurs in discrete localised plots within the larger cutover raised bog complexes located to the south, east and south-east of Blackwater Bog.

2.6.3.3 Quarries

There are quarry developments located within 15km of the Blackwater Bog. These are typically localised sand and gravel quarries associated with esker ridges. These quarries have the potential to contribute in-combination effects to European Sites within the project zone of influence through the potential release of unattenuated surface water run-off to the receiving watercourses and surface water catchments.

2.6.3.4 Proposed Solar Farm at Blackwater Bog

Bord na Móna are currently developing a renewable energy project called Blackwater Solar Farm, using solar photovoltaic panel arrays to produce electricity. This proposed project is in the pre-planning stage, but the area being considered for development has informed the constraints for the proposed rehabilitation works (see drawing number BNM-DR-23-14-05: Enhanced Rehab Measures and BNM-DR-23-14-20: Standard Rehab Measures). The proposed renewable energy project will use only part of Blackwater Bog. The proposed solar farm development study area is 1079 hectares. The planning application will be accompanied by an Appropriate Assessment, considering impacts and consequent effects to European Sites.

2.6.3.5 ESB West Offaly Power Ash Disposal Facility

Electricity Supply Board (ESB) are applying for planning permission for the development of an Integrated Constructed Wetland (ICW) for the treatment and management of leachate derived from their West Offaly Power (WOP) Ash Disposal Facility (ADF) at Derrylahan, Co. Offaly. The ESB West Offaly Power station ceased electricity generation in December 2020. The ADF facility is currently undergoing capping works of the final ADF cells. A suitable water management system, using best available practice is required. A Natura Impact Statement has been drafted to accompany the planning permission for the ICW providing the following conclusion:

> *This NIS concludes beyond reasonable scientific doubt that, assuming the correct implementation of the proposed mitigation measures outlined ……., the construction of an ICW will not, either alone or in combination with other plans or projects, adversely impact the integrity of the Natura 2000 network. Moreover, during its operational lifecycle, it is expected that the ICW will work to enhance water quality within the Gowlan River as well as providing refuge, food and other resources for various flora and fauna species.*

To that end, baseline impacts and contributory effects to European Sites have been considered for this project and appropriate mitigation measures have been prescribed to avoid baseline impacts to the receiving environment and by extension downstream and connected European Sites.

2.6.3.6 NPWS Raised Bog Restoration

It is proposed to undertake restoration works of the following raised bog sites, designated as SACs or NHAs in 2022:

- Scohaboy Phase 2
- Kilsallagh Phase 2
- Cloncrow Phase 2
- Hawkswood
- Daingain
- Curraghlehanagh and Camderry (will start this FY but extend into FY23)
- Milltownpass
- Mouds Phase 2
- All Saints Phase 3
- Annaghmahera
- Derrinlough

An Appropriate Assessment (of the National Raised Bog SAC Management Plan 2017-2022) has been carried out in accordance with Regulation 42(11) and 42(12) of the European Communities (Birds and Natural Habitat) Regulations 2011-2015 and has had regard to the findings of the Natura Impact Statement, the conservation and management measures set out in the National Raised Bog SAC Management Plan 2017-2022 and which constitute plan-level mitigation measures, and the submissions and observations received on the (draft) National Raised Bog SAC Management Plan[8]. 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 bogs, and that any required mitigation to avoid adverse effects on European Site integrity will be in place.

2.6.3.7 Agricultural Activity

Given the proximity of Blackwater Bog to the River Shannon, 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 Blackwater Bog. Most of these activities are not subject to Appropriate Assessment, and form part of the existing baseline environment.

2.6.3.8 EPA Licenced Facilities

The zone of influence of the proposed works supports the following EPA licenced facilities:

- P0611-01 – ESB West Offaly Power, Shannonbridge, Co. Offaly;
- P502 - Bord na Móna Energy Limited (Blackwater)
- P0110 - Arran Chemical Company Limited, Athlone Co. Roscommon;
- P1094 - Alexion Pharma International Operations Unlimited Company;
- P0100 - Alkermes Pharma Ireland Limited
- W0028-03 – Waste Licenced Facility Ballydonagh Landfill

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

Activities at these facilities are subject to the licencing conditions, controls and ongoing monitoring.

2.6.3.9 Local Authority Development Plans

The following development plans have been identified:

- Offaly County Development Plan 2021-2027;
- Offaly Heritage Plan 2017-2021 (extended to 2022);
- Galway County Development Plan 2022 – 2028; and
- Galway County Heritage and Biodiversity Plan 2021 – 2027.

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

2.6.3.10 Other Projects or Activities

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

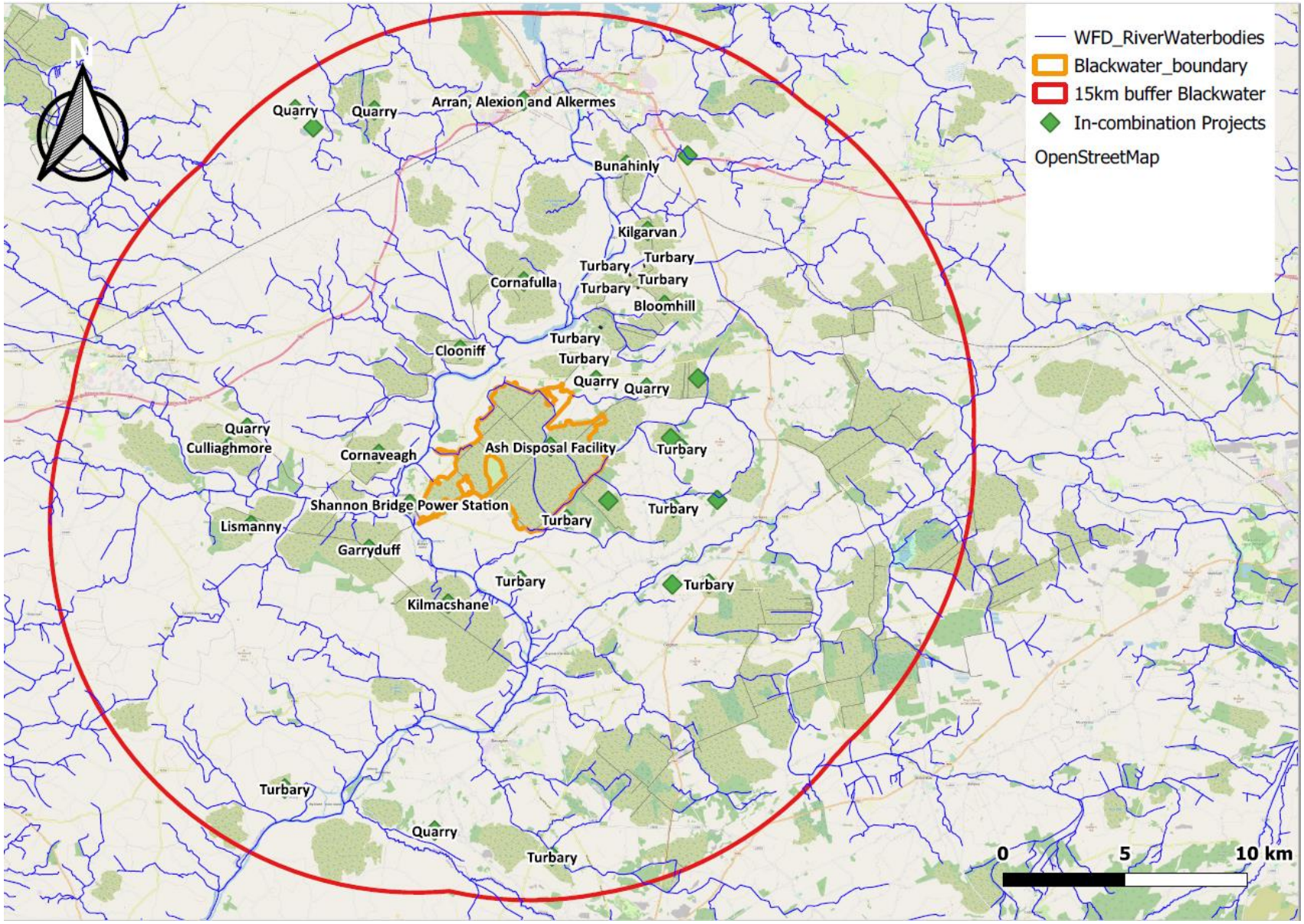


Figure 12: Other Projects and Plans within the Zone of Influence of the proposed Decommissioning and Rehabilitation works

2.7 European Sites under consideration

2.7.1 Distance of the Project to European Sites

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

The assessment of connectivity between the European Sites and the proposed works follows the potential Source>>Pathway>>Receptor model, which identifies the source of likely significant impacts, if any, the pathway (land, air, hydrological, hydrogeological pathways, etc) along which those impacts may be transferred from the source to the receiving environmental receptors (i.e. European Sites and/ or features for which the sites are designated). A precautionary 15km distance was chosen to evaluate the potential for effects (alone and in-combination) on European Sites.

The proximity of the proposed Decommissioning and Rehabilitation Plan to European sites, and more importantly QIs/SCIs of European sites, is of importance when identifying potentially likely significant effects. During the initial scoping of this report, a 15km ZoI was applied for impact assessment. A conservative approach has been used, which minimises the risk of overlooking distant or obscure effect pathways, while also avoiding reliance on buffer zones within which all European sites should be considered. This approach assesses the complete list of all QIs/SCIs of European sites in Ireland (i.e. potential receptors), instead of listing European sites within buffer zones. This follows Irish departmental guidance on AA:

“For projects, the distance could be much less than 15km, and in some cases less than 100m, but this must be evaluated on a case-by-case basis with reference to the nature, size and location of the project, and the sensitivities of the ecological receptors, and the potential for in combination effects” (DoEHLG, 2010; p.32, para 1).

Following the guidance set out by the NRA (2009), the proposed plan has been evaluated based on an identified ZoI with regard to the potential impact pathways to ecological features (e.g. mobile and static). The ZoI of the proposed plan on mobile species (e.g. birds, mammals, and fish), and static species and habitats (e.g. saltmarshes, woodlands, and flora) is considered differently. Mobile species have ‘range’ outside of the European site in which they are QI/SCI. The range of mobile QI/SCI species varies considerably, from several meters (e.g. in the case of whorl snails Vertigo spp.), to hundreds of kilometres (in the case of migratory wetland birds). Whilst static species and habitats are generally considered to have ZoI’s within close proximity of the proposed plan, they can be significantly affected at considerable distances from an effect source; for example, where an aquatic QI habitat or plant is located many kilometres downstream from a pollution source.

Hydrological linkages between the proposed Decommissioning and Rehabilitation Plan area and European sites (and their QIs/SCIs) can occur over significant distances; however, any effect will be site specific depending on the receiving water environment and nature of the potential impact. A reasonable worst-case ZoI for water pollution from the proposed Decommissioning and Rehabilitation Plan area is considered to be the hydrological pathway from the proposed plan until it reaches the first lentic water body (e.g. lake), as the depositional nature of these water bodies would limit the transport capacity of any potential influences from the proposed Decommissioning and Rehabilitation Plan to European sites located downstream.

Other European Sites outside of the 15km buffer zone, supporting remote hydrological connectivity with the works, have also been considered as part of this Assessment and includes European Sites downstream along the River Shannon Catchment as follows:

- Lough Derg, North-east Shore SAC (002241) – located 34km downstream;
- Lough Derg SPA (004058) – Located 34km downstream;

- Lower River Shannon SAC (002170) – located 74km downstream; and
- River Shannon and River Fergus Estuaries SPA (004077) - Located 104km downstream.

However, given the nature and scale of the proposed rehabilitation works, likely significant effects to these European Sites are not possible due to the distance downstream to these European Sites (>34km) and the assimilative and dilutional capacity of the River Shannon catchment.

In addition, all other Special Protection Areas outside of the 15km buffer zone are located >25km from the proposed rehabilitation works. These means that the proposed works are not within the core foraging range for Special Conservation Interest species for these European Sites and therefore, there will be no likely significant effects to SPAs outside of the 15km buffer zone.

There are **20 European Sites** - 14 Special Area's of Conservation (SAC) and 6 Special Protection Area (SPA) - **within 15km of Blackwater Bog.** The locations of these European Sites are illustrated in **Figure 13: European Sites within 15km of Blackwater** and **Figure 14: Proximal, overlapping and adjacent European Sites.**

The distances from the Blackwater bog rehabilitation site and comment on hydrological connectivity provided in **Table 9**.

Table 9: Proximity of the proposed Blackwater 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 Blackwater Bog)
River Shannon Callows SAC	000216	The western boundary of Blackwater Bog overlaps the boundary of this European Site. However, the proposed rehabilitation works do not overlap this European Site.	Y: Downstream via the river Blackwater (Shannonbridge 020) watercourse which drains through the bog continuing south south-west of the bog, entering the River Shannon main channel south of Blackwater Bog boundary.
Mongan Bog SAC	000580	235m north of the Blackwater Bog boundary	N: No hydrological connectivity between the proposed bog rehabilitation site and this European Site.
Fin Lough SAC	000576	The Blackwater Bog boundary overlaps this European Site. The proposed rehabilitation works are located immediately south of this European Site.	Y: The proposed bog works support potential hydrogeological connectivity to Fin Lough SAC, given the proximity of the proposed rehabilitation works to this European Site.
Pilgrim's Road Esker SAC	001776	1.4km north of Blackwater Bog at its closest point.	N: Pilgrim's Road Esker SAC is partially located within the same surface water subcatchment Shannon (Lower)_SC_030 as the proposed rehabilitation works. However, Pilgrim's Road Esker SAC is located upstream of the proposed rehabilitation works and does not support hydrological connectivity.
Moyclare Bog SAC	000581	3.7km east of Blackwater Bog at its closest point.	N: No hydrological connectivity between the proposed bog rehabilitation site and this European Site.
Ferbane Bog SAC	000575	5.0km east/south-east of Blackwater Bog at its closest point.	N: No hydrological connectivity between the proposed bog rehabilitation site and this European Site.

European Site (SAC or SPA)	Site Code	Distance from the Development*	Hydrological Connectivity (Y/N: If Yes Downstream or Upstream connectivity relative to Blackwater Bog)
Crosswood Bog SAC	002337	10.9km north/north-east of Blackwater Bog at its closest point.	N: No hydrological connectivity between the proposed bog rehabilitation site and this European Site.
Carn Park Bog SAC	002336	13.3km north/north-east of Blackwater Bog at its closest point.	N: No hydrological connectivity between the proposed bog rehabilitation site and this European Site.
Ballynamona Bog and Corkip Lough SAC	002339	14.1km north-west of Blackwater Bog at its closest point.	N: No hydrological connectivity between the proposed bog rehabilitation site and this European Site.
Castlesampson Esker SAC	001625	11.8km north-west of Blackwater Bog at its closest point.	N: No hydrological connectivity between the proposed bog rehabilitation site and this European Site.
Lough Ree SAC	000440	12.4km north/north-east of Blackwater Bog at its closest point.	N: Lough Ree SAC is located upstream of the proposed rehabilitation works and does not support hydrological connectivity.
All Saint's Bog and Esker SAC	000566	11.9km south of Blackwater Bog at its closest point	N: No hydrological connectivity between the proposed bog rehabilitation site and this European Site.
Redwood Bog SAC	002353	12.1km south/ south-west of Blackwater Bog at its closest point	N: No hydrological connectivity between the proposed bog rehabilitation site and this European Site.
Ridgewood; SW of Rapemills SAC	000919	14.5km south of Blackwater at its closest point	N: No hydrological connectivity between the proposed bog rehabilitation site and this European Site.
Middle Shannon Callows SPA	004096	The western boundary of Blackwater Bog overlaps the boundary of this European Site. However, the proposed rehabilitation works do not overlap this European Site.	Y: Downstream via the river Blackwater (Shannonbridge 020) watercourse which drains through the bog continuing south south-west of the bog, entering the River Shannon main channel south of Blackwater Bog boundary.
Mongan Bog SPA	004017	235m north of the Blackwater Bog boundary	N: No hydrological connectivity between the proposed bog rehabilitation site and this European Site.
All Saints Bog SPA	004103	12.0km south of Blackwater Bog at its closest point.	N: No hydrological connectivity between the proposed bog rehabilitation site and this European Site.
River Little Brosna Callows SPA	004086	12.6km south/south-west of Blackwater Bog at its closest point.	N: No hydrological connectivity between the proposed bog rehabilitation site and this European Site.
Lough Ree SPA	004064	12.4km north/north-east of Blackwater Bog at its closest point.	N: Lough Ree SAC is located upstream of the proposed rehabilitation works and does not support hydrological connectivity.
River Suck Callows SPA	004097	1.3km west of Blackwater Bog	Y: Remote hydrological connectivity via the River Shannon main channel and

European Site (SAC or SPA)	Site Code	Distance from the Development*	Hydrological Connectivity (Y/N: If Yes Downstream or Upstream connectivity relative to Blackwater Bog)
			flooding regimes associated with the Shannon catchment.

*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 twenty European Sites examined in this Screening Report are provided in **Table 10.**

The Site Synopsis and Conservation Objectives for each site are available in full on the National Parks & Wildlife Service website at https://www.npws.ie/protected-sites and references including date of access, are included in **Section 4**. Conservation Objectives were reviewed to inform the current appraisal – in particular to identify any possible sensitivities and resultant pathways for likely significant effect

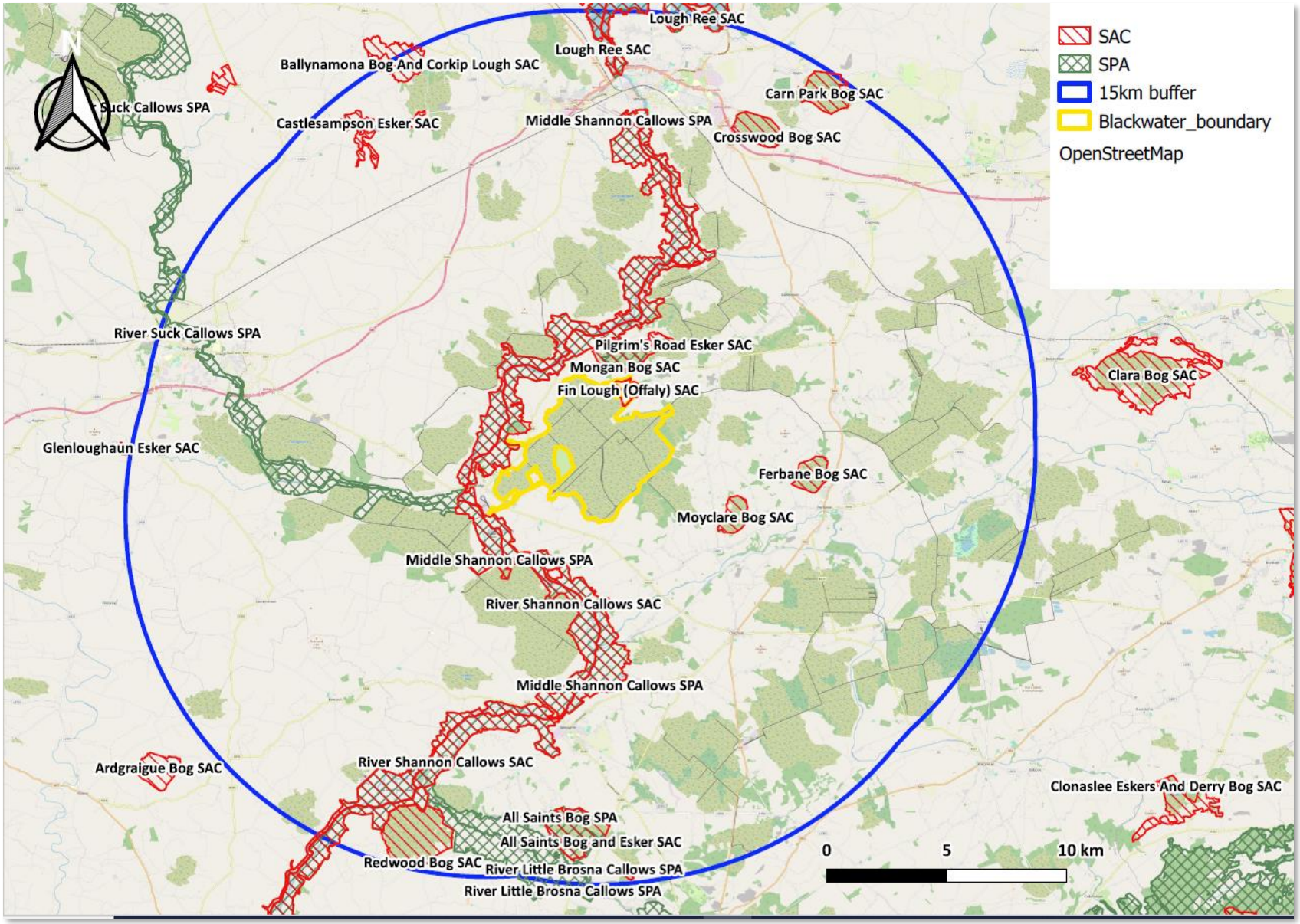


Figure 13: European Sites within 15km of Blackwater Bog

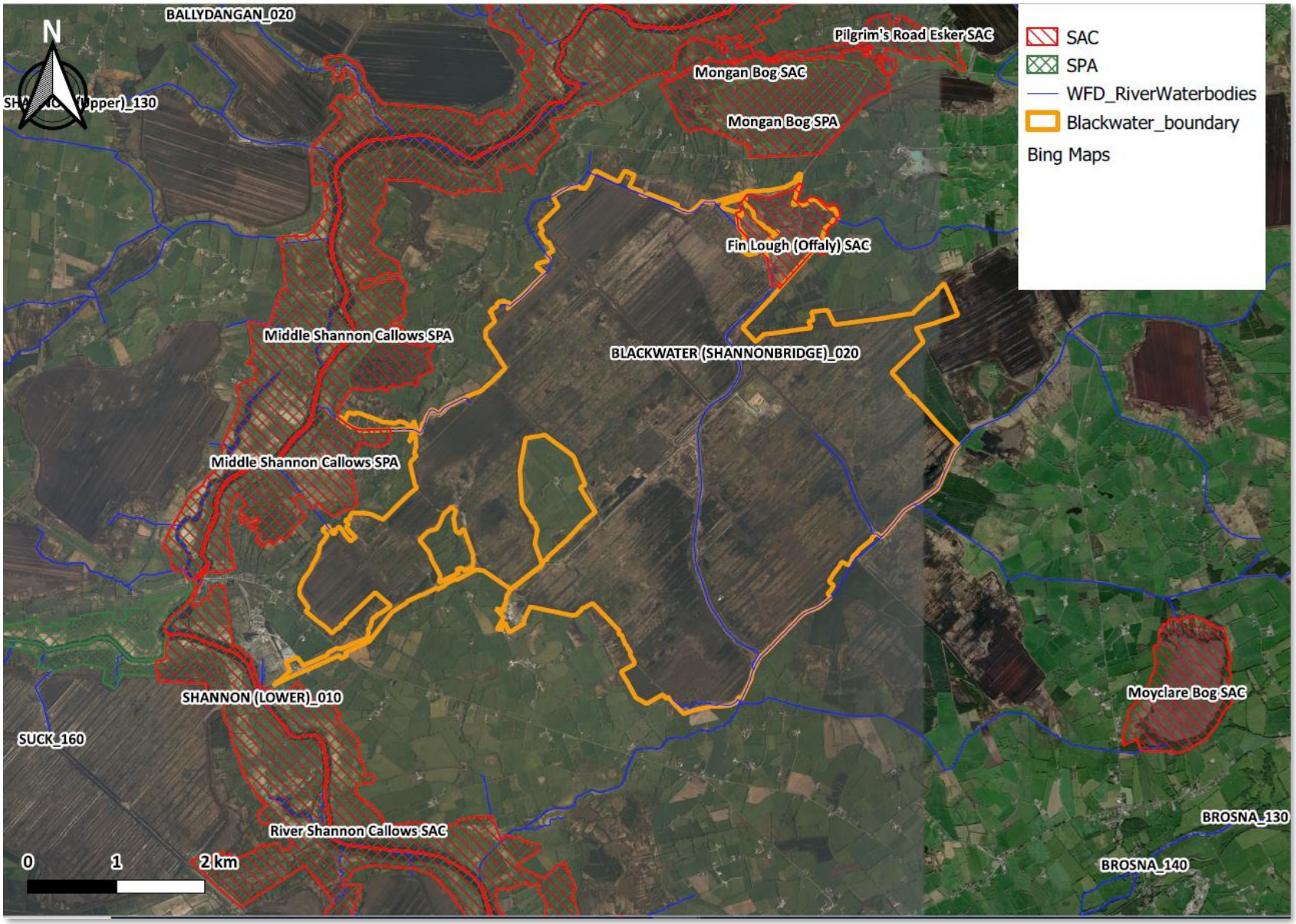


Figure 14: Proximal, adjacent and overlapping European Sites

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

	European Site Name and Code	Qualifying Interest / Special Conservation Interest and Code *denotes a priority habitat	Summary Description (from Site Synopsis)[9]	Data Source – Conservation Objectives Supporting Form
1	River Shannon Callows SAC (000216)	[6410] *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) [6510] Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*) [8240] Limestone pavements* [91E0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae)*	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 (NPWS, 2013a).	NPWS (2022) Conservation Objectives: River Shannon Callows SAC 000216. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage. Accessed online 14.02.2022
2	Mongan Bog SAC (000580)	[7110] Raised Bog (Active)* [7120] Degraded raised bogs still capable of natural regeneration [7150] Depressions on peat substrates of the Rhynchosporion	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. 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	NPWS (2016) Conservation Objectives: Mongan Bog SAC 000580. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht Accessed online 14.02.2022

[9] Site Synopses for River Shannon Callows SAC, Middle Shannon Callows SPA and Fin Lough (Offaly) SAC are presented in **Appendix C**.

	European Site Name and Code	Qualifying Interest / Special Conservation Interest and Code *denotes a priority habitat	Summary Description (from Site Synopsis)[9]	Data Source – Conservation Objectives Supporting Form
			bog ecology at the site reinforces its international importance (NPWS, 2013b).	
3	Fin Lough SAC (000576)	[1013] Geyer's Whorl Snail *Vertigo geyeri* [7230] Alkaline fens	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 (NPWS, 2013c).	NPWS (2019) Conservation Objectives: Fin Lough (Offaly) SAC 000576. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht. Accessed online 14.02.2022
4	Pilgrim's Road Esker SAC (001776)	[6210] Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	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 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. 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	NPWS (2018) Conservation Objectives: Pilgrim's Road Esker SAC 001776. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht. Accessed online 14.02.2022

	European Site Name and Code	Qualifying Interest / Special Conservation Interest and Code *denotes a priority habitat	Summary Description (from Site Synopsis)[9]	Data Source – Conservation Objectives Supporting Form
			rare Green-winged Orchid is the largest known in Ireland (NPWS, 2014).	
5	Moyclare Bog SAC (000581)	[7110] Raised Bog (Active)* [7120] Degraded raised bogs still capable of natural regeneration [7150] Depressions on peat substrates of the Rhynchosporion	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.	NPWS (2015) Conservation Objectives: Moyclare Bog SAC 000581. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Accessed online 14.02.2022
6	Ferbane Bog SAC (000575)	[7110] Raised Bog (Active)* [7120] Degraded raised bogs still capable of natural regeneration [7150] Depressions on peat substrates of the Rhynchosporion	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. 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 Annex I of the E.U. Habitats Directive (NPWS, 2013e).	NPWS (2015) Conservation Objectives: Ferbane Bog SAC 000575. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Accessed online 14.02.2022
7	Crosswood Bog SAC (002337)	[7110] Raised Bog (Active)* [7120] Degraded raised bogs still capable of natural regeneration	Crosswood Bog is situated approximately 5 km east of Athlone, Co. Westmeath, mainly in the townlands of Crosswood, Glenaghanvoneen, and Creggan Lower. The site comprises a raised bog that includes both areas of high bog and cutover bog. The northern margin of the bog lies along the southern side of the Dublin-Galway	NPWS (2016) Conservation Objectives: Crosswood Bog SAC 002337. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the

	European Site Name and Code	Qualifying Interest / Special Conservation Interest and Code *denotes a priority habitat	Summary Description (from Site Synopsis)[9]	Data Source – Conservation Objectives Supporting Form
			railway line. 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 Sphagnum pulchrum. 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 (NPWS, 2014b).	Gaeltacht. Accessed online 14.02.2022
8	Carn Park Bog SAC (0002336)	[7110] Active raised bogs* [7120] Degraded raised bogs still capable of natural regeneration	Carn Park Bog is situated 8 km east of Athlone, in the townlands of Tullywood, Carn Park, Cappaghbrack, Warren High and Moydrum, Co. Westmeath. The site comprises a raised bog that includes both areas of high bog and cutover bog. The margins of the site are bounded by roads on the north, west and southern margins and forestry on the east. Carn Park 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 Sphagnum lawns, as well as the rare species Sphagnum pulchrum. 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	NPWS (2015) Conservation Objectives: Carn Park Bog SAC 002336. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Accessed online 27.01.2022

	European Site Name and Code	Qualifying Interest / Special Conservation Interest and Code *denotes a priority habitat	Summary Description (from Site Synopsis)[9]	Data Source – Conservation Objectives Supporting Form
			the E.U. resource of this habitat type (over 60%) and so has a special responsibility for its conservation at an international level (NPWS, 2014d).	
9	Ballynamona Bog and Corkip Lough SAC (002339)	[3180] Turloughs* [7110] Raised Bog (Active)* [7120] Degraded Raised Bog [7150] Rhynchosporion Vegetation [91D0] Bog Woodland*	Ballynamona Bog and Corkip Lough is a site of considerable conservation significance as it consists of a raised bog, a rare habitat in the E.U. and one that is becoming increasingly scarce and under threat in Ireland. Ireland has a high proportion of the total E.U. resource of raised bog (over 60%) and so has a special responsibility for its conservation at an international level. Active raised bog, bog woodland and turlough are listed as priority habitats on Annex I of the E.U. Habitats Directive (NPWS, 2014c).	NPWS (2016) Conservation Objectives: Ballynamona Bog and Corkip Lough SAC 002339. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. Accessed online 14.02.2022
10	Castlesampson Esker SAC (001625)	[3180] Turloughs* [6210] Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia) (* important orchid sites)*	Castlesampson Esker is a complex site with esker, turlough and raised bog all found. The esker is the most westerly of an important group of eskers centred on Adrnacloon Hill in south-east Co. Roscommon, 9 km west of Athlone. It forms a steep-sided, crescent-shaped hill composed of glacial gravels, situated on the south side of a metalled road. Although gravel is being quarried all around the esker and gravel pits occur within the site, the esker ridge itself is largely intact and fairly undisturbed. Lying to the east of the esker is a raised bog, whilst to its west is a turlough. The Castlesampson Esker site is of high conservation for the proximity and juxtaposition of esker, raised bog and turlough. The esker itself is of high importance for its almost intact structure (something which is very rare in Irish eskers), its relatively undisturbed state and for the presence of good quality, species-rich dry calcareous grassland, a habitat that is listed with priority status on Annex I of the E.U. Habitats Directive.	NPWS (2021) Conservation Objectives: Castlesampson Esker SAC 001625. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage. Accessed online 14.02.2022

	European Site Name and Code	Qualifying Interest / Special Conservation Interest and Code *denotes a priority habitat	Summary Description (from Site Synopsis)[9]	Data Source – Conservation Objectives Supporting Form
11	Lough Ree SAC (000440)	[1355] Otter *Lutra lutra* [3150] Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation [6210] Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [7120] Degraded raised bogs still capable of natural regeneration [7230] Alkaline fens [8240] Limestone pavements [91A0] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91D0] Bog woodland*	Lough Ree is the third largest lake in Ireland and is situated in an ice-deepened depression in Carboniferous limestone on the River Shannon system between Lanesborough and Athlone. The site spans Counties Longford, Roscommon and Westmeath. Some of its features (including the islands) are based on glacial drift. It has a very long, indented shoreline and hence has many sheltered bays. Although the main habitat, by area, is the lake itself, interesting shoreline, terrestrial and semi-aquatic habitats also occur. Lough Ree and its adjacent habitats are of major ecological significance. Some of the woodlands around the lake are of excellent. St John's Wood is particularly important; it is one of the very few remaining ancient woodlands in Ireland. The lake itself is an excellent example of a mesotrophic to moderate-eutrophic system, supporting a rare fish species and a good diversity of breeding and wintering birds (NPWS, 2019).	NPWS (2016) Conservation Objectives: Lough Ree SAC 000440. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. Accessed online 14.02.2022.
12	All Saint's Bog SAC (000566)	[6210] Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [7110] Active raised bogs [7120] Degraded raised bogs still capable of natural regeneration [7150] Depressions on peat substrates of the Rhynchosporion [91D0] Bog woodland*	All Saints Bog is a lowland raised bog lying about 5 km north-west of Birr in Co. Offaly, and separated from the Little Brosna Callows by a fragmented esker ridge. 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 (NPWS, 2013)	NPWS (2016) Conservation Objectives: All Saints Bog and Esker SAC 000566. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Accessed online 13.04.2022.

	European Site Name and Code	Qualifying Interest / Special Conservation Interest and Code *denotes a priority habitat	Summary Description (from Site Synopsis)[9]	Data Source – Conservation Objectives Supporting Form
13	Redwood Bog SAC (002353)	[7110] Active raised bogs [7120] Degraded raised bogs still capable of natural regeneration [7150] Depressions on peat substrates of the Rhynchosporion	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 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 (NPWS, 2014).	NPWS (2015) Conservation Objectives: Redwood Bog SAC 002353. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Accessed online 13.04.2022
14	Ridgewood; SW of Rapemills SAC (000919)	[6210] Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	This site consists of steep-sided, twin esker ridges formed from glacial gravels. It is situated under 2 km south-west of the village of Rapemills in Co. Offaly. The more northerly ridge supports a road running towards the Little Brosna River. Hollows are present with deeper soils which are more nutrient-enriched, while the banks are slightly leached. Although small, this site 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	NPWS (2018) Conservation Objectives: Ridge Road, SW of Rapemills SAC 000919. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

	European Site Name and Code	Qualifying Interest / Special Conservation Interest and Code *denotes a priority habitat	Summary Description (from Site Synopsis)[9]	Data Source – Conservation Objectives Supporting Form
			increasingly rare in Ireland - many have been destroyed as a result of gravel extraction (NPWS, 2014).	
15	Middle Shannon Callows SPA (004096)	[A038] Whooper Swan *Cygnus cygnus* [A050] Wigeon *Anas penelope* [A122] Corncrake *Crex crex* [A140] Golden Plover *Pluvialis apricaria* [A142] Lapwing *Vanellus vanellus* [A156] Black-tailed Godwit *Limosa limosa* [A179] Black-headed Gull *Chroicocephalus ridibundus* [A999] Wetland and Waterbirds	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 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 (NPWS, 2012).	NPWS (2012) Middle Shannon Callows SPA 004096. Version date: 10.1.2012. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Accessed online 27.01.2022
16	Mongan Bog SPA (004017)	[A395] Greenland White-fronted Goose *Anser albifrons flavirostris*	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. The cutaway area of bog provides habitat for a range of bird species, including birds of prey, thrushes, warblers and finches. A study of the birds of Mongan Bog in 1985 recorded Mallard, Snipe, Skylark and Meadow Pipit breeding on the peat dome. Mongan Bog is owned by An Taisce (the National Trust) and is a Ramsar Convention site, a Biogenetic Reserve and a Statutory Nature Reserve (NPWS 2014.	NPWS (2021) Conservation objectives for Mongan Bog SPA [004017]. Generic Version 8.0. Department of Housing, Local Government and Heritage. Accessed online 27.01.2022.
17	All Saint's Bog SPA (004103)	[A395] Greenland White-fronted Goose *Anser albifrons flavirostris*	Redwood Bog is located 7 km south west of Banagher, mainly in the townland of Redwood, Co.	

	European Site Name and Code	Qualifying Interest / Special Conservation Interest and Code *denotes a priority habitat	Summary Description (from Site Synopsis)[9]	Data Source – Conservation Objectives Supporting Form
			Tipperary. The site comprises a raised bog that includes both areas of high bog and cutover bog. The site is bounded by the Middle Shannon Callows Special Protection Area (SPA) to the north and the River Little Brosna SPA to the north-east.	
18	River Little Brosna Callows SPA (004086)	[A038] Whooper Swan *Cygnus cygnus* [A050] Wigeon *Anas penelope* A052] Teal *Anas crecca* [A054] Pintail *Anas acuta* [A056] Shoveler *Anas clypeata* [A140] Golden Plover *Pluvialis apricaria* [A142] Lapwing *Vanellus vanellus* [A156] Black-tailed Godwit *Limosa limosa* [A179] Black-headed Gull *Chroicocephalus ridibundus* [A395] Greenland White-fronted Goose *Anser albifrons flavirostris*	The River Little Brosna Callows SPA follows the River Brosna from its confluence with the River Shannon for approximately 9 km south-eastwards to just beyond New Bridge on the R438 road. The site extends along both sides of the river within counties Offaly and Tipperary. The main habitat present is the extensive area of low-lying callow grassland along the floodplain of the river. These grasslands are subject to prolonged flooding in winter, early spring and occasionally in summer. 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 (NPWS, 2014).	NPWS (2022) Conservation objectives for River Little Brosna Callows SPA [004086]. Generic Version 9.0. Department of Housing, Local Government and Heritage.
19	Lough Ree SPA (004064)	[A004] Little Grebe *Tachybaptus ruficollis* [A038] Whooper Swan *Cygnus cygnus* [A050] Wigeon *Anas penelope* [A052] Teal *Anas crecca* [A053] Mallard *Anas platyrhynchos*	Situated on the River Shannon between Lanesborough and Athlone, Lough Ree is the third largest lake in the Republic of Ireland. It lies in an ice-deepened depression in Carboniferous Limestone. Some of its features (including the islands) are based on	NPWS (2022) Conservation objectives for Lough Ree SPA [004064]. Generic Version 9.0. Department of Housing, Local Government and

	European Site Name and Code	Qualifying Interest / Special Conservation Interest and Code *denotes a priority habitat	Summary Description (from Site Synopsis)[9]	Data Source – Conservation Objectives Supporting Form
		[A056] Shoveler *Anas clypeata* [A061] Tufted Duck *Aythya fuligula* [A065] Common Scoter *Melanitta nigra* [A067] Goldeneye *Bucephala clangula* [A125] Coot *Fulica atra* [A140] Golden Plover *Pluvialis apricaria* [A142] Lapwing *Vanellus vanellus* [A193] Common Tern *Sterna hirundo* [A999] Wetland and Waterbirds	glacial drift. The main inflowing rivers are the Shannon, Inny and Hind, and the main outflowing river is the Shannon. The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Whooper Swan, Wigeon, Teal, Mallard, Shoveler, Tufted Duck, Common Scoter, Goldeneye, Little Grebe, Coot, Golden Plover, Lapwing and Common Tern (NPWS, 2015).	Heritage. Accessed online 14.02.2022
20	River Suck Callows SPA (004097)	[A038] Whooper Swan *Cygnus cygnus* [A050] Wigeon *Anas penelope* [A140] Golden Plover *Pluvialis apricaria* [A142] Lapwing *Vanellus vanellus* [A395] Greenland White-fronted Goose *Anser albifrons flavirostris*	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 (NPWS, 2014).	NPWS (2022) Conservation objectives for River Suck Callows SPA [004097]. Generic Version 9.0. Department of Housing, Local Government and Heritage

2.8 Sources of Information & Consultation

2.8.1 Consultation

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

To inform the current Rehabilitation Plan and the Appropriate Assessment process, both national and local stakeholders, including neighbours whose land adjoins Blackwater 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 Blackwater Bog (see **Appendix B**).

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

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

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

Ministerial consultation in line with Regulation 42 of the European Union (Birds and Natural Habitats) Regulations has been undertaken in respect of the proposed PCAS activities.

Finally, a public consultation process for the proposed Blackwater Bog PCAS scheme was undertaken in accordance with the updated European Union (Birds and Natural Habitats) (Amendment) Regulations 2021, once it was determined that an appropriate assessment was required, and the current report has had regard to any submission received, where applicable. No submissions were received from following the public consultation process held for Blackwater rehabilitation works.

2.8.2 Sources of Information

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

- Review of the Conservation Objectives, Site Synopsis and Site boundary information for the European Sites within with study area;
- Review of OSI Discovery Mapping for the 15km study area around Blackwater 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 Blackwater 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 CBS datasets; www.birdwatchireland.ie);
- Geological Survey of Ireland - National Draft Bedrock Aquifer map;
- Geological Survey of Ireland - Groundwater Database (www.gsi.ie);
- National Parks & Wildlife Services Public Map Viewer (www.npws.ie);
- Water Framework Directive catchments.ie/maps/ Map Viewer (www.catchments.ie);
- OPW Indicative Flood Maps (www.floodmaps.ie),
- CFRAM Preliminary Flood Risk Assessment (PFRA) maps (www.cfram.ie);
- River Basin Management Plan for Ireland 2018 – 2021;
- Bord na Móna Annual Report 2019;
- Spatial data in respect of Article 17 reporting, available online at https://www.npws.ie/maps-and-data/habitat-and-species-data/article-17.
- Spatial data in respect of Article 12 reporting, available online at https://www.npws.ie/maps-and-data/habitat-and-species-data/article-12-data.
- Available data on Greenland White-fronted Geese such as annual reporting by the Greenland White-fronted Goose Study and National Parks and Wildlife Service.

Planning peatland rehabilitation also takes account of research, experience and engagement with other peatland restoration and rehabilitation projects and peatland research including Irish, UK, European and International best-practise guidance (full citations are in the References **Section 4**):

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

- Schouten (2002). Conservation and Restoration of Raised Bogs: Geological, Hydrological and Ecological Studies. Dúchas - The Heritage Service of the Department of the Environment and Local Government, Ireland;
- Thom (2019). Conserving Bogs – Management Handbook.
- Wheeler & Shaw (1995). Restoration of Damaged Peatlands – with Particular Reference to Lowland Raised Bogs Affected by Peat Extraction.
- Wittram *et al*. (2015). A Practitioners Guide to *Sphagnum* Reintroduction. Moors for the Future Partnership.

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

2.9.1 Potential Sources, Pathways and Timing of Impacts to SACs

2.9.1.1 Direct Impact to Habitats within the SAC

There is spatial overlap between Blackwater Bog's northern boundary and Fin Lough (Offaly) SAC and its westernmost boundary and the River Shannon Callows SAC (See **Figure 14**). However, it is not proposed to carry out rehabilitation works (including maintenance of silt ponds) within the SAC boundary. Furthermore, there will be no rehabilitation works within 2km of the River Shannon Callows SAC. Therefore, there will be no direct impacts to the River Shannon Callows as a result of the proposed rehabilitation works.

Where the works are in the vicinity of Fin Lough SAC, rehabilitation measures are all within the category of 'Marginal Lands', silt ponds or Constraints. Nonetheless, a precautionary approach is taken, and therefore, there is the potential for direct impacts to Fin Lough SACs to occur. Other SAC's can be excluded from consideration in respect of direct effects. Furthermore, there is the remote potential for direct disturbance, displacement or mortality impacts to otter, should they be utilising silt ponds or sections works areas within or overlapping the SAC site boundaries.

All other SAC's within the project ZoI can be excluded from consideration in respect of direct effects.

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

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

Working within watercourses and drainage channels along the site boundary / periphery to retain the function of hydraulic barriers between the site and the surrounding environment and to sustain the flow of surface water around the margins of the site. Such works may require localised instream works, mobilisation of particulate matter, local excavations within drainage channels, machinery works within and adjacent to watercourses. A water quality map for Blackwater Bog is presented in **Figure 3**.

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

Potential Blackwater Bog Decommissioning and Rehabilitation Impact/Pathway Connectivity:

The identified impact sources could possibly reduce water quality or aquatic habitat quality in the local context, where all works are located outside of and at a distance from any designated SAC. The closest SACs are the River Shannon Callows SAC and Fin Lough (Offaly) SAC, which adjoins Blackwater Bog to the west and north respectively. Blackwater Bog also supports hydrological connectivity to the River Shannon Callows SAC through the Gowlan River. No rehabilitation works are proposed where the Blackwater Bog boundary adjoins the River Shannon Callows SAC, therefore there will no indirect loss or degradation of aquatic habitats to the adjacent areas of this European Site.

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

Timing of Impacts: The potential for impact sources arising from the project only relates to the stage (i.e. Decommissioning and Rehabilitation), when groundworks and use of machinery will take place for a limited duration - in this instance expected to be completed over a 2 year period. Once decommissioning and rehabilitation are complete, the decommissioned and rehabilitated Blackwater Bog will require some

monitoring, generally involving visual inspections of habitat succession, sometimes using drones, and any ongoing scheduled maintenance such as of silt ponds, or collection of water samples. Due to the negligible (both in terms of source magnitude but also duration) and non-intrusive nature of operational activities, there is no potential for the operational phase of the proposed decommissioning and rehabilitation to cause effects to European Sites.

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

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

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

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

Potential Blackwater Bog Decommissioning and Rehabilitation Impact/Pathway Connectivity: The impact sources identified above may result in possible localised impacts occurring within the local context of the decommissioning and rehabilitation area during the construction phase. Any such impacts resulting in disturbance or displacement effects on Annex II species listed as Qualifying Interests of SACs (e.g. Otter) would be *ex situ*. Blackwater Bog boundary adjoins the River Shannon Callows SAC and Fin Lough (Offaly) SAC. Otters utilising the nearby adjoining floodplains of the River Shannon Callows SAC may experience indirect and ex-situ disturbance effects as a result of the proposed rehabilitation works. Furthermore, the upper stretches of the Gowlan River supports evidence of otter activity. Direct disturbance and displacement effects are considered in **Section 2.9.1.1**.

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

2.9.1.4 Indirect or ex-situ mortality of Qualifying Interests

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

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

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

Potential Blackwater Bog Decommissioning and Rehabilitation Impact/Pathway Connectivity: The impact sources identified above may result in possible localised impacts occurring within the local context of the decommissioning and rehabilitation area during the construction phase. Such impacts resulting in disturbance

or displacement effects on Annex II species listed as Qualifying Interests of SACs (e.g. Otter) would be indirect and *ex situ* and separated from any European Site.

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

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

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

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

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

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

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

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

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

2.9.2 Potential Sources, Pathways and Timing of Impacts to SPAs

2.9.2.1 Direct Impacts to Habitats within SPAs

There is spatial overlap between Blackwater Bog's westernmost boundary and the Middle Shannon Callows SPA (See **Figure 14**). However, it is not proposed to carry out rehabilitation works within the SPA boundary. Furthermore, there will be no rehabilitation works within 2km of the Middle Shannon Callows SAC. Therefore, there will be no direct impacts to the Middle Shannon Callows as a result of the proposed rehabilitation works. There is no spatial overlap between the proposed rehabilitation site and any other Special Protection Areas.

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

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

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

Potential Blackwater Bog Decommissioning and Rehabilitation Impact/Pathway Connectivity: The identified impact sources could reduce water quality or aquatic habitat quality in the local context. The current appraisal evaluates the possibility of any effects in overlapping or immediately adjacent SPAs in addition to downstream hydrologically connected SPAs through sediment/contaminant/nutrient laden runoff, changes to hydrological regimes or morphology of supporting watercourses, or through the spread of invasive species, regarding any indirect (effective) habitat loss or degradation effects to Special Conservation Interests.

The proposed Decommissioning and Rehabilitation at Blackwater Bog adjoins one SPA boundary (Middle Shannon Callows SPA). Effects on this SPA and, on one hydrologically connected, downstream SPA (River Suck Callows SPA), are evaluated to determine the potential (or not) for significant effects.

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

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

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

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

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

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

The western fringes of Blackwater Bog adjoins the Middle Shannon Callows SPA. The proposed rehabilitation works are also located in proximity to Mongan Bog SPA. None of the proposed rehabilitation works will occur within the footprint of a SPA site.

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

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

May for Spring) and winter period (October to March) when most of the SCI species for which these sites are designated are present[10].

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

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

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

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

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

Potential Blackwater Bog Decommissioning and Rehabilitation Impact/Pathway Connectivity:

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

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

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

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

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

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

- Direct impacts to habitats within Fin Lough SAC and ;
- Indirect loss or degradation of terrestrial or aquatic habitats within SAC sites (during the construction and operational phases), alone and in combination; and
- Indirect or ex-situ disturbance or displacement of species of Qualifying Interest, alone and in combination.

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

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

As described in **Section 2.9.1.1** and **2.9.1.2**, there is **potential for direct and indirect effects** to features of qualifying Interest associated with European Sites due to the proximity and overlap of the Blackwater Bog site with the Fin Lough SAC. In addition, there is the **potential for indirect effects to** the Middle Shannon Callows SPA, the River Shannon Callows SPA and the River Suck Callows SAC, via hydrological connectivity.

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

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

	European Site	Separation Distance from Blackwater Bog	Hydrological Connection – Yes/No	Evaluation of the potential for Blackwater Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the twelve SAC Sites: **1**. Direct effects to Qualifying Interest habitats or species of an SAC Site (i.e. species mortality, habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC 2. Indirect loss or degradation of terrestrial or aquatic habitats within the SAC site; **2**. Indirect/ex-situ disturbance or displacement of species of Qualifying Interest. **3.** Indirect or ex-situ mortality of Qualifying Interests
1	River Shannon Callows SAC (000216)	The western boundary of Blackwater Bog overlaps the boundary of this European Site. However, the proposed rehabilitation works do not overlap this European Site. .	Y:Downstream via the river Blackwater (Shannonbridge 020) watercourse which drains through the bog continuing south south-west of the bog, entering the River Shannon main channel south of Blackwater Bog boundary.	**1: Screened Out – No likelihood for direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC** The proposed rehabilitation works footprint are not located within the footprint of this European Site. Therefore there will be no direct impacts to this European Site. **2: Screened In - Possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SAC** Due to presence of downstream hydrological connectivity between proposed activities and this European Site possible pathways for effects are identified. **3: Screened In - Possibility for indirect or ex-situ disturbance or displacement of species of Qualifying Interests** Due to the presence of hydrological connectivity and proximity / overlap between proposed activities and this European Site, possible pathways for localised effects on (ex-situ) Otter (a species of Qualifying Interest for this European Site) are identified, which cannot be screened out in the absence of measures to avoid harmful effects. **4: Screened In - Possibility for indirect or ex-situ mortality to species of Qualifying Interests** Due to the presence of hydrological connectivity and overlap between proposed activities and this European Site, possible pathways for localised effects on (ex-situ) mortality to species of Qualifying Interest (i.e. otter) are identified, which cannot be screened out in the absence of measures to avoid harmful effects such as accidental or inadvertent mortality when carrying out certain works e.g. cleaning of silt ponds.
2	Mongan Bog SAC (000580)			**1: Screened Out – No likelihood for direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC**

	European Site	Separation Distance from Blackwater Bog	Hydrological Connection – Yes/No	Evaluation of the potential for Blackwater Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the twelve SAC Sites: **1**. Direct effects to Qualifying Interest habitats or species of an SAC Site (i.e. species mortality, habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC 2. Indirect loss or degradation of terrestrial or aquatic habitats within the SAC site; **2**. Indirect/ex-situ disturbance or displacement of species of Qualifying Interest. **3.** Indirect or ex-situ mortality of Qualifying Interests
		235m north of the Blackwater Bog boundary	N: No hydrological connectivity between the proposed bog rehabilitation site and this European Site.	The proposed rehabilitation works footprint are not located within the footprint of this European Site. Therefore there will be no direct impacts to this European Site. **2: Screened Out - Possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SAC** Due to the separation distance to this SAC and the lack of hydrological connectivity, possible pathways for indirect loss, reduction or degradation of terrestrial / aquatic habitats within or in close proximity to Blackwater Bog can be excluded. **3: Screened Out - No potential for indirect or ex-situ disturbance or displacement of species of Qualifying Interests** There are no species of Qualifying Interest listed for this European Site. Therefore there will be no indirect or ex-situ disturbance effects in this regard. **4: Screened Out - No potential for indirect or ex-situ mortality to species of Qualifying Interests** There are no species of Qualifying Interest listed for this European Site. Therefore there will be no indirect or ex-situ effects in this regard.
3	Fin Lough SAC (000576)	The Blackwater Bog boundary overlaps this European Site. The proposed rehabilitation works are located immediately	Y: The proposed bog works support potential hydrogeological connectivity to Fin Lough SAC, given the proximity of the proposed rehabilitation works to this European Site.	**1: Screened In – Blackwater Bog partially overlaps with this European Site. As a result, there is the possibility for direct loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SAC** Blackwater Bog site boundary overlaps this European Site. Although the proposed Decommissioning and Rehabilitation activities do not support features of the qualifying interest for this European Site; '1013 Geyer's Whorl Snail (*Vertigo geyeri*) and (7230) Alkaline fens, the proximity and the presence of potential hydrological and hydrogeological connectivity between proposed activities and this European Site means possible pathways for effects are identified. **2: Screened In - Possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SAC** Due to proximity and the presence of hydrological and hydrogeological connectivity between proposed activities and this European Site, possible pathways for effects are identified.

	European Site	Separation Distance from Blackwater Bog	Hydrological Connection – Yes/No	Evaluation of the potential for Blackwater Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the twelve SAC Sites: **1**. Direct effects to Qualifying Interest habitats or species of an SAC Site (i.e. species mortality, habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC 2. Indirect loss or degradation of terrestrial or aquatic habitats within the SAC site; **2**. Indirect/ex-situ disturbance or displacement of species of Qualifying Interest. **3.** Indirect or ex-situ mortality of Qualifying Interests
		south of this European Site.		**3: Screened Out - No potential for indirect or ex-situ disturbance or displacement of species of Qualifying Interests** The QI species for this European Site is Geyer's Whorl Snail *Vertigo geyeri*, a molluscan species with highly specified habitat requirements (alkaline fens and tufa formations), none of which are present within the proposed rehabilitation works footprint. Therefore there is no potential for indirect or ex-situ disturbance or displacement to species of Qualifying Interests. **4: Screened Out - No potential for indirect or ex-situ mortality to species of Qualifying Interests** The QI species for this habitats is Geyer's Whorl Snail *Vertigo geyeri*, a molluscan species with highly specified habitat requirements (alkaline fens and tufa formations), none of which are present within the proposed works areas. Therefore there is no potential for indirect or ex-situ mortality to species of Qualifying Interests.
4	Pilgrim's Road Esker SAC (001776)	1.4km north of Blackwater Bog at its closest point.	N: Pilgrim's Road Esker SAC is partially located within the same surface water subcatchment Shannon (Lower)_SC_030 as the proposed rehabilitation works. However, Pilgrim's Road Esker SAC is located upstream of the proposed rehabilitation works and does not support hydrological connectivity.	**1: Screened Out – No likelihood for direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC** The proposed works are not located within or in proximity to this European Site. Therefore there will be no direct impacts to this European Site. **2: Screened Out - Possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SAC** Due to the separation distance to this SAC and the lack of hydrological connectivity, possible pathways for indirect loss, reduction or degradation of terrestrial / aquatic habitats within or in close proximity to Blackwater Bog can be excluded. **3: Screened Out - No potential for indirect or ex-situ disturbance or displacement of species of Qualifying Interests** There are no species of Qualifying Interest listed for this European Site. Therefore there will be no indirect of ex-situ disturbance effects in this regard. **4: Screened Out - No potential for indirect or ex-situ mortality to species of Qualifying Interests** There are no species of Qualifying Interest listed for this European Site. Therefore there will be no indirect of ex-situ effects in this regard.

	European Site	Separation Distance from Blackwater Bog	Hydrological Connection – Yes/No	Evaluation of the potential for Blackwater Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the twelve SAC Sites: **1**. Direct effects to Qualifying Interest habitats or species of an SAC Site (i.e. species mortality, habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC 2. Indirect loss or degradation of terrestrial or aquatic habitats within the SAC site; **2**. Indirect/ex-situ disturbance or displacement of species of Qualifying Interest. **3.** Indirect or ex-situ mortality of Qualifying Interests
5	Moyclare Bog SAC (000581)	3.7km east of Blackwater Bog at its closest point.	N: No hydrological connectivity between the proposed bog rehabilitation site and this European Site.	**1: Screened Out – No likelihood for direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC** The proposed works are not located within or in proximity to this European Site. Therefore there will be no direct impacts to this European Site. **2: Screened Out - Possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SAC** Due to the separation distance to this SAC and the lack of hydrological connectivity, possible pathways for indirect loss, reduction or degradation of terrestrial / aquatic habitats within or in close proximity to Blackwater Bog can be excluded. **3: Screened Out - No potential for indirect or ex-situ disturbance or displacement of species of Qualifying Interests** The proposed works located 6.4km from this European Site. There are no species of Qualifying Interest listed for this European Site. Therefore there will be no indirect of ex-situ disturbance effects in this regard. **4: Screened Out - No potential for indirect or ex-situ mortality to species of Qualifying Interests** The proposed works located 6.4km from this European Site. There are no species of Qualifying Interest listed for this European Site. Therefore there will be no indirect of ex-situ effects in this regard.
6	Ferbane Bog SAC (000575)	5.0km east/south-east of Blackwater Bog at its closest point.	N: No hydrological connectivity between the proposed bog rehabilitation site and this European Site.	**1: Screened Out – No likelihood for direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC** The proposed works are not located within or in proximity to this European Site. Therefore there will be no direct impacts to this European Site. **2: Screened Out - Possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SAC** Due to the separation distance to this SAC and the lack of hydrological connectivity, possible pathways for indirect loss, reduction or degradation of terrestrial / aquatic habitats within or in close proximity to Blackwater Bog can be excluded.

	European Site	Separation Distance from Blackwater Bog	Hydrological Connection – Yes/No	Evaluation of the potential for Blackwater Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the twelve SAC Sites: **1**. Direct effects to Qualifying Interest habitats or species of an SAC Site (i.e. species mortality, habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC 2. Indirect loss or degradation of terrestrial or aquatic habitats within the SAC site; **2**. Indirect/ex-situ disturbance or displacement of species of Qualifying Interest. **3.** Indirect or ex-situ mortality of Qualifying Interests
				3: Screened Out - No potential for indirect or ex-situ disturbance or displacement of species of Qualifying Interests The proposed works located 7.8km from this European Site. There are no species of Qualifying Interest listed for this European Site. Therefore there will be no indirect of ex-situ disturbance effects in this regard. **4: Screened Out - No potential for indirect or ex-situ mortality to species of Qualifying Interests** The proposed works located 7.8km from this European Site. There are no species of Qualifying Interest listed for this European Site. Therefore there will be no indirect of ex-situ effects in this regard.
7	Crosswood Bog SAC (002337)	10.9km north/north-east of Blackwater Bog at its closest point.	N: No hydrological connectivity between the proposed bog rehabilitation site and this European Site.	**1: Screened Out – No likelihood for direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC** The proposed works are not located within or in proximity to this European Site. Therefore there will be no direct impacts to this European Site. **2: Screened Out - Possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SAC** Due to the separation distance to this SAC and the lack of hydrological connectivity, possible pathways for indirect loss, reduction or degradation of terrestrial / aquatic habitats within or in close proximity to Blackwater Bog can be excluded. **3: Screened Out - No potential for indirect or ex-situ disturbance or displacement of species of Qualifying Interests** The proposed works located 4.8km from this European Site. There are no species of Qualifying Interest listed for this European Site. Therefore there will be no indirect of ex-situ disturbance effects in this regard. **4: Screened Out - No potential for indirect or ex-situ mortality to species of Qualifying Interests** The proposed works located 4.8km from this European Site. There are no species of Qualifying Interest listed for this European Site. Therefore there will be no indirect of ex-situ effects in this regard.
8	Carn Park Bog SAC (002336)			**1: Screened Out – No likelihood for direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC**

	European Site	Separation Distance from Blackwater Bog	Hydrological Connection – Yes/No	**Evaluation of the potential for Blackwater Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the twelve SAC Sites:** **1**. Direct effects to Qualifying Interest habitats or species of an SAC Site (i.e. species mortality, habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC 2. Indirect loss or degradation of terrestrial or aquatic habitats within the SAC site; **2**. Indirect/ex-situ disturbance or displacement of species of Qualifying Interest. **3.** Indirect or ex-situ mortality of Qualifying Interests
		13.3km north/north-east of Blackwater Bog at its closest point.	N: No hydrological connectivity between the proposed bog rehabilitation site and this European Site.	The proposed works are not located within or in proximity to this European Site. Therefore there will be no direct impacts to this European Site. **2: Screened Out - Possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SAC** Due to the separation distance to this SAC and the lack of hydrological connectivity, possible pathways for indirect loss, reduction or degradation of terrestrial / aquatic habitats within or in close proximity to Blackwater Bog can be excluded. **3: Screened Out - No potential for indirect or ex-situ disturbance or displacement of species of Qualifying Interests** The proposed works located 7.1km from this European Site. There are no species of Qualifying Interest listed for this European Site. Therefore there will be no indirect of ex-situ disturbance effects in this regard. **4: Screened Out - No potential for indirect or ex-situ mortality to species of Qualifying Interests** The proposed works located 7.1km from this European Site. There are no species of Qualifying Interest listed for this European Site. Therefore there will be no indirect of ex-situ effects in this regard.
9	Ballynamona Bog and Corkip Lough SAC (002339)	14.1km north-west of Blackwater Bog at its closest point.	N: No hydrological connectivity between the proposed bog rehabilitation site and this European Site.	**1: Screened Out – No likelihood for direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC** The proposed works are not located within or in proximity to this European Site. Therefore there will be no direct impacts to this European Site. **2: Screened Out - Possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SAC** Due to the separation distance to this SAC and the lack of hydrological connectivity, possible pathways for indirect loss, reduction or degradation of terrestrial / aquatic habitats within or in close proximity to Blackwater Bog can be excluded. **3: Screened Out - No potential for indirect or ex-situ disturbance or displacement of species of Qualifying Interests**

	European Site	Separation Distance from Blackwater Bog	Hydrological Connection – Yes/No	Evaluation of the potential for Blackwater Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the twelve SAC Sites: **1**. Direct effects to Qualifying Interest habitats or species of an SAC Site (i.e. species mortality, habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC 2. Indirect loss or degradation of terrestrial or aquatic habitats within the SAC site; **2**. Indirect/ex-situ disturbance or displacement of species of Qualifying Interest. **3.** Indirect or ex-situ mortality of Qualifying Interests
				The proposed works located 13.1km from this European Site. There are no species of Qualifying Interest listed for this European Site. Therefore there will be no indirect of ex-situ disturbance effects in this regard. **4: Screened Out - No potential for indirect or ex-situ mortality to species of Qualifying Interests** The proposed works located 13.1km from this European Site. There are no species of Qualifying Interest listed for this European Site. Therefore there will be no indirect of ex-situ effects in this regard.
10	Castlesampson Esker SAC (001625)	11.8km north-west of Blackwater Bog at its closest point.	N: No hydrological connectivity between the proposed bog rehabilitation site and this European Site.	**1: Screened Out – No likelihood for direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC** The proposed works are not located within or in proximity to this European Site. Therefore there will be no direct impacts to this European Site. **2: Screened Out - Possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SAC** Due to the separation distance to this SAC and the lack of hydrological connectivity, possible pathways for indirect loss, reduction or degradation of terrestrial / aquatic habitats within or in close proximity to Blackwater Bog can be excluded. **3: Screened Out - No potential for indirect or ex-situ disturbance or displacement of species of Qualifying Interests** The proposed works located 11.2km from this European Site. There are no species of Qualifying Interest listed for this European Site. Therefore there will be no indirect of ex-situ disturbance effects in this regard. **4: Screened Out - No potential for indirect or ex-situ mortality to species of Qualifying Interests** The proposed works located 11.2km from this European Site. There are no species of Qualifying Interest listed for this European Site. Therefore there will be no indirect of ex-situ effects in this regard.
11	Lough Ree SAC (000440)	12.4km north/north-east of Blackwater	N: Lough Ree SAC is located upstream of the proposed rehabilitation works and does not	**1: Screened Out – No likelihood for direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC** The proposed works are not located within or in proximity to this European Site. Therefore there will be no direct impacts to this European Site.

	European Site	Separation Distance from Blackwater Bog	Hydrological Connection – Yes/No	**Evaluation of the potential for Blackwater Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the twelve SAC Sites:** **1**. Direct effects to Qualifying Interest habitats or species of an SAC Site (i.e. species mortality, habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC 2. Indirect loss or degradation of terrestrial or aquatic habitats within the SAC site; **2**. Indirect/ex-situ disturbance or displacement of species of Qualifying Interest. **3.** Indirect or ex-situ mortality of Qualifying Interests
		Bog at its closest point.	support hydrological connectivity.	**2: Screened Out - Possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SAC** Due to the separation distance to this SAC and the lack of downstream hydrological connectivity, possible pathways for indirect loss, reduction or degradation of terrestrial / aquatic habitats within or in close proximity to Blackwater Bog can be excluded. **3: Screened Out - No potential for indirect or ex-situ disturbance or displacement of species of Qualifying Interests** The proposed works located 12.4km from this European Site. Disturbance or displacement of QI species associated with Lough Ree SAC will not occur due to the separation distance between Blackwater Bog and this European Site. **4: Screened Out - No potential for indirect or ex-situ mortality to species of Qualifying Interests** The proposed works located 12.4km from this European Site. Indirect or ex-situ mortality of QI species associated with Lough Ree SAC (Otter) will not occur due to the separation distance between Blackwater Bog and this European Site.
12	All Saint's Bog and Esker SAC (000566)	11.9km south of Blackwater Bog at its closest point	N: No hydrological connectivity between the proposed bog rehabilitation site and this European Site.	**1: Screened Out – No likelihood for direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC** The proposed works are not located within or in proximity to this European Site. Therefore there will be no direct impacts to this European Site. **2: Screened Out - Possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SAC** Due to the separation distance to this SAC and the lack of hydrological connectivity, possible pathways for indirect loss, reduction or degradation of terrestrial / aquatic habitats within or in close proximity to Blackwater Bog can be excluded. **3: Screened Out - No potential for indirect or ex-situ disturbance or displacement of species of Qualifying Interests** The proposed works located 11.9km from this European Site. There are no species of Qualifying Interest listed for this European Site. Therefore there will be no indirect of ex-situ disturbance effects in this regard. **4: Screened Out - No potential for indirect or ex-situ mortality to species of Qualifying Interests**

	European Site	Separation Distance from Blackwater Bog	Hydrological Connection – Yes/No	Evaluation of the potential for Blackwater Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the twelve SAC Sites: **1**. Direct effects to Qualifying Interest habitats or species of an SAC Site (i.e. species mortality, habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC 2. Indirect loss or degradation of terrestrial or aquatic habitats within the SAC site; **2**. Indirect/ex-situ disturbance or displacement of species of Qualifying Interest. **3.** Indirect or ex-situ mortality of Qualifying Interests
				The proposed works located 11.9km from this European Site. There are no species of Qualifying Interest listed for this European Site. Therefore there will be no indirect of ex-situ effects in this regard.
13	Redwood Bog SAC (002353)	12.1km south/ south-west of Blackwater Bog at its closest point	N: No hydrological connectivity between the proposed bog rehabilitation site and this European Site.	**1: Screened Out – No likelihood for direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC** The proposed works are not located within or in proximity to this European Site. Therefore there will be no direct impacts to this European Site. **2: Screened Out - Possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SAC** Due to the separation distance to this SAC and the lack of hydrological connectivity, possible pathways for indirect loss, reduction or degradation of terrestrial / aquatic habitats within or in close proximity to Blackwater Bog can be excluded. **3: Screened Out - No potential for indirect or ex-situ disturbance or displacement of species of Qualifying Interests** The proposed works located 12.1km from this European Site. There are no species of Qualifying Interest listed for this European Site. Therefore there will be no indirect of ex-situ disturbance effects in this regard. **4: Screened Out - No potential for indirect or ex-situ mortality to species of Qualifying Interests** The proposed works located 12.1km from this European Site. There are no species of Qualifying Interest listed for this European Site. Therefore there will be no indirect of ex-situ effects in this regard.
14	Ridgewood; SW of Rapemills SAC (000919)	14.5km south of Blackwater at its closest point	N: No hydrological connectivity between the proposed bog rehabilitation site and this European Site.	**1: Screened Out – No likelihood for direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC** The proposed works are not located within or in proximity to this European Site. Therefore there will be no direct impacts to this European Site. **2: Screened Out - Possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SAC**

	European Site	Separation Distance from Blackwater Bog	Hydrological Connection – Yes/No	**Evaluation of the potential for Blackwater Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the twelve SAC Sites:** **1**. Direct effects to Qualifying Interest habitats or species of an SAC Site (i.e. species mortality, habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC 2. Indirect loss or degradation of terrestrial or aquatic habitats within the SAC site; **2**. Indirect/ex-situ disturbance or displacement of species of Qualifying Interest. **3.** Indirect or ex-situ mortality of Qualifying Interests
				Due to the separation distance to this SAC and the lack of hydrological connectivity, possible pathways for indirect loss, reduction or degradation of terrestrial / aquatic habitats within or in close proximity to Blackwater Bog can be excluded. **3: Screened Out - No potential for indirect or ex-situ disturbance or displacement of species of Qualifying Interests** The proposed works located 14.5km from this European Site. There are no species of Qualifying Interest listed for this European Site. Therefore there will be no indirect of ex-situ disturbance effects in this regard. **4: Screened Out - No potential for indirect or ex-situ mortality to species of Qualifying Interests** The proposed works located 14.5km from this European Site. There are no species of Qualifying Interest listed for this European Site. Therefore there will be no indirect of ex-situ effects in this regard.

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

	European Site	Separation Distance from Blackwater Bog	Hydrological Connection – Yes/No	Evaluation of the potential for Blackwater Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the three SPA Sites: 1. Direct Impacts to Habitats within SPAs (i.e. disturbance, displacement, mortality) 2. Indirect loss, reduction or degradation of terrestrial or aquatic habitats within or in close proximity to the SPA site; (i.e. through habitat loss, degradation, fragmentation or reduction/loss of connectivity of suitable habitat, or through a reduction in prey item species) 3. Indirect or Ex-Situ disturbance or displacement of bird species of Special Conservation Interest (i.e. through disturbance, displacement or mortality of SCI species).
1	Middle Shannon Callows SPA (004096)	The western boundary of Blackwater Bog overlaps the boundary of this European Site. However, the proposed rehabilitation works do not overlap this European Site.	Y: Downstream via the river Blackwater (Shannonbridge 020) watercourse which drains through the bog continuing south south-west of the bog, entering the River Shannon main channel south of Blackwater Bog boundary.	**1: Screened Out – No likelihood for direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC** The proposed rehabilitation works footprint are not located within the footprint of this European Site. Therefore there will be no direct impacts to this European Site. **2: Screened In - Possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SPA** Due to proximity and the presence of hydrological connectivity between proposed activities and this European Site possible pathways for effects are identified. **3: Screened In - Possibility for indirect or ex-situ disturbance or displacement effects of bird species of Special Conservation Interest** Bird species of Special Conservation Interests for the most proximal SPA, the Middle Shannon Callows SPA include (wintering): Whooper Swan (*Cygnus cygnus*) [A038]; Wigeon (*Anas penelope*) [A050]; Corncrake (*Crex crex*) [A122]; Golden Plover (*Pluvialis apricaria*) [A140]; Lapwing (*Vanellus vanellus*) [A142]; Black-tailed Godwit (*Limosa limosa*) [A156] and Black-headed Gull (*Chroicocephalus ridibundus*) [A179]; Wetland and Waterbirds [A999]. Due to proximity, it is considered that it cannot be ruled out that migratory (in transit) or wintering individuals of the SCI Species may be attracted to wetland habitats at and adjoining Blackwater Bog, and hence be subject to possible disturbance events, dependant on timing. Screening in is on a precautionary basis, in line with the precautionary principle. SCI Species including Corncrake and Black-tailed Godwit are unlikely to utilise the Blackwater Bog site or its environs and therefore are unlikely to be subject to disturbance or displacement effects as a result of the proposed rehabilitation practices

	European Site	Separation Distance from Blackwater Bog	Hydrological Connection – Yes/No	Evaluation of the potential for Blackwater Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the three SPA Sites: 1. Direct Impacts to Habitats within SPAs (i.e. disturbance, displacement, mortality) 2. Indirect loss, reduction or degradation of terrestrial or aquatic habitats within or in close proximity to the SPA site; (i.e. through habitat loss, degradation, fragmentation or reduction/loss of connectivity of suitable habitat, or through a reduction in prey item species) 3. Indirect or Ex-Situ disturbance or displacement of bird species of Special Conservation Interest (i.e. through disturbance, displacement or mortality of SCI species).
2	Mongan Bog SPA (004017)	235m north of the Blackwater Bog boundary	N: No hydrological connectivity between the proposed bog rehabilitation site and this European Site.	**1. Screened Out - Possibility for direct loss, reduction or degradation of terrestrial or aquatic habitats within the SPA** The proposed rehabilitation and decommissioning works are not located within the bounds of Mongan Bog SPA. Therefore there will be no direct loss, reduction or degradation of terrestrial or aquatic habitats within the SPA. **2: Screened Out - Possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SAC** Due to the separation distance to this SAC and the lack of hydrological connectivity, possible pathways for indirect loss, reduction or degradation of terrestrial / aquatic habitats within or in close proximity to Blackwater Bog can be excluded. **3: Screened In - Possibility for indirect or ex-situ disturbance or displacement effects of bird species of Special Conservation Interest** Given the proximity of the proposed decommissioning and rehabilitation works to this European Site, there is the possibility for indirect or ex-situ disturbance or displacement effects of bird species of Special Conservation Interest. In accordance with Scottish Natural Heritage (SNH) Guidance[11] on assessing connectivity with SPA sites, the proposed rehabilitation works at Blackwater are considered to be within of the core winter foraging range (5-8km) for the SCI species of Mongan Bog SPA; i.e. Greenland White-fronted Goose. Due to the site's proximity with foraging range of the associated SCI species, it cannot be ruled out that migratory (in transit) or wintering individuals of the SCI Species may be attracted to wetland habitats at and adjoining Blackwater Bog, and hence be subject to possible disturbance events, dependant on timing of the rehabilitation and decommissioning works. Screening in is on a precautionary basis, in line with the precautionary principle.

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

	European Site	Separation Distance from Blackwater Bog	Hydrological Connection – Yes/No	**Evaluation of the potential for Blackwater Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the three SPA Sites:** 1. Direct Impacts to Habitats within SPAs (i.e. disturbance, displacement, mortality) 2. Indirect loss, reduction or degradation of terrestrial or aquatic habitats within or in close proximity to the SPA site; (i.e. through habitat loss, degradation, fragmentation or reduction/loss of connectivity of suitable habitat, or through a reduction in prey item species) 3. Indirect or Ex-Situ disturbance or displacement of bird species of Special Conservation Interest (i.e. through disturbance, displacement or mortality of SCI species).
3	All Saints Bog SPA (004103)	12.0km south of Blackwater Bog at its closest point.	N: No hydrological connectivity between the proposed bog rehabilitation site and this European Site.	**1. Screened Out - Possibility for direct loss, reduction or degradation of terrestrial or aquatic habitats within the SPA** Due to the separation distance to this SPA, possible pathways for direct effects can be excluded. **2: Screened Out - Possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SPA** Due to the separation distance to this SPA, possible pathways for indirect loss, reduction or degradation of terrestrial habitats within or in close proximity to Blackwater Bog can be excluded. **3: Screened Out - Possibility for indirect or ex-situ disturbance or displacement effects of bird species of Special Conservation Interest** Due to the separation distance to this SPA, possible pathways for disturbance or displacement effects to SCI species of All Saints Bog SPA can be excluded. All Saints Bog SPA is located 12.0km south of Blackwater Bog at its closest point. In accordance with Scottish Natural Heritage (SNH) Guidance on assessing connectivity with SPA sites, the proposed rehabilitation works at Blackwater Bog are considered to be outside of the core winter foraging range for the SCI species of All Saints Bog SPA. Therefore, there is no risk of the Greenland White-fronted Goose flocks at All Saint's Bog SPA utilising Blackwater Bog as a core foraging area. Therefore, there will be no risk of significant ex-situ disturbance or displacement effects of SCI species to All Saint's Bog SPA as a result of the proposed bog rehabilitation works. Once rehabilitation measures at Blackwater Bog are completed, pathways for future disturbance/displacement are expected to be negligible, and can be readily screened out.
4	River Little Brosna	12.6km south/south-west of	N: No hydrological connectivity	**1. Screened Out - Possibility for direct loss, reduction or degradation of terrestrial or aquatic habitats within the SPA** Due to the separation distance to this SPA, possible pathways for direct effects can be excluded.

	European Site	Separation Distance from Blackwater Bog	Hydrological Connection – Yes/No	**Evaluation of the potential for Blackwater Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the three SPA Sites:** 1. Direct Impacts to Habitats within SPAs (i.e. disturbance, displacement, mortality) 2. Indirect loss, reduction or degradation of terrestrial or aquatic habitats within or in close proximity to the SPA site; (i.e. through habitat loss, degradation, fragmentation or reduction/loss of connectivity of suitable habitat, or through a reduction in prey item species) 3. Indirect or Ex-Situ disturbance or displacement of bird species of Special Conservation Interest (i.e. through disturbance, displacement or mortality of SCI species).
	Callows SPA	Blackwater Bog at its closest point.	between the proposed bog rehabilitation site and this European Site.	**2: Screened Out - Possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SPA** Due to the separation distance to this SPA, possible pathways for indirect loss, reduction or degradation of terrestrial habitats within or in close proximity to Blackwater Bog can be excluded. **3: Screened Out - Possibility for indirect or ex-situ disturbance or displacement effects of bird species of Special Conservation Interest** Due to the separation distance to this SPA, possible pathways for disturbance or displacement effects to SCI species of River Little Brosna Callows SPA can be excluded. River Little Brosna Callows SPA is located 12.6km south/south-west of Blackwater Bog. In accordance with Scottish Natural Heritage (SNH) Guidance on assessing connectivity with SPA sites, the proposed rehabilitation works at Blackwater are considered to be outside of the core winter foraging range for the SCI species of River Little Brosna Callows SPA. Therefore, there is no risk of the Greenland White-fronted Goose flocks at River Little Brosna Callows SPA utilising Blackwater Bog as a core foraging area. Therefore, there will be no risk of significant ex-situ disturbance or displacement effects of SCI species to River Little Brosna Callows SPA as a result of the proposed bog rehabilitation works. Once rehabilitation measures at Blackwater Bog are completed, pathways for future disturbance/displacement are expected to be negligible, and can be readily screened out.
5	Lough Ree SPA (004064)	12.4km north/north-east of Blackwater Bog at its closest point.	N: Lough Ree SAC is located upstream of the proposed rehabilitation works and does not support hydrological connectivity.	**1. Screened Out - Possibility for direct loss, reduction or degradation of terrestrial or aquatic habitats within the SPA** Due to the separation distance to this SPA, possible pathways for direct effects can be excluded. **2: Screened Out - Possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SPA** Due to the separation distance to this SPA, possible pathways for indirect loss, reduction or degradation of terrestrial habitats within or in close proximity to Blackwater Bog can be excluded. **3: Screened Out - Possibility for indirect or ex-situ disturbance or displacement effects of bird species of Special Conservation Interest**

	European Site	Separation Distance from Blackwater Bog	Hydrological Connection – Yes/No	**Evaluation of the potential for Blackwater Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the three SPA Sites:** 1. Direct Impacts to Habitats within SPAs (i.e. disturbance, displacement, mortality) 2. Indirect loss, reduction or degradation of terrestrial or aquatic habitats within or in close proximity to the SPA site; (i.e. through habitat loss, degradation, fragmentation or reduction/loss of connectivity of suitable habitat, or through a reduction in prey item species) 3. Indirect or Ex-Situ disturbance or displacement of bird species of Special Conservation Interest (i.e. through disturbance, displacement or mortality of SCI species).
				Due to the separation distance to this SPA, possible pathways for disturbance or displacement effects to SCI species of Lough Ree SPA can be excluded. Lough Ree SPA is located 12.4km north/north-east of Blackwater Bog. In accordance with Scottish Natural Heritage (SNH) Guidance on assessing connectivity with SPA sites, the proposed rehabilitation works at Blackwater are considered to be outside of the core winter foraging range for the SCI species of Lough Ree SPA. Therefore, there is no risk of the Greenland White-fronted Goose flocks at Lough Ree SPA utilising Blackwater Bog as a core foraging area. Therefore, there will be no risk of significant ex-situ disturbance or displacement effects of SCI species to Lough Ree SPA as a result of the proposed bog rehabilitation works. Once rehabilitation measures at Blackwater Bog are completed, pathways for future disturbance/displacement are expected to be negligible, and can be readily screened out.
6	River Suck Callows SPA (004097)	1.3km west of Blackwater Bog	Y: Remote hydrological connectivity via the River Shannon main channel and flooding regimes associated with the Shannon catchment.	**1: Screened Out - Possibility for direct loss, reduction or degradation of terrestrial or aquatic habitats within the SPA** The proposed bog rehabilitation works are not located within the bounds of this SPA. Due to the separation distance to this SPA, possible pathways for direct effects can be excluded. **2: Screened In - Possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SPA** Due to the presence of hydrological connectivity between proposed activities and this European Site possible pathways for effects are identified. **3: Screened In - Possibility for indirect or ex-situ disturbance or displacement effects of bird species of Special Conservation Interest** Given the proximity of the proposed decommissioning and rehabilitation works to this European Site, there is the possibility for indirect or ex-situ disturbance or displacement effects of bird species of Special Conservation Interest. In accordance with Scottish Natural Heritage (SNH) Guidance[12] on assessing connectivity with SPA sites, the proposed rehabilitation works at Blackwater are

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

	European Site	Separation Distance from Blackwater Bog	Hydrological Connection – Yes/No	Evaluation of the potential for Blackwater Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the three SPA Sites: 1. Direct Impacts to Habitats within SPAs (i.e. disturbance, displacement, mortality) 2. Indirect loss, reduction or degradation of terrestrial or aquatic habitats within or in close proximity to the SPA site; (i.e. through habitat loss, degradation, fragmentation or reduction/loss of connectivity of suitable habitat, or through a reduction in prey item species) 3. Indirect or Ex-Situ disturbance or displacement of bird species of Special Conservation Interest (i.e. through disturbance, displacement or mortality of SCI species).
				considered to be within of the core winter foraging range (5-8km) for the SCI species of River Suck Callows SPA; i.e. Greenland White-fronted Goose, Whooper Swan, Lapwing, Golden Plover and Wigeon. Due to the site's proximity with foraging range of the associated SCI species, it cannot be ruled out that migratory (in transit) or wintering individuals of the SCI Species may be attracted to wetland habitats at and adjoining Blackwater Bog, and hence be subject to possible disturbance events, dependant on timing of the rehabilitation and decommissioning works. Screening in is on a precautionary basis, in line with the precautionary principle.

2.11 Screening for Appropriate Assessment: Conclusion Statement

The Screening Evaluation provided herein has examined the potential for any effects arising via source pathway linkages with regard to connectivity to designated European Sites (SACs and SPAs) within the zone of influence of all predicted Project impacts. An extended buffer zone of 15km was further considered, in line with NPWS guidance (DoEHLG, 2009), for evaluation of effects on any European Site which may arise associated with the proposed decommissioning and rehabilitation of Blackwater Bog, as required. There is a total of 20 European sites located within 15km of Blackwater Bog:

1. River Shannon Callows SAC (000216)
2. Mongan Bog SAC (000580)
3. Fin Lough SAC (000576)
4. Pilgrim's Road Esker SAC (001776)
5. Moyclare Bog SAC (000581)
6. Ferbane Bog SAC (000575)
7. Crosswood Bog SAC (002337)
8. Carn Park Bog SAC (002336)
9. Ballynamona Bog and Corkip Lough SAC (002339)
10. Castlesampson Esker SAC (001625)
11. Lough Ree SAC (000440)
12. All Saint's Bog and Esker SAC (000566)
13. Redwood Bog (002353)
14. Ridgewood; SW of Rapemills SAC
15. Middle Shannon Callows SPA (004096)
16. Mongan Bog SPA (004017)
17. All Saint's Bog SPA (004103)
18. River Little Brosna Callows SPA (004086)
19. Lough Ree SPA (004064)
20. River Suck Callows SPA (004097)

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

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

- River Shannon Callows SAC (Site Code: 000216);
- Middle Shannon Callows SPA (Site Code: 004096);
- Fin Lough SAC (000576);
- Mongan Bog SPA (Site Code: 004017); and
- River Suck Callows SPA (Site Code: 004097).

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

3 STAGE 2: APPROPRIATE ASSESSMENT

3.1 Introduction to Stage 2

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

- River Shannon Callows SAC (Site Code: 000216);
- Middle Shannon Callows SPA (Site Code: 004096);
- Fin Lough SAC (000576);
- Mongan Bog SPA (Site Code: 004017); and
- River Suck Callows SPA (Site Code: 004097).

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

An overview of Backwater Bog proposed Decommissioning and Rehabilitation is provided in **Section 2.2** and see also the document included as **Appendix B** of this report. Site synopsis of European Sites considered as part of this Natura Impact Statement are presented in **Appendix C**.

3.1.1 Current Status of the Qualifying or Special Conservation Interests of the European Sites under consideration

3.1.1.1 River Shannon Callows SAC (Site Code 000216)

The site-specific conservation objectives of the River Shannon Callows SAC aim to define favourable conservation condition for the particular habitat or species at that site. These objectives and conditions are considered in **Table 13** below in respect of the Qualifying Interests of River Shannon Callows SAC which were screened in for further evaluation. Further consideration is provided in **Table 13** to each Qualifying Interest and the potential for the proposed project to support connectivity and potentially impact this feature of Qualifying Interest.

The conservation objectives of River Shannon Callows SAC are available in full on the National Parks & Wildlife Service website at https://www.npws.ie/protected-sites.

The conservation objectives reproduced in the table below were sourced from NPWS (2021) Conservation objectives for River Shannon Callows SAC [000216]. Generic Version 8.0. Department of Housing, Local Government and Heritage - Version Date 18/01/2022[13]. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage and should be read in conjunction with any other supporting documentation on the referenced website as provided above.

[13] https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000216.pdf

Table 13: **Conservation Objectives of the River Shannon Callows SAC (Site Code 000216)**

Code and Qualifying Interest	Current Article 17 Reporting Status (2019[14])	Conservation Objective	Potential Connectivity Source-Pathway-Receptor Link
Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) (6410)	Overall trend in conservation status deteriorating.	To restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected	These Annex I habitats are potentially located in downstream sections of the River Shannon Callows SAC, especially within and along the floodplain areas of the River Shannon main channel. The proposed rehabilitation works support potential connectivity to the River Shannon and the River Shannon Callows SAC via receiving watercourses within and adjoining the study area; i.e the Blackwater (Shannonbridge)_020 watercourse. Therefore, there is a potential source-pathway-receptor link between the proposed rehabilitation works and these habitats of Qualifying Interest for the River Shannon Callows SAC.
Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*) (6510)	Overall trend in conservation status deteriorating.	To restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected	
Alkaline fens (7230)	Overall trend in conservation status deteriorating.	To maintain the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected	
Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae)* (91E0)	Overall trend in conservation status deteriorating.	To maintain the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected	
Otter (*Lutra lutra*) (1355)	Overall trend in conservation status improving.	To maintain the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected	Otter activity (spraints, slides) was noted along the Blackwater (Shannonbridge)_020 watercourse during the April 2022 site walkover survey. In addition, otter may potentially utilise

[14] 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

Code and Qualifying Interest	Current Article 17 Reporting Status (2019[14])	Conservation Objective	Potential Connectivity Source-Pathway-Receptor Link
			the internal and adjoining drainage network, watercourses and wetlands (ephemeral and permanent) within the Blackwater Bog site. Therefore, there is a potential source-pathway-receptor link between the proposed rehabilitation works and this species of Qualifying Interest for the River Shannon Callows SAC.
Limestone pavements* (8240)	Overall trend in conservation status stable.	To maintain the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected	Limestone pavements are not water dependent or nutrient sensitive habitats and therefore the potential hydrological connectivity between the rehabilitation works and this Annex I habitat will not contribute to significant negative effects. Therefore, the proposed works will not impact or contribute to significant negative effects to this Annex I habitat.

3.1.1.2 Middle Shannon Callows SPA (Site Code 004096)

The Middle Shannon Callows SPA is designated in respect of the following Special Conservation Interests:

- Whooper Swan (*Cygnus cygnus*) [A038]
- Wigeon (*Anas penelope*) [A050]
- Corncrake (*Crex crex*) [A122]
- Golden Plover (*Pluvialis apricaria*) [A140]
- Lapwing (*Vanellus vanellus*) [A142]
- Black-tailed Godwit (*Limosa limosa*) [A156]
- Black-headed Gull (*Chroicocephalus ridibundus*) [A179]
- Wetland and Waterbirds [A999]

The conservation objectives of Middle Shannon Callows SPA are available in full on the National Parks & Wildlife Service website at https://www.npws.ie/protected-sites.

The conservation objectives reproduced in the table below were sourced from : NPWS (2021) Conservation objectives for Middle Shannon Callows SPA [004096]. Generic Version 8.0. Department of Housing, Local Government and Heritage and should be read in conjunction with any other supporting documentation on the referenced website as provided above.

Corncrake (*Crex crex*) [A122]

Regarding Corncrake, no breeding has occurred by this species within the Middle Shannon Callows and the former breeding population within the SPA is now considered extinct. In 2002, 2003, 2006, 2007, 2008 and 2012 heavy rainfall led to flooding events during the Corncrake breeding season. This contributed to an acute level of breeding failure, and led to severe declines in Corncrake numbers; from 23 in 2005 to just one in 2011 and 2012. While 2013 saw an increase in the number of calling males to 2 (during the census period), just one calling male was recorded in 2014 and finally in 2015, for the first time no Corncrake was heard on the Shannon Callows[15]. The year 2018, was the fourth consecutive year in which no birds were recorded in the Shannon Callows[16]. Given the remaining population is focused heavily in two core areas of Donegal and West Connacht, with migration flyways to these likely to be coastal in nature (A. Copland personal communication) it is considered that pathways for effects to this species from any proposed activities at **Blackwater Bog** can reasonably be excluded.

Whooper Swan (*Cygnus cygnus*) [A038]

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

[15] 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

[16] 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

Results of the Irish Wetland Bird Survey (IWeBS[17]) for the winter period 2009/10 – 2015/16 report a population size (ROI) of 11,852 individuals (from Crowe *et al*., 2015), of which 4,052 were associated with the SPA network. The peak (2011-2015) population associated with the Shannon Callows was 305 birds. The 2015 swan census recorded a peak of 386 individuals for the River Suck.

Regarding connectivity to Blackwater Bog and potential linkage between the River Suck and the Shannon Callows, Scottish Natural Heritage (SNH)[18] recommends a core range of 5km from night-time roosts be assumed in respect of foraging Whooper Swan during the winter months when establishing connectivity between a proposed wind farm development and nearby SPA's. However, it is also accepted that the distribution of the Whooper Swan population wintering in Ireland may change over the winter months, possibly due to birds dispersing southwards (as the winter progresses) from their original arrival grounds[19].

Suitable foraging habitat (expansive improved grazing fields) for Whooper Swan does occur in the immediate vicinity of the Blackwater Bog, subject to flood levels. Outside of the River Shannon and its associated floodplain, pastoral fields comprise a small patchwork interspersed with areas of degraded bog and poor draining land contributing less than optimal grazing / foraging grounds. Whooper Swan were identified in small numbers using the ephemeral wetland habitats at Blackwater Bog during winter 2021 and 2022, peak count 11 – See **Appendix J**. However the nearby areas of the River Shannon Callows support suitable habitat for Whooper Swan foraging and roosting. In addition, Whooper Swan may overfly the **Blackwater Bog** site when travelling to and from the Shannon Callows and can feed on suitable habitat within proximity of the Blackwater site. The proposed decommissioning and rehabilitation works are located within the Minimum Approach Distance (MAD) for suitable Whooper Swan foraging habitat (123.2m) within areas of river floodplain, north and north-west of Blackwater Bog. However, the proposed rehabilitation works are not located within proximity to the Middle Shannon Callows floodplain areas. It is also considered that works in these areas will be temporary and are likely to be completed outside of the over-wintering bird season. Any potential impacts associated with works within the MAD for Whooper Swan will be small scale and temporary and of low magnitude. Therefore, Whooper Swan associated with the Middle Shannon Callows SPA are excluded from potential adverse effects from the proposed decommissioning and rehabilitation works.

Wigeon (*Anas penelope*) [A050]

The latest Article 12 reporting data available from NPWS in respect of Wigeon relates to the period 2006-2011. The wintering population size for this period, based on a five-year mean was 56,350 of which 43,746 occurred within the SPA network. Trends, both short term (1999-2011) and long-term (1987-2011) were all negative and decreasing. The main pressures and threats comprise *outdoor sports and leisure activities, recreational activities*, *renewable abiotic energy use*, *marine and freshwater aquaculture*, *hunting and collection of wild animals* (terrestrial), *pollution to surface waters*, *marine water pollution*, *other forms of pollution, invasive non-native species*, *human induced changes in hydraulic conditions* and *other ecosystem modifications*.

Results of the Irish Wetland Bird Survey (IWeBS) for the winter period 2009/10 – 2015/16 report a population size (ROI) of 50,452 individuals of which 38,514 were associated with the SPA network, and describes long term

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

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

[19] 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.

declines in the wintering population of Wigeon in Ireland. The peak count in the period 2011-15 for the Shannon Callows was 1,351; whilst for the River Suck in the same period, the peak count was 3385.

No species-specific guidance is available with which to establish connectivity distances to SPA's, however, a foraging distance of up to 16km is stated in Cramp 1977-1993. Wigeon are almost entirely vegetarian feeding on mainly leaves, stems, stolons, bulbils and rhizomes of plants. Small numbers of Wigeon were identified using the ephemeral wetland habitats at Blackwater Bog, during the winter of 2021 and 2022 (See **Appendix J**).Wigeon were not identified foraging within the ephemeral wetland areas, silt ponds or general environs of the **Blackwater Bog** during the April 2022 site walkover survey. Suitable foraging and roosting habitat occurs within the ephemeral wetland habitats and silt ponds at Blackwater Bog and in those areas located west and north-west of **Blackwater Bog** along the River Shannon floodplain areas and contributory watercourses. In line with a precautionary approach, potential connectivity to this SCI of the Middle Shannon Callows is assumed.

Golden Plover (*Pluvialis apricaria*) [A140]

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

Results of the Irish Wetland Bird Survey (IWeBS) for the winter period 2009/10 – 2015/16 report a population size (ROI) of 80,707 individuals of which 63,123 were associated with the SPA network, and describes long terms declines in the wintering population of Golden Plover in Ireland, possibly due to short-stopping. The peak count in the period 2011-15 for the Shannon Callows was 7,610; no count data has been published for the River Suck in the same period – however a peak of 600 is noted for the River Suck for the period 1994/95 – 2000/01 (Crowe, 2005).

Golden Plover feed on a variety of soil and surface-living invertebrates, principally beetles and earthworms, but also plant material such as berries, seeds and grasses, and in winter are known to be attracted to mown grass or close-grazed pastures, stubbles, fallows, harvest-fields and other farmlands of open character, including flood lands (Cramp 1977-1993). Golden Plover will utilise cutaway bog for diurnal roosting. Suitable habitat is available for this species along the River Shannon adjacent to **Blackwater Bog** (foraging and roosting), and within the bog boundary (for roosting only). Golden Plover were not identified at **Blackwater Bo**g during the April 2022 site walkover survey, nor during the over-wintering bird survey counts held in 2021 and 2022.

No species-specific guidance is available with which to establish connectivity distances to wintering bird-based SPA's, however, a foraging range of up to 11km is cited in respect of breeding season foraging, and it is also known that cold weather can result in movements of Golden Plover during the winter. In line with a precautionary approach potential connectivity is assumed between **Blackwater Bog** and the SPA's identified for which this species is a Special Conservation Interest or SCI; i.e. Middle Shannon Callows SPA and the River Suck Callows SPA.

Lapwing (*Vanellus vanellus*) [A142]

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

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

Results of the Irish Wetland Bird Survey (IWeBS) for the winter period 2009/10 – 2015/16 report a population size (ROI) of 69,823 individuals of which 48,232 were associated with the SPA network, and describes long term declines in the wintering population of Lapwing in Ireland. The peak count in the period 2011-15 for the Shannon Callows was 7,672; for the River Suck in the same period – a peak of 1400 is noted however the Suck is classified as no longer supporting numbers of National Importance.

Lapwing feed on chiefly small invertebrates, which live on or in the ground. During the winter, they utilise habitats such as arable fields and pastures in addition to coastal and estuarine habitats. Suitable over-wintering habitat is available for this species along the River Shannon and its associated floodplain adjacent to **Blackwater Bog**. In addition, the expansive ephemeral wetland areas within Blackwater Bog support suitable breeding habitat for Lapwing (exposed bare ground surrounded and adjoined by ephemeral water) and Lapwing were identified within the Blackwater site during the April 2022 walkover survey. No species-specific guidance is available with which to establish connectivity distances to wintering bird-based SPA's, however, it is also known that cold weather can result in movements of Lapwing during the winter. In line with a precautionary approach potential connectivity is assumed between **Blackwater Bog** and the SPA's identified for which this species is a Special Conservation Interest or SCI; i.e. Middle Shannon Callows SPA and the River Suck Callows SPA.

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

The latest Article 12 reporting data available from NPWS in respect of Black-tailed Godwit relates to the period 2006-2011. The wintering population size for this period, based on a five-year mean was 18,080 individuals of which 16,752 occurred within the SPA network. Trends in the short term (1999-2011) and long-term (1987-2011) were positive in quality and increasing. The main pressures and threats comprise marine and freshwater aquaculture, *renewable abiotic energy use*, *fishing and harvesting aquatic resources*, *modification of cultivation practices*, *outdoor sports and leisure activities, recreational activities*, *human induced changes in hydraulic conditions* and *marine water pollution*.

Results of the Irish Wetland Bird Survey (IWeBS) for the winter period 2009/10 – 2015/16 report a population size (ROI) of 17,862 individuals of which 16,575 were associated with the SPA network, and describes a sustained population increase and range expansion over the last century in Ireland. The peak count in the period 2011-15 for the Shannon Callows was 220; no count data has been published for the River Suck in the same period – however a peak of 2 is noted for the River Suck for the period 1994/95 – 2000/01 (Crowe, 2005). The Site Synopses for the River Suck SPA cites a figure of 24 as recorded within said SPA. Black-tailed Godwit were not observed using the Blackwater Bog site during the January 2022 walkover survey.

In Ireland, Black-tailed Godwits are known to undertake movements during the winter between sites to feed on freshwater grassland, for example the Blackwater Callows, which is 25km inland from surrounding SPA's such as at Cork Harbour, Ballymacoda and Dungarvan has supported birds which also utilised the aforementioned nearby coastal complexes[20]. The proposed decommissioning and rehabilitation works are not located within the Minimum Approach Distance (MAD) for suitable Black-tailed Godwit foraging habitat (42m) within areas of river floodplain, west and north-west of Blackwater Bog. Any potential impacts associated with works within the MAD for Black-tailed Godwit will be small scale and temporary and of low magnitude. Black-tailed Godwit were not identified within Blackwater Bog during the over-wintering bird surveys completed in

[20] 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

2021 and 2022. Therefore, Black-tailed Godwit associated with the Middle Shannon Callows SPA are excluded from potential adverse effects from the proposed decommissioning and rehabilitation works.

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

Black-headed Gull is a SCI species for the middle Shannon Callows SPA in respect of wintering birds. The latest Article 12 reporting data available from NPWS in respect of Black-headed Gull relates to the period 2006-2011. The wintering population size for this period, based on a five-year mean was 50181 individuals of which 39252 occurred within the SPA network. Trends in the short term (1999-2011) and long-term (1987-2011) were unknown. The main pressures and threats comprise marine and freshwater aquaculture, *Marine water pollution*, *fishing and harvesting aquatic resources*, *renewable abiotic energy use*, and *other ecosystem modifications*. The North& West European Population is thought to be stable or declining (Wetlands International, 2018).

Results of the Irish Wetland Bird Survey (IWeBS) for the winter period 2009/10 – 2015/16 are limited in respect of this species insofar as counting of Black-headed Gulls is optional, and no recent counts are available for the Middle Shannon Callows or the River Suck. Crowe,2015 describes a peak count of 1284 for the Shannon Callows in the period 1994/95 – 2000/01; for the same period the peak count for the River Suck is 240.

Habitats utilised by this species during the winter months include inland, moist grasslands, where food such as insects and earthworms can be collected. Suitable habitat is present west of Blackwater Bog in the form of grazed, callows grassland.

No species-specific guidance is available with which to establish connectivity distances to wintering bird-based SPA's, however, the species has been described as developing seasonal patterns of movements between foraging areas and secure roosts 'many km' distant; and recorded travelling up to 25-30km to a nocturnal, wintertime, roost (Cramp 1977-1993). On this basis, and in line with the natural connectivity via a hydrological corridor, it is considered that's individuals which may occur at **Blackwater Bog** or its environs cannot reasonably be excluded from occurrence within the Middle Shannon Callows SPA. In line with a precautionary approach potential connectivity is assumed between **Blackwater Bog** and the SPA's identified for which this species is a Special Conservation Interest or SCI; i.e. Middle Shannon Callows SPA.

Wetland and Waterbirds [A999]

The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the wetland area contained in the SPA and the waterbirds that utilize this resource are of Special Conservation Interest for 'Wetland & Waterbirds'. In addition to the Special Conservation Interests described above, the Site Synopsis for the Middle Shannon Callows SPA describes a wide range of species as utilizing the site, including Mute Swan, Teal, Tufted Duck, Dunlin, Curlew and Redshank. The callow grasslands present in the SPA provide optimum feeding grounds for these various species of waterfowl, while many of the birds also roost or rest within the (European) site. Other wetland bird species, such as Snipe, Kingfisher, Moorhen, Shoveler and Grey Heron utilise or are likely to utilise the **Blackwater Bog** site, particularly, drainage channels, silt ponds, watercourses and large ephemeral wetland areas.

Wetland habitats do occur outside of the peat extraction areas and adjacent to the River Shannon, and as they occur within the Middle Shannon Callows SPA (also designated for wetland and waterbirds), are assumed to be attractive to a similar assemblage of waterbirds. Mute Swan, Teal, and Curlew are also described in the Site Synopsis for the Middle Shannon Callows SPA for example.

It is assumed that due to connectivity from the individual species described above, potential connectivity between **Blackwater Bog** and the Middle Shannon Callows exists in respect of the 'waterbirds' element of this SCI.

3.1.1.3 Fin Lough SAC (Site Code: 000576)

The site-specific conservation objectives for Fin Lough SAC aim to define favourable conservation condition for the particular habitat or species at that site. These objectives and conditions are considered in **Table 14** below in respect of the Qualifying Interests of Fin Lough SAC which were screened in for further evaluation. Further consideration is provided in **Table 14** to each Qualifying Interest and the potential for the proposed project to support connectivity and potentially impact this feature of Qualifying Interest.

The conservation objectives of Fin Lough (Offaly) SAC are available in full on the National Parks & Wildlife Service website at https://www.npws.ie/protected-sites.

The conservation objectives reproduced in the table below were sourced from NPWS (2019) Conservation Objectives: Fin Lough (Offaly) SAC 000576. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht and should be read in conjunction with any other supporting documentation on the referenced website as provided above.

Table 14: Conservation Objectives of the Fin Lough (Offaly) SAC (Site Code 000576)

Code and Qualifying Interest	Current Article 17 Reporting Status (2019[21])	Conservation Objective	Potential Connectivity Source-Pathway-Receptor Link
1013 Geyer's Whorl Snail *Vertigo geyeri*	Overall trend in conservation status deteriorating.	To maintain the favourable conservation condition of Geyer's Whorl Snail in Fin Lough (Offaly) SAC	Due to proximity and the presence of potential hydrological and hydrogeological connectivity between proposed activities and this European Site, possible pathways for effects are identified.
7230 Alkaline fens	Overall trend in conservation status deteriorating.	To maintain the favourable conservation condition of Alkaline fens in Fin Lough (Offaly) SAC.	

3.1.1.4 River Suck Callows SPA (Site Code: 004097)

The River Suck Callows SPA is designated in respect of wintering:

- Whooper Swan (*Cygnus cygnus*) [A038]
- Wigeon (*Anas penelope*) [A050]
- Golden Plover (*Pluvialis apricaria*) [A140]
- Lapwing (*Vanellus vanellus*) [A142]
- Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395]
- Wetland and Waterbirds [A999]

[21] 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

Whooper Swan, Wigeon, Golden Plover and Lapwing have already been described. As Blackwater Bog supports remote hydrological connectivity (via the river floodplain) to the River Suck Callows SPA, connectivity between proposed activities and the River Suck SPA in respect of these SCI species is assumed.

The conservation objectives of River Suck Callows SPA are available in full on the National Parks & Wildlife Service website at https://www.npws.ie/protected-sites .

The conservation objectives reproduced in the table below were sourced from NPWS (2021) Conservation objectives for River Suck Callows SPA [004097]. Generic Version 8.0. Department of Housing, Local Government and Heritage and should be read in conjunction with any other supporting documentation on the referenced website as provided above.

Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395]

The River Suck Callows SPA is an important site for wintering waterfowl. Of particular note is the nationally important Greenland White-fronted Goose flock (293 – five year mean peak for the period 1994/95 to 1998/99) which congregates mainly in the middle reaches of the river (from Site Synopses).

The latest Article 12 reporting data available from NPWS in respect of (wintering) Greenland White-fronted Geese relates to the period 2012. The wintering population size for this period, based on a complete count was 12173 individuals of which up to 12,140 occurred within the SPA network.

Trends in the short term (1999-2011) are considered to be negative and decreasing; in the long-term (1987-2011) numbers in 2012 represented an increase on those present in 1983. The main pressures and threats are; *changes in biotic conditions*, *modification of cultivation practices*, *annual and perennial non-timber crops*, *renewable abiotic energy use*, *utility and service lines*, *improved access to site*, *marine and freshwater aquaculture*, *Outdoor sports and leisure activities*, *recreational activities*, *hunting and collection of wild animals (terrestrial)*, *Marine water pollution*, *grazing*, *agriculture activities not referred to above*, *forest planting on open ground*, *interspecific faunal relations*, *changes in abiotic conditions* and *other forms of pollution*.

Results of the Irish Wetland Bird Survey (IWeBS) for the winter period 2009/10 – 2015/16 report a current (winter 2017/18) population size (ROI) of 9,500 individuals of which 9,346-9,428 were associated with the SPA network. The report describes acute declines in numbers both nationally and internationally since 1999. The overall population decline in recent years has been attributed to chronic low breeding productivity, which has been particularly evident in the Irish Flocks (Fox et al., 2018, cited in Lewis et al., 2019). IWeBS counts for the period 2009/10-2015/16 recorded Geese at 33 sites included the River Suck which was surveyed aerially, however the mean peak for the River Suck across the period was below the threshold for significance at a National Level (100).

In the winter period 2018/19, the Spring population census (2019) recorded 7,436 birds wintering in Wexford and 1,899 in the rest of Ireland, total 9,335[22]. Numbers at the River Suck on this census were relatively unchanged (109 birds recorded). Lough Croan and Four Roads Turlough are the two main sites for the River Suck flock (around 130+ were present over the winter period 2019/20 – BWI, Personal communication to Bord na Móna). However, it is considered that movements up and down the Suck or to locations in closer proximity to Blackwater Bog cannot be excluded. A record exists of 58 birds in the townland of Dalysgrove, located ca 25km north-west of Blackwater Bog[23].

Greenland White-fronted Geese are traditionally associated with peatlands, mires and raised bogs during the winter months, where favored food items such as Common Cotton Grass *Eriophorum angustifolium*, White beaked sedge *Rhynchospora alba* occur (Fox & Stroud, 2002). In Ireland, birds use both raised bogs and river flood plains or 'callows', where most feeding occurs on grasslands. Habitat loss and disturbance pressure are

[22] Fox, T., Francis, I., Norriss, D., Walsh, A. (2019). Report of the 2018/2019 International Census of Greenland White-fronted Geese. Greenland White-Fronted Goose Study and National Parks and Wildlife Service. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Wexford Wildfowl Reserve, North Slob, Wexford, Ireland.

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

seen as restricting the range of flocks. Birds roost at night on bogs, flooded areas or near lakes, typically up to 100m from water, and occasionally roost in open fields. Feeding can take place at night. However, surveys and usage trends of Greenland White-fronted Goose flocks between Athlone to Shannonbridge and Ballinasloe to Shannonbridge over the past twenty-five years have noted the abandonment of the callows and the adjoining raised bog areas as regular feeding and foraging habitats. This is due to ongoing peat harvesting and turbary which removed important feeding and refuge sites between Athlone and Shannonbridge; flooding and development between Ballinasloe and Shannonbridge as well as various sources of disturbance in and near the callows area. At present, potential usage of the Blackwater site and its environs by Greenland White-fronted Geese results from overflying birds or temporary staging during seasonal migration.

In terms of establishing connectivity, SNH recommends that usage of suitable foraging habitats may occur up to 8km from known roosts. The River Suck Callows SPA are located 1.3km west of the Blackwater Bog site at its closest point. Therefore, Greenland White-fronted Geese flocks associated with the River Suck Callows SPA are within the core foraging range of Blackwater Bog. However, due to the absence of optimal roosting and foraging habitat within Blackwater Bog, Greenland White-fronted Geese are unlikely to utilise the bog with any regularity, with the exception of overflying birds of temporary staging.

Wetland and Waterbirds [A999]

The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the wetland area contained in the SPA and the waterbirds that utilize this resource are of special conservation interest for 'Wetland & Waterbirds'. In addition to the Special Conservation Interests described above, the Site Synopsis for the River Suck Callows SPA describes a wide range of species as utilizing the site, including Mute Swan, Teal, Mallard, Black-tailed Godwit, Curlew and Black-headed Gull.

It is assumed that due to connectivity from the individual species described above, connectivity exists between wetlands present in or near Blackwater Bog in respect of 'Wetland and Waterbirds' as an SCI. However birds associated with the River Suck Callows SPA are unlikely to utilise the peatland or adjacent habitats associated with Blackwater Bog with any regularity, with the exception of overflying birds of temporary staging.

3.1.1.5 Mongan Bog SPA (Site Code: 004017)

The generic conservation objectives of Mongan Bog SPA are available in full on the National Parks & Wildlife Service website at https://npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004017.pdf. The Generic Conservation Objective for Mongan Bog SPA is as follows: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

- Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395]

The site synopsis for Mongan Bog SPA describes recent and ongoing usage of the site by Greenland White-fronted Goose as follows:

> *"Mongan Bog is one of the raised bogs that was traditionally used as a feeding/roosting site by small numbers of the River Suck population of Greenland White-fronted Goose. These birds utilise the callows near the mouth of the Suck to Shannonbridge and as far as Clonmacnoise. The numbers of Greenland White-fronted Goose using this part of the range was always small (peak count of 26 in 1984/85) and geese have not been recorded using the site in recent years - the last record was 11 individuals in 1989/90"*[24].

The suitability of the proposed decommissioning site and trends for Greenland White-fronted Geese within the Middle Shannon Callows SPA and River Suck Callows SPA has been described in **Section 3.1.1.2** and **Section 3.1.1.4** above. The proposed rehabilitation works footprint at Blackwater Bog are located >1km south of Mongan Bog SPA; i.e. within the core foraging range (8km) for Greenland White-fronted Geese. Although, the vast cutover bog habitats and adjoining marginal habitats are unsuitable to sustain ongoing foraging or roosting

[24] https://npws.ie/sites/default/files/protected-sites/synopsis/SY004017.pdf

of Greenland White-fronted Goose flocks, they may interact with the proposed rehabilitation site via overflying or temporary staging during migration. In addition, the extensive wetland habitats may also provide suitable habitat for these species. Such interactions are unlikely to be frequent, if any and will not result in impacts of such magnitude that would contribute significant negative effects to the Greenland White-fronted Goose population of Mongan Bog SPA. Therefore, Greenland White-fronted Geese associated with Mongan Bog SPA are excluded from potential adverse effects from the proposed decommissioning and rehabilitation works.

3.1.1.6 Site Specific Conservation Objectives for SPA sites within the Project Zone of Influence

Site Specific Conservation Objectives (SSCOs) have not been published for the Middle Shannon Callows SPA (Site Code: 004096), River Suck Callows SPA (Site Code 004097) and Mongan Bog SPA (004017). To that end, the SSCOs published for the River Shannon and River Fergus Estuaries SPA, Lough Swilly SPA and Castlemaine Harbour SPA are presented in **Table 15** by proxy.

Table 15: Special Conservation Interest Species for the River Shannon and River Fergus Estuaries SPA (004077)

Attribute	Measure	Target	Potential Connectivity Source-Pathway-Receptor Link and Impacts
A038 Whooper Swan (*Cygnus cygnus*)			
Population trend	Percentage change	Long term population trend	The nature and scale of the proposed works and associated potential impacts (ex-situ disturbance effects, localised deterioration in water quality) are such that they will not impact the long term population trend for this species for SPAs within the project Zone of Influence.
Distribution	Range, timing and intensity of use of areas	There should be no significant decrease in the range, timing or intensity of use of areas by whooper swan other than that occurring from natural patterns of variation	Suitable habitat for this species occurs outside of the proposed works footprint and usage of nearby or adjacent areas cannot be precluded. Small numbers of Whooper Swan were identified within the ephemeral wetland habitats at Blackwater Bog, using these areas for opportunistic, occasional feeding purposes. Potential works within the proposed rehabilitation site and could lead to temporary, localised disturbance effects to this SCI species. However, such disturbance effects should not contribute toward significant decreases in the range, timing or intensity of use of key feeding, foraging and roosting habitat by this species. Further consideration of disturbance effects to SCI species are provided below.
A050 Wigeon (*Anas penelope*)			
Population trend	Percentage change	Long term population trend	The nature and scale of the proposed works and associated potential impacts (ex-situ disturbance effects, localised deterioration in water quality) are such that they will not impact the long term population trend for this species for SPAs within the project Zone of Influence.

Attribute	Measure	Target	Potential Connectivity Source-Pathway-Receptor Link and Impacts
Distribution	Range, timing and intensity of use of areas	There should be no significant decrease in the range, timing or intensity of use of areas by wigeon other than that occurring from natural patterns of variation	Suitable habitat for this species occurs within the margins of the proposed rehabilitation site, primarily the site's silt ponds. The usage of nearby or adjacent areas also cannot be precluded. Wigeon were identified within the ephemeral wetland habitats at Blackwater Bog, using these areas for opportunistic, occasional feeding purposes.. Potential works within the proposed rehabilitation site and could lead to temporary, localised disturbance effects to this SCI species. However, such disturbance effects should not contribute toward significant decreases in the range, timing or intensity of use of key feeding, foraging and roosting habitat by this species. Further consideration of disturbance effects to SCI species are provided below.
A122 Corncrake (*Crex crex*)			
Site specific Conservation Objectives have not been published for Corncrake for the Middle Shannon Callows SPA or the other European Sites for which this is a Special Conservation Interest species.			
A140 Golden Plover (*Pluvialis apricaria*)			
Population trend	Percentage change	Long term population trend	The nature and scale of the proposed works and associated potential impacts (ex-situ disturbance effects, localised deterioration in water quality) are such that they will not impact the long term population trend for this species for SPAs within the project Zone of Influence.
Distribution	Range, timing and intensity of use of areas	There should be no significant decrease in the range, timing or intensity of use of areas by golden plover other than that occurring from	Suitable habitat for this species occurs within the open expansive cutover bog areas. Roosting birds which might utilise cutaway peat are excluded as sufficient displacement habitat is available - significant disturbance effects are unlikely. Potential

Attribute	Measure	Target	Potential Connectivity Source-Pathway-Receptor Link and Impacts
		natural patterns of variation	disturbance effects to Golden Plover as a result of the proposed works are unlikely to be significant due to the availability of sufficient and widespread displacement habitat within the Blackwater Bog site and surrounding environs.
(A142) Lapwing (*Vanellus vanellus*)			
Population trend	Percentage change	Long term population trend stable or increasing	The nature and scale of the proposed works and associated potential impacts (ex-situ disturbance effects, localised deterioration in water quality) are such that they will not impact the long term population trend for this species for SPAs within the project Zone of Influence.
Distribution	Range, timing and intensity of use of areas	There should be no significant decrease in the range, timing or intensity of use of areas by lapwing other than that occurring from natural patterns of variation	Lapwing were identified within the ephemeral wetland habitat located near the northern half of the site during the site walkover survey. Potential works within the proposed rehabilitation site and could lead to temporary, localised disturbance effects to this SCI species. However, such disturbance effects should not contribute toward significant decreases in the range, timing or intensity of use of key feeding, foraging and roosting habitat by Lapwing.
(A179) Black-headed Gull (*Chroicocephalus ridibundus*)			
Population trend	Percentage change	Long term population trend in	The nature and scale of the proposed works and associated potential impacts (ex-situ disturbance effects, localised deterioration in water quality) are such that they will not impact the long term population trend for this species for SPAs within the project Zone of Influence.
Distribution	Range, timing and intensity of use of areas	There should be no significant decrease in the range, timing	Black-headed Gull were identified overflying the proposed rehabilitation site. Potential works within the

Attribute	Measure	Target	Potential Connectivity Source-Pathway-Receptor Link and Impacts
		or intensity of use of areas by black-headed gull other than that occurring from natural patterns of variation	proposed rehabilitation site and could lead to temporary, localised disturbance effects to this SCI species. However, such disturbance effects should not contribute toward significant decreases in the range, timing or intensity of use of key feeding, foraging and roosting habitat by this species. Further consideration of disturbance effects to SCI species are provided below.
(A395) Greenland White-fronted Goose (*Anser albifrons flavirostris*)[25]			
Population trend	Percentage change	Long term population trend	The nature and scale of the proposed works and associated potential impacts (ex-situ disturbance effects, localised deterioration in water quality) are such that they will not impact the long term population trend for this species for SPAs within the project Zone of Influence.
Distribution	Number and range of areas used by waterbirds	No significant decrease in the numbers or range of areas used by waterbird species, other than that occurring from natural patterns of variation	Suitable habitat for this species occurs outside of the proposed works footprint and usage of nearby or adjacent areas cannot be precluded. Potential works within the proposed rehabilitation site and could lead to temporary, localised disturbance effects to this SCI species. However, such disturbance effects should not contribute toward significant decreases in the range, timing or intensity of use of key feeding, foraging and roosting habitat by this species. Further consideration of disturbance effects to SCI species are provided below.

[25] Attributes, measures and targets for Greenland White-fronted Goose sourced from the Conservation Objectives Supporting Document for Lough Swilly SPA 004075 https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004075.pdf

Attribute	Measure	Target	Potential Connectivity Source-Pathway-Receptor Link and Impacts
(A053) Mallard (*Anas platyrhynchos*)[26]			
Population trend	Percentage change	Long term population trend stable or increasing	The nature and scale of the proposed works and associated potential impacts (ex-situ disturbance effects, localised deterioration in water quality) are such that they will not impact the long term population trend for this species for SPAs within the project Zone of Influence.
Distribution	Number and range of areas used by waterbirds	No significant decrease in the numbers or range of areas used by waterbird species, other than that occurring from natural patterns of variation	Potential works within the proposed rehabilitation site and could lead to temporary, localised disturbance effects to this SCI species, particularly within the silt pond sites along the site margins. However, such disturbance effects should not contribute toward significant decreases in the range, timing or intensity of use of key feeding, foraging and roosting habitat by this species. Further consideration of disturbance effects to SCI species are provided below. Further consideration of disturbance effects to SCI species are provided below.
(A052) Teal (*Anas crecca*)			
Population trend	Percentage change	Long term population trend stable or increasing	The nature and scale of the proposed works and associated potential impacts (ex-situ disturbance effects, localised deterioration in water quality) are such that they will not impact the long term population trend for this species for SPAs within the project Zone of Influence.
Distribution	Range, timing and intensity of use of areas	There should be no significant decrease in the range, timing	Potential works within the proposed rehabilitation site and could lead to temporary, localised disturbance effects

[26] Attributes, measures and targets for Mallard sourced from the Conservation Objectives Supporting Document for Castlemaine Harbour SPA 004029 https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004029.pdf

Attribute	Measure	Target	Potential Connectivity Source-Pathway-Receptor Link and Impacts
		or intensity of use of areas by teal other than that occurring from natural patterns of variation.	to this SCI species, particularly within the silt pond sites along the site margins. However, such disturbance effects should not contribute toward significant decreases in the range, timing or intensity of use of key feeding, foraging and roosting habitat by this species. Further consideration of disturbance effects to SCI species are provided below.
A056 Shoveler (*Anas clypeata*)			
Population trend	Percentage change	Long term population trend stable or increasing	The nature and scale of the proposed works and associated potential impacts (ex-situ disturbance effects, localised deterioration in water quality) are such that they will not impact the long term population trend for this species for SPAs within the project Zone of Influence.
Distribution	Range, timing and intensity of use of areas	There should be no significant decrease in the range, timing or intensity of use of areas by shoveler other than that occurring from natural patterns of variation.	Potential works within the proposed rehabilitation site and could lead to temporary, localised disturbance effects to this SCI species. However, such disturbance effects should not contribute toward significant decreases in the range, timing or intensity of use of key feeding, foraging and roosting habitat by this species. Further consideration of disturbance effects to SCI species are provided below.
A125 Coot (*Fulica atra*)[27]			
Population trend	Percentage change	Long term population trend stable or increasing	The nature and scale of the proposed works and associated potential impacts (ex-situ disturbance effects, localised deterioration in water quality) are such that they will not impact the long term

[27] Attributes, measures and targets for Coot sourced from the Conservation Objectives Supporting Document for Lough Swilly SPA 004075 https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004075.pdf

Attribute	Measure	Target	Potential Connectivity Source-Pathway-Receptor Link and Impacts
			population trend for this species for SPAs within the project Zone of Influence.
Distribution	Number and range of areas used by waterbirds	No significant decrease in the numbers or range of areas used by waterbird species, other than that occurring from natural patterns of variation As determined by regular low tide and other waterbird surveys.	Potential works within the proposed rehabilitation site and could lead to temporary, localised disturbance effects to this SCI species, particularly within the silt pond sites along the site margins.. However, such disturbance effects should not contribute toward significant decreases in the range, timing or intensity of use of key feeding, foraging and roosting habitat by this species. Further consideration of disturbance effects to SCI species are provided below.

3.1.2 Threats and Pressures of European Sites

Threats and pressures published for the screened in European Sites are presented in **Table 16** to **Table 20** below.

Table 16 – Threats and Pressures for River Shannon Callows SAC (000216)

Rank[28]	Threat Pressure[29]	Inside (i) / Outside (o) / Both (b)
L	G01 - Outdoor sports and leisure activities, recreational activities	i
M	J02.11 - Siltation rate changes, dumping, depositing of dredged deposits	i
M	J02.05.02 - Modifying structures of inland water courses	i
L	F03.01 - Hunting	b
M	A04.01 - Intensive grazing	i
L	C01.03.02 - Mechanical removal of peat	i
L	J02.01 - Landfill, land reclamation and drying out, general	i
H	A03.03 - Abandonment / lack of mowing	i
L	G05.01 - Trampling, overuse,	i
M	B02.02 - Forestry clearance	i
L	D01.01 - Paths, tracks, cycling tracks	i
M	K03.04 - Predation	b
H	A04.03 - Abandonment of pastoral systems, lack of grazing	i
H	A07 - Use of biocides, hormones and chemicals	i
L	A04.02.05 - Non intensive mixed animal grazing	i
L	A10.01 - Removal of hedges and copses or scrub	i
L	J02.05 - Modification of hydrographic functioning, general	i
H	J02.04.01- Flooding	i
M	A08 - Fertilisation	i
L	B06 - Grazing in forests/ woodland	i

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

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

Table 17 – Threats and Pressures for Middle Shannon Callows SPA (004096)

Rank	Threat / Pressure	Inside (i) / Outside (o) / Both (b)
L	A04.03 - Abandonment of pastoral systems, lack of grazing	i
H	E01 - Urbanised areas, human habitation	o
H	G01.01 - Outdoor sports and leisure activities, recreational activities	i
L	F03.01 - Hunting	i
M	G01.02 - Walking, horseriding and non-motorised vehicles	i
H	D01.05 - Bridge, viaduct	i
M	A08 - Fertilisation	o
H	A04 - Grazing	i
L	A08 - Fertilisation	i
M	F02.03 - Leisure fishing	i
L	D01.01 - Paths, tracks, cycling tracks	i

Table 18 – Threats and Pressures for Fin Lough SAC (000576)

Rank	Threat / Pressure	Inside (i) / Outside (o) / Both (b)
L	F03.01 - Hunting	i
H	A04.03 - Abandonment of pastoral systems, lack of grazing	i
L	E03.01 - Disposal of household / recreational facility waste	i
L	E03.03 - Disposal of inert materials	i
H	K01.02 - Silting up	i
H	K02 - Biocenotic evolution, succession	i
H	K01.03 - Drying out	i
H	J01.01 - Burning down	i
M	J02.10 - Management of aquatic and bank vegetation for drainage purposes	i

Table 19 – Threats and Pressures for River Suck Callows SPA (004097)

Rank	Threat / Pressure	Inside (i) / Outside (o) / Both (b)
H	A04 - Grazing	o
L	F03.01 - Hunting	i
M	A03 - Mowing / cutting of grassland	i
H	A08 - Fertilisation	o
M	A04 - Grazing	i
M	G01.01 - Outdoor sports and leisure activities, recreational activities	i
L	F02.03 - Leisure fishing	i
M	A08 - Fertilisation	i
L	B - Sylviculture, forestry	o
M	E01.03 - Dispersed habitation	o

Table 20 – Threats and Pressures for Mongan Bog SPA (004017)

Rank	Threat / Pressure	Inside (i) / Outside (o) / Both (b)
L	D05 - Improved access to site	i
M	C01.01 - Sand and gravel extraction	o
L	C01.03 - Peat extraction	i
L	A04 - Grazing	i
M	A04 - Grazing	o
M	C01.03 - Peat extraction	o

3.1.3 Conservation Objectives for the relevant European Sites

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

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

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

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

European Site	Qualifying Interest/Special Conservation Interest for evaluation at Stage 2	Impact examined at Stage 2
River Shannon Callows SAC (Site Code 000216)	[1355] Otter (*Lutra lutra*) [6410] *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) [6510] Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*) [8240] Limestone pavements* [91E0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae)*	a) Indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SAC Indirect loss or degradation of terrestrial or aquatic habitats within the SAC b) Indirect or ex-situ disturbance or displacement of species of Qualifying Interests c) Possibility for indirect or ex-situ mortality to species of Qualifying Interests

European Site	Qualifying Interest/Special Conservation Interest for evaluation at Stage 2	Impact examined at Stage 2
Middle Shannon Callows SPA (004096)	Whooper Swan (*Cygnus cygnus*) [A038] Wigeon (*Anas penelope*) [A050] Golden Plover (*Pluvialis apricaria*) [A140] Lapwing (*Vanellus vanellus*) [A142] Black-tailed Godwit (*Limosa limosa*) [A156] Black-headed Gull (*Chroicocephalus ridibundus*) [A179] Wetland and Waterbirds [A999]	a) Indirect loss, reduction or degradation of terrestrial or aquatic habitats within or in close proximity to the SPA site; b) Indirect or Ex-Situ disturbance or displacement of bird species of Special Conservation Interest.
Mongan Bog SPA (004017)	Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395]	c) Indirect or Ex-Situ disturbance or displacement of bird species of Special Conservation Interest.
River Suck Callows SPA (004097)	Whooper Swan (*Cygnus cygnus*) [A038] Wigeon (*Anas penelope*) [A050] Golden Plover (*Pluvialis apricaria*) [A140] Lapwing (*Vanellus vanellus*) [A142] Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395] Wetland and Waterbirds [A999]	b) Indirect loss, reduction or degradation of terrestrial or aquatic habitats within or in close proximity to the SPA site. c) Indirect or Ex-Situ disturbance or displacement of bird species of Special Conservation Interest.
Fin Lough SAC (Site Code: 000576)	Geyer's Whorl Snail (*Vertigo geyeri*) [1013] Alkaline fens [7230]	a) Direct loss, reduction or degradation of terrestrial or aquatic habitats b) Indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SAC Indirect loss or degradation of terrestrial or aquatic habitats within the SAC

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

Evaluations are generally grouped between those which impact habitats (direct or indirect based on where secondary habitat degradation potentially occurs, i.e. within a European Site boundary or outside) and then species (disturbance/displacement or mortality). Mortality is only considered relevant in respect of Otter as

bird species can evade contact with operating machinery. Disturbance or displacement to the key avian receptors which comprise SCI's and form part of the 'Wetland and Waterbirds' SCI is dealt with collectively. Potentially adverse impacts on wetlands as part of 'Wetlands and Waterbirds' are addressed under the treatment of indirect loss, reduction or degradation of terrestrial or aquatic habitats. Potentially adverse secondary effects on waterbirds as part of 'Wetlands and waterbirds' are evaluated under 'Indirect or Ex-Situ disturbance or displacement of bird species of Special Conservation Interest.'

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

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

3.3.1 Direct effects to Qualifying Interest habitats or species of an SAC Site (i.e. species mortality, habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC

3.3.1.1 Alone or In Combination

Pathways for direct effects to habitats with a European Site, occur in the context of the River Shannon Callows SAC and Fin Lough (Offaly) SAC - SACs that adjoin or partially overlap the boundary of Blackwater Bog. However decommissioning and rehabilitation works are not required within the footprint of the River Shannon Callows SAC and Fin Lough (Offaly) SAC. The River Shannon Callows SAC adjoin the western boundary of the Blackwater Bog site, while Fin Lough intersects the northern boundary of the Blackwater Bog Site. As there will be no rehabilitation works within these areas, there will be no direct effects to these SACs of their features of Qualifying Interest.

No land use change is proposed for habitats within SAC boundaries, with the only activities to overlap a SAC, being Fin Lough (Offaly) SAC comprising site access and personnel / machinery movement. Silt ponds can be accessed from existing cutaway bog or previously used tracks. Direct effects on habitats within the SAC are evaluated as negligible in magnitude, reversible and unlikely to impact on Conservation Objectives. It should be noted, that the proposed rehabilitation works will enhance suitable foraging conditions and refugia for otter (a QI species of this SAC) as the measures establish.

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

3.3.1.2 Stage 2 Evaluation

Adverse direct effects on the integrity of the SAC/Conservation Objectives (alone or in combination) will not occur.

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

3.3.2.1 Alone

Otter are rated as a very high sensitivity receptor (based on International importance ratings) and do not tolerate disturbance at or near holts (breeding dens) that are in active use (breeding may occur at any time of the year, but most likely during the Summer/early Autumn period). When Otters are not breeding, records suggest that Otters are less sensitive to human disturbance (Chanin, 2013). This could include the disturbance of animals at resting places (couches) but also at natal holts.

The site walkover surveys and mammal survey undertaken in April 2022 identified signs of otter usage (spraints and slides) at Blackwater Bog along the Blackwater (Shannonbridge)_020 watercourse (See **Figure 5**). The site's silt ponds and the Blackwater (Shannonbridge)_020 watercourse provide the greatest potential to support otter. The remaining areas of expansive cutover bog subject to decommissioning and rehabilitation are generally unsuitable to support otter foraging, commuting and breeding. The likelihood of otter disturbance and displacement during the proposed works are considered to be low and associated with any works practices nearby watercourses or silt ponds. Such works will take place on an occasional or temporary basis and disturbance effects as a result of the proposed works would be most likely to occur during daylight hours. Such disturbance effects are highly unlikely, however should they occur, they would be considered to be temporary and indirect. Such disturbance and displacement effects, should they occur, will not be adverse.

Were the impacts described above to occur within an SAC watercourse it may result in direct adverse effects on QI Species and Conservation objectives such as a decline in range and/or distribution and numbers of individuals within the SAC catchment.

In instances where this impact occurs outside or ex-situ the SAC it may, dependant on source magnitude, degree of hydrological connectivity and presence or absence of mitigating measures in line with tried and tested methods, have secondary adverse effects on connected or supporting populations for downstream but ecologically connected Otter.

3.3.2.2 In Combination

There is potential for cumulative effects from other plans or projects which may result in similar source-impact-pathways to Otter within other tributaries or within the River Suck/River Shannon complex.

The decommissioning and rehabilitation of Blackwater Bog by BnM, which is also within the River Shannon catchment, may result in likely significant/ potentially adverse effects on Otter; this project may temporally overlap works proposed for other BnM sites proposed for decommissioning, such as the nearby / adjacent Bunahinly-Kilgarvan and Bloomhill Bogs located to the north of the Blackwater Bog.

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

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

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

3.3.2.3 Stage 2 Evaluation

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

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

3.3.3.1 Alone

Otter are rated as a very high sensitivity receptor (based on International importance ratings) and may be sensitive to mortality through inadvertent collision with moving vehicles or machinery, in particular during

hours of darkness. There are no known Otter holts at Blackwater Bog, and the general unsuitability of areas subject to decommissioning and rehabilitation no doubt constrains their usage within this area, however Otter may utilise existing silt ponds or open areas of watercourses located upstream and downstream of the site and between the peatland basins. In addition, otter were confirmed along the Gowlan River Blackwater (Shannonbridge)_020 as it passes through Blackwater Bog.

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

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

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

3.3.3.2 In combination

There is potential for cumulative effects from other plans or projects which may result in similar source-impact-pathways to Otter within other tributaries or within the River Shannon Callows SPA.

The decommissioning and rehabilitation of Blackwater Bog by BnM, which is also in the River Shannon catchment, may result in likely significant/potentially adverse effects on Otter; this project may temporally overlap works proposed for other BnM sites proposed for decommissioning such as the nearby / adjacent Bunahinly-Kilgarvan and Bloomhill Bogs located to the north of the Blackwater Bog.

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

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

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

3.3.3.3 Stage 2 Evaluation

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

3.3.4 Indirect loss, reduction or degradation of aquatic habitats within the SAC and consequent effects to reliant aquatic species of Qualifying Interest

Aquatic habitats and species in this instance refers to the water dependent and nutrient sensitive habitats and species of Qualifying Interest for the River Shannon Callows SAC, Fin Lough (Offaly) SAC,; *Molinia* meadows (6410), Lowland hay meadows (6510), Alkaline Fens (7230), Alluvial forests (91E0), Active raised bogs (7110), Degraded raised bogs still capable of natural regeneration (7120), Depressions on peat substrates of the Rhynchosporion (7150) and Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) (6210).

The Blackwater Bog site may be accessed from the north via the R444 and an existing travel path south of this regional road, both of which are outside of European Site boundaries. These access and travel operations are located on existing built road infrastructure and will not present indirect impacts to the hydrological or hydrogeological regime of Mongan Bog SAC or Fin Lough SAC, through alteration or upgrades of existing drainage features in this area.

Deterioration in water quality within Blackwater Bog and the downstream watercourses as a result of the proposed works, could result following the release of sediment or silt laden water from the site to the receiving watercourses; i.e. Gowlan River (Blackwater (Shannonbridge)_020 watercourse and further downstream to the River Shannon main channel. Siltation of the receiving watercourses could effect the in-situ and / or reliant QI species for the River Shannon Callows SAC such as the QI habitats and species listed above. In addition, the proximity of the proposed works to another SAC site;, Fin Lough (Offaly) SAC could contribute indirect hydrological or hydrogeological impacts to this European Sites during or following the proposed rehabilitation and decommissioning works. However, BnM will no longer deepen existing internal drains to support peat extraction activities. The proposed blocking of the internal drainage system and the enhanced rehabilitation measures designed to rewet large areas of cutover peat within bog sites such as Blackwater Bog, could be assumed to sustain or secure the hydrological and hydrogeological conditions with the rehabilitation site, with the potential for knock on positive effects to nearby or interconnected groundwater dependent habitats and their associated species.

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

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

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

Alone

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

and loss of aquatic habitat quality. Such surfacewater impacts are not likely for Fin Lough (Offaly) SAC, as there no surface water vectors (rivers, streams, channels etc.) linking the proposed decommissioning and rehabilitation works with these European Sites. There is no surfacewater connectivity between the works and this SAC. Any potential runoff from the proposed rehabilitation works will enter the Gowlan River (Blackwater / Shannonbridge_020) that in turn will convey water downstream to the River Shannon main channel.

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

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

In combination

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

The decommissioning and rehabilitation of Blackwater Bog by BnM, may result in likely significant/potentially adverse effects on water quality to downstream European SAC; i.e. the River Shannon Callows SAC.

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

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

Stage 2 Evaluation

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

3.3.4.2 Alteration of flow regimes or changes to watercourse morphology

Alone

Watercourse morphology relates to the shape of a watercourse channel, its bed and banks and how erosion, transportation of water, sedimentation and the composition of riparian vegetation changes this shape over time. In the absence of mitigation there is potential for sediment deposition at a scale which may alter tributary channel morphology within or ex-situ an SAC thus reducing the suitability of receiving (downstream) aquatic habitats and species of Qualifying Interest. Such occurrences could affect Site Integrity and/or Conservation Objectives for a European Site – particularly those which seek to maintain or restore the favourable conservation condition of aquatic habitats and species at the designated SAC.

The following Hydrological effects may occur to the local environment at Blackwater Bog as a result of the proposed works and may influence flow regimes to the receiving environment, adjacent groundwater dependent Annex I habitats and receiving watercourses. These include:

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

Increased flooding and consequent run-off to lands adjacent to and surrounding Blackwater Bog could result in increased run-off of potential pollutants to the receiving watercourses; i.e. the Blackwater (Shannonbridge)_020 watercourse, which provides connectivity between the site and the River Shannon Callows SAC. Changes to the hydrological regime (reductions or increases in run-off) could result in consequent effects to ex-situ water dependent species using the downstream areas of the River Shannon main channel. Increased flow volumes / regimes to receiving watercourses may change localised watercourse morphology (as a result of localised erosion / scouring) which could contribute ex-situ effects to QI species using the downstream areas of the River Shannon, particularly otter. Changes or alterations to in-situ hydrological and hydrogeological regimes could result in consequent effects to adjacent and connected European Sites which support groundwater dependent Annex I habitats; i.e. Fin Lough (Offaly) SAC. However, BnM will no longer deepen existing internal drains to support peat extraction activities. The proposed blocking of the internal drainage system and the enhanced rehabilitation measures designed to rewet large areas of cutover peat within bog sites such as Blackwater Bog, could be assumed to sustain or secure the hydrological and hydrogeological conditions with the rehabilitation site, with the potential for knock on positive effects to nearby or interconnected groundwater dependent habitats and their associated species.

In combination

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

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

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

Stage 2 Evaluation

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

3.3.5 Direct Impacts to Habitats within SPAs

3.3.5.1 Alone or In Combination

The Middle Shannon Callows SPA adjoins the western boundary of the site and is located outside of the footprint of the proposed rehabilitation works. Therefore, there is no risk of direct to SPAs from the proposed rehabilitation works.

No land use change is proposed for habitats within the SPA, and there will be no rehabilitation activities within the SPA boundary. Therefore, there will be no direct effects to SPAs as a result of the proposed works. It should

be noted, that the proposed rehabilitation works will create suitable foraging, feeding and roosting habitat for SCI species in the long term as proposed measures establish.

3.3.5.2 Stage 2 Evaluation

Adverse direct effects on the integrity of the SPA/Conservation Objectives (alone or in combination) will not occur.

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

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

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

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

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

Alone

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

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

Overall effects may reduce the suitability of the receiving waters as a resource for SCI's, thus affecting Site Integrity and/or Conservation Objectives – particularly those which seek to maintain or restore the favourable

conservation condition of the wetland habitat at the designated SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.

In combination

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

The decommissioning and rehabilitation of Blackwater Bog by BnM, which supports hydrological connectivity with the Middle Shannon Callows SPA and is located upstream of the River Suck Callows SPA, may result in likely significant/potentially adverse effects on water quality; this project is known to temporally overlap works proposed for BnM D&R sites located in the upstream catchment of Blackwater Bog.

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

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

Stage 2 Evaluation

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

3.3.6.2 Alteration of flow regimes or changes to watercourse morphology

Alone

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

The following Hydrological effects may occur to the local environment at Blackwater Bog as a result of the proposed works and may influence flow regimes to the receiving environment, adjacent groundwater dependent Annex I habitats and receiving watercourses. These include:

- Increases in groundwater levels which may affect neighbouring lands across hydraulic gradients;

- Reductions in conveyance capacity around or through Blackwater Bog, or;

- Marginal alteration of topographical catchments, also resulting in flooding as a result of increased run off.

Increased flooding and consequent run-off to lands adjacent to and surrounding Blackwater Bog could result in increased run-off of potential pollutants to the receiving watercourses; i.e. the Gowlan River (Blackwater (Shannonbridge)_020 watercourse) which provides connectivity between the site and the Middle Shannon Callows SPA. Changes to the hydrological regime (reductions or increases in run-off) could result in consequent effects to ex-situ water dependent species using the downstream areas of the River Shannon main channel. Increased flow volumes / regimes to receiving watercourses may change localised watercourse morphology (as a result of localised erosion / scouring) which could contribute ex-situ effects to SCI species using the downstream areas of the Middle Shannon Callows SPA. Changes or alterations to in-situ hydrological and hydrogeological regimes could result in consequent effects to adjacent and connected European Sites which support groundwater dependent Annex I habitats which in turn support or potentially support SCI species; i.e. Mongan Bog SPA.

In combination

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

The decommissioning and rehabilitation of Blackwater Bog by BnM, which is also within the River Shannon catchment and upstream of the River Suck Callows SPA, may result in likely significant/potentially adverse effects on water quality; particularly where the proposed D&R works overlap with other D&R BnM sites, downstream of Blackwater Bog. Such effects will not occur to Mongan Bog SPA as there are no watercourses or surface water features linking the proposed rehabilitation works with this European Site.

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

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

Stage 2 Evaluation

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

3.3.6.3 Spread of invasive species

Alone

Invasive aquatic species include non-native, terrestrial invasive species such as Rhododendron, Japanese knotweed or Himalayan balsam, invasive riparian vegetation (such as Japanese knotweed) and also fish and mobile invertebrate fauna (such as Asian clam, Signal crayfish, or non-native shrimp species). Aquatic invasive species may be introduced to unaffected catchments or spread within infected watercourses to hydrologically connected SPA's during the course of instream works or transported via excavated material by site machinery.

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

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

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

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

In combination

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

The decommissioning and rehabilitation of Blackwater Bog by BnM, which is adjoined by the Middle Shannon Callows SPA and in proximity to Mongan Bog SPA, may contribute to the spread of invasive species to these European Sites.

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

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

Stage 2 Evaluation

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

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

3.3.7.1 Alone

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

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

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

Seeing as the construction phase is expected to be of a temporary to short-term duration, the disturbance effects are considered similarly temporary to short term in duration. Due however to the proximity of suitable SCI habitat to the proposed works, and the possibility of works taking place during the winter/migration season, the potential for adverse effects through the disturbance/displacement of wintering or passage wildfowl is considered and examined herein.

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

Regarding Greenland White-fronted geese, it is acknowledged that the usage of the River Suck tributary floodplain, despite declines in use of associated bog systems, may be influenced by the absence of major sources of disturbances along the river channel. Surveys and trends of Greenland White-fronted Goose flocks

between Athlone to Shannonbridge and Ballinasloe to Shannonbridge over the past twenty-five years have noted the abandonment of the callows and the adjoining raised bog areas as regular feeding and foraging habitats. This is due to ongoing peat harvesting and turbary which removed important feeding and refuge sites between Athlone and Shannonbridge; flooding and development between Ballinasloe and Shannonbridge as well as various sources of disturbance in and near the callows area. At present potential usage of the Blackwater bog site and its environs by Greenland White-fronted Geese results from overflying birds or temporary staging during seasonal migration.

Disturbance in general plays a pronounced role in the winter ecology of Greenland White-fronted Geese because of extensive fragmentation of traditional feeding ranges. Recent changes in individual flock differences in Ireland were correlated with number and size of feeding sites but also disturbance rate, and the use of individual feeding sites may relate to relative levels of disturbance. Detailed studies also showed that wintering Greenland White-Fronted geese tended to avoid strip of grassland within 75m of a busy road but fed right up to sea wall embankment. Effects of such disturbance were detectable up to 150m from field margins (Fox & Stroud, 2002). This figure (i.e 150m) is higher than that cited in Livezey et al. (123.2m in respect of Anseriformes and motorised vehicles) and is considered more suitable as a MAD for this species, in line with species specific information.

The wetland habitats of Fin Lough (Offaly) SAC are known to support an over-wintering population of Hen Harrier. The nearest SPA for which Hen Harrier is an SCI species is the Slieve Bloom Mountains SPA (004160), located ca. 28km south-east. It is possible that Hen Harrier utilising Fin Lough are associated with this SPA. Direct Disturbance effects to wintering Hen Harrier at Fin Lough as a result of the proposed decommissioning and rehabilitation works are possible as the works are located immediately south of the SAC boundary at their nearest location. Hen Harrier associated with the Fin Lough winter roost site may overfly or use the margins of bog site for foraging, hunting or commuting purposes on an occasional or temporary basis. Consequent disturbance effects as a result of the proposed works would be most likely to occur during daylight hours. Such disturbance events would be limited in frequency to interactions by foraging birds, during daylight hours, within the minimum approach distance (150m) from sources of disturbance such as machinery (150m is the Minimum Approach Distance (MAD) (Livesey et al., 2016) indicated for likely disturbance in respect of Falconiformes (the family of birds with characteristics most similar to Hen Harrier). These effects would be highly reversible. Such disturbance effects are highly unlikely, however should they occur, they would be considered to be temporary and indirect. Such disturbance and displacement effects, should they occur, will not be adverse.

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

Table 22: SCI Disturbance evaluation

SCI[30]	MAD (m)	Sensitivity	Notes
Greenland White-fronted Goose	150.0	Foraging/ Roosting	Suitable habitat within 150m of activities and usage cannot be precluded; significant disturbance effect. Based on desk based data for Greenland White-fronted Goose trends near the Blackwater Bog site (See **Section 3.1.1.3**) potential for occurrence and consequent disturbance is considered to be

[30] SCI species associated with the Middle Shannon Callows SPA, River Suck Callows SPA and Mongan Bog SPA within the project Zone of Influence

SCI[30]	MAD (m)	Sensitivity	Notes
			low. Greenland White-fronted Goose not identified within the Blackwater site during the 2022 site walkover surveys.
Whooper Swan	123.2	Foraging/ Roosting	Suitable habitat within 123.2m of works and usage cannot be precluded; significant disturbance effect. Whooper Swan were identified in small numbers using the ephemeral wetland habitats at Blackwater Bog during winter 2021 and 2022, peak count 11 – See **Appendix J**.
Shoveler	123.2	Foraging/ Roosting	Suitable habitat within 123.2m of works and usage cannot be precluded; significant disturbance effect. Shoveler were identified within the Blackwater Bog site during the 2022 site walkover survey.
Wigeon	123.2	Foraging/ Roosting	Suitable habitat within 123.2m of works and usage cannot be precluded; significant disturbance effect. Small numbers of Wigeon were identified using the ephemeral wetland habitats at Blackwater Bog, during the winter of 2021 and 2022 (See **Appendix J**).Wigeon were not identified foraging within the ephemeral wetland areas, silt ponds or general environs of the Blackwater Bog during the April 2022 site walkover survey. Suitable foraging and roosting habitat occurs within the ephemeral wetland habitats and silt ponds at Blackwater Bog and in those areas located west and north-west of Blackwater Bog along the River Shannon floodplain areas and contributory watercourses.
Mallard	123.2	Foraging/roosting	Suitable habitat within 123.2m of works and usage cannot be precluded; significant disturbance effect. Mallard identified within the Blackwater Bog site during the 2022 site walkover survey and during the 2021/2022 wintering bird surveys.
Teal	123.2	n/a	Suitable habitat within 123.2m of works and usage cannot be precluded; significant disturbance effect. Teal were identified within the Blackwater Bog site during the 2022 walkover survey and during the 2021/2022 wintering bird surveys...
Lapwing	42.2	Foraging/roosting	Suitable habitat within 42.2m of works and usage cannot be precluded; significant disturbance effect. Lapwing were identified within the Blackwater Bog site during the 2022 site walkover survey and during the 2021/2022 wintering bird surveys..
Golden Plover	42.2	Foraging	Suitable habitat within 42.2m of works and usage cannot be precluded; significant disturbance effect. Golden Plover were not identified within the Blackwater Bog site during the 2022 site walkover survey.

SCI[30]	MAD (m)	Sensitivity	Notes
			Roosting birds which might utilise cutaway peat are excluded as sufficient displacement habitat is available - significant effects are unlikely.
Curlew	42.2	Foraging/ roosting	Suitable habitat within 42.2m of works and usage cannot be precluded; significant disturbance effect. Curlew were not identified within the Blackwater Bog site during the site walkover surveys.
Black-tailed Godwit	42.2	Foraging/ roosting	Suitable habitat within 42.2m of works and usage cannot be precluded; significant disturbance effect. Black-tailed Godwit were not identified within the Blackwater Bog site or the adjoining wetland / callows areas during the site walkover surveys.
Black-headed Gull	42.2	Foraging/Roosting	Suitable habitat within 42.2m of works and usage cannot be precluded; significant disturbance effect.
Wetland and waterbirds	123.2*	Foraging/Roosting	Suitable habitat present and usage cannot be precluded; significant disturbance effect.

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

3.3.7.2 In combination

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

The decommissioning and rehabilitation of Blackwater Bog by BnM, which adjoins the Middle Shannon Callows, may result in likely significant/potentially adverse effects on water quality; particularly where the proposed D&R works overlap with other D&R BnM sites within the Zone of Influence of Blackwater Bog; e.g. Bunahinly-Kilgarvan Bog and Bloomhill Bog. Rehabilitation works for Blackwater Bog are likely to run concurrently for Bloomhill Bog, Bunahinly-Kilgarvan and Clooniff bogs in 2022. In addition, some remaining rehabilitation and decommissioning works may be carried out at Belmont, Kilmacshane and Garryduff bogs while rehabilitation works at Blackwater rehab are ongoing.

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

Additional sources of disturbance such as baseline agricultural activities /turbary within or in close proximity to the SPA's under consideration, and in suitable habitat for SCI's, are considered in the large part unlikely to result in in-combination adverse effects - primarily due to habituation to these background baseline activities.

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

3.3.7.3 Stage 2 Evaluation

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

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

3.4 Mitigation Measures

3.4.1 Description of the measure

The below best practice and bespoke mitigation measures have been designed and are prescribed in cognisance of those water dependent and nutrient sensitive features of Qualifying Interest for which European Sites within the project Zone of Influence have been designated. These features of Qualifying Interest and their associated Site Specific Conservation Objectives are presented in **Section 3.1.3** of this document. These measures have been designed and have been prescribed to ensure that all targets and attributes set out for these features of qualifying interest are not compromised or effected by the proposed rehabilitation works at Blackwater Bog.

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

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

- Bog restoration/rehabilitation works will be restricted to within the footprint of the proposed rehabilitation works area.
- The proposed rehabilitation works will have due regard to noise limits and hours of operation (i.e. dusk and dawn) to minimise any potential disturbance on resident and local fauna that utilise the site and immediate environs.
- A standard operating procedure overseen by the Project Ecologist will be in place for all PCAS activities to avoid any significant effects on breeding birds. This will include ground nesting birds and will apply to silt pond cleaning, and cutaway activities. Restriction zones will be in place to avoid effects on any identified ground nesting birds/waterfowl as appropriate.
- All plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations (SI 359/1996).
- The proposed works will be restricted to daylight hours and there will be no requirement for artificial lighting.
- Silt ponds will be inspected and maintained as per the IPC Licence.
- During periods of heavy precipitation and run-off, works will be halted.
- Works will be carried out using a suitably sized machine and, in all circumstances, excavation depths and volumes will be minimised where possible.
- All machines will be regularly checked and maintained prior to arrival at the site to prevent hydrocarbon leakage.
- Hoses and valves will be checked regularly for signs of wear and will be closed and securely locked when not in use.
- Fuelling and lubrication of equipment shall only be carried out in designated areas away from surface water drainage features and ecologically sensitive areas.
- Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for disposal or re-cycling.
- All waste will be sorted by the works crews, managed within the site in designated waste disposal facilities, and removed to a licenced waste facility, in line with BnM Standard operating practice.

- Vehicles will never be left unattended during refuelling.
- No direct discharges to waters will be made. No washings from vehicles, plant or equipment will be carried out on site.
- All plant refuelling will take place using mobile fuel bowsers. Only dedicated trained and competent personnel will carry out refuelling operations.
- All fuels required for machinery and equipment will be stored in a designated location, away from main traffic activity, at the nearest BnM Compound. All fuel will be stored in bunded, locked storage containers. Diesel or petrol fuel and mechanical oils will also be used by site vehicles.
- Mobile storage such as fuel bowsers will be bunded to 110% capacity to prevent spills. Tanks for bowsers and generators shall be double skinned. When not in use, all valves and fuel trigger guns from fuel storage containers will be locked. All pumps using fuel or containing oil will be locally and securely bunded where there is the possibility of discharge to waters.
- Potential impacts caused by spillages etc. during rehabilitation works will be reduced by keeping spill kits and other appropriate equipment on-site.
- Site works will be carried out in accordance with 'best practice'. In order to ensure compliance and implementation of 'best practice', these measures will be communicated to relevant Bord na Móna staff and updated as required.
- All waste water will be removed by a licenced waste contractor to a licenced waste water treatment facility.
- Any fertiliser used will be Rock Phosphate and will not be applied in the following conditions:
    1. The land is waterlogged;
    2. The land is flooded, or it is likely to flood;
    3. The land is frozen, or covered with snow;
    4. Heavy rain is forecast within 48 hours (forecasts will be checked from Met Éireann).
    5. The ground slopes steeply and there is a risk of water pollution, when factors such as surface run-off pathways, the presence of land drains, the absence of hedgerows to mitigate surface flow, soil condition and ground cover are taken into account.
- No fertiliser will be spread on land within 2 metres of a surface watercourse- this will be extended to 10m should any locations exist where spreading is required on bare peat and the surface slope suggests higher rates of potential runoff.
- Buffer zones in respect of waterbodies, as specified onhttps://gis.epa.ie/EPAMaps/, will be adhered with at all times with regard to fertiliser application.

The below image / flow chart (**Figure 15**) provides Bord na Móna's proposed clean up procedures for fuel/oil and peat.

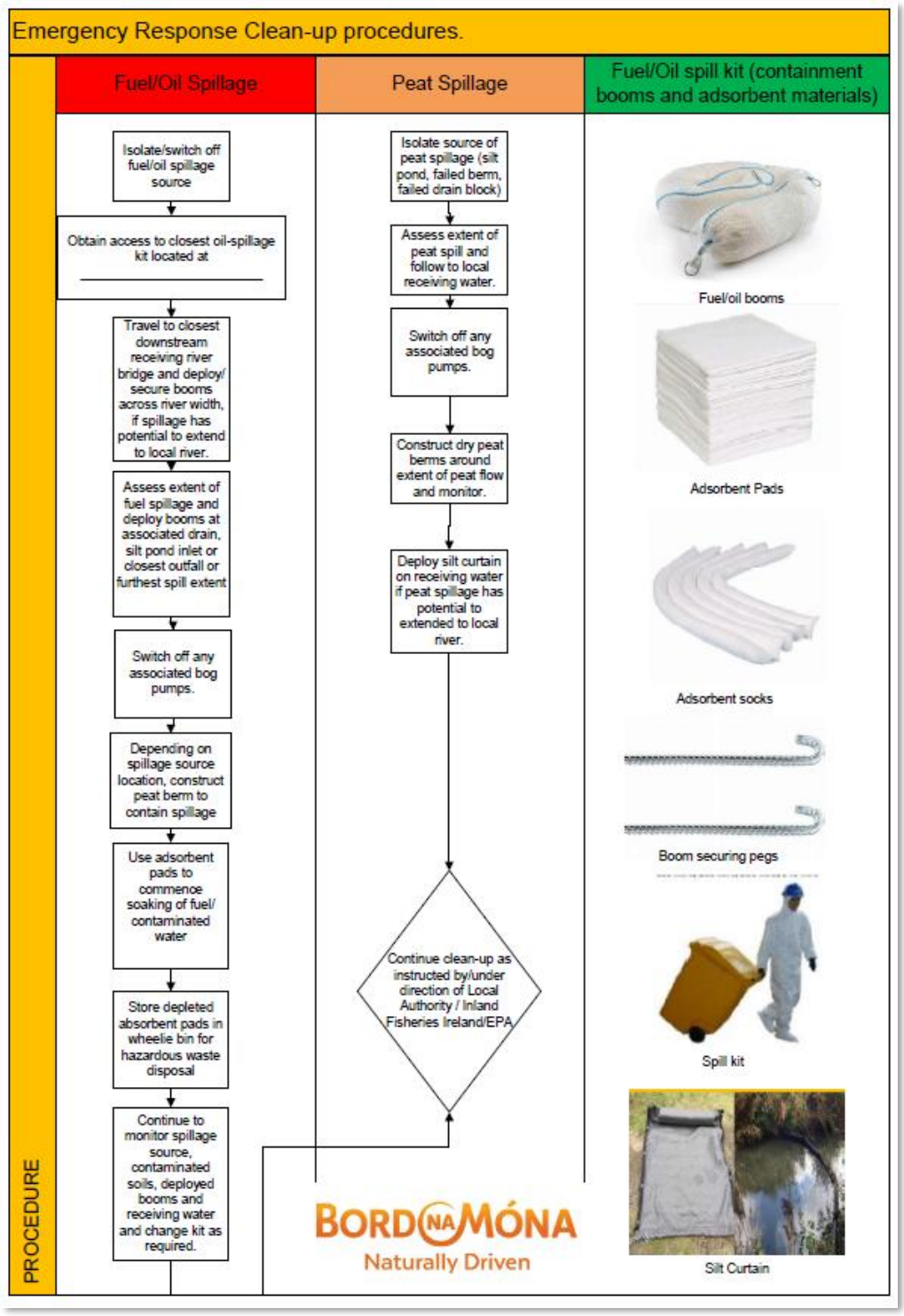
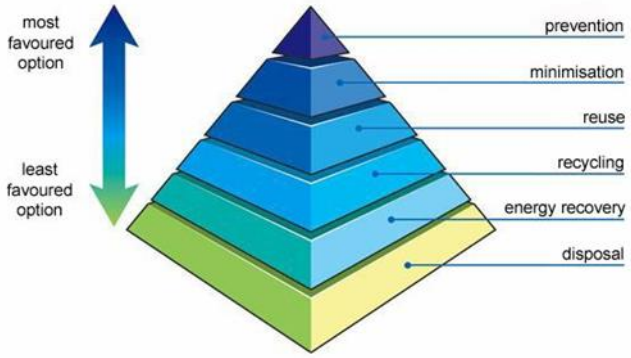


Figure 15: BnM Emergency Response Clean Up Procedures

3.4.1.2 Best Practice Measures around the treatment of Waste

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

- Disposal or recovery of waste shall take place only as specified in Schedule 2(i) Hazardous Wastes for Disposal/Recovery and Schedule 2(ii) Other Wastes for Disposal/Recovery of this licence and in accordance with the appropriate National and European legislation and protocols. No other waste shall be disposed of/recovered either on-site or off-site without prior notice to, and prior written agreement of, the Agency.
- Waste sent off-site for recovery or disposal shall only be conveyed to a waste contractor, as agreed by the Agency, and only transported from the site of the activity to the site of recovery/disposal in a manner which will not adversely affect the environment.
- A full record, which shall be open to inspection by authorized persons of the Agency at all times, shall be kept by the licensee on matters relating to the waste management operations and practices at this site. This record shall as a minimum contain details of the following:
    - The names of the agent and transporter of the waste.
    - The name of the persons responsible for the ultimate disposal/recovery of the
    - waste.
    - The ultimate destination of the waste.
    - Written confirmation of the acceptance and disposal/recovery of any hazardous waste consignments sent off-site.
    - The tonnages and EWC Code for the waste materials listed in Schedule 2(i) Hazardous Wastes for Disposal/Recovery and Schedule 2(ii) Other Wastes for Disposal/Recovery sent off-site for disposal/recovery.
    - Details of any rejected consignments.
- A copy of this Waste Management record shall be submitted to the Agency as part of the AER for the site.
- As required by the licence, these waste items will be removed for recycling or disposal, using external contractors with the required waste collection permits, as agreed by the EPA, with waste records maintained as required for inspection by authorized persons of the EPA at all times.
- Where possible, Bord na 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.

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

3.4.1.3 Best Practice & Biosecurity

Invasive alien plant species were not identified on the Blackwater Bog site during the 2022 site walkover survey. Nonetheless, invasive alien species known to occur at the subject bog (or desktop review suggests presence is likely), and for which reasonably foreseeable source impact pathways for dispersal may result from the proposed PCAS are described here. A broad range of common garden 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.

The potential for importation or introduction of non-native plant species (such as Japanese Knotweed, Himalayan Balsam, etc.) has been identified. Section 49 of the European Communities (Birds and Natural Habitats) Regulations 2011 prohibits the introduction and dispersal of invasive alien species (particularly plant species) listed on Part 1 (third column) of the 'Third Schedule'.

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

- Records of problematic invasive species within the various bog units will be marked out with signs to highlight areas of infestation to personnel.
- All plant machinery will be restricted from disturbing known colonies of invasive species.
- All plant machinery will avoid unnecessary crossings to adjoining lands.
- For any material entering the site, the supplier must provide an assurance that it is free of invasive species.
- All plant and equipment employed on the proposed works (e.g. diggers, tracked machines, footwear etc.) must be thoroughly cleaned down using a power washer unit, and washed into a dedicated and contained area prior to arrival on site and on leaving site to prevent the spread of invasive aquatic / riparian species such as (but not limited to) Japanese knotweed (Fallopia japonica) and Himalayan Balsam (*Impatiens glandulifera*). A sign off sheet must be maintained by the contractor to confirm cleaning;
- Good site hygiene will be employed to prevent the introduction and spread of problematic invasive alien plant species (i.e. Japanese Knotweed (*Fallopia japonica*), Himalayan Balsam (*Impatiens glandulifera*), Himalayan Knotweed (*Persicaria wallichii*), etc.) by thoroughly inspecting and washing vehicles prior to entering the works area.

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

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

- All water quality monitoring equipment which has been used in water will be treated with a disinfectant or a strong saline solution and then thoroughly dried (ideally over 24 hours) BEFORE being used in water again.
- Check, Clean, Dry protocol will be adhered with before and after visiting a river or lake for monitoring, in line with Best Practice[31] or for activities such as Sphagnum inoculation.
- Virkon Aquatic will be available as required.

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

3.4.1.4 Silt Ponds

Silt Ponds – 37 no. Silt ponds with a total volume of 168406.4925m^3 and area of 11.98ha are in place at Blackwater Bog and connected to the existing drainage network. These silt ponds, already stipulated and in use as mitigation measures in respect of Peat Extraction under IPC license, will continue to function as the primary intervention in terms of sediment release to receiving waterbodies. It should be noted, that the silt pond network at the Blackwater Bog site will not be the sole mitigation measure to attenuate silt laden waters emanating from the site during the project construction and operational phases. The design of the PCAS scheme requires the creation of internal drain blocking measures (including terminal dams), which will in itself reduce the possibility of surface run-off to the receiving environment during the rehabilitation works. Once rehabilitation works are completed and the bog has been rehabilitated, the bog will act as a natural repository for surface water, regulating and slowing the movement of surface water from Blackwater Bog to the receiving environment. It is considered that the silt pond network will provide further attenuation and regulation to those measures associated with the PCAS measures during the project construction phase and the rewetted peatland habitat during the project's operational phase.

Regular cleaning and reporting on same already forms part of annual (AER) reporting submitted to EPA. All Silt Ponds at Blackwater Bog site are currently compliant with EPA requirements. **Table 23** below, and **Figure 16** overleaf summarise and illustrate the onsite Silt Pond locations, the figures also illustrates the current flow regime within the main drainage network (into which any other drains also feed). Continued maintenance and reporting on same will be reported on annually until IPC license Surrender.

Table 23: Silt Ponds in use at the Blackwater Bog site

Bog Name	IPC License Reference	Pond No.	Area (m^2)	Volume (m^3)
Blackwater	502_01	n/a	379.4701789	569.2052683
Blackwater	502_01	n/a	1551.868656	2327.802984
Blackwater	502_01	n/a	673.6612412	1010.491862
Blackwater	502_01	BW156	658.5471422	987.8207132
Blackwater	502_01	BW157	4039.802878	6059.704317
Blackwater	502_01	BW158	3916.516863	5874.775295
Blackwater	502_01	BW159	2852.047465	4278.071198
Blackwater	502_01	BW160	3929.476787	5894.215181
Blackwater	502_01	BW161	318.9207168	478.3810752
Blackwater	502_01	BW162	460.5277031	690.7915546
Blackwater	502_01	BW163	663.6359895	995.4539843

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

Bog Name	IPC License Reference	Pond No.	Area (m^2)	Volume (m^3)
Blackwater	502_01	BW163A	1056.770886	1585.156329
Blackwater	502_01	BW164	321.74969	482.624535
Blackwater	502_01	BW165	1691.423075	2537.134613
Blackwater	502_01	BW166	744.1598091	1116.239714
Blackwater	502_01	BW167	881.8915056	1322.837258
Blackwater	502_01	BW168	1053.368529	1580.052794
Blackwater	502_01	BW169	1365.953099	2048.929648
Blackwater	502_01	BW170	420.9467925	631.4201888
Blackwater	502_01	BW171	1374.766394	2062.149592
Blackwater	502_01	BW172	317.8844874	476.8267311
Blackwater	502_01	BW173	75085.0263	102394.3552
Blackwater	502_01	BW174	303.6403405	455.4605108
Blackwater	502_01	BW175	462.6988264	694.0482396
Blackwater	502_01	BW175A	207.26315	310.894725
Blackwater	502_01	BW176	278.3329077	417.4993615
Blackwater	502_01	BW177	387.7356911	581.6526975
Blackwater	502_01	BW178	273.1103727	409.665559
Blackwater	502_01	BW179	682.8861838	710.6848883
Blackwater	502_01	BW180	758.9652102	691.7679691
Blackwater	502_01	BW181	246.928624	263.3552169
Blackwater	502_01	BW182	9514.931331	14272.397
Blackwater	502_01	BW183	260.2950461	390.4425691
Blackwater	502_01	BW184	723.7770859	1085.665629
Blackwater	502_01	BW185	929.9262728	1270.830778
Blackwater	502_01	BW186	909.5768605	1246.137632
		Total	119832.8505(m^2)	168406.4925(m^3)

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

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

These mitigation measure has been included for the protection of watercourses in the receiving environment, downstream connected European Sites (River Shannon Callows SAC, Middle Shannon Callows SPA and River Suck Callows SPA) and their nutrient sensitive and water dependent habitats and species of Qualifying Interest.

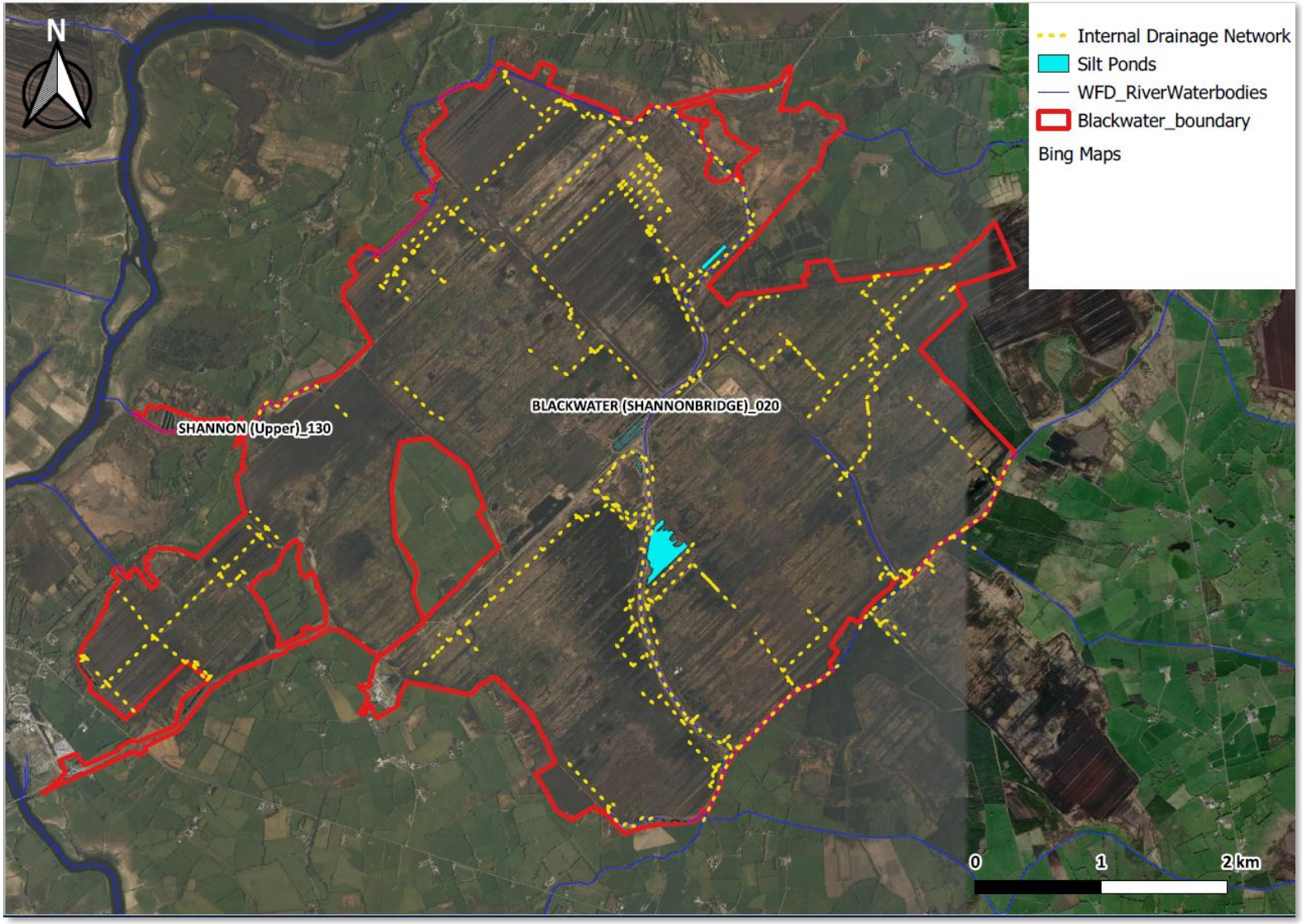


Figure 16: Blackwater Bog Site Drainage and Silt Ponds

3.4.1.5 Measures to avoid runoff when carrying out drain blocking

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

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

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

3.4.1.6 Measures for cleaning Silt Ponds within EPA Blue line features

Cleaning of silt ponds integrated, adjoining or upstream EPA Blue line features, such as the Blackwater (Shannonbridge)_020 watercourse, will follow the below best practice measures.

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

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

In addition to the above, Bord na Mona have prepared a silt pond maintenance procedure, which is presented in full in **Appendix I**.

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

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

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

3.4.1.7 Mortality or disturbance to Otter

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

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

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

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

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

This mitigation measure has been included for the protection of watercourses in the receiving environment, downstream connected European Sites (Middle Shannon Callows SPA / River Shannon Callows SAC / River Suck Callows SPA) and their nutrient sensitive and water dependent habitats and species of Qualifying Interest. In addition, this mitigation seeks to maintain the hydrological conditions of the site and by extension the adjacent and nearby SPA and SAC sites that support groundwater dependent habitats and there reliant species of Qualifying Interest; i.e. Mongan Bog SAC, Mongan Bog SPA, Fin Lough SAC and Pilgrim's Road Esker SAC. However, BnM will no longer deepen existing internal drains to support peat extraction activities. The proposed blocking of the internal drainage system and the enhanced rehabilitation measures designed to rewet large areas of cutover peat within bog sites such as Blackwater Bog, could be assumed to sustain or secure the hydrological and hydrogeological conditions with the rehabilitation site, with the potential for knock on positive effects to nearby or interconnected groundwater dependent habitats and their associated species.

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

Boundary drains may require maintenance to retain their functionality as hydraulic breaks between the site and adjoining lands. Ground verification surveys were completed by a Chartered Engineer from the Bord na Mona engineering team in September 2021, in advance of developing the Engineering drawings for Blackwater Bog, to establish the baseline condition for all boundary drains in proximity to Natura 2000 sites and third party lands and whether maintenance or upgrading was required to achieve the outcomes presented in the Drainage Management Plan for the bog. The retention of the boundary drains (peripheral drains) presented on Drawing BNM-DR-23-05-BL-0212 will not require further intervention or excavation. The capacity and condition of these drains has been assessed through a desk top study in addition to the ground verification exercise which has verified that the drains required to be retained are suitable to act as a hydraulic break to adjoining lands. This hydraulic break essentially cuts the hydraulic gradient from the bog to the adjoining lands limiting the rise in ground water. The boundary drains will have a minor impact in terms of drying out peat along the edges of the bog, however it is observed from experience, the zone of influence of the drain is limited with positive impacts occurring in very close proximity to the drains. To modify these boundary drains would create the potential for unacceptable negative impact to adjoining lands.

Maintenance of boundary drains will be completed during periods of low flow and will follow the below sequencing:

- Prior to commencement of channel works, at least 2 no. check dams will be placed at the downstream end of the drainage channel to control the flow of suspended sediment downstream to receiving watercourses.
- The most downstream check dam will comprise locally sourced turves and double bagged sand bags to initially secure and check downstream flow within the channel. At least 10m upstream of this check dam, a peat dams will be created and keyed into the adjoining drainage channel banks following the methodologies presented in **Section 2.6.1.3**.
- The build-up of silt material upstream of the constructed check dams will be monitored during upgrade works and the silt material will be removed from the drainage channel during works as it builds up. The material will be removed from the channel, spread and levelled into the adjacent field, a minimum of 10m from the nearest drain.
- The constructed check dams will be inspected during periods of dry weather to ensure no 'cracking' of peat has occurred which might allow for discharge.
- Upon completion of the upgrade works, all silt will be removed from the drainage channel immediately upstream of the 2 standard drain blocks prior their removal. The 2 standard drain blocks will only be removed once all upgrade works are completed and once all water within the channel is suitably settled with no evidence of suspended solids within the water column.
- Where a new drain is required, it will be formed and established prior to connecting the drainage channel to wider drainage network. Only once it has formed and become established, with the bed and banks stabilised will it be connected to the wider drainage network. This approach will minimise to a negligible level the potential for suspend solids to be generated in waters within the new drainage channel and conveyed downstream to receiving watercourses and European Sites.
- An Emergency Response Plan will be available in the event of any inadvertent release of a large volume of sediment.

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

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

3.4.1.10 Mitigation through Design - Emergency Response Plan for Berm Failure

The below mitigation measures will be put in place when constructing and working with berm features as part of the bog rewetting and rehabilitation process. The berm design adopts an empirical design approach. It is proposed to apply proven sizes, proportions, materials, and assemblies from existing successful rehabilitation measures and flood defense berm features carried out in the past by Bord na Mona. This represents mitigation for the proposed rehabilitation works through design; i.e. integrating key design principles into the rehabilitation efforts to restrict potential berm failure and consequent run-off to the receiving environment. Further to the above, **Figure 15** above presents an Emergency Response procedure to address peat spillage in the unlikely event of berm failure.

The selection of an appropriate drain block spacing.

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

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

3.4.1.11 Mitigation through maintenance and avoidance:

- Ongoing monitoring of completed peat drain blocks in the weeks after formation will ensure they have consolidated.
- The risk associated with peat drain block failure from an environmental and rehabilitation measures impact is generally categorised as low as a peat drain block failure will result in an impact that is localised and silt control measures are provided upstream of all discharge points. There is an allowance for a reactive approach to remediation measures where required.
- A post rehabilitation Lidar and imagery survey will take place which will capture any areas where failures occurred resulting in remediation measures in a particular area if required. The Lidar survey will be implemented when the rehabilitation measures have been in place for a reasonable period of time allowing areas of weakness or potential concern to become apparent.
- In the event of a peat drain block failure, the adjacent peat drain blocks will generally have sufficient capacity to accommodate any additional hydrostatic pressures generated ensuring the negative impact is localised.
- If, after heavy rainfall, significant water flows in the drains cause localised drain block failure, the regular and frequent placing of drain blocks along the drain further downstream will mitigate the impact to the immediate area.
- As peat drain blocks are designed to retain water on the cutover resulting in a reduction in discharge into the boundary drains, preventing any negative impacts on adjacent agricultural land.

Further to the above, **Figure 15** above presents an Emergency Response procedures to address peat spillage in the unlikely event of berm failure.

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

3.4.1.12 Measures to avoid disturbance or displacement to SCI bird species

Birds

- An Ecological Restriction Zone will be adopted as part of the proposed rehabilitation works. This will include a buffered area ca. 150m from silt ponds that supported (or has the capacity to support) feeding over-wintering avifauna within Blackwater Bog as well as larger ephemeral wetland areas within the Blackwater Bog site – see **Figure 17** overleaf. Any potential disturbance to SCI birds outside of these Ecological Restriction Zones within Blackwater Bog are considered to be reversible and not significant. The proposed Ecological Restriction Zone comprises a 150m buffer offsetting seasonal wetland areas at Blackwater Bog (shown in blue), in addition to the silt pond areas on site (shown in red). Both of these areas are considered to provide suitable foraging or roosting habitat for some SCI species of the Middle Shannon Callows SPA and River Suck Callows SPA; i.e. Whooper Swan, Wigeon, Lapwing, Golden Plover and Black-headed Gull. PCAS activities will be restricted within these areas for the non-breeding period associated with the SCI species for which potentially adverse effect pathways exist.
- The extent of restriction will be overseen by the Project Ecologist dependent on water levels within the Ecological Restriction Zone and the usage of the site by avifauna. Works restrictions may be required between the months of October to March inclusive. The timing and duration of the restrictions and works practices during this period will be considered through ongoing liaison between the Project Ecologist and the project team.
- Once an Ecological Restriction Zone is operational, no PCAS scheme activities will take place within the prescribed zone. Travel and access within these sections of the site to undertake cleaning or maintenance activities may be permitted as they are likely to be intermittent, short term and of low intensity and duration. General usage will be restricted to use of existing rail and travel passes. All will be overseen by the Project Ecologist
- The timing restrictions associated with the Ecological Restriction Zone will be communicated to staff through toolbox talks, incorporated into the EMP for the project and visual markers will be placed on the peat extraction area to delineate the avoidance zone.
- Locations of these restriction zones will also be presented to the machine drivers via the built-in GPS tablet and ESRI application and the machine drivers will use this technology to avoid entering any restricted areas.
- Conformance will be audited through compliance checks by the Project Ecologist (with 'stop-works' authority).
- A standard operating procedure overseen by the Project Ecologist will be in place for all PCAS activities to avoid any significant effects on breeding birds. This will include ground nesting birds and will apply to silt pond cleaning, and cutaway activities. Restriction zones will be in place to avoid effects on any identified ground nesting birds/waterfowl as appropriate.

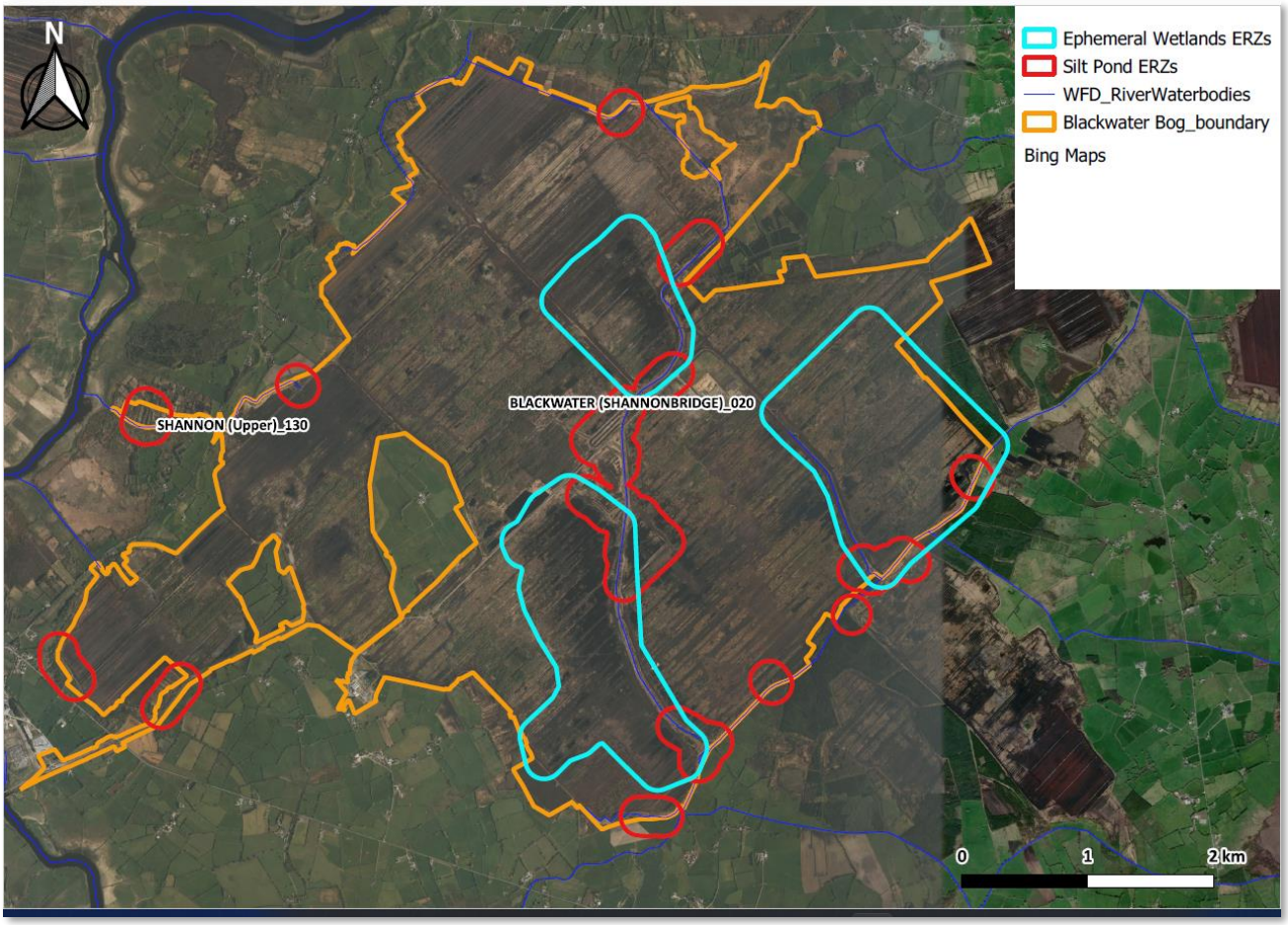


Figure 17: Ecological Restriction Zones for Blackwater Bog

This mitigation measure has been included for the protection (and the avoidance of disturbance and displacement) of SCI species for adjacent and nearby SPA sites (Middle Shannon Callows SPA / River Suck Callows SPA and Mongan Bog SPA).

3.4.1.13 Standard Operating Procedures for Loading of remaining Peat Stockpiles within Blackwater Bog

The loading and removal of any remaining milled peat stockpiles at Blackwater Bog will follow the below Standard Operating Procedures (SOPs) (See **Figure 18**). The below schematic / flow diagram displays how peat loading and removal will be completed at the Blackwater Bog site. This will ensure that loading and removal of remaining peat stockpiles will be controlled, will follow an agreed protocol and will not result in the release or spread or milled peat to the receiving or surrounding environment and by extension European Sites within the project Zone of Influence.

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

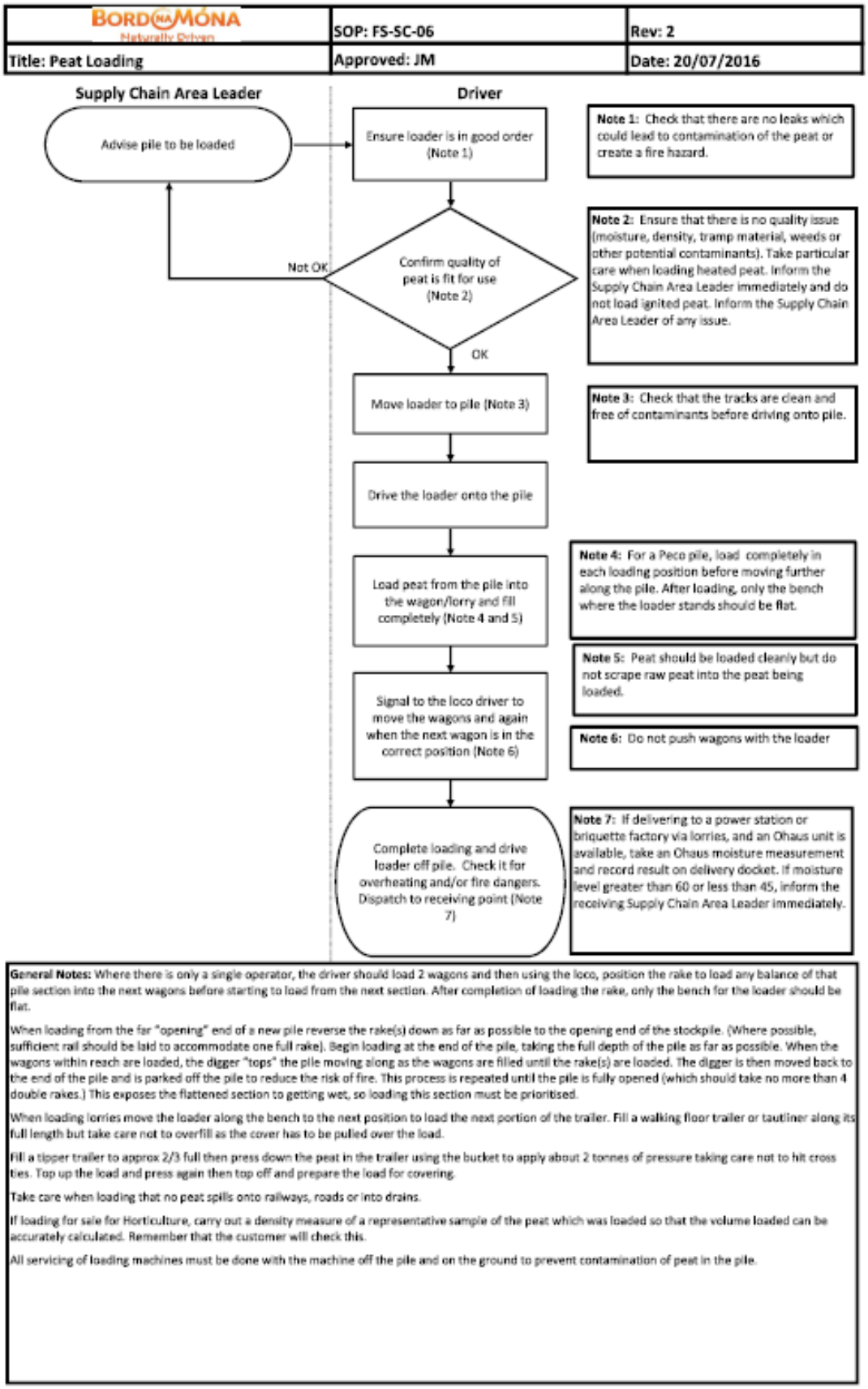


Figure 18: BnM Peat Loading SOPs

General Dust Control Steps:

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

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

Headland Harvesting

- Keep the headland continuously ridged.
- Harvest headland peat every third crop, as per FS-PR-13 standard.
  · By Haku trailer where possible or,

  · Harvest to fields, disengage crossing drains and outfalls.

  · By utilising headland harvesters.

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

3.4.2 Effectiveness of these measures

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

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

3.4.2.1 Watercourse crossing works and aquatic habitat protection guidance

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

3.4.2.2 Pollution Prevention Guidance Notes (PPGs) & Guidance for Pollution Prevention (GPP)[32]

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

3.4.2.3 Construction Industry Research and Information Association (CIRIA)[33]

- CIRIA Report C502 Environmental Good Practice on Site;

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

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

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

3.4.2.4 Invasive Species Guidance

- Managing Japanese knotweed on development sites - The Knotweed Code of Practice produced by the Environmental Agency (2013)[34];
- NRA Guidelines on The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads (2010)[35];
- Managing Invasive Non-native Plants in or near Freshwater, Environment Agency (2010)[36];
- Best Practice Management Guidelines Japanese knotweed *Fallopia japonica*, Invasive Species Ireland (2015);
- IFI Biosecurity Protocol for Field Survey Work, Inland Fisheries Ireland (2010[37]).

3.4.2.5 Guidance relating to Bird Disturbance

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

3.4.2.6 Guidance relating to Mammal Disturbance

- OPW (2013) Construction, Replacement or Alteration of Bridges and Culverts[38].

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

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

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

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

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

- National Roads Authority. Guidelines for the treatment of Otters prior to the construction of National Road Schemes. https://www.tii.ie/tii-library/environment/construction-guidelines/Guidelines-for-the-Treatment-of-Otters-prior-to-the-Construction-of-National-Road-Schemes.pdf

3.4.3 Implementation of Mitigation Measures

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

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

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

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

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

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

3.4.5 Monitoring of the Implementation and Effectiveness of the Mitigation Measures

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

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

- There will be **initial quarterly monitoring assessments** of the site to determine the general status of the site, the condition of the silt-ponds, assess the condition of the rehabilitation work, monitoring of any potential impacts on neighbour's land, general land security, boundary management, dumping and littering.
- The number of these site visits will reduce after 2 years to bi-annually and then after 5 years to annual visits.

- These monitoring visits will also consider any requirements, if required, for further practical rehabilitation measures.
- The **baseline condition of the site will be established** post-rehabilitation implementation by using an aerial drone survey to take an up to date aerial photo, when rehabilitation is completed. The extent of bare peat will be assessed using this baseline data, and habitat maps will be updated, if required.
- A **water quality monitoring programme** at the bog will be established. The main objective of this water quality monitoring programme will be to establish a baseline and then monitor the impact of peatland rehabilitation on water quality from the bog. Monitoring of key environmental variables will include: Ammonia, Phosphorous, Suspended solids (silt), pH and conductivity. Water quality samples will be collected from the main drainage system from the bog at a designated point, before water leaves the site. Water quality samples will be collected at monthly intervals.
- If, after three years, key criteria for successful rehabilitation are being achieved and critical success factors are being met, then the water quality monitoring programme will be reviewed, with consideration of potential ongoing research on site. The water quality data, the drone surveys and the habitat mapping will be collated and will be submitted to the EPA as part of the final validation report.
- If, after three years, key criteria for successful rehabilitation have **not** been achieved and critical success factors have **not** been met, then the rehabilitation measures and status of the site will be evaluated and enhanced, where required. This evaluation may indicate no requirement for additional enhancement of rehabilitation measures but may demonstrate that more time is required before key criteria for rehabilitation has been achieved. Monitoring of water quality will then also continue for another period to be defined.
- Where other uses are proposed for the site, these will be assessed by Bord na Móna in consultation with interested parties. Other after-uses can be proposed for licensed areas and must go through the appropriate assessment process and planning procedures.

3.4.6 How any mitigation failure will be addressed

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

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

Nonetheless contingency measures will be in place for unforeseen events such as oil/fuel spillages, water pollution or any inadvertent release of sediment. This will ensure any unforeseen potentially adverse effects are identified in a timely manner and appropriate remedial action taken immediately. The Ecologist, Environmental Compliance Officer, Engineer, H & S Manager, Site Supervisor and PSCS will have a 'stop-works' authority to temporarily stop works over part of the site to avoid an infringement of the Environmental Commitments or an unforeseen environmental event. Works will not be allowed to re-commence until the issue is resolved.

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

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

Table 24: Integrity of European Site checklist

Does the project or plan have the potential to: **Yes/No**	**Middle Shannon Callows SPA (Site Code: 004096)**	**River Shannon Callows SAC (Site Code: 000216)**	**River Suck Callows SPA (Site Code: 004097)**	**Mongan Bog SPA (Site Code: 004017)**	**Fin Lough SAC (000576)**
- cause delays in progress towards achieving the conservation objectives of the site?	No	No	No	No	No
- interrupt progress towards achieving the conservation objectives of the site?	No	No	No	No	No
- disrupt those factors that help to maintain the favourable conditions of the site?	No	No	No	No	No
- interfere with the balance, distribution and density of key species that are the indicators of the favourable condition of the site?	No	No	No	No	No
- change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the site?	No	No	No	No	No
- interfere with predicted or expected natural changes to the site (such as water dynamics or chemical composition)?	No	No	No	No	No
- reduce the area of key habitats?	No	No	No	No	No
- reduce the population of key species?	No	No	No	No	No
- change the balance between key species?	No	No	No	No	No
- reduce diversity of the site?	No	No	No	No	No
- result in disturbance that could affect population size or density or the balance between key species?	No	No	No	No	No

3.6 Conclusion

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

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

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

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

- Ex-situ disturbance and displacement of SCI waterbird species occurring for the Middle Shannon Callows SPA, River Suck Callows SPA and Mongan Bog SPA were found not to result in adverse effects due to the protective measures around timing and scheduling of works, such as the implementation of an exclusion zone during the period when SCI's may present (**Section 3.4.1.12**). This exclusion zone (150m) is selected based on the largest Minimum Approach Distance or MAD for the SCI species under consideration and constitutes Best Available Scientific knowledge.
- Impacts to water dependent and nutrient sensitive Annex I habitats and species of River Shannon Callows SAC and Fin Lough (Offaly) SAC as a result of deterioration in water quality or changes to in-situ hydrological regimes. These habitats and species are as follows: *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) (6410), Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*) (6510), Alkaline fens (7230), Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae)* (91E0), Otter (*Lutra lutra*) (1355), Active raised bogs (7110), Degraded raised bogs still capable of natural regeneration (7120), Depressions on peat substrates of the Rhynchosporion (7150) and Geyer's Whorl Snail (*Vertigo geyeri*) (1013).
- Disturbance and / or displacement of the otter population associated with the River Shannon Callows SAC.

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

the rehabilitated bog will provide further attenuation contributing to positive quality trends to the receiving environment, including the downstream areas of the Middle Shannon Callows SPA and River Shannon Callows SAC. Changes or alterations to in-situ hydrological and hydrogeological regimes could result in consequent effects to adjacent and connected European Sites which support groundwater dependent Annex I habitats; i.e. Fin Lough (Offaly) SAC. However, BnM will no longer deepen existing internal drains to support peat extraction activities. The proposed blocking of the internal drainage system and the enhanced rehabilitation measures designed to rewet large areas of cutover peat within bog sites such as Blackwater Bog, could be assumed to sustain or secure the hydrological and hydrogeological conditions with the rehabilitation site, with the potential for knock on positive effects to nearby or interconnected groundwater dependent habitats and their associated species.

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

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

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

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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 Blackwater Bog. The standard matrix for this report provided in Annex 2 of the guidance document was followed. Line items in italics are taken directly from the guidance document.

Finding of No Significance Effects Report	
Name and location of the Natura 2000 sites	The Screening Evaluation provided herein has examined the potential for any effects arising via source pathway linkages with regard to connectivity to designated European Sites (SACs and SPAs) within the zone of influence of all predicted Project impacts. An extended buffer zone of 15km was further considered, in line with NPWS guidance (DoEHLG, 2009), for evaluation of effects on any European Site which may arise associated with the proposed decommissioning and rehabilitation of Blackwater Bog, as required. There is a total of 20 European sites located within the 15km zone of consideration: - River Shannon Callows SAC (000216) - Mongan Bog SAC (000580) - Fin Lough SAC (000576) - Pilgrim's Road Esker SAC (001776) - Moyclare Bog SAC (000581) - Ferbane Bog SAC (000575) - Crosswood Bog SAC (002337) - Carn Park Bog SAC (002336) - Ballynamona Bog and Corkip Lough SAC (002339) - Castlesampson Esker SAC (001625) - Lough Ree SAC (000440) - All Saint's Bog and Esker SAC (000566) - Redwood Bog (002353) - Ridgewood; SW of Rapemills SAC - Middle Shannon Callows SPA (004096) - Mongan Bog SPA (004017) - All Saint's Bog SPA (004103) - River Little Brosna Callows SPA (004086) - Lough Ree SPA (004064) - River Suck Callows SPA (004097)
Description of the project or plan	**Overview:** Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the 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. Blackwater Bog is part of the

Finding of No Significance Effects Report	
	Blackwater bog group. Blackwater Bog is located in Co. Offaly, east and north-east of Shannonbridge. A document titled 'Blackwater Bog Cutaway Bog Decommissioning and Rehabilitation Plan 2022' has been prepared specifically to describe the proposed decommissioning and rehabilitation measures at **Blackwater Bog** as appended to this document as Appendix B. **Purpose:** The decommissioning and Rehabilitation of **Blackwater Bog** as required under IPC license.
Is the Project or Plan directly connected with or necessary to the management of the site (provide details)?	No
Are there other projects or plans that together with the project of plan being assessed could affect the site (provide details)?	Yes: In addition to the proposed decommissioning and rehabilitation plan the following projects were considered: 1 Other BnM Bog Group Decommissioning and Rehabilitation 2 NPWS Raised Bog Restoration Projects 3 Agricultural Activity 4 Turbary 5 Quarries 6 Agriculture 7 Proposed Solar Farm at Blackwater Bog 8 ESB West Offaly Power Ash Disposal Facility 9 NPWS Raised Bog Restoration 10 EPA Licenced Facilities 11 Local Authority Development Plans 12 Local and Regional Amenity Developments 13 Local small residential and agricultural developments, extensions, alterations
The Assessment of Significant Effects	
Describe how the project or plan (alone or in combination) is likely to affect the Natura 2000 site	Disturbance of SCI species using sections of Blackwater Bog and environs, within and ex-situ of the Middle Shannon Callows SPA, River Suck Callows SPA and Mongan Bog SPA. Disturbance of mobile QI species using upstream, adjoining and downstream sections of the site and River Shannon Callows SAC. Potential indirect effects to adjacent SAC sites and their component habitats of Qualifying Interest; i.e. Fin Lough (Offaly) SAC. Indirect effects to downstream sections of the River Shannon Callows SAC and Middle Shannon Callows SPA and their component water dependent and

Finding of No Significance Effects Report	
	nutrient sensitive habitats and species as a result of run-off to receiving watercourses during the rehabilitation works (such as siltation, hydrocarbons etc.).
Explain why these effects are not considered significant	Following examination and analysis, and taking account of the protective measures proposed, the potential for disturbance and displacement of SCI waterbird species occurring ex-situ of the Middle Shannon Callows SPA, River Suck Callows SPA and Mongan Bog SPA were found not to result in adverse effects due to the protective measures around timing and scheduling of works, such as the implementation of an Ecological Restriction Zone exclusion zone during the period when SCI's may present. This exclusion zone is selected based on the largest Minimum Approach Distance or MAD for the SCI species under consideration and constitutes Best Available Scientific knowledge. The key protective measure being retention of silt laden water and potentially deleterious materials associated with the decommissioning and rehabilitation works to the project footprint. The attenuation of silt and particulate matter generated as a result of the proposed works is a key mitigation measure for the proposed rehabilitation and decommissioning works. The main source of potential impact to influence significant adverse effects to the downstream areas of the River Shannon Callows SAC relate to particulate matter run-off from the site, during the rehabilitation works. A key consideration in this regard will be drain blocking. This methodology relies on the placement of terminal dams at the extremity of the drain; i.e. that closest to watercourse within the receiving environment. The securing of strategic peat dams will allow the hydraulic separation between the proposed rehabilitation works and the receiving and downstream aquatic environment, and in so doing isolating these works from sensitive ecological and environmental receptors within the project zone of influence and in the case of Blackwater Bog, the River Shannon Callows SAC, Middle Shannon Callows SPA and the River Suck Callows SPA.
Name of Agency or Body Consulted	**Summary of Response**
NPWS	Formal consultation has been undertaken with NPWS regarding proposed Decommissioning and Rehabilitation Plans, including protected Sites. The findings and feedback from the consultation process have been fed into the final rehabilitation and decommissioning plans. Due cognisance was also given to information available on the NPWS website at: https://www.npws.ie/development-consultations#.

Finding of No Significance Effects Report			
	In addition, two meetings were held with the EAU to discuss consultation with the Minister in accordance with Regulation 42(9) of the European Communities (Birds and Natural Habitats) Regulations, 2011.		
Data Collected to Carry out the Assessment			
Who carried out the assessment	*Sources of Data*	*Level of assessment completed*	*Where can the full results of the assessment be accessed and viewed*
Delichon Ecology	A combination of consultation, desktop studies and field surveys.	Screening for Appropriate Assessment Appropriate Assessment – Natura Impact Statement	Bord na Móna, Leabeg, Blueball, Tullamore, Co. Offaly, R35 P304.

Appendix B Blackwater Bog: Cutaway Bog Decommissioning and Rehabilitation Plan 2022

Bord na Móna

Blackwater Bog

Cutaway Bog Decommissioning and Rehabilitation Plan 2022

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 Blackwater 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 Blackwater Bog.

In addition, to preparing this document to comply with Condition 10 of IPC Licence Ref. P0502-01, due regard was also given to the Peatlands Climate Action Scheme (PCAS) announced by the Minster. This Scheme will see the Minister support, via the Climate Action Fund and Ireland's National Recovery and Resilience Plan, Bord na Móna in developing a package of measures, 'the Scheme', for enhanced decommissioning, rehabilitation and restoration of cutaway peatlands referred to as, the Peatlands Climate Action Scheme'. However, only the additional costs associated with the additional and enhanced rehabilitation, i.e., measures which go beyond the existing standard mandatory decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support. The additional costs of the Scheme will be supported by Government, administered by the Department of Environment, Climate and Communications (DECC), while the National Parks and Wildlife Service (NPWS) will act as the Scheme regulator.

While this document outlines the enhanced rehabilitation measures planned for Blackwater Bog, activities which goes beyond that required by Condition 10 in the Licence, rehabilitation necessary to comply with the 'standard' requirement of Condition 10 (in the absence of the Scheme) is also included, to estimate costs. The inclusion of the 'standard' rehabilitation together with the enhanced rehabilitation in this document allows the Scheme Regulator to distinguish and objectively determine the specific activities (and their associated costs) eligible for support under the Scheme.

Bord na Móna have defined the key rehabilitation outcome at Blackwater Bog as environmental stabilisation, re-wetting and setting the bog on a trajectory towards development of naturally functioning peatland habitats.

Any consideration of any other future after-uses for Blackwater 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:	Blackwater Bog Cutaway Bog Decommissioning and Rehabilitation Plan 2022
Document File Path:	
Document Status:	Final

This document comprises:	DCS	TOC	Text (Body)	References	Maps	No. of Appendices
	1	1	48	4	0	12

Rev. 0.1	Author(s):	Checked By:	Approved By:
Name(s):	JOS	MMC	MMC
Date:	04/02/2022	25/02/2022	25/02/2022

Rev. 1	Author(s):	Checked By:	Approved By:
Name(s):	CC	JOS	MMC
Date:	03/03/22	12/04/2022	18/04/2022
Rev. 1.1	**Author(s):**	**Checked By:**	**Approved By:**
Name(s):		MMC	MMC
Date:		24/05/2022	24/05/2022

Note: This finalised version of the Rehabilitation Plan has been updated to take account that several planning actions listed in Section 8.1 have been completed and have been incorporated into the plan. This includes an Appropriate Assessment of the rehabilitation plan. See Blackwater Decommissioning and Rehabilitation Plan – Addendum 1 for more details.

Table of Contents

NON-TECHNICAL SUMMARY

- Industrial peat harvesting is now completely finished at Blackwater Bog.
- Bord na Móna is currently planning to rehabilitate **a portion** of Blackwater Bog, located in west Co. Offaly, approximately 1 km north-east of Shannonbridge, under the PCAS Scheme. Part of the western extent of Blackwater is located adjacent to the River Shannon.
- This is happening as Bord na Móna are obliged to carry out peatland rehabilitation via an IPC License issued by the Environmental protection Agency. In addition, the Government has agreed to support peatland rehabilitation via the establishment of the Peatland Climate Action Scheme (PCAS). This is funded via the Government and by Bord na Móna.
- The key objective of peatland rehabilitation is environmental stabilisation. This means developing habitats and vegetation back onto the bare peat, and minimising effects to downstream waterbodies. Blackwater was drained in the past to allow peat production. Better results for water quality improvements, climate action, the reduction of carbon emissions and biodiversity are achieved when the remaining peat is re-wetted. This means drain-blocking and other measures to raise water levels to the surface of the bog and to encourage the natural colonisation of vegetation.
- In general, soggy ground conditions are preferred. This means the remaining peat is wet and that plants that prefer wetter conditions, like Bog Cotton and Reeds will thrive.
- Many Bord na Móna bogs cannot be restored to raised bog, as so much peat has been removed and the environmental conditions have been modified. However other natural habitats will develop like shallow wetlands with Reedbeds, fen peatland and Birch woodland, and in time a naturalised peatland can be restored.
- Re-wetting peat is also better for climate action. This reduces carbon emissions as re-wetting the remaining peat reduces carbon losses such as the production of Carbon Dioxide, the main Greenhouse Gas. The area proposed for rehabilitation is expected to still be a reduced carbon source for some time, but eventually the carbon sink function can re-establish as peat-forming conditions are restored. This will take some time.
- The development of a range of habitats in Blackwater Bog will support biodiversity including plants, insects, birds and mammals. This includes some species that are rare and protected in the wider landscape. It will increase the national area of native woodland. Many wetland habitats in the wider landscape have been reclaimed for agriculture and other uses and peatland rehabilitation is an opportunity to create new peatland habitats.
- The drainage and development of Blackwater for industrial peat production began in 1950s. Industrial peat production completely ceased in 2020.
- Much of the bog is already establishing a range of pioneer wetland, fen peatland and scrub habitats. There are still some bare peat areas.
- Parts of Blackwater bog have already naturally re-wetted. Measures proposed for Blackwater Bog include drain blocking and additional measures required to raise water levels to the surface of the peat (changing levels of pipes for example) across vegetated and unvegetated areas where hydrological conditions can be improved. Some fertiliser will be spread on headlands and other areas (a small part of the overall area) to encourage vegetation growth.
- Bord na Móna plan to carry out this work on part of the site in 2022-2024.
- These rehabilitation measures will be planned by a team consisting of expert ecologists, hydrologists and engineers. It is a guiding principle of Bord na Móna rehabilitation planning that no actions or activities

will be undertaken that would negatively impact on adjacent land. No boundary drains will be blocked. Water will still leave the bog via the existing outlets.

- It will take some time for fully developed habitats to fully develop at Blackwater Bog, and for a peatland ecosystem to develop. However, it is expected that most of the bare peat areas will be developing pioneer habitats after 5-10 years.
- This is a peatland rehabilitation plan. This plan does not plan future after-use or development. Bord na Móna continually reviews its land-bank to consider future commercial or industrial developments, such as renewable energy. Any other proposed development will be planned in adherence to relevant planning guidelines and will consider the rehabilitation and the condition of the bog.
- Bord na Móna are currently developing a renewable energy project called Blackwater Solar Farm (Home | Blackwater Solar Farm), using solar photovoltaic panel arrays to produce electricity. This proposed project is in the pre-planning stage, but the area being considered for development has informed the constraints (see drawing number BNM-DR-23-14-05: Enhanced Rehab Measures and BNM-DR-23-14-20: Standard Rehab Measures). The proposed renewable energy project is expected to use only part of Blackwater Bog. The proposed solar farm development study area is 1079 hectares.
- In advance of this proposed planning submission, it is planned to rehabilitate **part** of Blackwater Bog in 2022 - 2024. The remaining area will be rehabilitated after the proposed renewable energy construction is complete, or at a later date. It is expected that Bord na Móna will revise and update this rehabilitation plan for Blackwater when this renewable energy project has been considered by the planning process, and other areas can be considered for peatland rehabilitation.
- Peatland rehabilitation of these bogs will bring a range of benefits to the local community via improvements to the local landscape and is also important for supporting national policies and strategies in relation to reduction of carbon emissions from these peatlands, supporting biodiversity and improvements to water quality.

SUMMARY

Name of bog: Blackwater Bog **Total Area:** 2314ha **Rehabilitation area (FY23 PCAS extent):** 554 ha

Site description:

- Blackwater bog was drained and developed for industrial peat production in the 1950's. Peat production ceased in 2020. The peat was harvested for fuel peat to be used in West Offaly Power in Shannonbridge, Offaly.
- Blackwater Bog is considered a shallow peat cutaway bog with some small pockets of deep peat remaining.
- This bog has pumped bog drainage. Some of the pumps which facilitated former peat extraction are now switched off. Several pumps are still operational.
- Blackwater bog is an older production bog and there is extensive development of pioneer cutaway vegetation communities and wetlands across the former production area, with some areas of bare peat also remaining.
- Coillte have developed a portion of the bog for Commercial plantation forestry, this is outside the area proposed for FY23 PCAS.
- Some of the cutaway has been developed for forestry and has been used for BOGFOR forestry trials, this is also outside the area proposed for FY23 PCAS.
- An ash repository site is present at Blackwater Bog, and is managed by ESB.
- Blackwater Bog is located in close proximity to several designated conservation sites. The EU Designated site Fin Lough Offaly SAC lies within the north-western part of Blackwater. River Shannon Callows SAC and Middle Shannon Callows SPA occur adjacent to the western boundary.

Rehabilitation goals and outcomes

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

This is defined as:

- Meeting conditions of the IPC licence.
- Stabilisation or improvement in water quality parameters (e.g. suspended solids).
- Environmental stabilisation.
- Optimising hydrological conditions for the further development of mainly open water habitats, fen, Reed Swamp and wet woodland on shallow cutaway peats, along with management of existing habitats.
- Rehabilitation will support the National Policies on Climate Action and GHG mitigation by maintaining and enhancing the current residual peat storage capacity of the bog (locking the carbon into the ground). It is expected that the bog will have reduced emissions (reduced source) as it develops naturally functioning peatland habitats. It will also support Ireland's commitments towards Water Framework Directive and the National River Basin Management Plan 2018-2021.
- 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 Blackwater 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 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 Blackwater Bog, in particular, optimising climate action benefits.
- The key goals and outcomes of rehabilitation at this bog outlined above.
- To minimise potential impacts on neighbouring land, boundary drains around Blackwater Bog will be left unblocked, as blocking boundary drains could affect adjacent land.
- Some remnant raised bog around the margins are still utilised for private sod peat cutting.
- Proposed land-use. Bord na Móna are currently developing a renewable energy project called Blackwater Solar Farm. This proposed project is in the pre-planning stage. In advance of this proposed planning submission, it is planned to rehabilitate part of Blackwater Bog in 2022- 2024. The remaining area will be rehabilitated after the proposed renewable energy construction is complete, or at a later date. Bord na Móna remain committed to rehabilitating all of Blackwater Bog and meeting conditions of the IPC License for this bog.

Criteria for successful rehabilitation:

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

- Rewetting of residual peat in the former area of industrial peat production to slow water movement across the site to retain silt, encouraging development of vegetation cover via natural colonisation, and reducing the area of bare exposed peat through the creation of open water habitats, fen, Reed swamp and wet woodland (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 potential emissions to water (e.g. suspended solids). This will be measured via water quality monitoring (suspended solids and ammonia) for at least 2 years after the rehabilitation has been completed. (IPC Licence validation).
- Reducing pressure from peat production on the local river catchment (WFD) (IPC Licence validation). This will be measured by the EPA WFD monitoring programme.
- Optimising the extent of suitable hydrological conditions 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.
- Setting the area proposed for rehabilitation on a trajectory towards establishment of a mosaic of compatible habitats including open water, fen, Reed-Swamp, wet woodland, heath, scrub and birch woodland, where conditions are suitable, and eventually towards a reduced carbon source. Some areas will naturally be dry and develop birch woodland and other drier habitats. It will take some time for stable naturally functioning habitats to fully develop at Blackwater Bog.
- Improvement in biodiversity and ecosystem services (climate action verification).

Summary of measures:

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

- Planning actions, including developing a detailed site plan and carrying out a hydrology and drainage appraisal.
- Carry out an ecological appraisal of the potential impacts of the planned rehabilitation.
- Carry out proposed measures, which will include a combination of hydrological management, drain blocking, peat field re-profiling and fertiliser applications (targeting bare peat sections of headlands, high fields and other areas).
- 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:

- 2021-2022: Short-term planning actions.
- 2022 - 2023: Short-term practical actions.
- 2023-2025: Any Long-term practical actions; Evaluate success of short-term rehabilitation measures outlined above and remediate, where necessary.
- 2025: 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 and Ireland's National Recovery and Resilience Plan, Bord na Móna in developing a package of measures, 'the Scheme', for enhanced decommissioning, rehabilitation and restoration of cutaway peatlands referred to as, the Peatlands Climate Action Scheme'. *However, only the additional costs associated with the additional and enhanced rehabilitation, i.e., measures which go beyond the existing standard mandatory decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support.*
- In relation to the pre-existing Condition 10 IPC Licence requirement to carry out what can be termed the 'standard' decommissioning and rehabilitation, Bord na Móna maintains a provision on its balance sheet to pay for these future costs when industrial peat extraction ceases. This is updated every year. For more information see the Bord na Móna Annual Report (Bord na Móna 2021). Bord na Móna is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

Monitoring, after-care and maintenance

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

- Quarterly monitoring assessments of the site to determine the general status of the site, assess the condition of the rehabilitation work, asses the progress of natural colonisation, monitoring of any potential impacts on neighbouring land and general land security. The number of site visits will reduce after 2 years to bi-annually. These site visits will assess the need to additional rehabilitation, if needed.

- **Water quality monitoring** will be established. Monitoring of key water quality parameters for 2 years after rehabilitation will include: ammonia, phosphorous, suspended solids (silt) and pH.
- Where other uses are proposed for the site, these will be assessed by Bord na Móna in consultation with interested parties. Other after-uses can be proposed for licensed areas and must go through the required assessment and planning procedures.

Additional Monitoring:

- The monitoring and validation of re-vegetation via natural colonisation and changes in bog condition will be carried out using an aerial survey, after rehabilitation measures are implemented. 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.

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 licence, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. Blackwater bog is part of the Blackwater bog group (see Appendix II for details of the bog areas within the Blackwater Bog Group) and is located in Co. Offaly.

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 measures.
- Budget and Costings.
- Associated aftercare, maintenance and monitoring.

Note: This plan should be read in conjunction with the accompanying Map book.

It is proposed by Government that Bord na Móna carry out a Peatlands Enhanced Decommissioning, Rehabilitation and Restoration Scheme on its peatlands. Note this proposal is also known colloquially as the 'Peatlands Climate Action Scheme' (PCAS). The additional costs of the Scheme will be supported by Government through the Climate Action Fund, and Ireland's National Recovery and Resilience Plan administered by the Department of Environment, Climate and Communications (DECC), while the National Parks and Wildlife Service (NPWS) will act as the Scheme regulator. Bord na Móna have previously identified a footprint of 33,000 ha as peatlands suitable for this scheme. This Scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations (Appendix VII and IX) under existing EPA IPC licence conditions. Improvements supported by the Scheme will ensure that environmental stabilisation is achieved (meaning IPC obligations are met), and importantly, significant additional benefits, particularly relating to climate action and other ecosystem services, will also be delivered. The Scheme commenced in 2021.

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

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

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

- more intensive management of water levels through pump management, drain-blocking and cell bunding,
- re-profiling that will deliver suitable conditions for development of wetlands, fens and bog habitats,
- targeted fertiliser applications,
- seeding of targeted vegetation, and
- proactive inoculation of suitable peatland areas with *Sphagnum.*

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

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

A portion of Blackwater Bog is proposed to be part of this Scheme (PCAS), which commenced in 2021 and this rehabilitation plan outlines the approach to be taken. Activities are proposed for 2022.

1.1 Constraints and Limitations

This document seeks to address the requirements of Condition 10.2 of IPC Licence 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.*"

It also seeks to outline measures to optimise climate action and other ecosystem services benefits, mainly through hydrological management.

This document covers the area of **Blackwater Bog**.

Industrial peat extraction at Blackwater Bog permanently ceased in 2020, having commenced in the 1950's. Blackwater bog is an older production bog and there has been extensive development of pioneer cutaway vegetation communities and wetlands across the former production area where sub-sections have been cutaway over the years. Some areas were in peat extraction until recently and still have bare peat.

It is anticipated that the combination of active enhanced rehabilitation measures and natural colonisation will quickly accelerate environmental stabilisation. Nevertheless, it will still take some time (30-50 years) for naturally functioning wetland and peatland ecosystems to fully re-establish.

Parts of Blackwater Bog (partly within the areas owned and under the control of Bord na Móna) are currently being 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 Blackwater 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.

Bord na Móna are proposing to develop a renewable energy project (solar farm) at Blackwater Bog. This project is in pre-planning. The proposed development area of the solar farm has been mapped as a constraint. In advance of this development, it is proposed to rehabilitate a substantial part of Blackwater Bog in 2022 that is not constrained (see *Figure: BNM-DR-23-14-05: Enhanced Rehab Measures*). The remaining viable areas will be rehabilitated until after the proposed renewable energy construction is complete, or at a later date. It is expected that Bord na Móna will revise and update the rehabilitation plan for Blackwater when this renewable energy project has been considered by the planning process.

Other constraints within the Blackwater Bog boundary include four plots of Coillte plantation forestry. In addition, Bord na Móna operate an Ash Repository Facility for ESB for the waste ash generated from the power station in Shannonbridge (West Offaly Power). This facility is owned by the ESB. ESB have applied for planning permission (as of March 2022) for the development of an Integrated Constructed Wetland for the treatment and management of leachate derived from the Ash Disposal Facility. The ash site and the proposed constructed wetlands are located outside of the rehabilitation footprint.

Bord na Móna remain fully committed to rehabilitating the whole bog and meeting the conditions of the IPC Licence. Any consideration of any other future after-uses for **Blackwater** Bog, such as renewable energy (other than the previously noted solar farm), 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.

Rehabilitation in other areas of the bog may also be constrained due to other property issues, archaeological features or issues such as rights of way, which may similarly constrain PCAS activities.

2. METHODOLOGY

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

The ecological information and site information collected during the Bord na Móna ecological baseline survey in 2009, with additional confirmatory site visits (covering the period 2010 to 2021 inclusive) and monitoring and desktop analysis forms the basis for the development of the rehabilitation plan for the bog, along with:

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

2.1 Desk Study

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

- Anderson *et al*. (2017). An overview of the progress and challenges of peatland restoration in Western Europe.
- Barry, T.A. et al (1973). A survey of cutover peats and underlying mineral soils. Soil Survey Bulletin No. 30. Dublin, Bord na Móna and An Foras Taluntais.
- Bonn *et al*. (2017). Peatland restoration and ecosystem services- science, policy and practice.
- Carroll *et al*. (2009). *Sphagnum* in the Peak District. Current Status and Potential for Restoration. Moors for the Future Report No 16.
- Clark & Rieley (2010). Strategy for responsible peatland management.
- Eades *et al*. (2003). The Wetland Restoration Manual.
- Farrell & Doyle (2003). Rehabilitation of Industrial Cutaway Atlantic Blanket Bog, NW Mayo, Ireland.
- Gann *et al*. (2019). International Principles and Standards for the practice of Ecological Restoration.

- Hinde *et al*. (2010). *Sphagnum* re-introduction project: A report on research into the re-introduction of *Sphagnum* mosses to degraded moorland. Moors for the Future Research Report 18.
- Joosten & Clarke (2002). Wise Use of mires and peatlands – Background and Principles including a framework for Decision-making.
- Lindsay (2010). Peatbogs and Carbon: A Critical Synthesis to Inform Policy Development in Oceanic Peat Bog Conservation and Restoration in the Context of Climate Change.
- Mackin *et al*. (2017). Best practice in raised bog restoration in Ireland. Irish Wildlife Manuals, No. 99. National Parks and Wildlife Service,
- McBride *et al*. (2011). The Fen Management Handbook (2011), Scottish Natural Heritage.
- McDonagh (1996). Drain blocking by machines on Raised Bogs. Unpublished report for National Parks and Wildlife Service.
- NPWS (2017a). National Raised Bog Special Areas of Conservation management plan. Department of Arts, Heritage and the Gaeltacht.
- Pschenyckyj et al., 2021, Optimising Water Quality Returns from Peatland Management while Delivering Co-Benefits for Climate and Biodiversity. An Fóram Uisce.
- Quinty & Rochefort (2003). Peatland Restoration Guide, second edition. Canadian *Sphagnum* Peat Moss Association and New Brunswick Department of Natural Resources and Energy.
- Regan*, et. al.* (2020). Ecohydrology, Greenhouse Gas Dynamics and Restoration Guidelines for Degraded Raised Bogs. EPA Research Report. Prepared for the Environmental Protection Agency by Trinity College Dublin.
- Renou-Wilson *et al*. (2011). BOGLAND - Sustainable Management of Peatlands in Ireland. STRIVE Report No 75 prepared for the Environmental Protection Agency.
- Schouten (2002). Conservation and Restoration of Raised Bogs: Geological, Hydrological and Ecological Studies. Dúchas - The Heritage Service of the Department of the Environment and Local Government, Ireland;
- Thom (2019). Conserving Bogs – Management Handbook.
- Wheeler & Shaw (1995). Restoration of Damaged Peatlands – with Particular Reference to Lowland Raised Bogs Affected by Peat Extraction.
- Wittram *et al*. (2015). A Practitioners Guide to Sphagnum Reintroduction. Moors for the Future Partnership.

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

- 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, Blackwater Bog was surveyed in December 2009. Additional ecological walk-over surveys and visits have taken place at Blackwater Bog between 2011-2021 (with a final confirmatory survey taking place in February 2022 of the proposed 2022 PCAS extent). Habitat maps have been updated, where required. This rehabilitation plan is informed by the original baseline survey as well as subsequent confirmatory site walk-over surveys and visits, and updates to baseline data.

Habitat mapping followed best-practice guidance from Smith *et al.* (2011). Map outputs including all habitat maps and target notes were produced using GIS software application packages (ArcGIS). General marginal habitats and other habitats that had not been modified significantly by industrial peat extraction were classified using Fossitt *et al*. (2000). Plant nomenclature for vascular plants follows Stace (2010), while mosses and liverworts nomenclature follows identification keys published by the British Bryological Society (2010). A more detailed Bord na Móna classification system was previously developed for classifying pioneer cutaway habitats as Fossitt categories were deemed not to be detailed enough for cutaway bog (much of cutaway bog could be classified as Cutover Bog - PB4). Much of the pioneer cutaway vegetation is still at an early stage of its development and cannot be assigned to Fossitt Level 3 categories yet. A site visit was used to categorise any changes in habitats overlapping the currently proposed PCAS extent at Blackwater Bog in February 2022.

A detailed ecological survey report for the entirety of Blackwater Bog is contained in Appendix III.

3. SITE DESCRIPTION

Blackwater Bog is located approximately 1 km north-east of Shannonbridge in Co. Offaly (Grid reference: N 02634 27356). It is part of the Blackwater group of bogs (Blackwater sub-group).

The bog is accessed to the north via the R444 Shannonbridge to Clonmacnoise public road which lies outside the western/north-western boundary of the site, and via local roads off the R357 Shannonbridge to Cloghan road, to the south of the bog.

The area proposed for rehabilitation in this phase consists of three discrete parcels of land within the wider Blackwater Bog boundary, with a total footprint of 554 ha. These rehabilitation parcels include:

- Tullaghbeg: An area of 115 ha of land in the northern part of the site, which lies adjacent to the boundary of Fin Lough (Offaly) SAC.
- Clondelara-Blackwater: an area of 170 ha of land located in the southern part of the site, with its eastern boundary formed by the Gowlan River, and its western boundary extending to the main access road.
- Derrylahan-Blackwater: an area of 270 ha lies east of the Gowlan River, extending to the eastern boundary of the site, where the River Blackwater is located

Blackwater Bog is considered a shallow peat cutaway bog with some small pockets of deep peat remaining. The bog is an older production bog and there is extensive development of pioneer cutaway vegetation communities and wetlands across the former production area where peat has been cutaway.

The main landscape feature in this area is the River Shannon and its associated riparian zone and floodplain, which lies west of the western leg of Blackwater Bog. The surrounding landscape comprises of a mosaic 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. Belmont Bog is located immediately adjacent to Blackwater to the west, with Ballaghurt immediately adjacent to the north-east and Bloomhill to the north. Kilmacshane and Garryduff bogs area located south-west of Blackwater Bog, on the opposite bank of the River Shannon. These bogs are also part of the Blackwater bog group.

Blackwater Bog partially overlaps Fin Lough (Offaly) SAC (NPWS Site Code: 000576).

This bog has pumped bog drainage. Pumping of the site was critical to sustaining the industrial peat production areas. Seven pumps were previously in operation at Blackwater. Three of these pumps are still operational and four are no longer operational/decommissioned.

See Figure *BNM-DR-23-14-01: Blackwater Bog: Bog Site Location*, included in the accompanying Mapbook[1], which illustrates the location of Blackwater Bog in context to the surrounding area.

A small part of the greater Blackwater site, outside the current extent proposed for rehabilitation, has already been rehabilitated/stabilised with the development of conifer forestry and various forestry trials. In addition, several wetland areas were created around 2000 including Blackwater Lake and a rewetted area adjacent to Fin Lough SAC, which acted as a buffer.

Blackwater Bog formerly hosted the Clonmacnoise and West Offaly Railway. This was a tourist amenity with a rail engine and carriage transporting visitors around a loop of Blackwater Bog and included various interpretation of local heritage and the heritage of the bog. This tourist amenity is now closed.

[1] Cutaway Bog Decommissioning and Rehabilitation Plan – Blackwater Bog Map Book

3.1 Status and Situation

3.1.1 Site history

Blackwater bog was drained and developed for industrial peat production in the 1950's. Peat production ceased in 2020. The peat was harvested for fuel peat to be used in West Offaly Power in Shannonbridge, Offaly.

3.1.2 Current land-use

- Industrial peat production has now permanently ceased at Blackwater Bog.
- A Bord na Móna workshop and grounds is located in the south of the bog, removed from the currently proposed PCAS extent.
- Ash Repository Facility: Bord na Móna operate an Ash Repository Facility for ESB for the waste ash generated from the power station in Shannonbridge (West Offaly Power). This facility is owned by the ESB. It is licensed by the IPC licences of both ESB (P0611-01) and Bord na Móna (Ref. IPC Licence 502). The ash disposal facility located on the site is likely to be in operation up to 2023 and is similarly outside the lands where rehabilitation is proposed. The drainage of this site requires some pumping of discharges, licenced by an EPA IED licence.
- ESB have applied for planning permission (as of March 2022) for the development of an Integrated Constructed Wetland for the treatment and management of leachate derived from the Ash Disposal Facility. It is proposed that leachate will be treated through a multi-cell constructed wetland. Leachate entering the Integrated Constructed Wetland will flow sequentially through the treatment cells and discharge to an existing surface water drain on-site, ahead of final discharge to the Gowlan River via an existing licenced discharge location. The treated leachate from the ICW will be substantially reduced in volume, particularly during drier periods and the quality of any discharge will comply with the existing EPA IE licence prior to discharge to the Gowlan River. This proposed development will be located within the Ash facility boundary and is outside the lands where rehabilitation is proposed.
- There are two rehabilitated constructed wetlands within Blackwater Bog that are maturing and developing into semi-natural habitats (89.4 ha).
- Parts of Blackwater Bog, along the southern margins (partly within the areas owned and under the control of Bord na Móna) are currently being used by domestic turf cutters to harvest peat.
- Some of the cutaway has been developed for forestry and has been used for Coillte/Bord na Móna BOGFOR forestry research trials (44.32 ha), these lands do not overlap the currently proposed PCAS extent.
- Clonmacnoise-Blackwater Railway. This former tourist amenity, which operated in the 1990s, is now closed.
- The EU Designated site Fin Lough Offaly SAC lies partially within the north-western part of Blackwater bog, although this designated area was never developed for peat extraction.

3.1.3 Future Landuse

- Bord na Móna are proposing to develop a solar farm at Blackwater Bog. The proposed footprint of the solar farm has been mapped as a constraint for this rehabilitation plan. In advance of this development, it is proposed to rehabilitate areas within Blackwater Bog that are not currently constrained in 2022-2024

(see *Figure: BNM-DR-23-14-05: Enhanced Rehab Measures*). The peatland rehabilitation will **either** be in association with a potential renewable energy project, with peatland rehabilitation integrated into the proposed project, **or** will be completed in the absence of any proposed renewable energy project. It is expected that Bord na Móna will revise and update the rehabilitation plan for Blackwater when this renewable energy project planning application process is completed.

- There are several different proposals and feasibility studies ongoing for amenity development (e.g. greenways) on Blackwater Bog. Bord na Móna are reviewing each of these various proposals from local communities, private groups, the local authority and Failte Ireland.

3.1.3. Socio-Economic conditions

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

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

In respect of Blackwater Bog, jobs would have included those to facilitate harvesting for fuel peat to be used in West Offaly Power in Shannonbridge.

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

These job numbers have now declined with the cessation of peat extraction at this bog. It is anticipated that the scheme (PCAS) will provide some employment for a team of workers at this site for a period of time (> 1 year).

3.2 Geology and Peat Depths

3.2.1 Sub-soil geology

The sub-soil geology of the entire Blackwater bog is hereby described.

The underlying geology[2] of the south-eastern section of Blackwater comprises Waulsortian Limestones (Massive unbedded lime-mudstone), whilst the geology of the mid-section of the bog comprises Ballysteen Formation (dark

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

muddy limestone & shale) and the western and north-western margins the underlying geology comprises Navan beds (dark limestone, mudstone and sandstone).

The underlying soils and sub-soils are classed as 'Raised Bog Cutover Peat'. The lowest lying areas are underlain by marl and lacustrine clay (below c. 37mOD), while there are several ridges of more elevated material (rising to >46mOD). This has been interpreted as glacial till due to the presence of clayey material encountered during coring and based on comparable features present in the surrounding area.

3.2.2 *Peat type and depths*

Blackwater bog is a shallow peat bog (peat depths 0-1 m), with some small pockets of deep peat remaining (>2m). The northern rehab area is predominantly shallow peat (0-5m) on the former peat production area, with more deep peat along the margins. Rehabilitation areas in the eastern part of the site are predominantly shallow, with some small pockets of residual deep "*Sphagnum*" peat, (> 2 metres) close to the eastern margin.

3.3 Key Biodiversity Features of Interest

Blackwater Bog is now recolonising with Pioneer Vegetation forming a mosaic with Bare Peat and Wetland habitats.

3.3.1 Current habitats

The most common habitats[3] present within the currently proposed rehabilitation areas include:

- Open Water (FL) with Emergent Wetland Communities (poor fen) and Reedbeds.
- Recolonising Cutover (PB4) comprising pioneer Poor Fen (PF2) with Bog Cotton and Bottle Sedge-dominated Poor Fen vegetation.
- Reedbeds (FS1)
- Cutover Bog (PB4) – areas of bare peat.
- Dry heather-dominated communities on Cutaway Bog (PB4) have developed in drier more elevated land, mainly in mosaic with Birch Scrub (WS1).
- Birch Woodland (WN7) occurs in some small patches around the margins.
- Scrub (WS1) (around margins, mainly dominated by Birch, Gorse and Willow).
- Raised Bog (PB1), remnant sections of raised bog occur in the northern area of Blackwater at Tullaghbeg-Fin Lough.
- Watercourses and Riparian zones including the Gowlan River, Derryhask stream and Drainage Ditches (FW4).

[3] Codes refer to Fossitt (2000), *A Guide to Habitats in Ireland,* The Heritage Council 2000, we note that habitat categories presented are not exhaustive and are meant to indicate the primary habitats of importance which are present. Equivalent Fossitt codes to the habitat descriptions are provided here but we note the referenced figure displays the general BNM habitat layer.

The rehabilitation area consists of three discrete parcels of land within the wider Blackwater boundary. The main habitats in these parcels of land are described below.

Tullaghbeg

The rehabilitation area includes 115 ha of land in the northern part of Blackwater and lies adjacent to Fin Lough (Offaly) SAC. The Gowlan River flows along the north and east side and demarcates the boundary. Wetland habitats have developed in the south-east corner of this parcel of land, dominated by pioneer Reedbeds and Open Water. Extensive areas of Bare Peat remain. The former production area along the northern margin had now revegetated with Pioneer Poor Fen vegetation.

The adjacent Fin Lough area (the SAC) contains a mosaic of Rich Fen (PF1), Raised bog (PB1), Reedbeds (FS1), Scrub (WS1) and some Wet Grassland (GS4) around an infilling Limestone Lake (FL3). Fringe habitats around the margins include raised Bog Remnants (PB1, PB4) Scrub developing on high bog (WS1), Bracken (HP1) and Birch Woodland (WN7).

Derrylahan-Blackwater

This area comprises 270 ha and is bounded on the south west by the Gowlan River and the north east by the Derryhask stream. This section extends to the boundary of Blackwater Bog where the Blackwater River forms the demarcation between Blackwater and the adjacent Belmont Bog (rehabilitated in 2021).

The majority of this area is re-vegetating with a mixture of Open Water, Pioneer Poor Fen, Reedbeds And Birch Scrub, although some areas of Bare Peat still remain. A significant portion of this section is quite wet and Wetland habitats have developed at either end of this parcel of land, dominated by Reedbeds and Open Water. It is subject to annual flooding or high water levels during the winter months, due to its proximity to the corridor of the Blackwater River.

Clondelara-Blackwater

This rehabilitation area consists of 170 ha of land and is the most westerly parcel of land proposed for rehabilitation. The Gowlan River flows to its east whilst to the west is the main access road into the centre of Blackwater and the ash deposition facility.

The majority of this section was in active peat production until relatively recently and is now starting to revegetate with Pioneer Poor Fen and Scrub communities, with a large area of open water and extensive Reedbeds forming adjacent to the Gowlan River. Drier areas occur within the southern part of this section with Bare Peat, Pioneer Poor Fen and Scrub communities. Bodies of more permanent water would be subject to increased inundation during the winter period.

See Drawing number BNM-DR-23-14-17 titled **Blackwater Bog: Current Habitat Map**, included in the accompanying Mapbook, which illustrates the habitats at Blackwater Bog.

Wetland, Poor Fen and Reedbed habitat in the north-eastern part of Blackwater (Derrylahan-Blackwater section)

Wetland, fringed by Reedbed habitat in the south-western part of Blackwater (Clondelara-Blackwater)

Bare peat and Poor Fen habitat in the north-eastern part of Blackwater (Derrylahan-Blackwater section)

Bare peat and Poor Fen habitat in the south-western part of Blackwater (Clondelara-Blackwater)

Dry heather dominated vegetation and Birch Woodland along marginal land in the north-eastern part of Blackwater (Derrylahan-Blackwater section)

Dry Heather dominated vegetation and Birch Woodland occurs in drier more elevated areas in the central north-eastern part of Blackwater (Derrylahan-Blackwater section)

3.3.2 Species of conservation interest

A number of species of conservation concern utilize the habitats available at Blackwater Bog. The following is a summary of the records of these species available within both BnM records (covering the whole of Blackwater Bog) and those of the National Biodiversity Centre.

A review of available Biodiversity records from the National Biodiversity Data Centre (hereafter NBDC) of flora and fauna recorded within a polygon including Blackwater Bog found records for several terrestrial mammal species, including records for Badger (*Meles meles*), Eurasian Pygmy Shrew (*Sorex minutus*), Eurasian Red Squirrel (*Sciurus vulgaris*), European Otter (*Lutra lutra*), Pine Marten (*Martes martes*), Red Deer (*Cervus elaphus*), West European Hedgehog (*Erinaceus europaeus*), Irish Hare (*Lepus timidus subsp. hibernicus*) and Irish Stoat (*Mustela erminea subsp. hibernica*).

A number of bat species have also been recorded on or within 5 km of Blackwater bog including Common Pipistrelle (*Pipistrellus pipistrellus sensu lato*), Soprano Pipistrelle (*Pipistrellus pygmaeus*) Daubenton's Bat (*Myotis daubentonii*).

The rehabilitation footprint within Blackwater Bog intersects one 10 km square (N02), which has records of 70 species of birds (2007-2011 Bird Atlas period), 358 species of flowering plant, 27 species of moss, 1 amphibian species, 19 butterfly species, 67 moth species and 77 mollusc species.

Lepidopteran species of conservation interest recorded at Blackwater bog include the near threatened species Dingy Skipper (*Erynnis tages*), Small Heath (*Coenonympha pamphilus*), endangered species Wall (*Lasiommata megera*). Dingy Skipper and Wall have been encountered along the Bord na Móna railways. The presence of the rare snail, *Vertigo geyeri*, a species listed on Annex II of the E.U. Habitats Directive, at Fin Lough is of considerable conservation significance.

Numerous bird species are known to use the cutover bogs in Ireland's midlands as breeding grounds, wintering grounds or both. Blackwater contains several semi-natural wetland habitats and a substantial part of the bog as a whole can be subject to inundation during winter periods (although this can vary inter-annually). Based on previous BNM commissioned surveys these areas have the potential to attract substantial amounts of Whooper Swans (*Cygnus cygnus*) (Annex I Birds Directive species) and waterfowl during the winter months As recently as 2015, Blackwater supported a nationally important population of non-breeding Teal (*Anas crecca*)(i.e. >340) and smaller numbers of Mallard (*Anas platyrhynchos*), Wigeon (*Anas penelope*) and Pintail (*Anas acuta*), and was considered a potential sub-site of the Mid Shannon Callows SPA (in the Whooper Swan context) based on the occurrence of internationally important numbers of this species on at least one occasion (BES 2015[4]). Two areas within Blackwater Bog (outside the current proposed rehabilitation extent) were previously counted as 'Blackwater Railway Lakes' as part of the Irish Wetland Bird Survey (IWeBS) and published reporting describes the occurrence of nationally important numbers of Teal and Pintail , along with occasionally nationally important numbers of Whooper Swan (Crowe *et al.* 2005).

Foraging Hen Harrier (*Circus cyaneus*) are regularly recorded at Blackwater during the winter or non-breeding period and are known to roost at one location outside the currently proposed rehabilitation extent. Individuals may also be recorded foraging occasionally during the breeding period.

Blackwater (as a whole) is a notable location for breeding waders. Surveys carried out in 1997 recorded 25 pairs of Lapwing (*Vanellus vanellus*), 17 pairs of Ringed Plover (*Charadrius hiaticula*), 6 pairs of Common Sandpiper

[4] BES (2015) BORD NA MONA WINTER BIRD SURVEY, 2014-2015 BLACKWATER BOG GROUP DRAFT REPORT OCTOBER 2015. Unpublished report.

(*Actitus hypoleucos*), 5 pairs of Redshank (*Tringa totanus*) and 2 pairs of Common Snipe (*Gallinago gallinago*) (Cooney, 1997). A follow up survey carried out in 1998, recorded 55 breeding pairs of waders, which included 29 pairs of Lapwing, 5 pairs of Common Snipe, 5 pairs of Redshank, 12 pairs of Ringed Plover and 4 pairs of Common Sandpiper (Cooney, 1998). About half of the breeding wader pairs were located around the artificial lakes, with the remainder found in low lying areas to the north-east, that had numerous shallow pools. During breeding wader surveys carried out at Blackwater in 2014 (Copland & Gallagher, 2014) the following breeding pairs were recorded: 3 pairs of Lapwing, 1 pair of Redshank, 1 pair of Ringed Plover, 1 pair of Common Sandpiper and 1 pair of Common Snipe. Whilst breeding numbers of some wader species have likely decreased due to habitat succession, it is still considered that suitable habitats across Blackwater Bog are used by breeding waders.

Multiple signs of terrestrial mammal species have been recorded on or in close proximity to the bog during BNM ecology surveys including Deer, Badger, Hare, Red Fox, Pine Marten and Squirrel. Otter signs have been recorded at the wetlands within the site. The Annex II species (EU Habitats Directive) Whorl Snail (*Vertigo geyeri*), was recorded in 1998 (Moorkens 1998), in the northern part of Fin Lough SAC.

3.3.3 Invasive species

Invasive alien species known to occur at Blackwater Bog (or desktop review suggests presence is likely), and for which reasonably foreseeable source impact pathways for dispersal may result from the proposed PCAS are described here.

There are NBDC records and BNM records for Pitcherplant *(Sarracenia purpurea)* from marginal habitat close to the western boundary of Blackwater, however there are no records for this species within the footprint of the proposed rehab areas.

No aquatic invasive species are described in available EPA documentation[5] in respect of WFD Cycle 2 sub-catchment reporting.

A broad range of common garden escapes are occasionally present around the margins of Bord na Móna bogs, and although spatial overlap with the PCAS is expected to be limited, these are, where necessary, to be treated in line with best practice during PCAS activities.

3.4 Statutory Nature Conservation Designations

There are a number of European Sites (SAC's or SPA's) in close proximity (i.e. within a 5 km radius at minimum) to Blackwater Bog. In addition, there are a number of nationally designated sites (NHAs and pNHAs) in proximity to the site.

Fin Lough (Offaly) SAC (site code: 000576) lies within the Bord na Móna site boundary and is immediately adjacent to the rehabilitation area in the northern part of the site. The qualifying interests of this SAC are Alkaline fens [7230] and Geyer's Whorl Snail (*Vertigo geyeri*) [1013]. This site is also designed as a pNHA.

Mongan Bog SAC (site code: 000580) lies 240m north of the Blackwater Bog boundary (657 m north of nearest rehabilitation area). The qualifying interests of this SAC are Active raised bogs [7110], Degraded raised bogs still

[5] https://catchments.ie/wp-content/files/subcatchmentassessments/07_6%20Blackwater[Longwood]_SC_010%20Subcatchment%20Assessment%20WFD%20Cycle%202.pdf

capable of natural regeneration [7120] and Depressions on peat substrates of the *Rhynchosporion* [7150]. Mongan Bog SPA (site code: 004017) overlaps the boundary of this SAC and is designated for Greenland White-fronted Goose *(Anser albifrons flavirostris)* [A395]. This site is also designated as a pNHA.

Pilgrim's Road Esker SAC (site code: 001776) lies 1.4 km north west of Blackwater Bog and is designated for Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210]. This site is also designated as a pNHA.

Moyclare Bog SAC (site code: 000581) lies 3.4 km south-east of Blackwater Bog and is designated for Active raised bogs [7110], Degraded raised bogs still capable of natural regeneration [7120] and Depressions on peat substrates of the *Rhynchosporion* [7150]. This site is also designated as a pNHA.

River Shannon Calllows SAC (site code: 000261) lies 500m west of the boundary of Blackwater Bog (2.5 km from the closest rehabilitation area). This SAC is designated for *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410], Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*) [6510], Limestone pavements* [8240], Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae)* [91E0] and Otter (*Lutra lutra*) [1355].

Middle Shannon Callows SPA (site code: 004096) overlaps this SAC boundary and is designated for Black-tailed Godwit (*Limosa limosa*) [A156], Golden Plover (*Pluvialis apricaria*) [A140], Black-headed Gull (*Chroicocephalus ridibundus*) [A179], Wigeon (*Anas penelope*) [A050], Whooper Swan (*Cygnus cygnus*) [A038], Corncrake (*Crex crex*) [A122], Lapwing (*Vanellus vanellus*) [A142] and Wetlands [A999]. The River Shannon Callows is also designated as a pNHA.

The River Suck Callows SPA (site code: 004097) lies 1.1 km west of Blackwater Bog (approximately 4 km west of the nearest rehabilitation area), and is designated for Whooper Swan (*Cygnus cygnus*) [A038], Wigeon (*Anas penelope*) [A050], Golden Plover (*Pluvialis apricaria*) [A140], Lapwing (*Vanellus vanellus*) [A142], Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395] and Wetland and Waterbirds [A999]. This site is also designated as an NHA.

In addition, there are a number of other nationally designated sites (NHAs and pNHAs) in proximity to the site. Lough Nanag Esker pNHA (site code: 000910) lies outside the western boundary of the site. Clonfinlough Esker pNHA (Site code: 000892) lies 815 m north east. Clorhane Wood pNHA (site code: 000894) is located approximately 325 m west of the Blackwater Bog boundary. Clonlyon Glebe Bog pNHA (site code: 001830) is located approximately 3 km north-east of Blackwater Bog.

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. The closest Ramsar Site to Blackwater is Mongan Bog, Co. Offaly, which lies 240m north of the Blackwater Bog boundary (657m north of nearest rehabilitation area). This site is designated for its raised bog habitat and is also internationally important for wintering populations of Greenland White-fronted Goose *(Anser albifrons flavirostris).* This site is also designated as SAC and SPA.

3.5 Hydrology and Hydrogeology

Blackwater forms part of the Lower Shannon Catchment (Catchment ID : 25B) as defined by the EPA under the Water Framework Directive (WFD) and is primarily situated within the Shannon[Lower]_SC_030 sub-catchment,

with a small portion of the bog falling within the SHANNON (Upper)_130 sub-catchment. It is surrounded by flat agricultural land and additional bog land areas. The Bog is situated just over 1 km to the North-East of Shannonbridge, between the Shannon River to the West and Belmont Rd to the East. The bog contains several drainage pathways and discharge locations, with the majority of the bog discharging to the Shannon River to the West of the Bog. The nearest Water Framework Directive gauging monitoring points in the area are located south of the bog where the water status was recorded as good in 2017 (Q=4, Station Name: Blackwater Br).

There are several rivers within and around the margins that drain the site. The Gowlan River (EPA code: 26G04), flows around the northern and north-eastern site boundary, and through the central part of the site in a south-easterly direction. This watercourse flows along the boundary of all three rehabilitation parcels within Blackwater Bog. The Derryhask stream (EPA code: 25D99) flows through the eastern section of the site. Both the Derryhask and the Gowlan watercourses discharge to the Blackwater (Shannonbridge) River (EPA code: 25B27), which flows in a south-westerly direction along the eastern boundary of Blackwater. This watercourse is a tributary of the River Shannon (lower) (EPA code: 25S01).

Regional hydrological data suggest that Blackwater receives average precipitation of 890mm/yr (1981-2010), with an estimated evapotranspiration rate of c. 505mm/yr, leaving an average effective precipitation of 385mm/yr. Assuming no recharge to groundwater and no groundwater contribution to discharge from the bog, the available precipitation that may become runoff (assuming no change in storage) is 385mm/yr, which equates to an annual runoff rate of c. 3,850m3/ha.

GSI data suggests that Blackwater Bog is underlain by several geological formations, the main bedrock units being the Ballysteen formation and Waulsortian Limestones which underlie the majority of the site. In addition, the Navan Beds underlie a small section of the bog towards the north-east and the Lucan Formation underlies a small portion to the south-east. All of these bedrock units are classified as Locally Important Aquifers (Bedrock which is Moderately Productive only in Local Zones). There are several bedrock faults trending through Blackwater Bog and the surrounding areas. Geological Survey of Ireland (GSI) mapping identifies several karst features (Springs and superficial solution features) within close proximity to the bog, with the nearest feature being located c. 250m from the North-western boundary of the bog. No data exists concerning depth to bedrock whilst the closest bedrock outcrop occurs 0.8 km to the east of the bog.

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.

Quaternary Sediment maps show an overview of Blackwater underlain by peat, yet surrounded by inorganic deposits, including till derived from limestone which occurs to the south-east and south-west of the bog and gravels derived from limestone which occur to the north-east, north and north-west. There are a number of eskers towards the north of the bog.

While Groundwater Vulnerability is typically used to indicate the susceptibility to groundwater pollution, it can provide a useful proxy indication of likely groundwater flow rates in the surrounding area. Groundwater vulnerability is generally high in the areas surrounding the bog; however, a number of extreme vulnerability areas can be identified in the surrounding area, typically associated with gravel deposits or bedrock outcrop.

Blackwater Bog has a pumped drainage regime. Hydrological modelling (BNM-DR-23-14-09 titled **Blackwater Bog: Depression analysis**) indicates that parts of the bog are natural basin with significant potential for re-wetting, with the assumption that all drains would be blocked. It is likely that a portion of the basins in target areas will

re-wet with deeper water, creating a mosaic of wetland habitats, when drains are blocked. Note that pumping is ongoing (three operational pumps). Some pumping is is likely to continue to support potential future land-use.

Blackwater Bog has four outfall points and associated silt pond infrastructure. Blackwater bog has two treated surface water outlets to the Blackwater River, and one to the Shannon Lower and one direct to Shannon Upper, all via a silt pond network.

3.6 Emissions to surface-water and watercourses

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

Blackwater bog has two treated surface water outlets to the Blackwater River (E_SH_25B270200 BLACKWATER (SHANNONBRIDGE)_020, and one to the Shannon Lower (IE_SH_25S012000 SHANNON (LOWER)_010 and one direct to Shannon Upper (IE_SH_26S021920 SHANNON (Upper)_130), all via a silt pond network.

The Blackwater River or receiving Shannon Upper/Lower are not indicated as being under pressure from peat or peat extraction in the third cycle River Basin Management Plan, currently under preparation.

Details of silt ponds, associated surface water emission points and those being monitored and sampled as part of the PCAS scheme are detailed on the accompanying structures map along with water quality map, see Drawing number BNM-DR-23-14-02 titled **Blackwater Bog: Structures and Sampling**, along with Drawing number BNM-DR-23-14-WQ01 titled **Blackwater Bog: Water Quality Map** included in the accompanying Mapbook, which illustrate the various drainage and water quality infrastructure present at Blackwater Bog.

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

The main emission limit value associated with this bog is 35mg/l suspended solids, with trigger levels for ammonia of 3.7 mg/l and COD 100mg/l. Initial monthly ammonia concentrations from November 2020 to October 2021 have a range of 0.021 to 0.213 mg/l with an average of 0.128 mg/l. Results for suspended solids for the same period indicate a range of >2 to 33mg/l with an average o of 3.31mg/l.

From an analysis of any monitoring over the past 6 years of the IPC licence environmental monitoring of some of the discharges from this bog, indicate that results were under the ELV for SS and Ammonia and broadly under the trigger levels for COD (see Table 3.1.).

Bog	SW	Monitoring	pH	SS mg/l	TS mg/l	Ammonia mg/l	TP mg/l	COD mg/l	Colour
Blackwater Bog	SW-74	Q2 21	7.4	3	172	0.176	<0.05	44	191
Blackwater Bog	SW-75	Q2 21	7.5	2	337	0.126	<0.05	45	184
Blackwater Bog	SW-76	Q2 21	7.5	7	245	0.179	<0.05	70	347
Blackwater Bog	SW-80	Q2 21	7.5	7	304	0.127	<0.05	44	182
Blackwater Bog	SW-74	Q1 19	7.7	<5	384	0.56	<0.05	48	94
Blackwater Bog	SW-75	Q1 19	7.8	<5	414	0.2	<0.05	36	68
Blackwater Bog	SW-76	Q1 19	7.7	<5	266	0.03	0.05	70	202
Blackwater Bog	SW-78	Q4 19	6.5	7	128	0.432	<0.05	79	497
Blackwater Bog	SW-79	Q4 19	7	4	198	2.36	<0.05	66	327
Blackwater Bog	SW-80	Q1 19	7.8	<5	416	0.09	<0.05	36	72
Blackwater Bog	SW-83	Q4 19	6	4	148	1.09	<0.05	106	594
Blackwater Bog	SW-78	Q3 18	7.6	5	326	5.1	0.05	72	164
Blackwater Bog	SW-79	Q3 18	7.7	5	470	0.11	0.05	26	50
Blackwater Bog	SW-83	Q3 18	7.2	5	248	1.5	0.05	107	282
Blackwater Bog	SW-81	Q4 18	7.9	5	226	0.72	0.05	50	134
Blackwater Bog	SW-82	Q4 18	7.4	5	206	2.5	0.05	81	250
Blackwater Bog	SW-84	Q4 18	6.6	5	270	3.4	0.05	85	283
Blackwater Bog	SW-86	Q4 18	7.5	36	210	1.1	0.08	113	152
Blackwater Bog	SW-74	Q2 15	7.8	5	374	1.3	0.05	51	85
Blackwater Bog	SW-77	Q2 15	8	6	372	0.36	0.05	20	60
Blackwater Bog	SW-78	Q2 15	7.7	5	328	0.49	0.05	49	108
Blackwater Bog	SW-80	Q3 15	8.1	5	362	0.02	0.05	43	69
Blackwater Bog	SW-81	Q3 15	8.1	5	410	0.16	0.05	23	99
Blackwater Bog	SW-82	Q3 15	8	9	272	0.29	0.05	57	175
Blackwater Bog	SW-83	Q3 15	7.4	5	226	1.6	0.05	120	5
Blackwater Bog	SW-84	Q3 15	7.7	5	354	0.21	0.05	66	206
Blackwater Bog	SW-86	Q3 15	7.8	5	342	0.19	0.05	60	178

Table 3.1: Decommissioning and Rehabilitation Programme Water Quality Monitoring.

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

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

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

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

This is necessary to ensure that there is alignment with the WFD monitoring programme and that where possible, the monitoring programme will enable any improvements in water quality or establishing trends to be quantified

against any available WFD monitoring data. It will also enable the periodic sharing of data which will inform the monitoring reports, success criteria and enable LAWPRO under the Water Framework Directive to track any changes in pressures and be aware of changes in water chemistry.

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

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

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

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. The area proposed for rehabilitation is recolonising with pioneer vegetation, but areas of bare peat still remain. Re-wetted peat also aids the primary objective of stabilizing peat, as when peat is re-wetted it is not vulnerable to wind erosion. Re-wetted peat and the development of wet peatland habitats can also act as sinks for silt and mobile peat, and increases additional retention time for solids, and the peatland vegetation can quickly stabilise this material within blocked drains on site (by acting like constructed wetlands).

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

Water will still discharge from designated emission points when rehabilitation at Blackwater 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 the key water body receptors; the Blackwater (Shannonbridge) River (EPA code: 25B27); the River Shannon (lower) (EPA code: 25S01) and the Shannon Upper (EPA code: 26S02) and is expected to support the future status of the waterbody as being of Good Status.

3.7 Fugitive Emissions to air

None.

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

3.8 Carbon emissions

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

The EPA-funded CarbonRestore Project (Renou-Wilson et. al. 2012) found that rewetting of drained peatlands can lead to restoration of functional peatland, such as the return of typical plant and animal species, which in turn may lead to the restoration of peat-formation and the C-sink function. The EPA NEROS project carried out GHG flux research at Moyarwood Bog and found that Moyarwood Bog was overall a Carbon sink (sink for CO_2 and a source for Methane) 6 years after bog restoration was carried out (Renou-Wilson et al. 2018).

The Reedflux Project – funded by Bord na Móna and EPA (Wilson et al. 2016) examined GHG fluxes at Blackwater Bog over a 5-year period. This study found that re-wetting created a carbon sink for CO_2 and a source for Methane. Overall, re-wetting at Blackwater reduced the global warming potential of the cutaway compared to an adjacent drained area. Rewetted sites may be more sensitive to interannual changes in weather conditions than their more resilient intact counterparts and may switch from an annual CO2 sink to a source if triggered by slightly drier conditions.

It is expected that Blackwater Bog will become a reduced carbon source following rehabilitation. The potential of any cutaway site to develop as a carbon sink in the longer-term depends on the success of the rehabilitation measures, the extent of development of *Sphagnum*-rich or other peat-forming habitats, the balance of carbon fluxes from different cutaway habitats and future climatic conditions. Much of this site is expected to develop fen and wetland vegetation that has potential to develop as a reduced GHG source when there are optimal hydrological conditions. There is limited potential for short-term development of *Sphagnum*-rich vegetation. Birch woodland is expected to develop on the drier mounds and peripheral headlands. Only a small part of the site has the potential to develop *Sphagnum*-rich peat-forming vegetation.

3.9 Current ecological rating

(Following NRA (2009) Evaluation Criteria and applicable to Blackwater Bog as a whole including lands outside the currently proposed PCAS extent).

Bare peat and other intensively managed areas are assessed as **local importance (lower value)**. Marginal habitats including woodland, scrub, pioneer cutaway habitats may act as a refuge, ecological corridors for wildlife or foraging habitat for wintering Hen Harrier are deemed to be **locally important (higher value)**. Mosaics of open water, pioneering fen and other habitat which support breeding waders are **locally important (higher value)** but some locations due to aggregations or presence of rare breeding species may be **Nationally** or **Internationally** important. Waterbodies which act as refugium's for Whooper Swan and other wintering wildfowl during the non-breeding period are evaluated as of **National Importance** but it is noted these are dependent on numbers which occur and may frequently reach **International Importance.** Habitats which host roosting Hen Harrier during the non-breeding period are **Internationally Important.**

Sections of the site (including Fin Lough in the northern part of the site) have been designated as part of nature conservation sites (River Shannon Callows and Fin Lough SACs, Lough Nanag pNHA). These areas contain habitats of particular ecological value (Raised Bog, Alkaline Fen) that are of **International Importance**. These areas are outside the footprint of the current rehabilitation areas.

4. CONSULTATION

4.1 Consultation to date

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

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

- General consultation with range of stakeholders at annual Bord na Móna Biodiversity Action Plan review days 2010-2018,
- Ongoing consultation with Coillte regarding forestry management (forestry leased to Coillte),
- Bird surveys and monitoring carried out by Birdwatch Ireland for Bord na Móna,
- Development of future amenity (local community, private groups, Offaly County Council and Failte Ireland),
- Midlands & East Regional WFD Operational Committee (River Basin Management Plans),
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht),
- The operation of the waste ash facility (ESB).
- Ongoing feasibility and development of amenity, greenways and cycle tracks (local groups, Offaly Leader, Offaly County Council and Failte Ireland);
- Consultation with Green Offaly regarding a proposed Peatland Biosphere Reserve in Offaly.
- Ongoing consultation and engagement with the National Park's and Wildlife Service regarding the conservation of Finlough SAC.
- Consultation between Bord na Móna and stakeholders as part of the proposed Blackwater Solar Farm is part of a different process and is not listed here (Home | Blackwater Solar Farm).

To inform the current Plan, both national and local stakeholders, including neighbours whose land adjoins Blackwater 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) were contacted. Any identified local interest groups were sought and informed of the opportunity to engage with this rehabilitation plan, and when identified invited to submit their comments or observations in relation to the proposed rehabilitation at Blackwater Bog (Appendix XII).

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 Blackwater Bog – these are summarised below. Issues raised below include responses received as part of general consultation in relation to PCAS plans in 2021.

4.2.1 Assessments of rehabilitation

To date a number of consultees including: the IFA, the IMSCA and Trinity College Dublin have raised concerns regarding the duration and scope of consultation period. Stakeholders suggested that the consultation period should be extended to allow all potential stakeholders to make submissions where required.

4.2.2 Assessments of rehabilitation

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

4.2.3 Restoration scope

Restoration/rehabilitation of marginal habitats was raised by IPCC and BCI relating to the finalisation of several bog rehab plans in 2021 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 the IPCC, University College Dublin and Trinity College researchers in their respective submissions relating to the finalisation of several bog rehab plans in 2021. Irish Water reiterated the requirement of a strong monitoring program with respect to water quality during and post rehabilitation.

4.2.5 Flooding and drainage

In response to consultation carried out in regard to several bog rehab plans in 2021, the IFA, Department of Agriculture Food and the Marine, and ICMSA queried the likely impacts of the proposed rewetting on adjoining lands, 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.

OPW responded via e-mail to advise that Blackwater Bog does not overlap with any OPW Arterial Drainage Scheme. The OPW expressed support for the Blackwater bog rehabilitation and rewetting as a nature based catchment management measure in managing flood flows in the Shannon River Catchment and acknowledged the many other environmental co-benefits from developing this project.

4.2.6 Future management

The IFA previously expressed concerns regarding the future ownership of the BnM bogs subject to rehabilitation. They expressed a desire for contingency planning for potential future ownership of designated bogs so as to ensure no negative impacts arise on adjacent properties from any new ownership.

4.2.7 Fin Lough SAC

There has been ongoing consultation and engagement with NPWS regarding the conservation of Fin Lough Bog SAC. Issues include the ongoing use of the travel path and industrial railway adjacent to Fin Lough SAC by Bord na Móna and management of this area. Other ongoing issues included water levels in Fin Lough Lake and the potential impact of industrial peat extraction in the adjacent former production area. Rocks were placed along the margin of a small area of fen habitat isolated on the northern side of the travel path to prevent disturbance to this area by vehicles after a request by NPWS. More recently NPWS have queried whether the drain that separates Fin Lough SAC and the adjacent cutaway could be blocked as part of the rehabilitation plan.

4.2.8 Other issues

Other issues (raised by IPCC) during the finalisation of several bog rehab plans in 2021 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 with regard to Blackwater Bog and replies, see Appendix XI.

4.3 Bord na Móna response to issues raised during consultation

4.3.1 Consultation

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

4.3.2 Assessments of rehabilitation

AA screening will be undertaken on all the bogs as part of PCAS and this is currently being undertaken by external consultants for Blackwater 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) has been undertaken on all the bogs in PCAS (Appendix XII). The aim for known archaeology on these bogs is to accomplish preservation in situ and we are taking steps to identify and avoid all known archaeology.

Bord na Móna aim to achieve this through including all known archaeology in the planning process of rehabilitation works and implementing an exclusion or buffer zone around these features. These measures should sufficiently protect any archaeology in these areas, during any ground works in the final plan. It is anticipated that any archaeology will benefit from the ultimate remit of the rehabilitation, in that water tables will be raised thereby preserving in-situ. There is also an identified procedure for managing reports of stray finds that may arise during rehabilitation works.

4.3.3 Restoration scope

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

4.3.4 Monitoring

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

4.3.5 Flooding, drainage or other impacts on adjacent land.

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

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

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

4.3.6 Future management

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

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

4.3.7 Amenity

Creating amenity such as walking tracks or greenways is not part of the direct scope of PCAS. There is no current amenity planned for Blackwater by BnM. Re-establishing previous amenity use (the former Blackwater railway) is not considered feasible at present due to technical and health and safety issues.

However, there have been discussions between local community groups and several other interested parties with Bord na Móna around various amenity proposals. There are also several feasibility studies considering potential greenway routes in Offaly and one such potential route would be along the BnM railway through Blackwater linking Clonmacnoise with Shannonbridge. PCAS will enable and support any future amenity development. There can be further opportunities to develop amenity at this site. Any future amenity can be positively aligned and integrated to any after-use plans following the completion of the proposed rehabilitation at Blackwater Bog. Rehabilitation measures proposed for Blackwater Bog do not need to be amended to integrate any future amenity projects (greenways) positioned along the margin of the former production bog or along the former bog railways.

4.3.8 Fin Lough SAC

Bord na Móna will continue to engage with NPWS regarding the conservation of Fin Lough Bog. The industrial railway is a critical piece of infrastructure for Bord na Móna and will be required until milled peat stock is removed from Bunihinly, Kilgarvan and Bloomhill Bogs. The travel path is required for continued maintenance of the industrial railway. It is anticipated that the bog railway will be decommissioned when peat stocks are removed from the above bogs. This is likely to occur in 2024-2025. Bord na Móna will consider the future use of this travel path when the bog railway has been decommissioned.

Industrial peat extraction has ceased in the area of former production bog adjacent to Fin Lough SAC. It is proposed to re-wet these sections as part of this rehabilitation phase. This will support the hydrological conditions and the conservation objectives of Fin Lough SAC. Bord na Móna are happy to continue to engage with NPWS regarding the conservation of Fin Lough Bog.

4.3.9 Other issues

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

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

4.3.10 Concluding statement.

- No specific issues were raised during consultation that required significant changes to the substance of the rehabilitation plan.
- 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, rights of way or turf-banks. This does not change the overall rehabilitation goals and outcomes and can be integrated with the other rehabilitation measures to allow cutaway re-wetting.
- No changes were required to the rehabilitation plan to enable any future planned or potential amenity.

5. REHABILITATION GOALS AND OUTCOMES

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

- Meeting conditions of IPC Licence.
- Stabilisation or reduction in water quality parameters of water discharging from the site (e.g. suspended solids).
- Reducing pressure on receiving waterbodies that have been classified as *At Risk* from peatlands and from peat extraction, via stabilization or improving water-quality from this bog, and therefore, reducing pressures.
- Optimising hydrological conditions for **climate action benefits as part of PCAS**.
- Optimising hydrological conditions for the development of Wetland habitats such as Reed Swamp, Fen and Wet Woodland on shallow cutaway peat, and eventually naturally functioning Wetland and Peatland habitats.
- Optimising hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future.
- Part of Blackwater and the now proposed rehabilitation areas has already vegetated and is stabilising.
- Integrating rehabilitation measures with existing conifer forestry BOGFOR trials. It is not proposed to change or affect any conifer or commercial forestry via this scheme. The future forestry management of these areas will be defined by Coillte.
- Supporting future renewable energy land-use planning. Integrating rehabilitation measures with planned amenity infrastructure on site. It is not proposed to carry out any rehabilitation actions to change or negatively affect any infrastructure.
- Integrating rehabilitation measures with future potential amenity projects. It is expected that any future amenity projects will be integrated with the emerging cutaway landscape and future potential land-use.
- 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 Blackwater Bog. This will happen over a longer timeframe than the implementation of this rehabilitation plan. A significant part of the area proposed for rehabilitation has already largely vegetated and stabilising.
- 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. 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 small proportion of the bog has potential to develop *Sphagnum*-rich habitats in this timeframe.

Nevertheless, re-wetting across the entire bog, as part of the Scheme, will improve habitat conditions of the whole bog. Other peatland habitats will develop in a wider mosaic that reflects underlying conditions.

- Rehabilitating former industrial peat production bog will also in the longer-term support other ecosystem services such as such the development of new habitat to support biodiversity and local attenuation of water flows from the bog.
- WFD status in receiving water bodies can be affected by peatlands and peat extraction but is also affected by other sources such as agriculture. In addition, receiving water bodies that are assessed as At Risk from peatlands and from peat extraction are likely to have several contributary sources of impacts (private peat extraction and Bord na Móna). Reducing pressures due to former peat extraction activities at Blackwater Bog will contribute to stabilising or improving water quality status of receiving water bodies in general. Ultimately, improving the WFD status of the receiving waterbody will depend on reducing pressure from a range of different sources, including peatlands in general (private and Bord na Móna).
- Bord na Móna are also planning rehabilitation measures in some nearby bogs (e.g. Bloomhill and Bunahinly-Kilgarvin) in 2022. There are expected to be cumulative water quality and other ecosystem service benefits to receiving water bodies such as the the Blackwater (Shannonbridge) River (EPA code: 25B27); the River Shannon (lower) (EPA code: 25S01) and the Shannon Upper (EPA code: 26S02).
- Current and future land-use at Boora Bog. Rehabilitation will focus on re-wetting that can be integrated into the current and potential future land-uses including renewable energy, amenity, and conifer forestry.
- Re-wetting in general will benefit the future preservation of most known and unknown archaeological features. An Archaeological Impact Assessment (AIA) is to be carried out under the PCAS scheme.

6. SCOPE OF REHABILITATION

The principal scope of this enhanced rehabilitation plan is to rehabilitate the bog or the currently proposed rehabilitation extent This is defined by:

- The area of Blackwater Bog and area proposed for rehabilitation as part of this phase (See Mapbook).
- EPA IPC Licence Ref. P0502-01. As part of Condition 10.2 of this licence, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. Blackwater bog is part of the Blackwater Bog group.
- The Scheme is designed to exceed the stabilisation requirements as defined by the IPC Licence. This scheme is designed to enhance the ecosystem services of Blackwater 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 Blackwater Bog mean that wetland creation and the development of Open Water, Fen, Reed Swamp and Wet Woodland as the most suitable rehabilitation approach for the area proposed for rehabilitation, including those areas currently proposed. Blackwater Bog lies in the floodplain of the River Shannon and has a pumped drainage regime and a significant area is likely to eventually develop as Wetland habitats, particularly Reed Swamp. There is only a small portion of residual deep peat.
- The key goals and outcomes of rehabilitation set by Bord na Móna. Bord na Móna have defined the key goal and outcome of rehabilitation at Blackwater Bog as **environmental stabilisation and optimising residual peat re-wetting, and setting the area proposed for rehabilitation on a trajectory towards the development of wetlands/Reed Swamp and fen on shallow more alkaline peat and other subsoils, and integrating rehabilitation with current land-uses and potential future land-uses..**
- Proposed land-use. Bord na Móna are currently developing a renewable energy project called Blackwater Solar Farm. This proposed project is in the pre-planning stage. It is planned to integrate rehabilitation with the future proposed development.
- Rehabilitation of Blackwater Bog will support multiple national strategies of climate action, biodiversity action and other key environmental strategies such was the Water Framework Directive.
- The time frame for the delivery of the planned rehabilitation will be undertaken according to available resources and appropriate constraints.
- Current land-uses. It is not proposed to carry out any intensive rehabilitation actions to change or negatively affect existing infrastructure or existing land-uses.

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 (open water, Reed Swamp, Fen, Wet Woodland , and Birch Woodland). Industrial peat extraction at Blackwater bog commenced in the 1950s and finished in 2020. As a result, peat depths are shallow for the most part (i.e.

<1m). In addition, this bog is a wet bog, lying in the floodplain of the River Shannon and Wetland habitats are developing already. These are local factors that will influence the future trajectory of this bog, which need to be considered as part of the wider rehabilitation work.

- Remaining peat depths are generally shallow for the majority of the area proposed for rehabilitation, with small pockets of deep peat remaining (greater than 2 metres).
- **Seasonal constraints.** Ground conditions, weather and seasonal inundation may affect the scheduling and scope of rehabilitation measures. At Blackwater Bog, the majority of the bog has been cutaway. There are local factors that will influence the future trajectory of the area proposed for rehabilitation which need to be considered as part of the wider rehabilitation work. Blackwater Bog is considered a 'wet bog', with a history of seasonal inundation. This bog is a pumped bog, and four of the original seven pumps are no longer operational.
- **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. 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**. There are several known archaeological features present at Blackwater Bog. The discovery of monuments or archaeological objects during peatland rehabilitation may potentially constrain the rehabilitation measures proposed for a particular area. While the rehabilitation will optimise hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future, any new archaeology may require rehabilitation measures will be reviewed and adapted. If this occurs, rehabilitation measures will be reviewed and adapted. An Archaeological Impact Assessment (Appendix XII) has been carried out to mitigate against any impact on found archaeology at Blackwater Bog. Known archaeological sites have been constrained and buffered to avoid direct disturbance. In the worst-case scenario works affecting the surface and sub-surface of the bog might disturb previously unknown archaeological deposits or artefacts without preservation by record taking place. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it should be avoided and reported to Bord na Móna Archaeological Liaison Officer and the National Museum of Ireland.
- **Turbary**. Parts of blackwater along the south-eastern boundary (partly within the areas owned and under the control of Bord na Móna) are currently being used by domestic turf cutters to harvest peat. However, there is no active turbary in the footprint of the rehabilitation areas.
- **Public Rights of Way**. A public right of way exists along the access road in the south of the site at Blackwater Bog, in the townlands of Leitra/Curraghmore. 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.
- **Existing landuse.** Bord na Móna operate an Ash Repository Facility for ESB for the waste ash generated from the power station in Shannonbridge (West Offaly Power). ESB have applied for planning permission (March 2022) for the development of an Integrated Constructed Wetland for the treatment and management of leachate derived from the Ash Disposal Facility. The ash site and the proposed constructed wetland are located outside of the rehabilitation footprint. Other key land-uses are conifer forestry.

- **Future land-use.** Bord na Móna are proposing to develop a solar farm at Blackwater Bog. The proposed footprint of the solar farm has been mapped as a constraint. In advance of this development, it is proposed to rehabilitate part of Blackwater Bog in 2022 that is not constrained (see *Figure: BNM-DR-23-14-05: Enhanced Rehab Measures*). The remaining area will be rehabilitated after the proposed renewable energy construction is complete, or at a later date. Bord na Móna remain committed to rehabilitating all of Blackwater Bog and to meeting IPC Licence conditions for this bog. Phasing rehabilitation in the way has the potential to support additional climate action measures (integrating renewable energy). It is expected that Bord na Móna will revise and update rehabilitation plan for Blackwater when this renewable energy review project has been considered by the planning process.
- **Designated sites.** Fin Lough (Offaly) SAC is located within the Blackwater Bog site boundary and is located adjacent to the rehabilitation area in the northern part of the site. No rehabilitation work will take place in the SAC.

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:

- Constrained areas, including the area under consideration for a solar renewable energy, the ash repository facility, and plots of Coillte forestry plantation.
- The longer-term development of stable naturally functioning habitats to fully develop at Blackwater Bog. The plan covers the short-term rehabilitation **actions** and **an additional monitoring and after-care programme** to monitor the rehabilitation and to respond to any needs.
- This plan is not intended to be an after-use or future land-use plan for Blackwater Bog.
- The longer-term management of this site, potentially as a nature conservation site, or for amenity, or for other uses in the future.
- Land leased to Coillte. This rehabilitation plan does not cover conifer forestry management on lands leased by Coillte.
- BOGFOR trials. It is not proposed to carry out any rehabilitation measures that would affect these areas. These areas are considered rehabilitated through land-use.
- BnM Blackwater Offices. It is not intended to carry out measures in this area.

7. CRITERIA FOR SUCCESSFUL REHABILITATION

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

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

Rehabilitation is generally defined by Bord na Móna as:

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

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

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

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

With regard to predicting and estimating likely trends that might materialize or could be considered as a target, monitoring of surface water ammonia emissions from Longfordpass bog in Littleton over 3 years, post cessation of peat extraction with ongoing rehabilitation, were considered. These are indicating a downward trend in Ammonia concentrations (Figure 7.1).

Similarly monitoring of surface water ammonia emissions from a Corlea bog in Mountdillon over the past 4 yrs. post cessation of peat extraction with ongoing rehabilitation, indicate downward trends.

As the monthly monitoring program at Blackwater Bogs continues in 2021/2022 during the rehabilitation works planned for 2022, and data from the 2021 monitoring program is compiled, further trending will be produced to verify any ongoing trends.

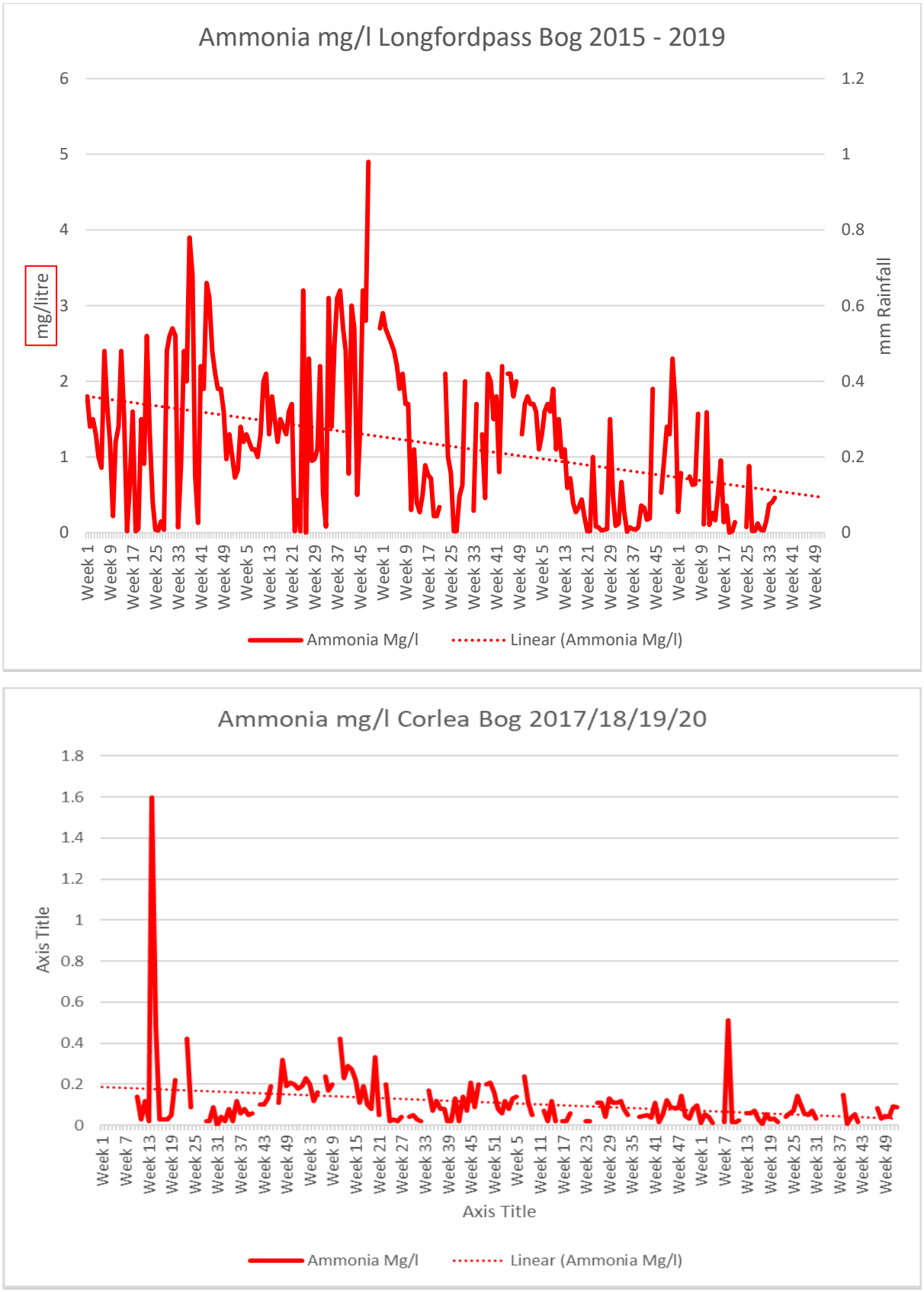

Figure 7.1. Ammonia levels over the period 2015-2019 at Longfordpass and the period 2017-2020 at Corlea.

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

- Optimising the extent of suitable hydrological conditions to optimise climate action and other ecosystem service benefits (optimising and maximising residual peat re-wetting). This will be measured by an aerial survey after rehabilitation has been completed.
- Accelerating the trajectory of the bog towards becoming a reduced carbon source. 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. Baseline monitoring will be carried after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.
- Reduction in carbon emissions. This will be estimated via a combination of habitat condition assessment and application of appropriate carbon emission factors derived from other sites. Baseline monitoring (habitat condition) will be carried after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.
- Setting the area proposed for rehabilitation on a trajectory towards establishment of a mosaic of compatible habitats including open water, Fen, Reed Swamp, Scrub, and Birch Woodland, where conditions are suitable. Some of these habitats have already in part established as pioneer vegetation/wetlands. It will take some time for stable naturally functioning habitats to fully develop at Blackwater Bog. This will be demonstrated and measured via aerial photography, habitat mapping and cutaway/habitat condition assessment. Baseline monitoring will be carried after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.
- Improvement in biodiversity and ecosystem services. This will be demonstrated by metrics outlined in Section 9.1 that can be used to measure changes in ecosystem services (e.g. water quality parameters, development of pioneer habitats, breeding bird monitoring). This will be measured by collecting a range of scientific data that can then quickly be adapted and into metrics that can be used to measure changes in various ecosystem services. Baseline monitoring will be carried after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.

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

Criteria type	Criteria	Target	Measured by	Expected Timeframe
IPC validation	Rewetting in the former area of industrial peat production	Delivery of rehabilitation measures Reduction in bare peat.	Aerial photography after rehabilitation has been completed – to demonstrate measures (drain-blocking) Establishment of a baseline for future monitoring of bare peat, vegetation establishment and habitat condition.	2022-2025
IPC validation	Key water quality parameters Ammonia, Phosphorous, Suspended solids, pH and conductivity	Reduction or stabilisation of key water quality parameters associated with this bog	Water quality monitoring for a period after rehabilitation has been completed	202122024
IPC validation	Reducing pressure from peat production on the local water body catchment (WFD)	Where this section of the water body, that this bog drains to, has not been identified as under pressure from peat extraction, that the intervening EPA monitoring programme associated with its Programme of Measures for this water body, confirms that its classification remains at not being at risk from peat extraction associated with activities at this bog.	EPA WFD monitoring programme	WFD schedule

Criteria type	Criteria	Target	Measured by	Expected Timeframe
Climate action verification	Optimising the extent of suitable hydrological conditions to optimise climate action	Optimal extent of suitable hydrological conditions	Aerial photography and Habitat mapping to map extent of suitable hydrological conditions. Baseline monitoring to be carried out during the scheme when rehabilitation is complete. Sites can be re-monitored in the future and compared against this baseline.	2022-2025
Climate action verification	Reduction in carbon emissions.	Reduction in carbon emissions	Carbon emissions – estimated using a bog condition assessment and appropriate carbon emission factors.	2022-2025
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.	2022-2025
Climate action verification	Biodiversity and ecosystem services. Habitat establishment Presence of key species – Sphagnum	Improvement in biodiversity and ecosystem services.	Metrics that relate to selected biodiversity and ecosystem services Presence of key species – *Sphagnum* – Walkover survey	2022-2025

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

Baseline monitoring to be carried out during the scheme when rehabilitation is complete. Sites can be re-monitored in the future and compared against this baseline.

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

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

- **Funding to pay for resources required to deliver the planned rehabilitation (Bord na Móna and external).** Bord na Móna maintains a provision on its balance sheet to pay for these future costs when industrial peat extraction ceases. Bord na Móna is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence. It is expected that additional costs of enhanced rehabilitation will be supported by Government through the Climate Action Fund and Ireland's National Recovery and Resilience Plan.
- **Bord na Móna to have sufficient resources (staff and training) to deliver the planned rehabilitation with required associated skills and competencies.**
- **Bord na Móna to have sufficient resources (suitable machinery) and staff to maintain this machinery.**
- **Weather conditions to be within normal limits over the rehabilitation plan timeframe.** Long periods of wet weather have the capacity to significantly affect ground conditions and constrain the delivery of rehabilitation. The potential impact of wet weather on ground conditions can be reduced by appropriate planning and management. Bord na Móna have significant experience of managing these issues through 70 years of working in these peatland environments.
- **Rehabilitation measures to be effective.** The rehabilitation measures proposed in this plan are based on 40 years of Bord na Móna experience of peatland management and best practice applied internationally in peatland management. Measures proposed in this plan have already been shown to be affective at other sites. Bord na Móna will apply a flexible and adaptable approach to the more innovative rehabilitation measures proposed in this plan**.** If measures are not initially effective, Bord na Móna will review any requirement for additional practical rehabilitation.
- **Natural colonisation of vegetation to develop semi-natural habitats at a rate within the normal limits.** The development of naturally functioning semi-natural habitats on degraded bog takes time. It may take 30-50 years for active raised bog vegetation to re-develop on suitable cutaway that was previously bare peat. However, Bord na Móna experience has demonstrated the effectiveness of these type of measures for re-wetting bog and creating carbon sinks (Renou-Wilson et al. 2018).
- Rehabilitation measures have been designed to accelerate and work with natural colonisation and other natural processes. Bord na Móna experience of rehabilitation has shown that re-wetting improves conditions for natural colonisation and that natural colonisation is accelerated where the environmental conditions are most suitable. Rehabilitation measures have been designed to modify the conditions of areas within sites where conditions are less suitable for natural colonisation (modifying hydrology, topography, nutrient status or availability of potential seed sources).
- **Monitoring to be robust and effective.** Rehabilitation Monitoring will be established to validate the success of rehabilitation as required by Condition 10 of the IPC Licence and to verify the benefits of the proposed enhanced measures to optimise climate action. This will focus on a collecting a range of scientific data that can then quickly be adapted and into metrics that can be used to measure changes in various ecosystem services.

8. REHABILITATION ACTIONS AND TIME FRAME

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

A number of illustrative figures have been produced to inform rehab planning and design, including aerial photography, peat depths, lidar surface maps, and depression analysis modelling; these are included in the accompanying mapbook as the drawings referenced below:

BNM-DR-23-14-22 titled **Blackwater Bog: Aerial Imagery 2020**

BNM-DR-23-14-04 titled **Blackwater Bog: Peat Depths**

BNM-DR-23-14-03 titled **Blackwater Bog: LiDAR Map**

BNM-DR-23-14-09 titled **Blackwater Bog: Depression Analysis**

The rehabilitation actions themselves will be a combination of PCAS measures to re-wet peat. The distribution of these measures is outlined in drawing titled **BNM-DR-23-14-05 Blackwater Bog: Rehabilitation Measures** in the accompanying Mapbook (note that the actual distribution of these measures may be subject to change in response to stakeholder consultation and refinement of the enhanced rehabilitation measures.)

These enhanced measures for Blackwater bog will include (see Table 8.1):

- Re-assessment of the pumping regime and removing pumps if this desired and has no significant external impact or impact to internal constraints. This assessment for this phase of rehabilitation has been completed. Initial hydrological modelling indicates that a large part of the area proposed for rehabilitation has the potential to develop as cutaway wetland habitats with some permanent deeper water.
- Some pumping will be continued to maintain conditions to support potential future land-uses. It is proposed during this phase to decommission four out of seven pumps on site. One of these pumps is currently operational and will be turned off. The other pumps will be retained for now. Hydrological management will look to optimise summer water levels to maximise the development of wetland vegetation (by looking to set water depths at < 0.5 m, where possible. It is inevitable that some sections will naturally have deeper water due to the topography at this site). Water-levels will be adjusted, where possible, at outfalls, by adjusting piped drainage and by the creation of overflow channels. More sustainable permanent gravity drainage solutions will be examined. Some targeted bunding may be required. It is expected that a natural seasonal regime of water fluctuation will develop, with water-levels fluctuating in association with levels in the adjacent local rivers. Wetland measures will include a combination of intensive drain blocking (max 7/100 m), modifying outfall heights and managing overflows with overflow pipes, and construction of larger berms where required.
- Deep peat measures including field re-profiling, creation of berms, modifying outfall heights and managing overflows and drainage channels.

- Regular drain blocking (3/100) on dry cutaway along with the blocking of outfalls and management of water levels.
- Targeted fertiliser applications to accelerate vegetation establishment on areas of bare peat on headlands and high fields, and within certain areas of dry cutaway. Areas where vegetation has established do not need fertiliser application.
- Some small bog remnants around the margins of the bog will be targeted for drain-blocking.
- The existing silt ponds will be retained and maintained during the rehabilitation phase. During the monitoring and verification phase the silt ponds will be continually inspected and maintained, where appropriate. When it is deemed that the 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. The silt ponds will either be de-watered (water levels lowered to a level where the silt pond will naturally develop as a small wetland feature), left in situ, or infilled (where discharges do not require silt control).

Table 8.1: Types of and areas for enhanced rehabilitation measures at Blackwater Bog. Note that the types of rehab and areas of rehab may change in response to stakeholder consultation and refinement of the enhanced rehabilitation measures.

Type	Code	Enhanced Rehabilitation Measure	Extent (Ha)
Wetland	WLT2	Modifying outfalls and managing water levels with overflow pipes + Targeted blocking of outfalls within a site	129.1
Wetland	WLT3	Modifying 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	44.3
Wetland	WLT4	More intensive drain blocking (max 7/100 m), + modifying outfalls and managing overflows + transplanting Reeds and other rhizomes	190.4
Deep Peat	DPT 4	Berms and field re-profiling (45x60m cell), modifying outfalls and managing overflows & drainage channels for excess water & *Sphagnum* inoculation	23.58
Dry Cutaway	DCT2	Regular drain blocking (3/100m) + modifying outfalls and managing water levels with overflow pipes + targeted fertiliser treatment	99.5
Marginal land	MLT1	No work required	30.4
Marginal land	MLT2	Targeted drain blocking	3.2
Drainage	Drainage	Silt Ponds	6.1
Constraint	Constraint	Other Constraints, including the ash disposal facility, Coillte forestry and the solar farm development (The proposed solar farm development study area is 1079 hectares).	1759.3
Additional Works	Additional Works	Targeted drain blocking	27.6
Total			2313.74

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 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 engineering drawings outlining how the various rehabilitation methodologies (The Scheme PCAS) will be applied to Blackwater Bog. This will take account of peat depths, topography, drainage, hydrological modelling and internal constrained areas (see map for an indicative view of the application of different rehabilitation methodologies).
- A drainage management assessment of the proposed enhanced rehabilitation measures has been carried out and any issues identified resolved and the rehabilitation plan adapted.
- A review of known archaeology and an archaeological impact appraisal of the proposed rehabilitation has been carried out. The results of this assessment has been incorporated into the rehabilitation plan to minimise known archaeological disturbance, where possible. There are several known archaeological features on the site. These have been constrained and buffered to avoid disturbance.
- An assessment of pumping requirements to complete decommissioning has been carried out. It is proposed during this phase to decommission four out of seven pumps on site. One of these pumps is currently operational and will be turned off. This is located at the northern end of the site adjacent to Fin Lough. The other pumps will be retained for now.
- A review of issues that may constrain rehabilitation such as known rights of way, the planned solar farm, and existing land agreements has been carried out.
- A review of remaining milled peat stocks is to be carried out. There are peat stocks remaining on the bog in general however only a single stockpile overlaps the currently proposed rehabilitation areas. It is expected that this stockpile will be removed prior to rehabilitation commencing.
- An ecological appraisal of the potential impacts of the planned rehabilitation on the presence of sensitive ground-nesting bird breeding species (e.g. breeding waders) has been carried out. The scheduling of rehabilitation operations will be adapted, where required.
- Ensure all activities comply with the environmental protection requirements of the IPC Licence.
- An Appropriate Assessment of the Rehabilitation Plan has been carried out. (Note that the rehabilitation plan for Blackwater Bog went to Stage 2, NIS). See Blackwater Bog Decommissioning and Rehabilitation Plan – Addendum 1 for more details.
- Track implementation and enforcement of the relevant IPC Licence conditions, and other environmental control measures during the implantation of the rehabilitation plan.

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

- Carry out proposed measures as per the detailed site plan. This will include a combination of drain blocking, and fertiliser applications targeting bare peat areas of headlands, high fields and other areas (where required) in addition to management prescriptions. All rehabilitation will be carried out with regard to best practice environmental control measures (Appendix IV).
- Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions.

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

8.3 Long-term (>3 years)

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

8.4 Timeframe

- **2021-2022**: Short-term planning actions.
- **2022 -2023**: Short-term practical actions.
- **2023-2025**: Long term practical actions. Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- **2025**: Decommission silt-ponds, if necessary.

8.5 Budget and costing

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

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

Bord na Móna maintains a provision on its balance sheet to pay for the future costs of **standard** rehabilitation and decommissioning when industrial peat extraction ceases. This is updated every year - for more information see the Bord na Móna Annual Report (Bord na Móna 2021). Bord na Móna is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

At this time, a ’standard’ rehabilitation provision (sufficient to discharge the requirement of Condition 10 in the licence) has been be allocated to the site based on the area of different cutaway types across the site (See Appendix I).

9. AFTERCARE AND MAINTENANCE

9.1 Programme for monitoring, aftercare and maintenance

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

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

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

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

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

- Vegetation and habitat monitoring after rehabilitation is completed using a cutaway bog condition assessment. This assessment will include assessment of on environmental and ecological indicators such as vegetation cover, vegetation communities, presence of key species, *Sphagnum* cover, bare peat cover and water levels. It is proposed that sites can be monitored against this baseline in the future.
- The condition of the bog can be assessed using the condition assessment and suitable Greenhouse Gas (GHG) emission factors can be assigned to different habitats. GHG emission factors have been determined for various peatland habitats in Ireland (Wilson *et al*., 2015) and are constantly being refined with more and more research. BnM is actively supporting research into GHG fluxes in different rehabilitated peatland habitats. This means that potential GHG emissions can be estimated from the site, as the site continues along its trajectory towards a naturally functioning peatland ecosystem.

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

IPC Licence 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 Licence 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.
- The site has been environmentally stabilised.

10. REFERENCES

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

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

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

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

Scope of rehabilitation

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

- The three identified rehabilitation areas in Blackwater Bog.
- EPA IPC Licence - Ref. P0502-01. As part of Condition 10.2 of this licence, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. Blackwater Bog is part of the Blackwater Bog Group.
- The current condition of Blackwater Bog. This bog has a pumped drainage regime.
- The key objective of rehabilitation, as defined by this licence, is **environmental stabilisation** of the bog.
- To minimise potential impacts on neighbouring land. Boundary drains around Blackwater Bog will be left unblocked as blocking boundary drains could affect adjacent land.
- Current land-use (conifer forestry trials, ash repository facility).
- Future potential land-use (Blackwater Solar Farm).

Rehabilitation goals and outcomes

The key rehabilitation goal and outcome for Blackwater Bog is environmental stabilisation of the site via peatland 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 and shallow cutaway in the former area of industrial peat production to offset potential silt run off and to encourage development of vegetation cover via natural colonisation and reducing the area of bare exposed peat.
- That there is a stabilising/improving concentration of suspended solids and ammonia associated with the measures undertaken to stabilise the peat surface by the blocking of the internal drainage system and the maximised rewetting of the peat surface. This will be demonstrated by developing a stable or downward trajectory of water quality indicators (suspended solids and ammonia) towards what would be typical of a re-wetted cutaway bog. This will be measured via water quality monitoring (suspended solids and ammonia).
- That the main water body associated with surface water from this bog continues to be excluded in the EPA's list of peat pressure water bodies as reported in the River Basin Management Plans. Where the water body has been identified as under pressure from peat extraction, that the intervening EPA monitoring programme associated with its Programme of Measures for this water body shows positive improvements in water quality impacts that were attributable to the original peat extraction activity.

Rehabilitation targets

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

Rehabilitation measures:

- Blocking field drains in drier sections of 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/enhance existing re-wetting.
- No measures are planned for the majority of 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:

- 2022-2023. 1st phase of rehabilitation. Field drain blocking.
- 2024. 2nd phase. Further realignment of piped drainage and other re-wetting measures dependent on success of 1st phase re-wetting, as determined by ongoing monitoring of water levels and re-vegetation.
- Other enhancement measures such as fertiliser treatment will be carried out, if needed. These will be determined by ongoing monitoring.
- 2024-2026. Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.

- 2024-2026. Decommission silt-ponds, if necessary.

Table AP-1: Standard Rehabilitation measures and target area.

Type	Code	Description	Area (Ha)
Deep peat	DPT1	Regular drain blocking (3/100 m) + modifying outfall heights and managing water levels with overflow pipes	25.7
Dry cutaway	DCT1	Modifying outfall heights and managing water levels with overflow pipes	166.1
Wetland	WLT1	Turn off or reduce pumping to re-wet cutaway + modifying outfall heights and managing water levels with overflow pipes	297.6
Marginal Land	MLT1	No work required	65.6
Other	Silt Pond	Silt ponds	6.1
Other	Constraint	Including Rights of Ways, Ash Disposal Facility, Coillte Forestry, and solar farm constrained areas	1752.7
Total			**2313.8**

See Drawing number BNM-DR-23-14-20 titled **Blackwater Bog: Standard Rehab Measures** included in the accompanying Mapbook which illustrates the standard rehab measures to be applied.

Monitoring, after-care and maintenance

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

Validation and IPC Licence surrender

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

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

APPENDIX II: BOG GROUP CONTEXT

The 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 all sites. Remaining milled peat stocks were supplied to Shannonbridge (WOP) and Lanesborough (LRP) in 2020. Both power stations ceased using peat by the end of 2020. Decommissioning and rehabilitation for the Blackwater Bog Group as part of the PCAS project started in 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 2014[6]). Several of these sites have been restored during the period 2011-2020.

Several sections of Tirrir-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.

[6] http://www.npws.ie/peatlandsturf-cutting/nationalraisedbogsacmanagementplan/

A breakdown of the component bog areas for the Blackwater Bog Group IPC Licence Ref. PO502-01 is outlined in Tables Ap-2a – Ap2c.

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 2019. Attymon is a deep peat cutover bog.	Attymon Bog formerly supplied fuel sod peat. Coillte have developed a portion of the former production area for conifer forestry. Some rehabilitation was carried out in 2019/2020.	2109	Finalised 2018
Cloonkeen	252	Cutover Bog Industrial peat production commenced at Cloonkeen Bog in 1953 and ceased in 2019. Cloonkeen Bog is a deep peat cutover bog.	Cloonkeen Bog formerly supplied fuel sod peat. Coillte have developed a portion of the former production area for conifer forestry. Some rehabilitation was carried out in 2019/2020.	2019	Finalised 2018
Derrydoo-Woodlough	452	Development Bog Derrydoo-Woodlough Bog was drained in the 1980s in anticipation of industrial peat production. No industrial peat harvesting ever took place.	Bog restoration was carried out in 2013-2014 Rehabilitation (bog restoration) now complete.	N/A	Finalised 2012
Tirrur-Derrymore	422	Development Bog This bog was drained in the 1980s in anticipation of industrial peat production. No industrial peat harvesting ever took place.	This bog has significant raised bog restoration potential. Section leased to NPWS as a SAC turf-cutting relocation site.	N/A	Updated 2020
Newtown-Loughgore	448	Development Bog This bog was drained in the 1980s in anticipation of industrial peat production. No industrial peat harvesting ever took place.	Some sod turf production Bog restoration was carried out in 2019-2020 Rehabilitation (bog restoration) nearly complete.	2020	Finalised 2012
Killeglan	581	Development Bog This bog was drained in the 1980s in anticipation of industrial peat production. No industrial peat harvesting ever took place.	Bog restoration was carried out in 2013-2014 Rehabilitation (raised bog restoration) complete	N/A	Finalised 2016
Cloonboley 1	675	Development Bog This bog was drained in the 1980s in anticipation of industrial peat production. No industrial peat harvesting ever took place on the main section.	A small sub-section has been used for sod turf production. Bog restoration was carried out in 2013-2014 Rehabilitation (raised bog restoration) complete across the majority of the site	2020	Finalised 2014
Cloonboley2	203	Development Bog This bog was drained in the 1980s in anticipation of industrial peat	Bog restoration was carried out in 2013-2014 Rehabilitation (raised bog restoration) complete	N/A	Finalised 2016

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
		production. No industrial peat harvesting ever took place.			

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
Ballaghhurt	597	Cutaway Bog Industrial peat production commenced at Ballaghhurt Bog in 1981. The majority of the site is cutaway with some residual deeper peat	Ballaghhurt 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. The majority of the site is cutaway.	There are some areas of pioneer cutaway vegetation communities naturally colonising cutaway sections. Coilte have developed a portion of the bog for forestry.	2020	Finalised 2021
Blackwater	2,303	Cutaway Bog Industrial peat production commenced at Blackwater Bog during the 1950's. The majority of the site is cutaway.	Blackwater Bog formerly supplied milled horticultural peat and fuel peat. There is extensive development of emergent cutaway vegetation communities across the former production area. The site has been used for experimental forestry (BOGFOR) and other conifer plantations. Part of the site was rehabilitated with lake and wetland creation. An ash facility took ash from Shannonbridge Power station	2020	To be finalised 2022
Bloomhill	883	Cutover Bog Industrial peat production commenced at Bloomhill Bog during 1981. The majority of the site still has relatively deep residual peat.	Bloomhill Bog formerly supplied milled horticultural peat and fuel peat. Much of the former peat production area is bare peat.	2020	To be finalised 2022
Bunahinly-Kilgarvan	389	Cutover Bog Industrial peat production commenced at Bunahinly-Kilgarvan Bog during the 1990's. Residual Deep peat remains on these bogs.	Bunahinly-Kilgarvan formerly supplied milled horticultural peat and fuel peat. Much of the former production area is bare peat. Part of Bunihinly has been re-wetted.	2020	Finalised 2022
Glebe	132	Cutover Bog Industrial peat production commenced at Glebe Bog during	Glebe Bog formerly supplied milled; horticultural peat and fuel peat. Glebe bog is still listed as a pNHA.	2020	Draft 2017

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
		the 1990's. Residual deep peat remains on these bogs.	Much of the former production area is bare peat.		
Clooniff	523	Cutover & cutaway Bog Industrial peat production commenced at Clooniff Bog during the 1970's. A mosaic of variable peat depths remains on this bog.	Clooniff Bog formerly milled fuel peat. Much of the former production area is bare peat or wetland. Some emergent vegetation communities are naturally colonising cutaway areas. Reduced pumping has created a large wetland in one area.	2020	Finalised 2021
Cornafulla	460	Cutover Bog Industrial peat production commenced at Cornafulla Bog in 1987. This bog still retains relatively deep residual peat.	Cornafulla Bog formerly supplied milled 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. This bog still retains relatively deep residual peat.	Cornaveagh Bog formerly supplied milled 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. Much of this bog is cutaway, with some pockets of deeper residual peat.	Culliaghmore Bog formerly supplied milled 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. The majority of this bog is cutaway.	Much of the former production area footprint or cutaway is bare peat. Extensive natural development of pioneer cutaway vegetation communities is present on cutaway areas.	2020	Finalised 2021
Kellysgrove	201	Development Bog Kellysgrove Bog was drained in the 1980s in anticipation of industrial peat production. No peat harvesting ever took place.	The site retains degraded raised bog vegetation. Kellysgrove Bog retains significant raised bog restoration potential. A way-marked walking trail is positioned along the old Ballinasloe Canal.	2020	Finalised 2021
Kilmacshane	1,294	Cutaway Bog Industrial peat production commenced at Kilmacshane Bog in 1960's. The majority of this bog is cutaway with some pockets of deeper peat remaining.	Kilmacshane Bog formerly supplied milled horticultural peat and fuel peat. Some pioneer cutaway vegetation communities are naturally colonising cutaway areas and water levels have risen as pumping reduced, creating wetlands.	2014	Finalised 2021
Lismanny	449	Cutaway Bog Industrial peat production commenced at Lismanny Bog in 1960's. The majority of this bog is cutaway with some pockets of deeper peat remaining.	Lismanny Bog formerly supplied milled horticultural peat and fuel peat. Much of the former production area footprint is bare peat. Some pioneer cutaway vegetation communities are naturally colonising cutaway areas.	2020	Draft 2020

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	Cutover bog Industrial peat production commenced at Derryfadda Bog in 1980's. This bog still retains residual deep peat.	Derryfadda Bog formerly supplied milled horticultural peat and fuel peat. Much of the former production area is bare peat. Some pioneer cutaway vegetation communities are naturally colonising cutaway areas.	2020	To be finalised 2022
Boughill	415	Cutover bog Industrial peat production commenced at Boughill Bog in 2008. This bog still retains residual deep peat.	Boughill Bog formerly supplied milled horticultural peat and fuel peat. Much of the former production area footprint or cutaway is bare peat.	2020	Draft 2017
Castlegar	517	Cutover bog Industrial peat production commenced at Castlegar Bog in 2001. This bog still retains residual deep peat.	Castlegar Bog formerly supplied milled horticultural peat and fuel peat. Much of the former production area is bare peat. The adjacent Annaghbeg Bog NHA is an intact undrained raised bog	2019	Finalised 2021
Gowla	650	Cutover bog Industrial peat production by BnM commenced at Gowla Bog in 1970's. Development for sugar production was in place at Gowla since the 1950's. This bog still retains residual deep peat.	Gowla Bog formerly supplied milled horticultural peat and fuel peat. Much of the former production area footprint is bare peat.	2020	Draft 2017

See Drawing number BNM-DR-23-14-24 titled **Blackwater Bog Group**, included in the accompanying Mapbook which illustrates the location of Blackwater Bog and the Blackwater Bog Group in context to the surrounding area.

APPENDIX III: ECOLOGICAL SURVEY REPORT

Ecological Survey Report

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

Bog Name:	**Blackwater**	**Area (ha):**	2338ha
Works Name:	Blackwater	**County:**	Offaly
Recorder(s):	MMC & DF	**Survey Date(s):**	7-10 December 2009 5/07/2010

Habitats present (in order of dominance)

The most common habitats present on the industrial site include:

- Bare peat (BP). The majority of the site in active production or is production-related cutaway. Areas mapped as BP can contain some minor recolonisation along the drains with pioneer Poor fen communities (pJeff, pEang), Scrub (eBir) and Reedbeds (pPhrag, pTyph) most common. (Codes refer BnM classification of pioneer habitats of industrial cutaway and production bog).
- Areas considered as production-related cutaway are re-colonising with some vegetation cover. Pioneer Poor fen communities (pJeff, pEang, PTrig), Birch scrub (eBir) and dry grassland (gCal) are most common habitats found. Some depressions contain small amounts of open water and Poor Fen. Reedbeds also appear in various places in conjunction with the above habitats.
- Reedbeds are more extensive in low-lying areas along the River Gowlan. Some of this bog is cutaway (that is out of production).
- There are two constructed wetlands on the site. The southern wetland contains a significant area of open water and is surrounded by reedbeds and pioneer poor fen communities. The northern wetland is dominated by Reedbeds (pPhrag) and pioneer poor fen communities (pRos, pEang) with much less open water. There are also some high fields with dry heath dominated by Heather (dHeath) and Birch scrub (eBir). There is a small area of Wet Willow-dominated woodland (WN6) with Reedbeds within the northern wetland that was never developed.
- There are several BOGFOR forestry plots on the site that contain a mixture of conifer forestry (WD4) and immature broad-leaved woodland (WS2). Several mounds contain more mature conifer forestry (WD4). (Codes refer to Heritage Council habitat classification, Fossitt 2000).
- A small, abandoned quarry associated with an esker is present on the fringes of the western site boundary. This area contains some dry calcareous grassland (GS1) along with exposed esker gravel and till (ED1), revegetating ground (ED3), scrub (WS1) and Bracken (HD1).
- The Gowlan River (FW2) flows through the site. This river is canalised, and riparian development is poor.
- The site contains an area used for disposal of ash produced by West Offaly Power (ED5). Some compartments are already filled and have been landscaped while other compartments are open. This is managed by the ESB.

- Two areas west of the Shannonbridge-Clonmacnoise Road contain some Raised bog (PB1) along with cutover bog (PB4) and fringe habitats (WS1) such as scrub and wet grassland (GS4). There is also a minor amount of conifer plantation and Birch woodland associated with these sections.
- The Fin Lough area contains a mosaic of Rich Fen (PF1), Raised bog (PB1), Reedbeds (FS1), Scrub (WS1) and some wet grassland (GS4) around a Limestone Lake (FL3).
- Fringe habitats around the margins of the site include raised bog remnants (PB1, PB4) scrub developing on high bog (WS1), Bracken (HP1) and Birch woodland (WN7).

Description of site

Blackwater is located in west Offaly adjacent to Shannonbridge and the west side of the site is located within 1 km of the River Shannon. The main section is a relatively large site that is sub-divided into smaller sections by the local topography and by railways and tracks on the site. This bog has a pumped drainage system. The Blackwater Works is located at the southern end of the site and there is one main track that runs in a NE-SW direction towards ash waste facility. A railway also runs along this track and there are other branch railways on either side that divide the rest of the site into several main blocks. The other main topographical features are a mineral island containing farmland at Leitra Townland, which is excluded from the site, and the Gowlan River, which flows N-S through the central part of the site and also around the NE boundary.

The vast majority of Blackwater was in industrial peat extraction until recently with Bare Peat and pioneer vegetation being the dominant habitat. Other main land-uses include the area used for the ash waste facility (storage of ash produced by West Offaly Power), several BOGFOR experimental forestry plots and two constructed wetlands. Several sections of the site have not been industrialised and still retain some of their semi-natural characteristics. The main site has been divided into a series of sub-sections for ease of description (see Habitat Map).

The Blackwater property also includes two smaller areas (Clonliff and Creevagh) located west of the Shannonbridge-Clonmacnoise Road (R444). Both these areas have never been used for industrial peat production. Both areas are located close to the River Shannon.

Cloniffeen-Curraghmore

This sub-section encompasses the south-west area, south-west of the mineral farmland at Leitra. This section is further divided into two main sections by a railway and a smaller mineral island. Nearly all of this area was in active peat production until recently and is dominated by pioneer vegetation with some bare peat. The main vegetation types include a mosaic of Poor Fen (pJeff), dry grassland (gCal) and scrub (eBir) that is re-colonising over a low ridge in the southern section. This whole area is somewhat higher than the rest of the site. Minor communities include patches of Common Reed (pPhrag), Reedmace appearing in the drains (pThyph) and small patches of disturbed/pioneer vegetation (DisCF). The highest part of the ridge that underlies the cutaway in the southern section is developing some Dry Heath with Heather.

The other main features of this area include several small patches of high raised bog (PB1) and other associated fringe habitats (cutover bog - PB4) around the fringes of the site that remain uncut or undeveloped. Some of these sections of high bog have been drained intensively so their capacity for regeneration is quite poor. One section of high bog was undeveloped but was a relatively small remnant. Some conifer forestry has also been planted around the edges of the mineral island (adjacent to the railway link to West Offaly Power), and this

section also contains some grassland (GA1, GS4), scrub (WS1) and broad-leaved woodland plantation (WD1). A linear section of conifer woodland is located along the north western boundary of this section, evidence of Squirrel activity in this section was evident.

Leitra-Creevagh

This sub-section encompasses a central area located to the west of the ash site and running between two railways to the western boundary. This block is somewhat higher compared to the rest of the site. A significant area is beginning to re-colonise with vegetation. The topography is this block is quite variable with several mounds, ridges and depressions that affect the type of recolonisation. The higher ground generally has a mosaic of Poor fen (pJeff) dry grassland (gCal), Birch scrub (eBir) and disturbed/pioneer vegetation (DisCF). Some of the higher ground has exposed glacial till. Some of the mounds are also developing Dry Heath dominated by Heather towards the west side. Mounds are being colonised by conifers in places. Several of the mounds are used for collecting fossil bog timber. The depressions are somewhat wetter and also contain Poor fen (pJeff, pEang) and Birch scrub as the main vegetation types. Some Reedbeds are also developing in place within the depressions (pPhrag) in association with minor areas of open water (OW).

This area contains a constructed wetland along the east side and adjacent to the track with a significant area of open water and Reedbeds (pPhrag). This area contained extensive areas of reedbed with *Typha latifolia* and *Phragmites australis,* both along the margins of the open water and as reedbed islands amongst the open water. Other habitats found alongside open water consisted of gCal, DisCf, eBir and eGor. A bird watching hide was located beside the lake and swallows had nested in this hide in the previous nesting season. This is fallen into disuse. Birds observed using the lake were Little Grebe, Grey Heron, Mute swan, Moorhen and Snipe. Robin, Blackbird and Chaffinch were observed in close proximity to this area.

This area also contains several BOGFOR forestry plots. Several large blocks were planted with various single-species tree crops including Sitka Spruce, Japanese Larch, Lodgepole Pine, and Birch in the 1990's. The development of these plantations overall has been poor although some species have done better than others. The plantations have reached the post-thicket stage but some sections have failed. Several mineral islands within this area were also planted with conifers in the 1970's and are relatively mature. These conifers seem to have done well in comparison with forestry planted on the cutaway bog areas. The canopy of these stands is relatively dense and the ground cover is dominated by leaf litter and moss cover.

Other features of interest include some high bog and associated fringe habitats along the western edge of this section that have remained undeveloped. Lough Nanag is found in one of these areas along the western boundary, although is it likely to have been impacted by the adjacent development of the production bog. This small area is within a NPWS conservation area (pNHA). Further north along this boundary there is a small borrow pit where gravel was extracted from an esker. This quarry is now abandoned and is revegetating. The flora of this area offers a diverse contrast with the majority of the site.

To the south of Lough Nanag an educational area complete with board walk is located. This section formed an important part of the bog rail tours in the past and contains species such as *Calluna vulgaris*, *Erica tetralix*, *Molinia caerulea*, *Trichophorum cespitosum* and *Rhynchospora alba* along with *Sphagnum sp*. A wooden walkway allowed easy access for the general public to this section of the bog. The invasive exotic Pitcher plant (*Sarracenia purpurea*) is found in this section. A section of raised bog to the north of the board walk area has been excavated in order to show off the peat profile with a steel stairway leading down to the bottom of the excavation. A section

of raised bog in this area had been drained but did not appear to have been harvested, it did not contain any boardwalk.

Lough Nanag

This relatively small area is located along the western boundary of the site and is designated as a pNHA. The original lake basin has infilled and the area now contains a range of wetland habitats including raised bog (Heather-dominated) (PB1), cutover bog (PB4), Birch woodland (WN7), Birch and Willow-dominated Scrub (WS1), transitional raised bog vegetation dominated by Purple Moor-grass and Bog Myrtle (PB1), some shallow open water with aquatic and emergent bog vegetation, Reedbeds (FS1) and some Rich Fen (PF1). The NHA survey also notes that the site contains some notable transitions between bog vegetation in the basin and dry calcareous grassland vegetation along the base of the eskers. Some of the shallow open water and surrounding habitat was quaking and could be considered a transition mire (PF3). Bottle Sedge and other Sedges were prominent in the vegetation as was Bog Cotton and the open water contained Bog Bean.

Tullaghbeg

This sub-section takes in the north-west section of the main site (north of railway branch) including the portion of Bord na Mońa property within Fin Lough. The Fin Lough section has been designated as part of a NPWS nature conservation site (cSAC). A mosaic of wetland habitats including Alkaline Fen (EU Habitats Directive Annex I habitat), Reedbeds and transitional habitats has developed around a small lake in this area. The Gowlan River flows along the north and east side of the section. The majority of this sub-section is in active production and is bare peat, some of which was wet at the time of the survey.

One of the main features in this section is the wetland that was constructed on cutaway adjacent to Fin Lough (bunded area visited 5/07/2010 - see habitat descriptions section). This wetland is about 20 years old and is developing into a diverse mosaic of wetland and dryland habitats. Reedbeds (pPhrag) are a prominent habitat and these are interspersed with stands dominated by Poor fen communities, Bog Cotton (pEang) and Bottle Sedge (pRos). There is a small amount of open water. There are also some fields that are still relatively unvegetated and dominated by bare peat. Several higher fields are developing Dry Heath (dHeath) dominated by Heather and Birch scrub (eBir). This area also contains a small section of wet Willow-dominated woodland (WN6) and Reedbeds (FS1) that probably was never developed. This wetland is notable for the appearance of rich fen indicators such as Saw Sedge (*Cladium mariscus*) and Black Bog-rush (*Schoenus nigricans*).

Adjacent to this wetland and the railway line that divides this section, there is a large area of production-related cutaway that was temporarily wet at the time of the survey. This open water was attracting a significant number of wildfowl. The drier sections were re-vegetating and contained a mosaic of Poor fen communities (pJeff, pEang, pTrig), Birch scrub (eBir) and Reedbeds (pPhrag).

There is also some remnant high raised bog (PB1) around the margins of this section. These remnants are relatively dry and in poor condition. Some have been drained but remain undeveloped. Some have been cut for sod peat (PB4). Gorse and Birch scrub is spreading over parts of these remnants while high bog along the western boundary is being colonised by conifers.

Clondelara-Blackwater

This sub-section is located in the SE section of the main site and is bounded by the Gowlan River to the north and the main track to the east. The majority of this section was in active production until recently and is a mosaic of bare peat and pioneer vegetation. A smaller area is considered production related cutaway and is re-vegetating with a mosaic of bare peat and Poor fen communities. This sub-section also includes some cutaway out of production that is dominated by Reedbeds (pPhrag). Some of this section (north-east corner) adjacent to the Gowlan River had high water-levels and was attracting large numbers of wildfowl and Whooper Swans.

This sub-section also contains a block of BOGFOR plantation with a mixture of conifer and broad-leaved tree species in individual blocks. One feature of interest is a small area of high bog (PB4) south of the railway that has been drained but remains undeveloped. This section is dominated by Heather and is quite dry and in poor condition. There are indications that the surface vegetation was removed in the past but has now re-colonised.

Derrylahan-Blackwater

This sub-section takes in the eastern central section of the main site and runs from the ash facility to the River Blackwater between the northern railway and the River Gowlan. The majority of this section was re-vegetating with a mixture of Poor Fen, Reedbeds and Birch scrub. A large part of the area zoned for the ash facility that has remained undeveloped has also developed Birch scrub in parts (eBir, oBir). A significant portion of the southern part was quite wet. This southern part adjacent to the Gowlan River also takes in a small area of cutaway out of production that is dominated by Reedbeds and open water. At the time of the site visit the south end of this section had high water levels to the extent that some railway lines were submerged and other railway lines had been damaged by the water.

Numerous small mineral islands are dotted along the middle part of this section, these islands have been used as places in which to store piles of fossil timber. The northern section from the ash facility to the Blackwater River is mostly bare peat and is in active industrial peat production.

Derryhask-Blackwater

This sub-section takes in the NE section of the main site and takes in all the land north of the northern railway branch (to Belmont). It is divided into two main sections by a railway that links to an adjacent site (Balaghurt/Glebe). The eastern section is still in production although there is some recolonisation. A mosaic of habitats is developing in this area in association with the underlying topography, as a ridge runs through this section. Drier Poor fen and grassland communities are developing in conjunction with Birch scrub, particularly along the drains. Some individual fields have more vegetation developed with Poor fen and Birch scrub being most prominent. There is some minor development of open water and Reedbeds in some depressions.

The area SW of the railway is mainly considered to be production related cutaway. This area is re-colonising with a mosaic of wetland and dryland communities reflecting the underlying topography. Several raised areas and mounds have a mosaic of Birch scrub and communities typical of drier conditions, such as dry grassland (gCal), disturbed/pioneer vegetation (DisCF) and Poor Fen (pJeff, pTrig). Wetlands are developing in the depressions with Poor fen (pEang, pRos, pJeff) and Reedbeds (pPhrag). A large part of this area adjacent to the Blackwater River was quite wet at the time of the survey.

Forestry and potential forestry on site

Four BOFOR experimental plots were planted on the site in the late 1990's. These plots contain a range of species and species mixes including broad-leaved and conifer species. The plots contain various-sized blocks of single/mixed species plantations. Larch, Lodgepole Pine, Norway Spruce, Sitka Spruce Oak and Birch were all planted. Various different trails looked at different cultivation techniques and the growth of different species and varieties in different conditions. Growth and development of these plots varies from species to species and from plot to plot. Larch was the best developed of all species in the south-east plot with max heights of 8 m. Some conifer plots had failed and were dominated by naturally regenerating Birch. Signs of Deer were prominent on some of the plots and had caused damage to some conifers and Birch.

Several mineral 'islands' or mounds on the site were also planted with conifers, but were older than the BOGFOR plots and were planted in the 1970's. These islands were planted with mainly Sitka Spruce and some Lawson Cypress, Norway Spruce and Lodgepole Pine. The conifer plantations were reasonably well-developed and had typically poorly developed ground cover dominated by leaf litter and a poor woodland structure.

There is some potential for development of forestry on some of the drier ridges and mounds around the site, particularly towards the western half of the site (see map). A Native Woodland Scheme or a conifer plantation (afforestation) grant could be used to fund the establishment of woodlands in these areas.

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

Fin Lough cSAC and pNHA (NPWS site code 000576)

This SAC is centred around Fin Lough located at the northern end of the site. This lake is a shallow limestone based lake surrounded by wetland habitats including Alkaline Fen (EU Annex I habitat). The site contains a notable transition from fen to raised bog habitat. A rare snail (*Vertigo geyeri)* has also been recorded on this site. Water levels and the area of open water have decreased significantly, leading to a large part of the former lake basin being infilled with Reedbeds. The drop in water levels has been related to industrial peat production in Blackwater.

Bord na Mońa owns a large section of the cSAC including part of the lake and fen, although this was never in industrial peat production. Part of this hydrological unit (outside the cSAC) was likely to have extended into the Blackwater industrial peat production area and was destroyed. However, some of this territory is currently being restored and is part of a constructed wetland.

River Shannon Callows cSAC & pNHA (NPWS site code 000216)

This large designated area extends between Athlone and Portumna. The designated area partially includes the two isolated parts of the Blackwater site that are located west of the Shannonbridge to Clonmacnoise road. Both these areas are located close to the river are low-lying and are dominated by intact raised bog (PB1) with surrounding cutover bog, scrub, transitional zones and wet grassland. There has been no industrial peat production in either section.

Both sections of raised bog have relatively intact sections that are notable for their intact transitional zones including lagg zones. The southern section was relatively dry and *Sphagnum* cover was quite low (inactive raised

bog). Pine were spreading over the bog. There was a relatively intact transition from wet grassland to raised bog dominated by Heather, through a zone with no obvious face-bank indicating old cutover bog, (although there may have been some cutting in the past).

The Middle River Shannon Callows SPA (NPWS site code 004096) partially overlaps with the above designation.

Lough Nanag Esker pNHA (NPWS site code 000910)

This designated area is located adjacent to the west side of the main site. It mainly consists of a series of esker ridges that contain some rare plant species and species-rich grassland, as well as a small lake called Lough Nanag that is surrounded by some bog habitats. The Lough Nanag basin is located within the Bord na Mońa property. This lake basin has partially infilled and contains open water, scrub, Reedbeds and wet grassland along with a small portion of remnant raised bog. The basin is located adjacent to industrial peat production and this activity is likely to have affected water levels in the lake (or the lake may have been drained.). The pNHA designation extends northwards and adjacent to another part of the Bord na Mońa property, which is an old disused gravel pit, now re-vegetating.

Adjacent habitats and land-use

A range of different habitats and land-use occurs around this large site.

Scrub, remnant high bog and cutover habitats are typically found immediately adjacent to the industrial cutaway. Some of this land may be grazed by livestock and is fenced off.

Small sections around the margins of site have been planted with conifers. Coillte also own a large plantation to the east of the site and adjacent to Belmont bog. Another large area has been recently planted with conifers adjacent to the north of the site and between Blackwater and Balaghurt/Glebe.

Wet grassland (GS4) is also a prominent habitat around the margins of the site and is generally grazed by livestock. Some grassland has been improved (GA1). There is also some dry grassland associated with the eskers to the west and north of the site that is also improved to various degrees and grazed by livestock.

Fin Lough cSAC contains a range of wetland habitats including Reedbeds (FS1), Raised bog (PB1) and rich alkaline fen (PF2). This area is grazed by cattle during the summer.

Watercourses (major water features on/off site)

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

- Fin Lough (a small lake and associated habitats designated as cSAC at the northern end of the site whose hydrology may have been compromised by industrial peat production in the adjacent bog.)
- Lough Nanag (a small lough at the western side of the site that has been significantly affected by adjacent industrial peat production).
- River Blackwater (a river that flows along the east side of the site and is a tributary of the Shannon).
- River Gowlan (a river that flows around the north-west part of the site draining Lough Nanag, then turns south-east through the centre of site linking to the River Blackwater and is largely channelised). The riparian development along the majority of this river is poor with a deep main channel surrounded by

tall embankments. Part of the river along the north-west boundary near Lough Nanag is likely to be piped.

- The Black River (a small stream in the north-east section of the site that is a tributary of the Blackwater River). This river was piped in the past.

Fauna biodiversity

Birds

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

- A Hen Harrier was noted on two occasions hunting over the site.
- A Marsh Harrier was noted hunting on the site in May 2010.
- A Cuckoo was observed on the site in May 2010.
- A Kestrel was also noted on the site on several occasions.
- A possible Merlin was noted over the northern end of the site near Fin Lough.
- Wildfowl were using two main areas of temporary open water, adjacent to the northern constructed wetland and along the Gowlan River. Mallard, Tufted Duck and Teal were noted with a max count of 400 birds between the two sections. Groups of Mallard were noted at several other locations around the site including 9 using some poor fen in a water-logged depression and 6 using northern the constructed wetland.
- Whooper Swans have been recorded using the site. A max count estimated that up to 200 birds were on one of the temporary Open Water areas. Whooper Swans (75) were also noted on the other temporary open water area so in total up to 300 birds may have been using the site. There was significant Whooper traffic to and from the Shannon callows area each day and total numbers fluctuated. Fieldwork was carried out at time when much of the Shannon callows were flooded. Waterfowl were observed roosting on sites with temporary open water at Blackwater. This could account for some of the high number of birdsusing these sites. Birds were generally roosting but some feeding was noted in some of the pools.
- Little Grebe and Moorhen were noted using the lake towards the centre of the site.
- Several pairs of Mute Swan were also noted on the site with one pair noted on the constructed wetland south of the Ash site.
- A group of Lapwing (16) were noted in one wet section along the Gowlan River, while 12 Lapwing were observed close to the lake.
- At least 3 Grey heron were observed on the site.
- Snipe were routinely flushed from most sections of the site, although higher densities were noted in some sections such as the constructed wetland adjacent to Fin Lough. In total about 124 individual or small groups of 2-3 birds were flushed from the site over the 4 days.
- Other more common birds were noted on the site each day. These included Blackbird, Starling, Grey Crow, Rook, Meadow Pipit, Blue Tit, Reed Bunting, Thrush, Goldfinch, Wren, Redpoll and Stonechat.

5/07/2010

Birds using the constructed wetland adjacent to Fin Lough include:

- Skylark
- Meadow Pipit
- Reed Bunting
- Sedge Warbler
- Mallard

Mammals

- Signs of Deer (most likely Fallow Deer) were noted at several locations around the site including within the BOGFOR plots where they have been causing some damage.
- Rabbit were also quite common on some of the drier sections of site and several Hares were also observed during fieldwork. Grazing by Rabbits/Hares was widespread throughout the site.
- Signs of Badger foraging and footprints were also noted in several sections of the site including around the wetland near Fin Lough, the production-related area in the north-east section that is re-vegetating the margins of the site and around some of the conifer plantations on the mineral islands
- Signs of Otter (Annex I species) were noted adjacent to the constructed wetland near Fin Lough. Fish remains were present on the side of this wetland (scales) at several locations. An Otter scat was also noted along a drain adjacent to the western boundary of the site.
- Pine Martin scats were deposited along the western boundary of the site.
- Squirrels (Red or Grey) are present at least along the margins of the site.
-

Fish/aquatic environment

- Remains of a large fish were noted adjacent to the wetland near Fin Lough. A large fish was also noted in the shallows of this wetland.
- Swan Mussel are present in the silt ponds to the north of the lake.

Other

5/07/2010

- Large White Butterfly
- Large Heath Butterfly
- Damselflies

Fungal biodiversity

Winter Chanterelle (*Chantharellus tubaeformis*) (amongst conifer plantation on the margins of the site), *Laccaria proxima* (Scurfy Deceiver) *Mycena sp* and *Lichenomphalia umbellifera* (Heath Navel).

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HABITAT DESCRIPTIONS

(See Habitats Description Document for detailed description of each vegetation community not described in this section.)

HABITAT DESCRIPTIONS

Bunded area adjacent to Fin Lough

This constructed wetland is located adjacent to Fin Lough SAC rich fen area. The wetland is developing and contains a range of habitats including pioneer areas with typical pioneer cutaway vegetation types such as pRos and pPhrag, and more established vegetation communities that are similar to those within the fen. The two most established communities include a small area of wet Willow woodland (WN6) that was never exploited for peat and a band of vegetation along the northern boundary that is largely dominated by Black Bog-rush and is quite diverse in places. The wet Willow woodland area has developed in a former part of the fen area that was probably drained to some extent.

The Black Bog-rush dominated vegetation is more extensive than previously thought. It is distributed mainly along the northern side of the bunded area. This vegetation type has probably developed from a pioneer cutaway community but seems to be longer established than other parts of the wetland. There may also have been remnants of the former fen vegetation present around the wet Willow woodland area. Black Bog-rush is dominant with frequent Purple Moor-grass in places and other species present include Devil's-Bit, Round-leaved Sundew, Tormentil, Cross-leaved Heath, Hare's-tail Bog-Cotton, Common Reed, Birch, Eared Willow, Common Bog Cotton, Common Yellow Sedge, Long-stalked Yellow Sedge, Common Sedge, Bottle Sedge, Glaucous Sedge, Catsear, Marsh thistle, Soft Rush, Creeping Bent, Sweet Vernal-grass, Heather, Yellow Rattle, Smooth Mouse-ear,

Common Spotted Orchid (*Dactylorhiza fuchsii*), Bog Myrtle, Bog Asphodel and Slender St Johns-wort. This vegetation type seemed to be developing in a particular zone within the wetland that is probably related to water levels.

Black Bog-rush is also scattered occasionally through-out the constructed wetland. Several clumps of Saw Sedge were also noted within the wetland but only one was relatively large (5 m diameter). Lesser Tussock Sedge (*Carex diandra*) was noted in some drains towards the north-eastern part of the wetland. Stoneworts were also noted in some drains.

A narrow band of vegetation along the eastern boundary contains typical rich fen species including some brown mosses such as *Scorpidium scorpoides* and *Campylium stellatum*. This vegetation type has frequent Purple Moorgrass, Black Bog-rush and Common Yellow Sedge. Other species present include Flea Sedge, Star Sedge, Birch, Saw Sedge (several stems), Common Spotted Orchid and Common Sedge.

The remaining wetland is a mosaic of poor fen communities (pRos, minor pJeff) and stands of Common Reed. Some of this vegetation was quite well-developed while in other sections, particularly to the west, the vegetation was at a pioneer stage and there was a significant amount of bare peat associated with the poor fen. Some the ground was very quaking although there was no standing water. Other small sections had some minor standing water. Other species found in this area included Yorkshire Fog, Mint, Marsh Pennywort, Marsh Lousewort, Lesser Spearwort, Milkwort, Royal Fern, Lesser Butterfly Orchid, Knapweed, Ragwort, Marsh Cinquefoil, Water Horsetail, Cuckoo Flower, Marsh Arrowgrass, Floating Sweetgrass, Bullrush, Reedmace, Bog Bean, Hairy Willowherb, Marsh Forget-me-not, Common Horsetail, Marsh Bedstraw, Marestail, Star Sedge, Bladderwort, Multi-flowered Wood-rush, Marsh Valerian, Knotted Pearlwort, *Calliergonella cuspidata*, Fissidens sp.

There are also some development of dry heath and scrub on higher fields. These areas were vegetated with Heather and also contained some Pine and Sitka Spruce along with the more common Birch and Willow. Other species noted included Bramble, Broad Buckler Fern, Hard Fern, Male Fern and Clubmoss was also noted.

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

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

APPENDIX V. BIOSECURITY

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:

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

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

In addition to the above, Best Practice measures around the prevention and spread of Crayfish plague[7] will be adhered with throughout all rehabilitation measures and activities.

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

APPENDIX VI. POLICY AND REGULATORY FRAMEWORK

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

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

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

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

1 EPA IPC Licence

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Blackwater bog group (Ref. P0-502-01). As part of Condition 10.2 of this licence, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. The bog is part of the Blackwater group (and within the Blackwater sub-group). This regulatory requirement is the main driver of the development of this rehabilitation plan.

2 The Peatlands Climate Action Scheme (PCAS)

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

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

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

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

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

3 National Climate Policy

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

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

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

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

4 National Peatlands Strategy

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

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

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

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

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

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

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

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

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

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

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

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

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

6 National Biodiversity Action Plan 2016-2021

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

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

7 National conservation designations

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

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

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

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

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

9 All-Ireland Pollinator Plan 2021-2025

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

10 Land-use planning policies

As Bord na Móna operates in many counties across Ireland, it is important to note the respective development plans in these counties. Many of the existing development plans recognise the potential that exists in the after-use of cutover/cutaway peatlands. Bord na Móna seeks to work with all of the relevant local authorities to ensure that the most appropriate after-uses are reflected in local planning policy. The following areas of consistent importance are of both direct and indirect relevance to Bord na Móna: heritage, tourism, biodiversity/conservation, landscape, renewable energy, and economy/enterprise.

11 National Archaeology Code of Practice

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

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

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

12 Bord na Móna Biodiversity Action Plan 2016-2021

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

One example of a key CBD target is:

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

The EUs headline target for progress by 2020 is to:

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

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

13 Bord na Móna commitments

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

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

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

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

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

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

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

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

APPENDIX VII. DECOMMISSIONING

1. Condition 10 Decommissioning

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

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

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

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

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

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

Item	Description	Decommissioning Plan
1	Clean-up of remaining or unconsolidated waste or materials located in Bogs, Yards, Buildings and Offices	Clean-up of Bog
2	Cleaning Silt Ponds	Cleaning Silt Ponds
3	Decommissioning Peat Stockpiles	Peat Stockpile Management
4	Decommissioning or Removal of Buildings and Compounds	Decommissioning or Removal of Buildings and Compounds
5	Decommissioning Fuel Tanks and associated facilities	Where relevant
6	Decommissioning and Removal of Bog Pump Sites	Where required
7	Decommissioning or Removal of Septic Tanks	Where relevant

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.

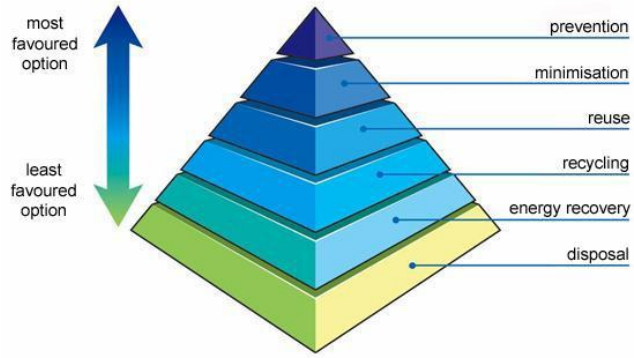
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

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	Prosperous Decommissioning Plan
1	Removal of Railway Lines	Removal of Railway Lines
2	Decommissioning Bridges and Underpasses	Where Applicable
3	Decommissioning Railway Level Crossing	Where Applicable
4	Restricting Access (bogs and silt ponds)	Restricting Access to Bog
5	Removal of High Voltage Power Lines	Where Applicable

APPENDIX VIII. GLOSSARY

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

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

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

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

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

Environmental stabilisation: The key objective of peatland rehabilitation is environmental stabilisation. This means developing habitats and vegetation back onto the bare peat, slowing water movement across the bog, minimising effects to downstream waterbodies and meeting the conditions of the IPC Licence. This is achieved by a combination of re-wetting, where possible, and natural colonisation of the former cutaway, with or without intervention**.** Habitats will develop that reflect the underlying environmental conditions. Other after-use development may also serve to act as environmental stabilisation.

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

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

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

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

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

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

APPENDIX IX. EXTRACTIVE WASTE MANAGEMENT PLAN

(Minimisation, treatment, recovery and disposal)

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

Scope:
This plan covers IPPC Licence's Ref P0502-01, Blackwater Group of Bogs located in County Offaly.

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

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

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

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

2.0 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 31' December2012. The Plan shall be reviewed at least once every five years thereafter in a manner agreeable to the Agency and amended in the event of substantial changes to the operation of a waste facility or to the waste deposited. Any amendments shall be notified to the Agency.
All extractive waste shall be managed in accordance with the Extractive Waste Management Plan. A report on the implementation of the Extractive Waste Management Plan shall be provided in the AER.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

7.0 Extractive Waste Management Plan

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

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

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

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

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

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

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

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

Classification in accordance Annex II.

Waste Material	Description	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 there placement back to the bog in smaller concentrated designated waste facilities does not constitute a risk to the prevention of water compliance.
The lands under where these materials are deposited are peatlands and are un-effected by the placing of this material.

Review.
This plan will be reviewed every five years, the first review to take place in September 2017. This review will entail an inspection of these waste facilities to ensure their placing, management, maintenance and stability comply with the requirements of the Extractive Waste Management requirements and condition 7.5, 7.6 and 7.7 of the Blackwater IPC Licence 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 APX -1 Consultees contacted

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Blackwater	Dept of Agriculture Food & the Marine	Multiple Staff Members	28/04/2022	Email		
Blackwater	Department of Housing, Local Government and Heritage NPWS	Multiple Staff Members	28/04/2022	Email		
Blackwater	National Museum of Ireland	Multiple Staff Members	28/04/2022	Email		
Blackwater	Department of Housing, Local Government and Heritage NPWS	General Email Contact	28/04/2022	Email		
Blackwater	Department of Environment, Climate and Communications	Multiple Staff Members	28/04/2022	Email		
Blackwater	Dept of Rural and Community Development	General Email Contact	28/04/2022	Email		
Blackwater	Department of Housing Local Government and Heritage	Minister Malcolm Noonan - Minister of State at the Department of Housing, Local Government and Heritage	28/04/2022	Email	03/05/2022	Email

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Blackwater	Minister for Environment, Climate and Communications	Minister - Eamon Ryan	28/04/2022	Email		
Blackwater	Minister of state for Agriculture with responsibility for Land use and Biodiversity	Pippa Hackett Minister of State for Land Use and Biodiversity)	28/04/2022	Email		
Blackwater	Oireachtas	Danielle McDonnell (Minister Malcolm Noonan Secretary)	28/04/2022	Email		
Blackwater	An Taisce	General Email Contact	28/04/2022	Email		
Blackwater	Environmental Protection Agency	Multiple Staff Members	28/04/2022	Email		
Blackwater	Inland Fisheries Ireland	General Email Contact & Multiple Staff Members	28/04/2022	Email		
Blackwater	Local Authority Waters Programme	Multiple Staff Members	28/04/2022	Email		
Blackwater	Teagasc	General Email Contact	28/04/2022	Email		
Blackwater	The Heritage Council	General Email Contact	28/04/2022	Email		

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Blackwater	Waterways Ireland	General Email Contact	28/04/2022	Email		
Blackwater	An Forum Uisce (The Water Forum)	General Email Contact	28/04/2022	Email		
Blackwater	Coillte	Multiple Staff Members	28/04/2022	Email		
Blackwater	Irish Water	Multiple Staff Members	28/04/2022	Email		
Blackwater	Office of Public Works (OPW)	Multiple Staff Members	28/04/2022	Email	06/05/2022	Email
Blackwater	CARO (Climate Action Regional Office) Eastern and Midlands	General Email Contact	28/04/2022	Email		
Blackwater	Bat Conservation Ireland	General Email Contact	28/04/2022	Email		
Blackwater	Birdwatch Ireland	General Email Contact	28/04/2022	Email		
Blackwater	Butterfly Conservation Ireland	General Email Contact	28/04/2022	Email		
Blackwater	Coirtrade	General Email Contact	28/04/2022	Email		
Blackwater	Eastern and Midland Regional Assembly	General Email Contact	28/04/2022	Email		

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Blackwater	Fisheries Ireland	General Email Contact	28/04/2022	Email		
Blackwater	Friends of the Earth	General Email Contact	28/04/2022	Email		
Blackwater	Friends of the Irish Environment	General Email Contact	28/04/2022	Email		
Blackwater	ICMSA (Irish Creamery Milk Suppliers Association)	General Email Contact and Multiple Staff Members	28/04/2022	Email		
Blackwater	ICSA (Irish Cattle and Sheep Farmers Association)	General Email Contact	28/04/2022	Email		
Blackwater	Irish Farmers Association	General Email Contact and Multiple Staff Members	28/04/2022	Email		
Blackwater	Irish Farmers Association (Laois, Offaly and Westmeath Office)	General Email Contact	28/04/2022	Email		
Blackwater	Irish Peatlands Conservation Council	General Email Contact	28/04/2022	Email		
Blackwater	Irish Raptor Study Group	General Email Contact	28/04/2022	Email		
Blackwater	Irish Rural Link (Community Wetlands Forum)	General Email Contact	28/04/2022	Email		

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Blackwater	Irish Rural Link	General Email Contact	28/04/2022	Email		
Blackwater	Irish Wildlife Trust	General Email Contact and Multiple Staff Members	28/04/2022	Email		
Blackwater	The Inland Waterways Association of Ireland (IWAI)	General Email Contact	28/04/2022	Email		
Blackwater	Inland Waterways Offaly	General Email Contact	28/04/2022	Email		
Blackwater	Irish Clay and Target Shooting Association (ICTSA)	General Email Contact	28/04/2022	Email		
Blackwater	National Association of Regional Game Councils (NARGC)	General Email Contact	28/04/2022	Email		
Blackwater	NPWS Rangers South East	Multiple Staff Members	28/04/2022	Email		
Blackwater	NUIG Galway	Multiple Staff Members	28/04/2022	Email		
Blackwater	National Museum of Ireland (NMI)	Multiple Staff Members	28/04/2022	Email	26/05/2022	Email
Blackwater	PPN Offaly Public Participation Network	General Email Contact	28/04/2022	Email		
Blackwater	Ranger Association Committee	General Email Contact	28/04/2022	Email		

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Blackwater	Shannon Flood Risk State Agency Co-ordination Working Group	General Email Contact	28/04/2022	Email		
Blackwater	Sustainable Water Action Network (SWAN)	General Email Contact	28/04/2022	Email		
Blackwater	Trinity College Dublin	Multiple Staff Members	28/04/2022	Email		
Blackwater	Turf Cutters and Contractors Association	General Email Contact	28/04/2022	Email		
Blackwater	UCD / Irish Rural Link	General Email Contact	28/04/2022	Email		
Blackwater	University College Dublin	General Email Contact	28/04/2022	Email		
Blackwater	Waterways Ireland	Multiple Staff Members	28/04/2022	Email		
Blackwater	Woodlands of Ireland	General Email Contact	28/04/2022	Email		
County councils						
Blackwater	Offaly County Council	Multiple Staff Members	28/04/2022	Email		
Blackwater	Offaly County Council - Director of Services	John Brannigan	28/04/2022	Email		
Blackwater	Offaly County Council - Chief Executive	Tom Shanahan	28/04/2022	Email		
Blackwater	Offaly County Council - Senior Planner	Anna-Marie Delaney	28/04/2022	Email		

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Blackwater	Offaly County Council - Local Enterprise Office	Andrew Murray	28/04/2022	Email		
Blackwater	Offaly County Council - Heritage Officer	Orla Martin	28/04/2022	Email		
Blackwater	Offaly County Councillors - Birr District	Cllr. John Carroll	28/04/2022	Email		
Blackwater	Offaly County Councillors - Birr District	Cllr. John Clendennon	28/04/2022	Email		
Blackwater	Offaly County Councillors - Birr District	Cllr. Eamonn Dooley	28/04/2022	Email		
Blackwater	Offaly County Councillors - Birr District	Cllr. John Leahy	28/04/2022	Email		
Blackwater	Offaly County Councillors - Birr District	Cllr. Clare Claffey	28/04/2022	Email		
Blackwater	Offaly County Councillors - Birr District	Cllr. Peter Ormond	28/04/2022	Email		
Blackwater	Offaly County Councillors - Edenderry District	Mark hackett	28/04/2022	Email		
Blackwater	Offaly County Councillors - Edenderry District	Noel Cribbin	28/04/2022	Email		
Blackwater	Offaly County Councillors - Edenderry District	Eddie Fitzpatrick	28/04/2022	Email		
Blackwater	Offaly County Councillors - Edenderry District	Liam Quinn	28/04/2022	Email		
Blackwater	Offaly County Councillors - Edenderry District	John Foley	28/04/2022	Email		
Blackwater	Offaly County Councillors - Edenderry District	Robert McDermott	28/04/2022	Email		
Blackwater	Offaly County Councillors - Tullamore District	Neil Feighery	28/04/2022	Email		
Blackwater	Offaly County Councillors - Tullamore District	Tony McCormack	28/04/2022	Email		
Blackwater	Offaly County Councillors - Tullamore District	Declan Harvey	28/04/2022	Email		

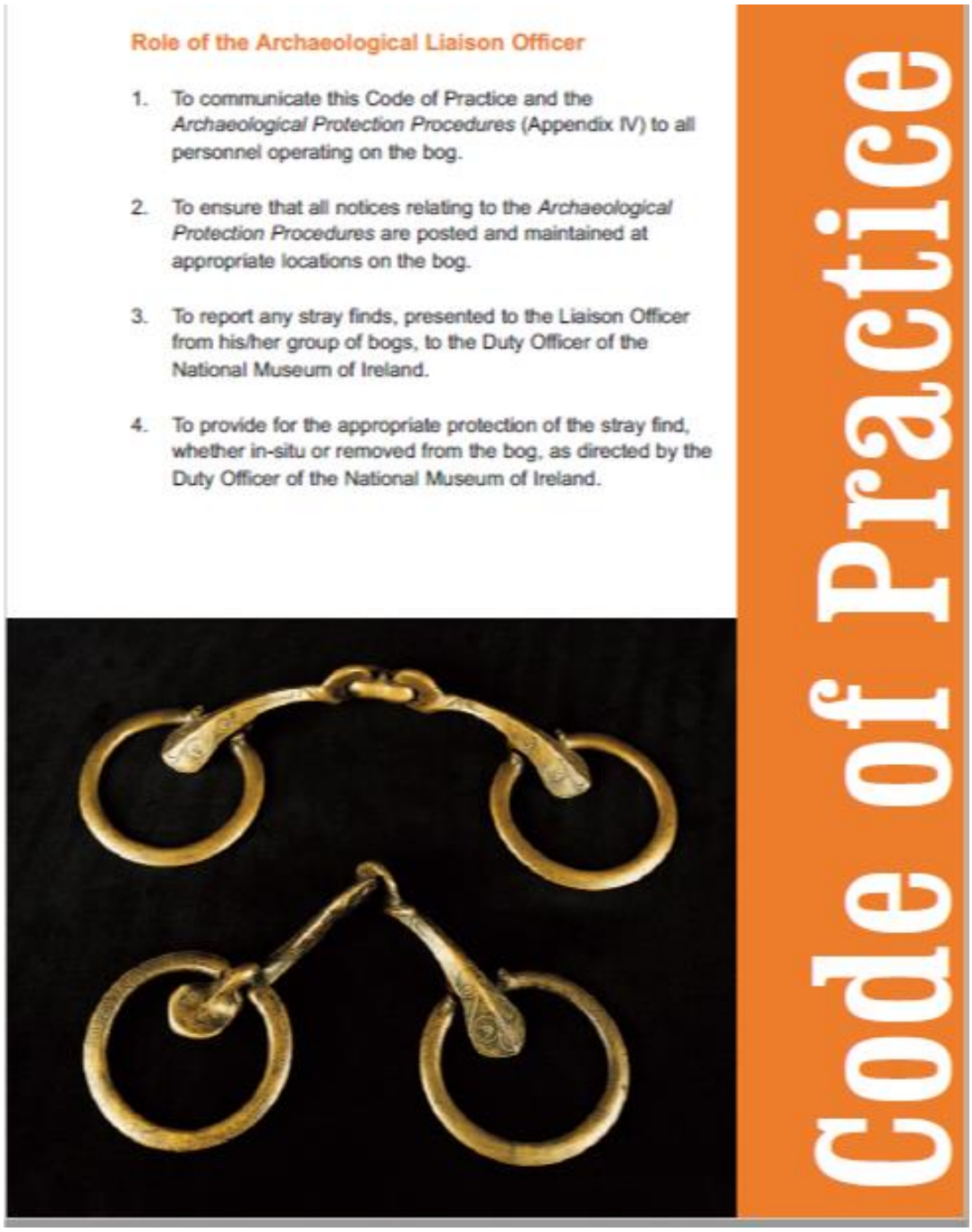
Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Blackwater	Offaly County Councillors - Tullamore District	Sean O'Brien	28/04/2022	Email		
Blackwater	Offaly County Councillors - Tullamore District	Ken Smollen	28/04/2022	Email		
Blackwater	Offaly County Councillors - Tullamore District	Frank Moran	28/04/2022	Email		
Blackwater	Offaly County Councillors - Tullamore District	Danny Owens	28/04/2022	Email		
Local Residents and Landowners						
Blackwater	All Land- owners in vicinity of bog	Leaflet Drop	28/04/2022	Leaflet		
Blackwater	All those with turbary rights	Leaflet Drop	28/04/2022	Leaflet		

Table APX -2 Response summary from Consultees contacted

Organisation	Summary of Response by Stakeholder	BnM Response
Office of Public Works (OPW)	OPW responded via e-mail on 06/05/2022 and advised that Blackwater Bog, does not overlap with any OPW Arterial Drainage Scheme. The OPW expressed support for the BnM bog rehabilitation and rewetting as a Nature Based Catchment Management measure in managing flood flows in the Shannon River Catchment and acknowledged the many other environmental co-benefits from developing this project.	No response required.
Danielle McDonnell Private Secretary to Minister Malcolm Noonan T.D. Office of the Minister of State for Heritage and Electoral Reform	Acknowledgement e-mail from department received 03/05/2022 to inform BnM of receipt of consultation and advised that Officials of this Department would be in contact in relation to the PCAS scheme, should it be required.	No response required.

Organisation	Summary of Response by Stakeholder	BnM Response
ICMSA	Responded to consultation regarding the PCAS project at large in 2021. 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.
IPCC	Responded to consultation regarding the PCAS project at large in 2021, to express support for the project and list a number of comments on how the project might be improved. 1) The cost of amenity development in land use space and its impacts on overall carbon fluxs at various BnM bogs 2) The IPCC requested that marginal Bog Remnants be considered for full rehabilitation 3) IPCC suggested that the inclusion of local community/education groups in the monitoring aspect of PCAS would improve the community outreach of PCAS as a whole. 4)Requested information on where Sphagnum for inoculation would be harvested. 5) Biosecurity and Invasive Species. 6) request for further information on Environmental Controls section of Draft Rehab Plan.	BnM acknowledged and responded via e-mail. BnM advised that going forward BnM will give due cognisance to all points raised in the submission by IPCC in the rehabilitation plan for PCAS projects. An on-site demonstration of PCAS rehabilitation was provided for IPCC in 14/09/2021. Dialogue is ongoing.
National Museum of Ireland (NMI)	The NMI responded on 26/05/2022 acknowledging receipt of our email and expressing support for the PCAS scheme. Issues raised were; 1) The request that due diligence must be given to consulting the national records, and care must 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	Dialogue is ongoing.

APPENDIX XII. ARCHAEOLOGY



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Code of Practice

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

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

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

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

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

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

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

1) Purpose

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

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

2) Procedure

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

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

Your Archaeological Liaison Officer is ……

3) Records

Revision Index			
Revision	Date	Description of change	Approved
1	13/09/2020	First release	EMcD
2			

Appendix C Site Synopses

SITE SYNOPSIS

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

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 are large area of the Annex I habitat alkaline fen. The fen comprises a complex of rich-fen plant communities. Sedges (*Carex lasiocarpa, Carex acutiformis)* and Bogbean (*Menyanthes trifoliata)* dominate parts of the fens while other small sedges are common throughout. The orchids Early Marsh Orchid (*Dactylorhiza incarnata),* Western Marsh Orchid (*D. majalis)* and Marsh Helloborine (*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.

SITE SYNOPSIS

Site Name: Fin Lough (Offaly) SAC

Site Code: 000576

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.

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):

[7230] Alkaline Fens
[1013] Geyer's Whorl Snail (*Vertigo geyeri*)

The alkaline fen is species-rich, with characteristic plants including Black Bog-rush (*Schoenus nigricans*) and the sedge species, *Carex flacca, C. lepidocarpa* and *C. panicea*. The total flora of the Fin Lough wetland is remarkably rich: 210 species of vascular plants and 29 species of bryophytes have been identified to date.

In addition, the site supports an extensive invertebrate fauna and is nationally important for two rare Hover-fly species (Order Diptera), *Chrysogaster macquarti* and *Platycheirus perpallidus*. The presence of the rare snail, *Vertigo geyeri*, a species listed on Annex II of the E.U. Habitats Directive, is of considerable conservation significance. As one of the few areas of standing water in Co. Offaly, the lake is also an important roosting area for winter bird visitors such as Mallard, Teal and Tufted Duck.

Drainage works to facilitate peat milling activities adjoining the site have reduced the extent of open water in the site, and large areas of the former lake basin are now overgrown by reedswamp and scrub woodland. Fin Lough remains an important site, however, because of the diversity of wetland habitats and species that it supports.

SITE SYNOPSIS

SITE NAME: MONGAN BOG SPA

SITE CODE: 004017

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.

The bog has a well-developed microtopography of hummocks, pools and lawns. Species such as Ling Heather (*Calluna vulgaris*), Cross-leaved Heath (*Erica tetralix*), cottongrasses (*Eriophorum angustifolium, E. vaginatum*), Carnation Sedge (*Carex panicea*) and White Beak-sedge (*Rhynchospora alba*) are common. A good variety of bog mosses (*Sphagnum* spp.) and other bryophytes are found. Strips of cut-away bog, part of which is colonised by willows (*Salix* spp.) and birch (*Betula* sp.) scrub, occur along the margins of the peat dome.

At the time this site was identified for Special Protection Area (SPA) designation it was being utilised by Greenland White-fronted Goose from the internationally important River Suck population. Although Greenland White-fronted Goose does not currently utilise the site, this species is regarded as a special conservation interest for this SPA.

Mongan Bog is one of the raised bogs that was traditionally used as a feeding/roosting site by small numbers of the River Suck population of Greenland White-fronted Goose. These birds utilise the callows near the mouth of the Suck to Shannonbridge and as far as Clonmacnoise. The numbers of Greenland White-fronted Goose using this part of the range was always small (peak count of 26 in 1984/85) and geese have not been recorded using the site in recent years - the last record was 11 individuals in 1989/90.

The cutaway area of bog provides habitat for a range of bird species, including birds of prey, thrushes, warblers and finches. A study of the birds of Mongan Bog in 1985 recorded Mallard, Snipe, Skylark and Meadow Pipit breeding on the peat dome.

Mongan Bog is owned by An Taisce (the National Trust) and is a Ramsar Convention site, a Biogenetic Reserve and a Statutory Nature Reserve.

25.3.2014

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 SYNOPSIS

SITE NAME: RIVER SUCK CALLOWS SPA

SITE CODE: 004097

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 site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Whooper Swan, Greenland White-fronted Goose, Wigeon, Golden Plover and Lapwing. 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 River Suck Callows SPA is an important site for wintering waterfowl. Of particular note is the nationally important Greenland White-fronted Goose flock (293 – five year mean peak for the period 1994/95 to 1998/99) which congregates mainly in the middle reaches of the river. Four other species occur in populations of national importance, i.e. Whooper Swan (164), Wigeon (3,232), Golden Plover (2,241) and Lapwing (3,906) – all figures are five year mean peaks from aerial surveys between 2001/02 and 2005/06. Other species present include Mute Swan (122), Teal (402), Mallard (70), Black-tailed Godwit (24), Curlew (22) and Black-headed Gull (86).

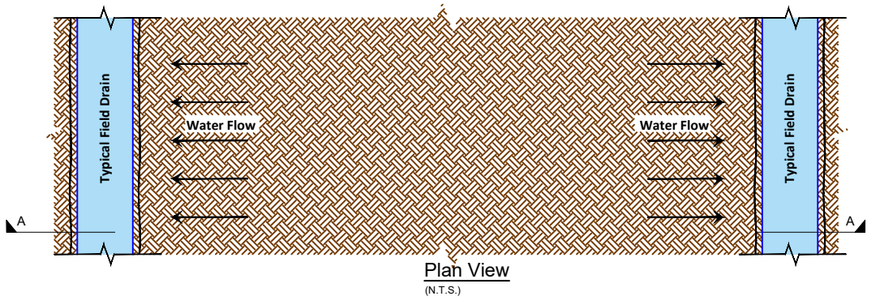
The River Suck Callows SPA is of considerable ornithological importance, in particular for the presence of nationally important populations of five species. Of note is that three of the species that occur regularly, i.e. Whooper Swan, Greenland White-fronted Goose and Golden Plover, are listed on Annex I of the E.U. Birds Directive. Part of the River Suck Callows SPA is a Wildfowl Sanctuary.

31.10.2014

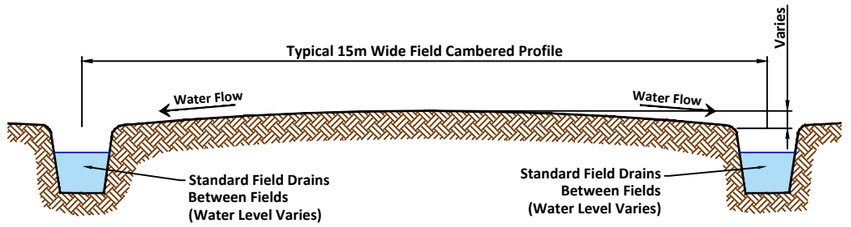
Appendix D Drawings of Proposed Rehabilitation Methodologies

Existing Layout:

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



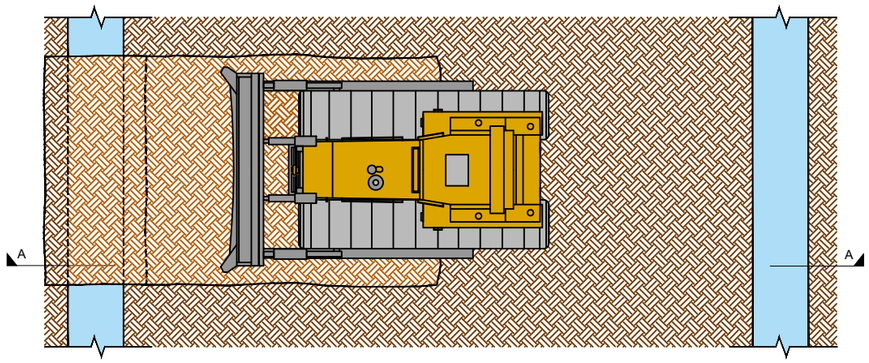
Plan View
(N.T.S.)



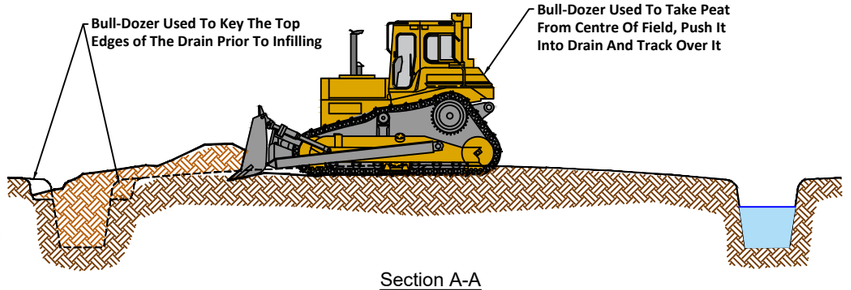
Section A-A
(N.T.S.)

Phase 1
Forming 'Speed Bump'

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



Plan View

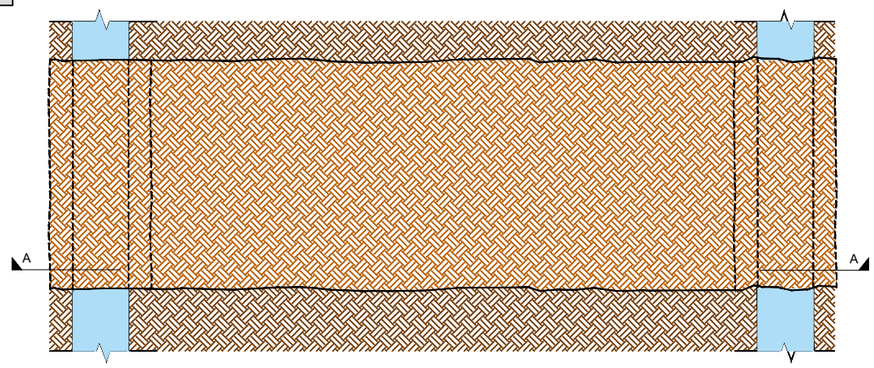


Section A-A
(N.T.S.)

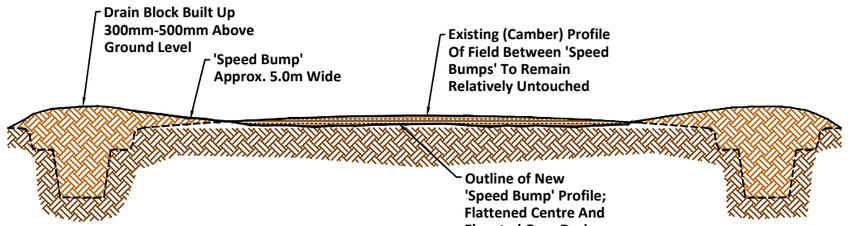
Plan View
(N.T.S.)

Complete Fields With Speed Bump (3 Per 100m)

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



Plan View
(N.T.S.)



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

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

NOTES:

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
2. REFER TO RELEVANT SITE PLAN TO ENSURE SPECIFIC DRAIN BLOCKS HAVE BEEN INSTALLED DOWNSTREAM PRIOR TO COMMENCING ANY RE-PROFILING WORKS, TO RETAIN ANY SILT THAT MAY ENTER THE DRAINS.
3. REFER TO RELEVANT SITE PLAN FOR No. OF DRAIN BLOCKS SPECIFIED PER 100M DRAIN LENGTH.
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.	03/03/21
b	'Key' Added To Top Edges Of Drain at Drain Block Locations	P.K.	09/02/21
a	Issued For Information	P.K.	29/01/21

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Tel. 057 9345900
Fax. 057 9345160

PROJECT:
Peatland Climate Action Scheme
PCAS

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

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

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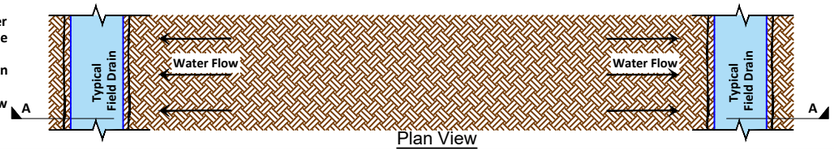
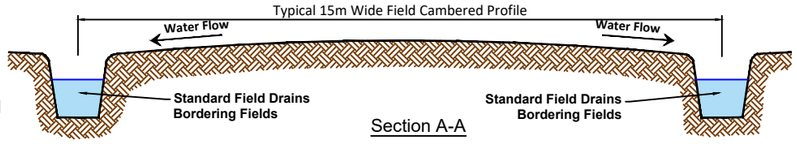
Existing Layout:

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



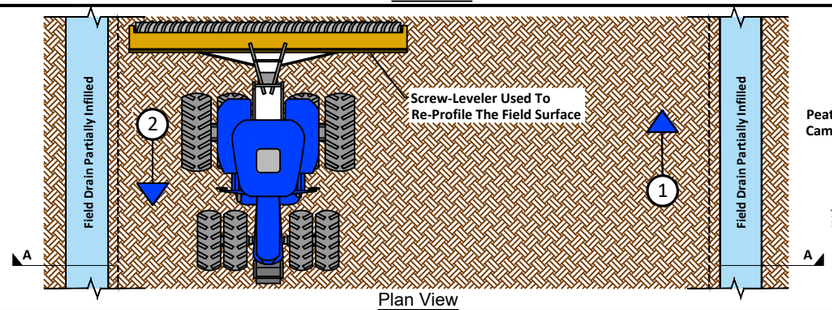
Plan View



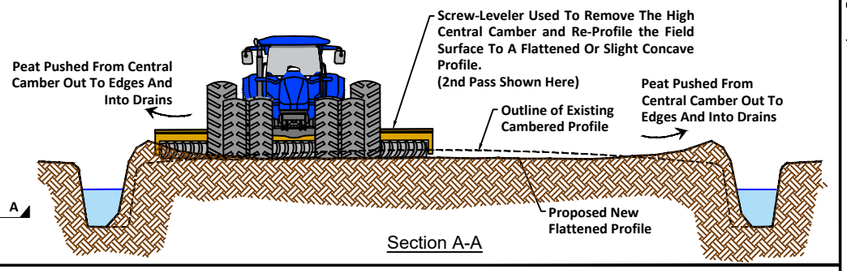
Section A-A

Phase 1
Re-Profiling of Field Surface

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



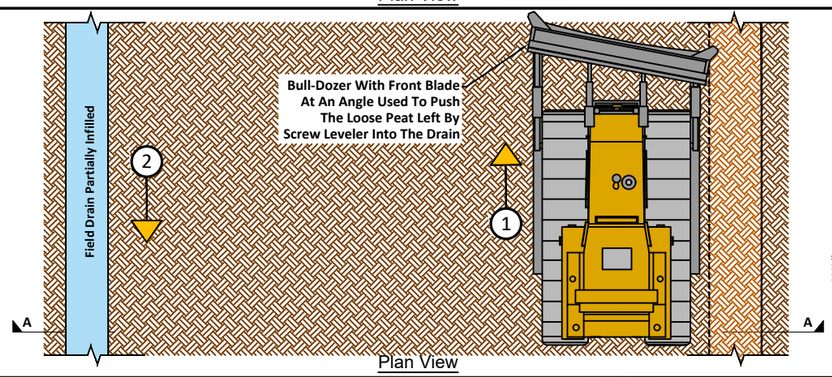
Plan View



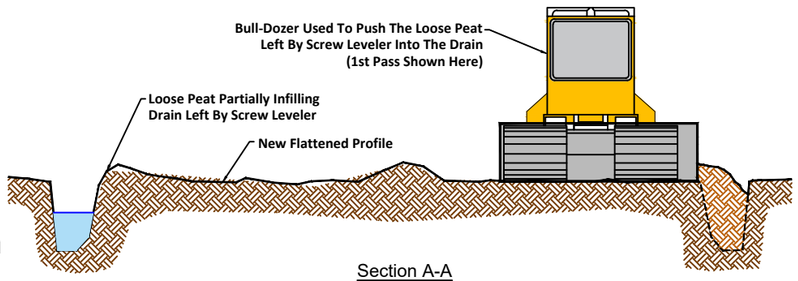
Section A-A

Phase 2
Infilling Of Drains

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



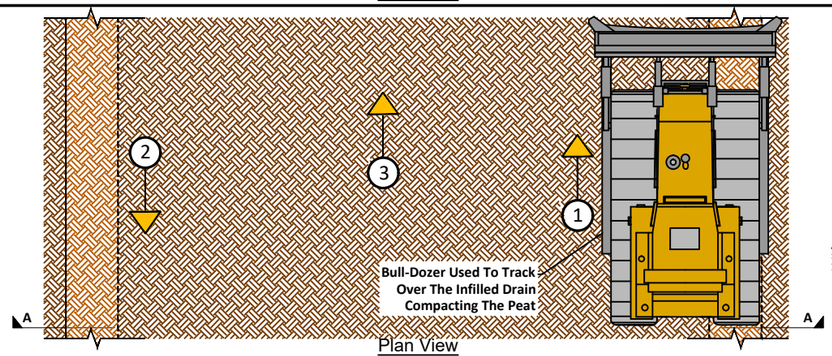
Plan View



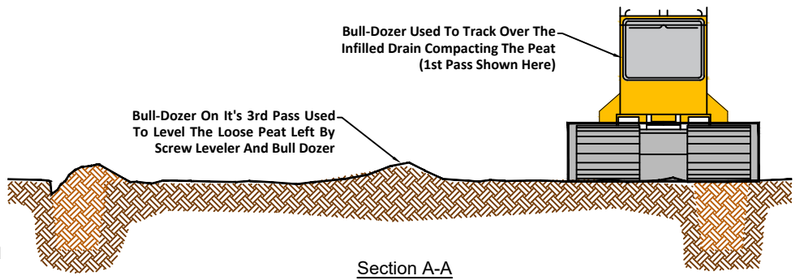
Section A-A

Phase 3
Final Leveling Of Drains & Field

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



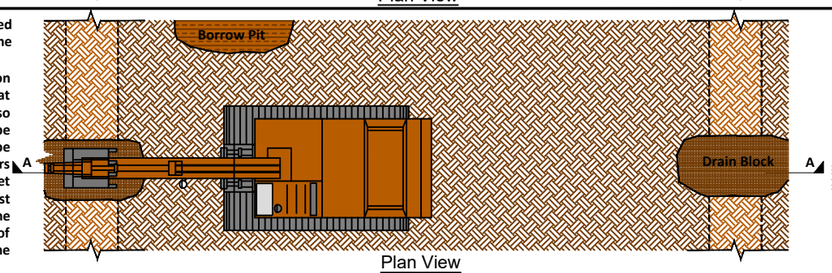
Plan View



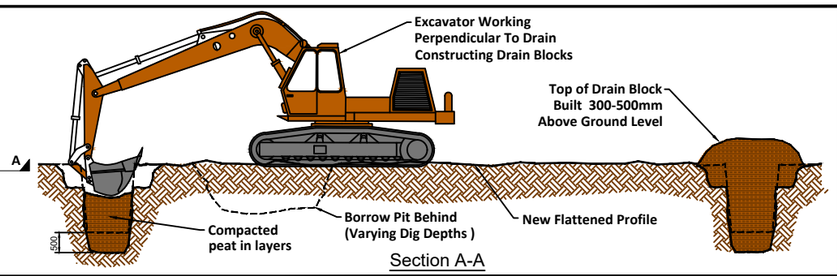
Section A-A

Phase 4
Drain Blocking

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



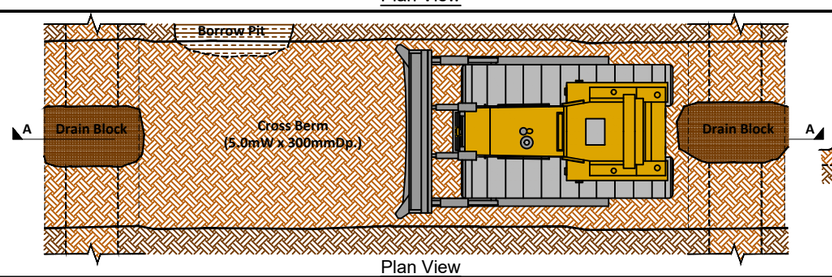
Plan View



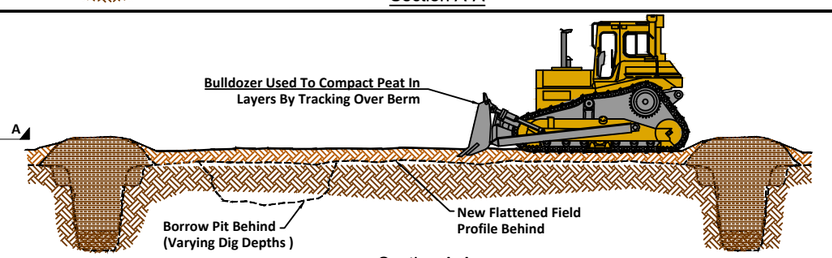
Section A-A

Phase 5
Cross Berm

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



Plan View



Section A-A

NOTES:

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

STATUS

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

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PROJECT:
Peatland Climate Action Scheme
PCAS

TITLE:
Rehabilitaion Method DPT 4A
Field Re-profiling

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

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

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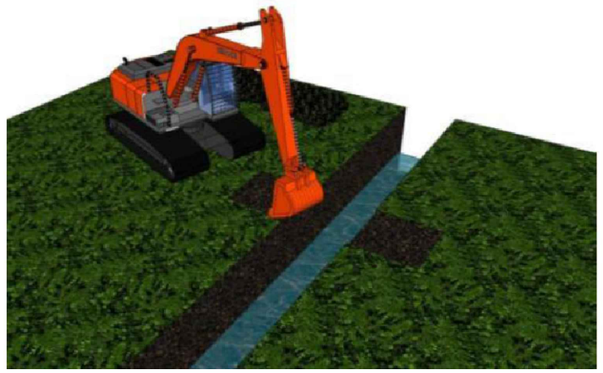
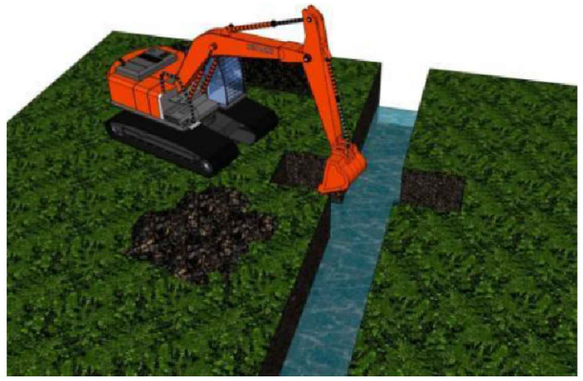
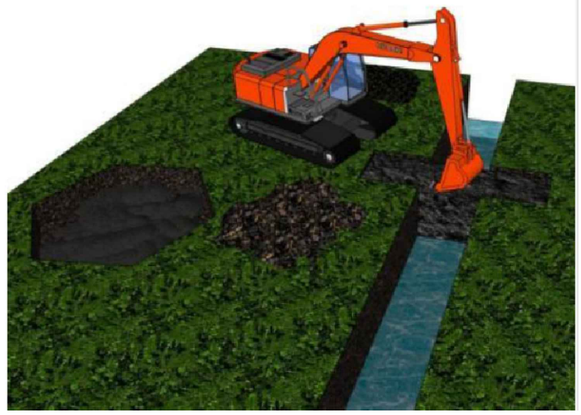
1. Before building of drain blocks, the sides and bottom of the ditch is cleaned using the excavator to remove dry degraded peat, to ensure a good peat-to-peat contact.
Any vegetation should be carefully removed and left aside for replacement at the end of the process.





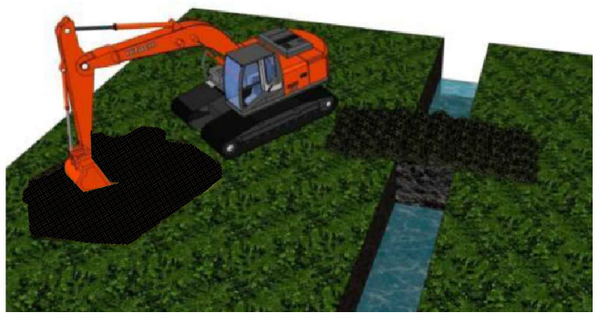
2. Cut key in either side of the drain approximately 500mm deep, and ensure that it is wider than the actual drain.
Remove 500mm of peat from bottom of the drain also and place behind the machine for replacement later.

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.
Any vegetation 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 to raise water levels, re-wetting peat and slowing water movements through the bog.

NOTES:

1. FIGURED DIMS ONLY TO BE TAKEN FROM THIS DRAWING.
2. REFER TO RELEVANT SITE PLAN TO ENSURE SPECIFIC DRAIN BLOCKS HAVE BEEN INSTALLED DOWNSTREAM PRIOR TO COMMENCING ANY RE-PROFILING WORKS, TO RETAIN ANY SILT THAT MAY ENTER THE DRAINS.
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STATUS

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

PROJECT:
Peatland Climate Action Scheme
PCAS

TITLE:
Rehabilitation Method MLT 2
Peat Drain Blocking

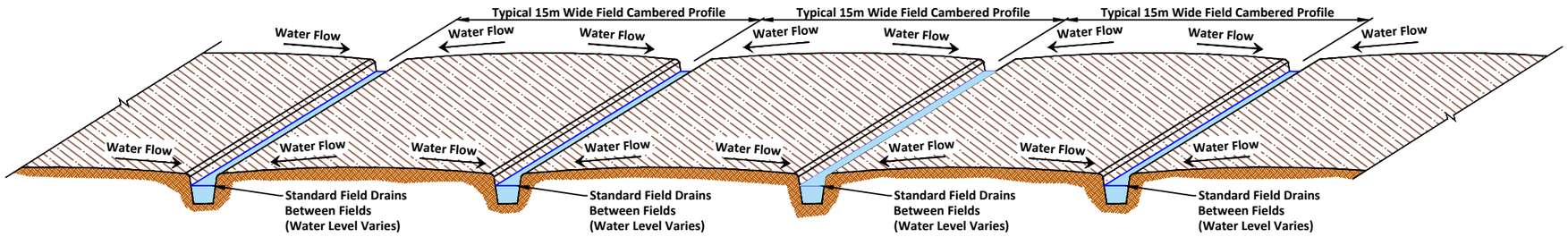
Drawn By:		Checked By:		Approved:
CAD	Designer	Discip. Lead	Design Lead	Design Manager
P.K.		D.K.	P.N.	P.N.

Date: 28/01/21 Scale : N.T.S. A3 Stage: For Approval

Drawing No.: PCAS-0100-013 Rev: b

Existing Layout:

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



NOTES:

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
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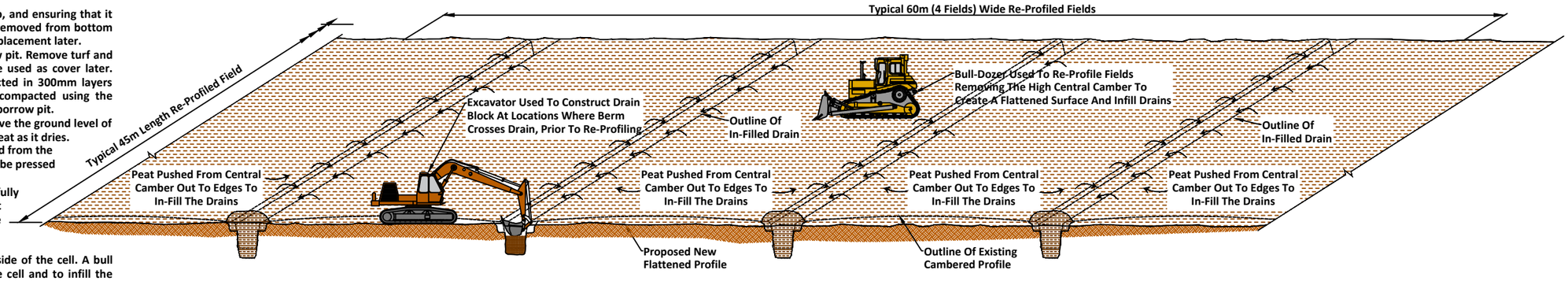
Phase 1
Drain Blocking And Re-Profiling of Fields Surface

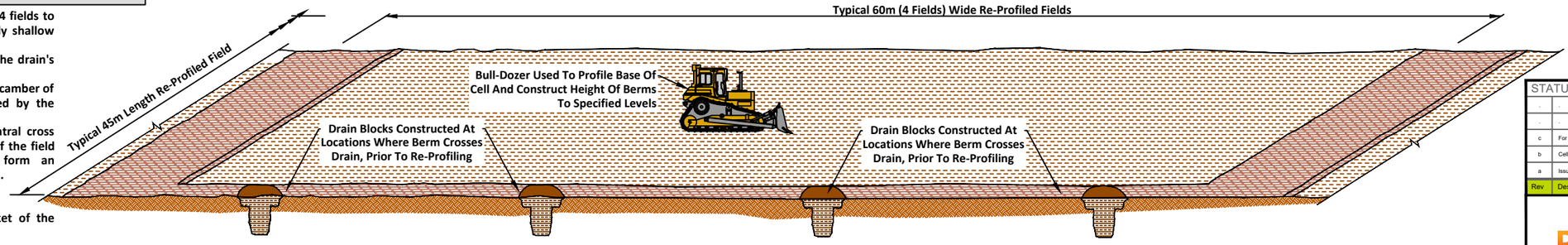
Drain blocks are constructed using an Excavator operating at a perpendicular direction to the field drains.
Key is cut in the drain approximately 500mm deep, and ensuring that it is wider than the actual drain. 500mm of peat is removed from bottom of drain also and placed behind the machine for replacement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

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



Phase 2
Formation of Surface Berms And Levelling Base of Cells

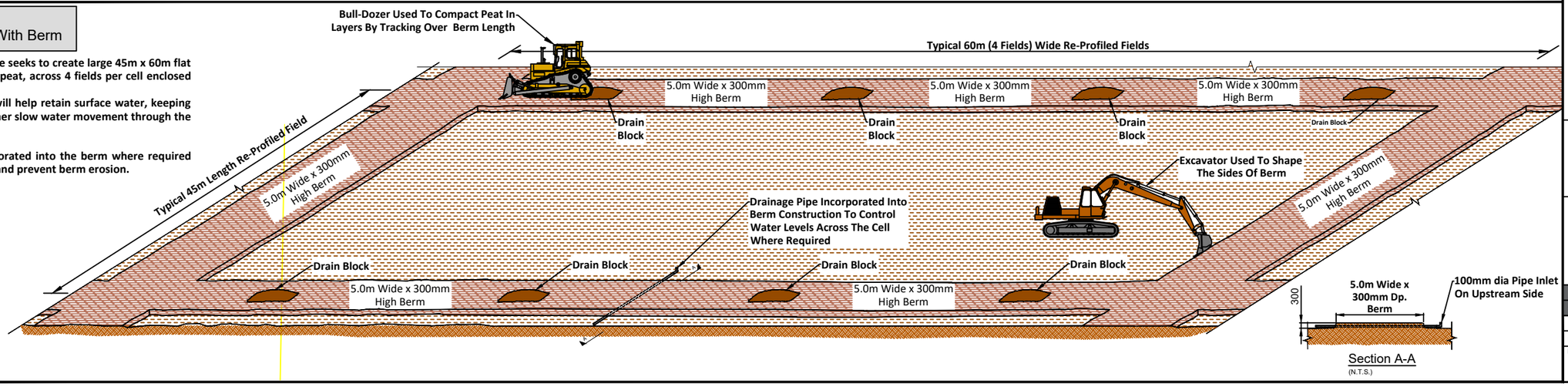
Berms are formed 45m in length and 60m across 4 fields to create an enclosed cell. The berms are relatively shallow (300mm high) and are 5.0 m wide.
An Excavator is used to form a key(5m long) in the drain's edges where the berm crosses.
A strip of peat(5m wide) is taken from the central camber of the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



Final Profile:
45m x 60m Cell With Berm

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

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



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

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

PROJECT:
Peatland Climate Action Scheme (PCAS)

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

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

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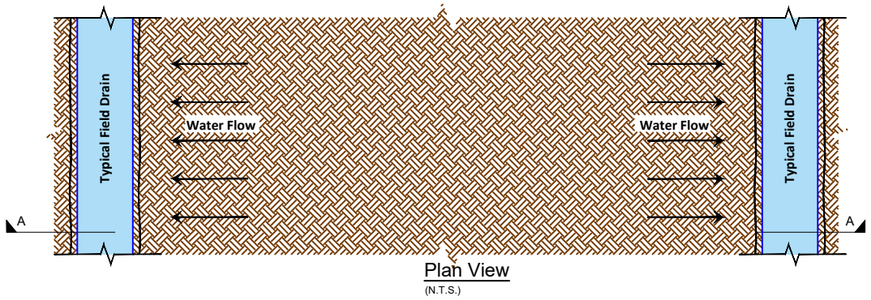
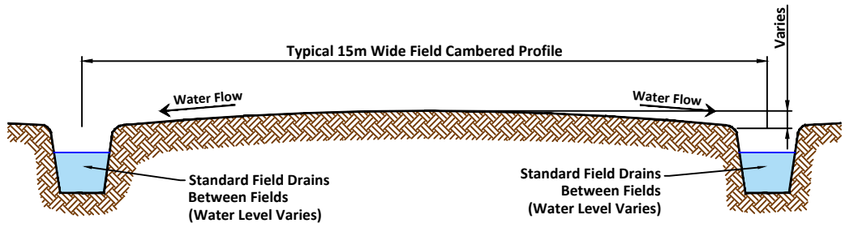
Existing Layout:

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



Plan View
(N.T.S.)



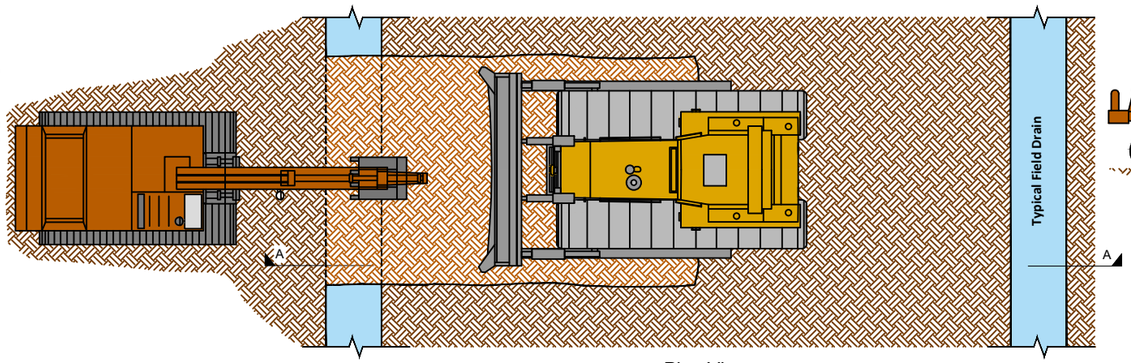
Section A-A
(N.T.S.)

NOTES:

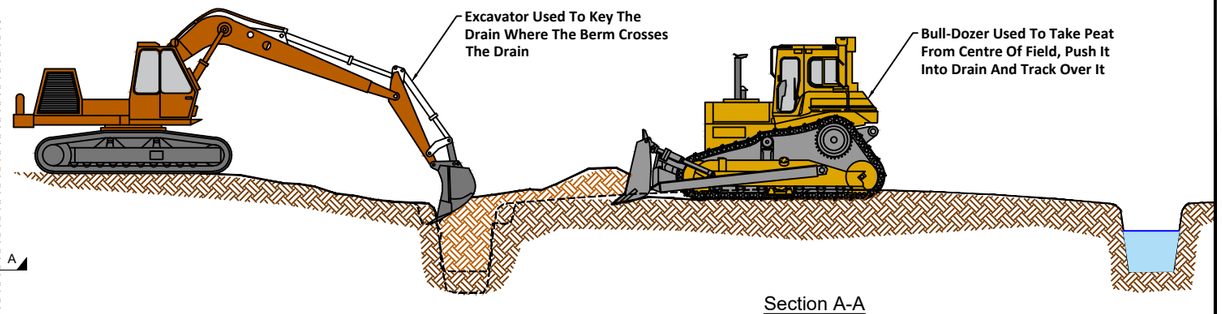
1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
2. REFER TO RELEVANT SITE PLAN TO ENSURE SPECIFIC DRAIN BLOCKS HAVE BEEN INSTALLED DOWNSTREAM PRIOR TO COMMENCING ANY RE-PROFILING WORKS, TO RETAIN ANY SILT THAT MAY ENTER THE DRAINS.
3. REFER TO RELEVANT SITE PLAN FOR No. OF DRAIN BLOCKS SPECIFIED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

Phase 1
Forming Peat Berm

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



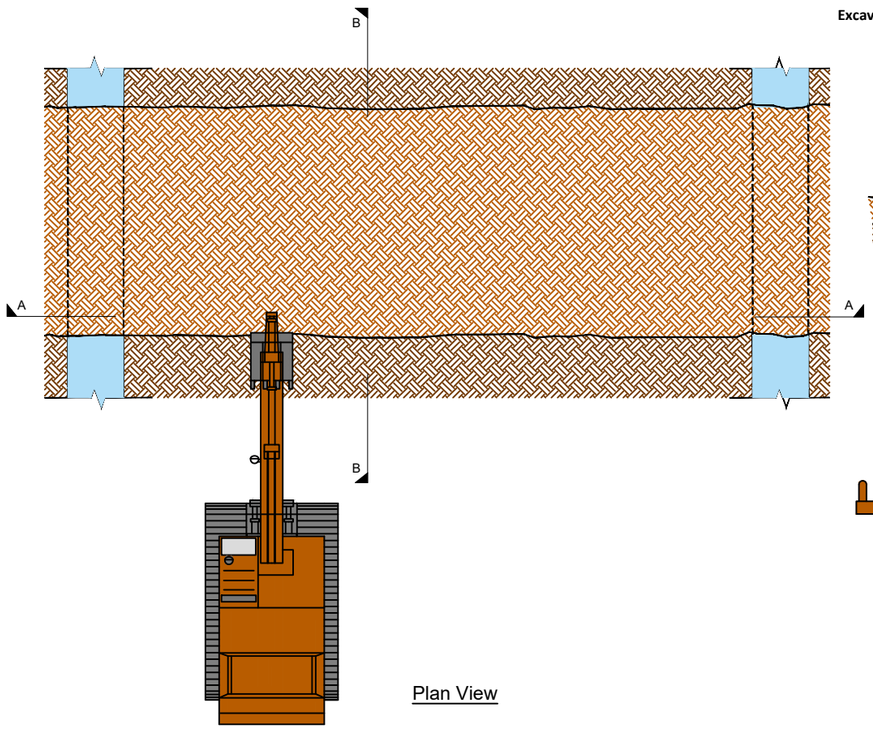
Plan View
(N.T.S.)



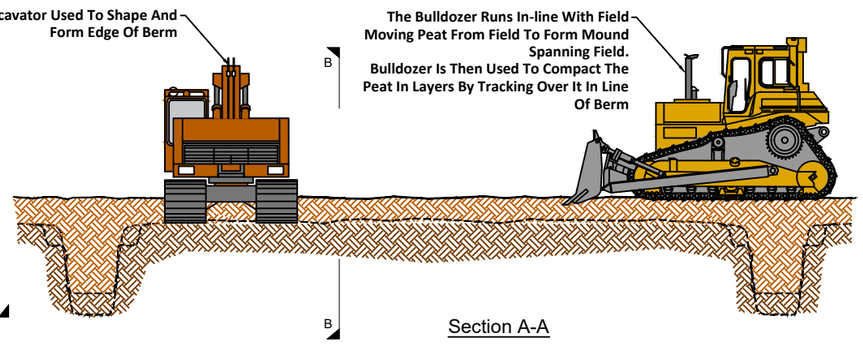
Section A-A
(N.T.S.)

Phase 2
Forming Peat Berm

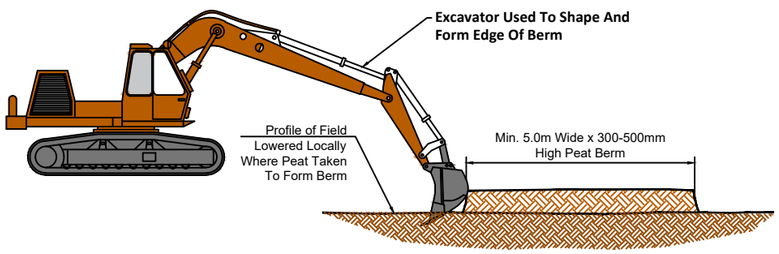
Next the bull-dozer is used to complete the central cross section of Berm by taking peat from the centre of the field and pushing it in line with the field to form a minimum 5m Wide x 300-500mm High Cross Berm.
The peat material in the berm is compacted in layers by the dozer tracking over it.
The excavator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



Plan View



Section A-A



Section B-B

STATUS

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

BORD NA MÓNA
Naturally Driven
Bord Na Móna Engineering Department
LEABEG, TULLAMORE CO. OFFALY
Tel. 057 9345900
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PROJECT:
Peatland Climate Action Scheme
PCAS

TITLE:
Rehabilitation Method WLT 3
Peat Berm

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

Date: 28/01/21 | Scale : Not to Scale A3 | Stage: Information
Drawing No.: PCAS-0100-010 | Rev: c

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Appendix E Environmental Management Plan

Peatland Climate Action Scheme

Environmental Management Plan

Prepared by

Bord na Móna, Civil Engineering Office

DOCUMENT CONTROL SHEET

Client	Bord na Móna					
Project Title	Peatland Climate Action Scheme					
Document Title	Environmental Management Plan					
Document No.	PCAS-RP-01-EMP					
This Document Comprises	DCS	TOC	Text	List of Tables	List of Figures	No. of Appendices
	1	1	19	4	0	2

Rev.	Status	Author(s)	Reviewed By	Approved By	Office of Origin	Issue Date
-	Draft	DM	EMcD/MMcC/ DK/CC	PN	BnM Engineering Dept.	28-04-2021
A	Final	DM	EMcD/MMcC/ DK/CC	PN	BnM Engineering Dept.	10-05-2021

Contents

1.0 Introduction

Bord na Móna have identified a footprint of 33,000 ha of their estate as peatlands suitable for enhanced rehabilitation. This proposed Peatlands Climate Action Scheme (PCAS) will significantly exceed the requirements of the rehabilitation and decommissioning obligations under existing Environmental Protection Agency (EPA) Integrated Pollution Control (IPC) Licence Conditions. Improvements supported by PCAS will ensure that environmental stabilisation is achieved, and significant additional benefits are realised through optimising climate action benefits. This decommissioning, rehabilitation and restoration process will be referred to in subsequent sections of this report as 'the works'.

The objectives of the Environmental Management Plan (EMP) are to:

a) Identify management responsibilities and reporting requirements for environmental management;
b) Identify the relevant Environmental Commitments;
c) Set out the environmental protection measures to be implemented;
d) Outline how compliance with the EMP will be achieved; and
e) Promote best environmental practices for the duration of the development.

This Environmental Management Plan should be read in conjunction with the following site-specific documents for the relevant bog where works are taking place:

- Rehabilitation Plan,
- Preliminary Health & Safety Plan,
- Engineering Construction Package,
- Environmental File,
- Ecology File,
- Associated IPC Licence,
- Training Pack,

The Rehabilitation Plan gives details on the proposed works and outlines control measures and associated monitoring in order to mitigate against any detrimental impacts that may arise on site during the works. It also outlines Bord na Móna's responsibilities under the existing IPC Licence Conditions with respect to peatland rehabilitation.

2.0 Proposed Rehabilitation Works

The enhanced rehabilitation measures are outlined and detailed in the site-specific Rehabilitation Plan, Engineering Construction Package, Environmental File & Ecology File. These measures are grouped into rehabilitation packages and their suitability for the deployment in different 'high level' categories of land types are outlined in Table 2-1. The Standard Rehab Methodology Drawings in Table 2-2 should be followed with respect to the execution of the various mythologies on site.

Table 2-1 Rehabilitation Packages

Code	Description
Deep Peat Cutover Bog	
DPT1	Regular drain blocking (3/100 m) + blocking outfalls and managing water levels with overflow pipes
DPT2	More intensive drain blocking (7/100 m) + blocking outfalls and managing overflows with a controlled weir outfall + Sphagnum inoculation
DPT3	More intensive drain blocking (7/100 m), + field reprofiling + blocking outfalls and managing overflows with a controlled weir outfall + + Sphagnum inoculation
DPT4	Berms and field re-profiling (45m x 60m cell) + blocking outfalls and managing overflows with a controlled weir outfall + drainage channels for excess water + + Sphagnum inoculation
DPT5	Cut and Fill cell bunding (30m x 30m cell) + blocking outfalls and managing overflows with a controlled weir outfall + drainage channels for excess water + Sphagnum inoculation
Dry Cutaway	
DCT1	Blocking outfalls and managing water levels with overflow pipes
DCT2	Regular drain blocking (3/100 m) + blocking outfalls and managing water levels with overflow pipes + targeted fertiliser treatment
DCT3	More intensive drain blocking (7/100 m) + blocking outfalls and managing overflows with a controlled weir outfall + targeted fertiliser treatment
Wetland	
WLT1	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes
WLT2	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes + Targeted blocking of outfalls within a site
WLT3	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes + Targeted blocking of outfalls within a site + constructing larger berms to re-wet cutaway + transplanting Reeds and other rhizomes
WLT4	More intensive drain blocking (7/100 m), + blocking outfalls and managing overflows with a controlled weir outfall + transplanting Reeds and other rhizomes
WLT5	More intensive drain blocking (7/100 m), + field reprofiling + blocking outfalls and managing overflows with a controlled weir outfall + transplanting Reeds and other rhizomes
Marginal Land	
MLT1	No work required
MLT2	More intensive drain blocking (7/100 m)

Table 2-2 – Schedule of Standard Rehab Methodology Drawings

Drawing No.	Drawing Title
PCAS-0100-001	Rehabilitation Method DPT1
PCAS-0100-002	Rehabilitation Method DPT2
PCAS-0100-003	Rehabilitation Method DPT3A
PCAS-0100-004	Rehabilitation Method DPT3B
PCAS-0100-005	Rehabilitation Method DPT4A
PCAS-0100-006	Rehabilitation Method DPT4
PCAS-0100-007	Rehabilitation Method DPT5
PCAS-0100-008	Rehabilitation Method DCT2
PCAS-0100-009	Rehabilitation Method DCT3
PCAS-0100-010	Rehabilitation Method WLT3
PCAS-0100-011	Rehabilitation Method WLT4
PCAS-0100-012	Rehabilitation Method WLT5
PCAS-0100-013	Rehabilitation Method MLT2
PCAS-0100-014	Modifying of Outfalls & Managing Water Levels
PCAS-0100-015	Field Re-profiling
PCAS-0100-016	Boundary Berm

3.0 Envisaged Sequence of Works

This section provides an outline of the envisaged sequence of works associated with the project. Bord na Móna Operations Risk Assessment Method Statements (RAMS) should include a detailed description of the works, particularly those works which have the potential to impact public spaces. Mitigation measures for these impacts should also be proposed within the RAMS.

3.1 Site Preparation Works

Bord na Móna Operations will be responsible for security of the site and as such, will be required to carry out, among others, the following tasks:

- Ensure that a relevant and robust site induction process is in place for all site personnel.
- Ensure that all site personnel have valid Safe Pass card, and valid CSCS card where applicable.
- Ensure that access to the site by unauthorised persons is restricted, by appropriate means.

The site compound may be used as a storage area for various materials throughout the course of the works. Typical materials to be stored include fuels, plant and equipment. Temporary water supply, electricity and sewerage to be satisfied by Bord na Móna Operations as required.

3.2 General Description of Works

The works involves the construction of peat dams, berms and the adoption of various peat bunding techniques in addition to monitoring activities as per the IPC Licence requirements.

The scope of works is described as, but are not limited to, the following:

- Silt pond inspections fortnightly and cleaning bi-annually.
- Sampling of the silt pond outlet every month.
- Refuelling of machines.
- Unloading of fuel from supplier into a double skinned tank onsite.
- Unloading of oil barrels from a pick-up and depositing into the oils store.
- Other materials being delivered to site by BNM and third parties.
- Idle travel out the bog bringing operators to machines to facilitate welfare breaks.
- Collection of loose polythene out the bog and stockpile at the centre.
- Collection of old unused concrete pipes and transport back to centre.

- Remove old machines from bogs, returning to the centre for cutting and collection by a scrap contractor.
- Lifting and collecting unused sections of rail line along mainline.
- Lifting laid permanent rail line and polythene.
- Decommissioning works including, but not limited to plastic clean up, lifting of rail lines etc.
- Provision of temporary welfare facilities for the Bord na Móna staff.
- Construction of peat dams within existing drains.
- Construction of peat bunds and berms.

4.0 Management & Mitigation Measures

4.1 Site Management

The works shall be managed and supervised by competent and qualified personnel and all works shall be carried out under appropriate supervision, best practice, current health and safety measures and also suitable quality control. Facilities for site employees shall be provided within the site compound.

Implementation of the mitigation measures for the works will be the responsibility of Bord na Móna Operations and supervision of the works will be carried out by this Bord na Móna Department incorporating Site Supervisors and the Project Supervisor Construction Stage (PSCS).

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

4.2 Health & Safety

All works shall be carried out so as to comply with all the requirements of the Safety and Health at Work Act 2005 and any subsequent regulations or amendments and with the requirements of the Health and Welfare at Work (Construction) Regulations, (SI 291 of 2013), any subsequent amendments and any other relevant Health and Safety legislation. All construction staff on site shall have a current Safe Pass card and relevant CSCS card. All works shall be carried out in a safe manner and in accordance with the above legislation and any other guidance notes issued by the Health and Safety Authority. In particular, all excavation works shall be carried out in accordance with the *HSA Publication: A Guide to Safety in Excavations.*

The PSCS will provide a site-specific Construction Stage Safety and Health Plan and will provide risk assessments and method statements for the works. On completion of the works the PSCS shall prepare a detailed safety file.

All site personnel/site visitors will be required to wear Personal Protective Equipment (PPE) and undergo the established site induction process prior to entering the site.

Bord Na Móna Operations should ensure that regular audits are carried out at the site, to ensure that measures and process outlined in the site health and safety plan are adhered to. Dangerous occurrences, incidents, near misses and unsafe acts should be recorded, with recorded action taken to prevent all further occurrences.

4.3 Restricted Activities

Species-specific seasonal restrictions on the proposed activities may be required in line with elements highlighted in the site-specific Rehabilitation Measures & Ecology File.

Regarding vegetation clearance, should it be required, all works will comply with Section 40 of the Wildlife Act. Please refer to Vegetation Clearance SOP ECO-004 for specific guidance. For the avoidance of doubt – no felling works will be carried out as part of the proposed works.

There may also be a requirement to protect other ecological receptors such as colonies of breeding Marsh Fritillary (a butterfly species), the breeding or resting places of Otter and possibly amphibians or reptiles which utilise locations such as drains or other water features.

Where clearance is required during the restricted period, the Department of Agriculture, Food and Marine advise that under Section 37 of the Forestry Act, 1946:

> *It is illegal to uproot any tree over ten years old or to cut down any tress of any age (including trees which form part of a hedgerow) unless a Felling Notice has been lodged at the Garda Station nearest to the trees at least 21 days before felling commences.*

The Closed Period "*40(1) (a) it shall be an offence for a person to cut, grub, burn or otherwise destroy during the period beginning on the 1st day of March and ending on the 31st day of August in any year, any vegetation growing on any land not then cultivated. (b) it shall be an offence for a person to cut, grub, burn or otherwise destroy any vegetation growing in any hedge or ditch during the period mentioned in paragraph (a) of this subsection"*

As per guidance from Inland Fisheries Ireland, any instream works proposed to be undertaken in any rivers streams and watercourses should be undertaken between July and September and in all cases must be agreed in advance with Inland Fisheries Ireland.

Measures to avoid the inadvertent transfer of alien invasive species (aquatic or terrestrial) will be required.

The Project Ecologist or Environmental Manager will advise Bord na Móna Operations on site-specific application of these restrictions to individual sites.

4.4 Archaeology

The discovery of monuments or archaeological objects during the works can constrain the rehabilitation measures proposed for a particular area. If this occurs, rehabilitation measures will be reviewed and adapted where required. An archaeological impact assessment for the site has been carried out and is included in the site-specific Rehabilitation Plan. The recommendations of this assessment have been incorporated into the site-specific Rehabilitation Plan, Engineering Construction Package, Environmental File & Ecology File to minimise impacts on known archaeology.

In addition, Bord na Móna Operations will adhere to the Archaeology Code of Practise relating to management of stray archaeological finds that may arise during the works.

4.5 Ground Water & Surface Water Management

A key component of the works is the potential hydrological impact rehabilitation may have on the bog, surrounding lands and lands downstream which may be hydrologically linked to the bog.

Measures should be taken to protect groundwater and surface water at the site during the works. Drip trays, spill kits and mobile bund systems should be used where required to prevent loss of chemicals/fuels to ground. Plant and equipment should be refilled in a bunded or hardstand area using a drip tray or mobile bund.

Damaged containers should be removed from site and disposed of appropriately to avoid further use. Fuels and oils on site should be stored securely to avoid damage. Relevant staff have received emergency response training for pollution events and be trained in the use of spill kits and handling and refuelling.

Management Activities will comply with Condition 6 of the IPC Licence as follows:

- Intensive sampling of 70% of our bog catchments
- Monthly sampling silt pond outlets
- Fortnightly silt pond inspections
- Bi-annual silt pond maintenance as per procedure

All works should be carried out in line with the site-specific Engineering Construction Package, Environmental File & Ecology File in addition to the *Inland Fisheries "Guidelines on protection of fisheries during construction works in and adjacent to waters".*

4.6 Drainage Management Plan Measures

Drainage Management Plans (DMP) have been developed for each bog to establish the baseline hydrological performance of the bog and the surrounding drainage network. The plan sets out the characterisation of the bog and surrounding lands, the existing performance of the drainage network and the level of flood risk. The plan identifies the potential hydrological zone of influence of the bog and the objectives, risks and opportunities associated with the rehabilitation of the bog.

The plan assesses the potential impact of the various rehabilitation measures which are proposed on the local drainage network and flood risk. It sets out, where necessary, mitigation measures required to reduce impacts to an acceptable level. The plan sets out the measures which are required to be delivered in parallel with the rehabilitation plan as well as the long-term operation and retention of the drainage network and associated infrastructure. The plan assesses the level of residual risk, the potential impact due to climate change and the adaptability of measures in response to these climate change impacts.

The DMP forms the basis of the detailed design drawings, included in the Engineering Construction Package, and should be read in conjunction with this report.

4.7 Traffic & Transport Management

All machines will be regularly checked and maintained prior to arrival at the site to prevent hydrocarbon leakage. No direct discharges to waters will be made.

4.8 Noise Management

Notwithstanding that there is little likelihood of a significant adverse impact, noise generation is expected as part of the works. It is envisaged that the main noise sources at the site will include earthworks plant and equipment and associated traffic.

Management Activities will comply with Condition 8 of the IPC Licence as follows:

- Activities on-site shall not give rise to noise levels off site at any noise sensitive location which exceed the following sound pressure limits ($L_{eq,30min}$):
  - Day-time: 55 dB(A)
  - Night-time: 45 dB(A)
- There shall be no clearly audible tonal component or impulsive component in the noise emission from the activity at any noise sensitive location.

The works will be restricted to within the footprint of the proposed rehabilitation area. The works will have due regard to noise limits and hours of operation (i.e. dusk and dawn) to minimise any potential disturbance on resident and local fauna that utilise the site and immediate environs. The proposed measures will be restricted to daylight hours and there will be no requirement for artificial lighting.

Bord na Móna Operations will be obliged to take specific noise abatement measures as part of the works and in line with the recommendations of BS5228-1 2009. These measures will typically include:

- No plant used on site will be permitted to cause an ongoing public nuisance due to noise
- The best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on site operations.

4.9 Dust Management

Dust generation is not expected as part of the works. The nature of the proposed works will naturally reduce the production of dust on site, as reprofiling site levels encourages settlement of water on the surface of the bog.

Activities that could give rise dust will be managed under the relevant conditions under Condition 5 of the IPC licence as follows:

- The licensee shall ensure that all operations on-site shall be carried out in a manner such that air emissions and/or dust do not result in significant impairment of, or significant interference with amenities or the environment beyond the site boundary.
- Activities on-site shall not give rise to dust levels off site at any Dust Sensitive Location which exceed an emission limit of 350 mg/m^2/day. [The sampling method to be in accordance with German TA Luft Immission Standards for Particle Deposition (IW1)].

4.10 Fuel Management

Fuels and oils used for plant and equipment on the site shall be stored in a bunded area within the site compound as required. This area shall be inspected regularly, and the bund shall be adequate to contain a minimum of 110% of the volume of the largest container of oil and fuel stored. Spill protection equipment such as absorbent mats, shall be available on site to contain any oil spill that may occur, and procedures shall be in place to deal with any such spillage. All plant shall be provided with drip trays and spill kits. Plant operators shall carry out a visual inspection of their vehicle daily and shall be trained in how to deal with any uncontrolled spillage of oil.

All plant refuelling will take place using mobile fuel bowsers or fixed bunded tanks. Only dedicated trained and competent personnel will carry out refuelling operations. Fuelling and lubrication of equipment shall only be carried out in designated areas away from surface water drainage features and ecologically sensitive areas. Hoses and valves will be checked regularly for signs of wear and will be closed and securely locked when not in use.

Fuel management to ensure no impact on the environment will be managed in accordance with Condition 9 of the IPC Licence as follows:

- No potentially polluting substance or matter shall be permitted to discharge to off-site surface waters, off site storm drains or groundwaters.
- The loading and unloading of fuel oils shall be carried out in designated areas protected against spillage and leachate run-off. While awaiting disposal, all materials shall be collected and stored in designated areas protected against spillage and leachate run-off.
- The licensee shall have in storage an adequate supply of containment booms and/or suitable absorbent material to contain and absorb any spillage.

- The licensee shall maintain a log of bi-annual inspections of all rail and tractor transported fuelling units. These inspections as a minimum should record any damage or leaks or flaws in rolling stock that could result in accidental spillage.

4.11 Waste Management

All waste arising from the works shall be managed and disposed of in a way that ensures the provisions of the Waste Management Act 1996 and associated amendments and regulations are applied.

Waste Management will be conducted in accordance with Condition 7 of the IPC Licence as follows:

- Disposal or recovery of waste shall take place only as specified in Schedule 2(i) Hazardous Wastes for Disposal/Recovery and Schedule 2(ii) Other Wastes for Disposal/Recovery of this licence and in accordance with the appropriate National and European legislation and protocols. No other waste shall be disposed of/recovered either on-site or off-site without prior notice to, and prior written agreement of, the Agency.
- Waste sent off-site for recovery or disposal shall only be conveyed to a waste contractor, as agreed by the Agency, and only transported from the site of the activity to the site of recovery/disposal in a manner which will not adversely affect the environment.
- A full record, which shall be open to inspection by authorised persons of the Agency at all times, shall be kept by the licensee on matters relating to the waste management operations and practices at this site. This record shall as a minimum contain details of the following.
    - The names of the agent and transporter of the waste.
    - The name of the persons responsible for the ultimate disposal/recovery of the waste.
    - The ultimate destination of the waste.
    - Written confirmation of the acceptance and disposal/recovery of any hazardous waste consignments sent off-site.
    - The tonnages and EWC Code for the waste materials listed in Schedule 2(i), Hazardous Wastes for Disposal/Recovery and Schedule 2(ii) Other Wastes for Disposal/Recovery sent off-site for disposal/recovery.
    - Details of any rejected consignments.

4.12 Soil Management

If soil contamination is encountered during the works arising from an accidental fuel spillage, this should be managed in accordance with Conditions 4, 7 & 9 of the IPC Licence as follows:

- The licensee shall notify the Agency by both telephone and email to the Agency's Headquarters, or to such other Agency office as may be specified by the Agency, as soon as practicable after the occurrence of any of the following:
    - Any release to atmosphere resulting in significant impairment of, or significant interference with amenities or the environment.
    - Any emission which does not comply with the requirements of this licence.
    - Any incident with the potential for environmental contamination of surface water or groundwater, or posing an environmental threat to air or land, or requiring an emergency response by a Local Authority.
    - The licensee shall include as part of the notification, date and time of the incident, details of the occurrence, and the steps taken to minimise the emissions and avoid recurrence.
- The licensee shall make a record of any incident as set out in above. The notification given to the Agency shall include details of the circumstances giving rise to the incident and all actions taken to minimise the effect on the environment and minimise wastes generated.

- A summary report of reported incidents shall be submitted to the Agency as part of the AER. The information contained in this report shall be prepared in accordance with any relevant guidelines issued by the Agency.
- In the case of any incident as set out above which relates to discharges to water, the licensee shall notify the appropriate Regional Fisheries Board, as soon as practicable after such an incident.
- In the event of any incident, as set out above having taken place, the licensee shall notify the appropriate Local Authority as soon as practicable, after such an incident.
- In the case of any incident, as set out above, which has the potential to impact the conservation objectives of the Special Areas of Conservation and Natural Heritage Areas identified in Attachment 10.1 of the IPC application having taken place, the licensee shall notify Dúchas of the Department of Arts, Heritage, Gaeltacht and the Islands as soon as practicable after such an incident.
- The licensee shall as part of their AER, or more frequently as may be necessary, notify and supply maps to the Agency of boglands, and discharges from same, intended to be included in the subsequent years' development and operational programmes.

4.13 Fire Safety

The ***Bord na Móna Fire Prevention & Fire Fighting Procedures*** in addition to the ***Bord na Móna Fire and Environmental Plan*** outline requirements for fire prevention and fighting in peat bogs and works locations.

It is the intention of Bord na Móna to identify the potential for and take all practicable measures to prevent the outbreak of fire by means of ensuring:

- Implementation of the above policy and procedures.
- Activities are risk assessed to identify potential fire hazards and allow for implementation of suitable control measures to eliminate or reduce to a minimum associated risk.
- Selection of suitable equipment and machinery which is used appropriately and adequately inspected and maintained by competent personnel.
- Installation, where appropriate, of fire-fighting equipment.
- Proper use, storage, and disposal of flammable materials.
- Use of permit to work system, as appropriate, where hot works are to be undertaken.

Bord na Móna Operations must ensure that all fire egress and access points are kept clear and free from obstruction. Emergency access to the various works zones shall be provided and maintained for the duration of the project.

- Unobstructed fire egress during the project.
- Adequate fire safety procedures.
- Access/egress for emergency vehicles.

5.0 Maintenance Access Requirements

The site-specific Drainage Management Plan (DMP) indicates that the effectiveness of a hydraulic break depends upon the drain's ability to convey water away.

The hydraulic breaks identified in the site-specific Engineering Construction Package will require routine monitoring by Bord na Móna, following the works, to ensure the drain is functioning as intended.

6.0 Protection of Existing Vegetation

Where peat extraction has ceased on a site several years ago it is typical for pioneer vegetation to have established on site via natural colonisation, which was encouraged by the cessation of disturbance from peat extraction activity. During this period, the field drainage system naturally breaks down in certain areas, accelerating natural colonisation. The development of pioneer habitats reflects the underlying environmental conditions with the key factor being topography and hydrology.

Regarding vegetation clearance, should it be required, all works will comply with Section 40 of the Wildlife Act. Please refer to Vegetation Clearance SOP ECO-004 for specific guidance. For the avoidance of doubt – no felling works will be carried out as part of the proposed works.

The Closed Period "40(1) (a) it shall be an offence for a person to cut, grub, burn or otherwise destroy during the period beginning on the 1st day of March and ending on the 31st day of August in any year, any vegetation growing on any land not then cultivated. (b) it shall be an offence for a person to cut, grub, burn or otherwise destroy any vegetation growing in any hedge or ditch during the period mentioned in paragraph (a) of this subsection"

The site-specific Ecology File will detail the application of these restrictions to individual sites where required.

7.0 Protected Habitats

Bord na Móna is committed to protecting the diverse habitats in proximity to our estate on which a wide range of Ireland's native animals and plants depend. Sites in proximity to SACs and NHAs have been identified in the site-specific Rehabilitation Plan, Engineering Construction Package, Environmental File & Ecology File for the relevant bog where works are taking place.

Bord na Móna Operations shall incorporate appropriate mitigation measures from the NIS into the CEMP as required to mitigate against adverse impacts on these protected habitats where required, in particular any measures stipulated in Appropriate Assessment reporting.

8.0 Ecology

Measures should be taken by Bord na Móna Operations to protect flora and fauna during the works are outlined in the site-specific Ecology File. The works should be limited to daylight hours, in proximity to watercourses, to allow otters, foxes and other wildlife to forage along the watercourses at dawn, dusk and during the night.

Works will take cognisance of any identified Ecological Restriction Zones (ERZ's) to protect sensitive ecological receptors such as birds (breeding or non-breeding), amphibians or reptiles, invertebrates (e.g. Marsh Fritillary) or mammals (such as Otter) and any particularly sensitive habitats.

In advance of works, all site personnel will receive a toolbox talk with regards to the protection of sensitive receptors onsite, and the prevention of the spread of invasive species.

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

In addition, it is the responsibility of Bord na Móna to undertake any or all measures stipulated in Appropriate Assessment Reporting where required. Refer to the site-specific Environmental and/or Ecology File for specific guidance.

9.0 Peat Dam and Peat Berm Construction

Refer to ***Engineering Methods for Peatland Rehabilitation*** in the Engineering Construction Package for specific guidance on Peat Dam and Peat Berm Construction. The main objective of peat dam construction, as a rehabilitation measure, is to block drains with peat to raise water levels, re-wetting peat and slowing water movements through the site. Peat berm construction follows a similar principle to create large (e.g. 45m x 60m) cells to retain shallow surface water. The creation of cells helps retain surface water, keeping peat wet and slows water movement through the bog.

Geotechnical failures of peat embankments and dams can occur by the lateral displacement of an intact block of peat material due to reductions in the embankment self-weight following partial drying of the crest material and an increase in the active hydrostatic pressures following an increase in the depth of retained water after an intense rainfall event. These factors must be considered when carrying out horizontal and vertical stability calculations for peat embankments and dams.

It is important to create a 'key' for the dam / berm to mitigate against local failures of the peat material used in the construction when subject to associated hydraulic forces from the water being retained. This technique also improves the overall strength of the dam by creating a foundation and reduces sub-surface flows through the area.

Risk mitigation against dam and berm failure will be employed initially via design, whereby maximum water levels for each site will be specified in the site-specific Engineering Construction Package. Following construction, regular inspections of berms will be carried out.

If a local failure to a peat dam or berm occurs, the water will follow a pathway towards the nearest silt pond allowing any peat sediment from the local failure to be captured in the silt pond prior to discharging from the bog.

Where the risk cannot be mitigated against (in the case where the bog sits on an existing flood plain for example) emergency measures will be outlined in the Bord na Móna Emergency Response Procedure document.

10.0 Biosecurity

The potential for importation or introduction of non-native plant species (such as Japanese Knotweed, Himalayan Balsam, etc.) during the works has the potential to result in the establishment of invasive species within the site.

Section 49 of the European Communities (Birds and Natural Habitats) Regulations 2011 prohibits the introduction and dispersal of invasive alien species (particularly plant species) listed on Part 1 (third column) of the 'Third Schedule'.

This section aims to reduce the risk from, and impacts of, invasive species and protecting biodiversity on bogs identified under PCAS. The works will have due regard to the relevant biosecurity measures as follows:

- Records of problematic invasive species identified within the bog units will be marked out with signs to highlight areas of infestation to personnel, including a buffer.
- All plant machinery will be restricted from disturbing known colonies of invasive species.
- All plant machinery will avoid unnecessary crossings to adjoining lands.
- Good site hygiene will be employed to prevent the introduction and spread of problematic invasive alien plant species (i.e. Japanese Knotweed (Fallopia japonica), Himalayan Balsam (Impatiens glandulifera), Himalayan Knotweed (Persicaria wallichii), etc.) by thoroughly inspecting and/or washing vehicles prior to entering the work area.
- Plant shall be inspected upon arrival and departure from site.
- All site users shall be made aware of these procedures and appropriate treatment methodologies.

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

In order to prevent the introduction and spread of aquatic invasive species, biosecurity will be required for all PPE, equipment, plant and machinery components before entering (or which are likely to enter) drains and watercourses on the site and again before leaving the site:

- Protective gloves should be worn when using any disinfectant solution in any of the procedures listed below.
- Visually inspect all equipment that has come into contact with the water for evidence of attached plant or animal material, or adherent mud or debris. This should be done before leaving the site.

- Remove any attached or adherent material (vegetation and debris) before leaving the site of operation.
- Ensure that all water is drained from any live wells and other water retaining compartments, tanks and other equipment before transportation elsewhere.
- It is recommended to apply disinfectant to the undercarriage and wheels of the vehicle/machine after steam cleaning or power hosing.
- Wet or live wells and other water retaining compartments in survey boats must be cleaned, rinsed or flushed with a 1% solution of Virkon Aquatic or another proprietary disinfection product. Alternatively, a 5% solution (100 ml / 20 litre solution) of chlorine bleach should be used. Rinse thoroughly with clean water.
- Footwear should be dipped in or scrubbed with a disinfectant solution (e.g. 1% solution of Virkon Aquatic or another proprietary disinfection product) and thoroughly dried afterwards.
- All PPE should be visually inspected and any attached vegetation or debris removed. Where appropriate, the gear should be wiped down with a cloth soaked in 1% solution of Virkon Aquatic or another proprietary disinfection product. Alternatively, a 5% solution (100 ml / 20 litre solution) of chlorine bleach should be used. Rubber gloves must be worn when undertaking this procedure.
- Survey equipment should also be sprayed with 1% solution of Virkon Aquatic.

11.0 Emergency Response Procedures

It is the intention of Bord na Móna to identify the potential for and take all practicable measures to prevent the occurrence of an emergency situation. However, in preparation for this possible occurrence, an Emergency Response Procedure will be prepared, implemented, maintained, and periodically reviewed by Bord na Móna Operations to minimise the potential for injury and ensure safe evacuation of persons.

Emergency Response Procedures are outlined for each location Appendix A

12.0 Reporting

Bord na Móna have a defined methodology for delivering the Peatland Climate Action Scheme. This is facilitated via adherence to our robust quality systems and project execution plans that have been developed to apply LEAN project management processes to our design and documentation. Bord na Móna teams adopt these key tools to the benefit of all projects and will adopt a formal reporting mechanism in line with the requirements of the IPC Licence. These reporting mechanisms are outlined in the site-specific Engineering Construction Package, Environmental File & Ecology File.

It is Bord na Móna policy to report, and where necessary, investigate any environmental incidents.

APPENDIX A – STANDARD OPERATING PROCEDURES (SOPs)

Bord na Móna Standard Operating Procedures with respect to Environmental & Biodiversity activities should be followed including, but not limited to, the documents listed in Table B-1 and Table B-2.

Table A-1 – Schedule of Biodiversity Standard Operating Procedures (SOP)

Code	Description
ECO 0001	Protection of Otter
ECO 0002	Prevention of disturbance (Birds)
ECO 0003	Protection of Marsh Fritillary
ECO 0004	Vegetation Clearance
ECO 0005	Protection of Amphibians and Reptiles
ECO 0006	Invasive Species

Table A-2 – Schedule of Environmental Standard Operating Procedures (SOP)

Code	Description
ENV017	Archaeological Findings
EP 5.0	General Emergency Preparedness & Response
SPIP	Silt Pond Inspection Procedure
SPMP	Silt Pond Maintenance Procedure
	Waste Management Procedure
	Gas Oil Loading Procedure

BORD NA MÓNA Naturally Driven	**Procedure: ECO-001**	**Rev: 1**
Title: Protection of Otter	**Approved:**	**Date: 16/03/21**

1) Purpose

To describe the environmental measures required to protect Otter across the Peatlands Climate Action Scheme (PCAS).

2) Scope

To avoid likely significant effects of disturbance, displacement or physical injury to Otter which occur or are likely to occur at any locations where Bord na Móna may be carrying out PCAS activities with the potential for effects.

The potential for negative effects will be avoided through adherence to Best Practice measures and the use of confirmatory surveys to establish any requirements such as derogations and/or restriction zones around confirmed breeding or resting sites as appropriate.

This Procedure should be read in association with any other pertinent procedures, in particular around vegetation clearance and working near water.

3) Related Documents

Bord na Mona Silt Pond Maintenance Procedure

Bord na Mona Silt Pond Inspection Procedure

National Roads Authority (2006). Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes. The National Roads Authority, Dublin.

National Roads Authority (2008.) Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes. The National Roads Authority, Dublin.

Highways Agency (1999). Design Manual for Roads and Bridges - Nature Conservation Advice in Relation to Otters HA81/99. The Highways Agency, London.

4) Procedure

<u>Environmental Controls</u>

1. The PCAS project team will liaise with the Bord na Móna Ecology Team who will approve and provide guidance on all on site activities which could have an ecological impact.
2. All PCAS staff will receive environmental training and/or an Environmental site induction/Toolbox talk before being allowed to work on a Bord na Móna bog.
3. Work will only be able to take place once the Bord na Móna Ecology Team has signed off on the installation of any required mitigation measures.
4. Adherence to any specified mitigation measures are to be subject to audit by the Bord na Móna Ecology Team and/or Site Supervisor/Environmental Officer or PSCS as appropriate.
5. Implementation of the mitigation measures for the works will be the responsibility of Bord na Móna Operations and supervision of the works will be carried out by this Bord na Móna Department incorporating Site Supervisors and the Project Supervisor Construction Stage (PSCS).

6. In addition, implementation of the mitigation measures will be monitored and inspected by Bord na Móna Environmental, Ecology and Engineering Departments, who are independent of Bord Na Móna Operations. Project Ecologists, Engineers and Environmental Compliance Officers will be appointed for each bog and they will ensure that measures are carried out in accordance with this Environmental Management Plan. The Project Ecologist, Environmental Compliance Officer, Engineer, H & S Manager, Site Supervisor and PSCS will have a 'stop works' authority.
7. Where non-compliance is detected, a system of follow up and corrective action will be implemented.

Preparation

1. Confirmatory surveys will be carried out 150m upstream and downstream of suitable Otter habitat where relevant activities are programmed to occur. This will include silt ponds (cleaning and maintenance), channelized sections of watercourses and bog drainage channels with connectivity to suitable habitat. These confirmatory Otter surveys will be undertaken no more than 12 months in advance of proposed activities, during the period November and April when vegetation cover is reduced. For silt ponds surveys will include an area comprising the pond plus a 50m buffer.
2. Confirmatory surveys will be undertaken by a suitably qualified ecologist.
3. The results of surveys will be communicated to the site manager responsible for scheduling activities on a need to know basis.
4. Zones or locations containing confirmed breeding or resting locations (holts/couches) are to be delineated with signage at an appropriate distance (150m) to prevent disturbance.
5. In addition, any restriction zones are to be digitised and provided in shapefile format for upload to machine/site supervisor PDA's where this facility is available.
6. These Ecological Restriction Zones (ERZs) will be marked out at regular intervals using a combination of appropriate signage or visual markers as appropriate, prior to works or activities commencing during the identified sensitive period.
7. The above will be carried out by a suitably qualified Ecologist/ Bord na Móna Ecology Team.
8. Surveys results will be confirmed no less than 3 days prior to scheduled activities commencing.
9. If required any derogation applications will be made by the Bord na Móna Ecology Team/designated project manager.

Operator Training

1. All PCAS operators will receive a toolbox talk by a suitably qualified Ecologist/ Bord na Móna Ecology Team, to educate them on any relevant restrictions prior to the commencement of activities.
2. This will include any restricted areas, the requirement for same, the location of reference documentation such as the schedule of mitigation measures, and the procedure to follow if in doubt as to the locations of activities in respect of any restricted areas.
3. A copy or map illustrating the restriction zones per bog, and periods wherein activities can be undertaken will be available at all times at the site office.

4. Where pertinent, a schedule of Mitigation Measures per bog will also be available at all times in the site office.

Responsibilities

1. The appointed PCAS Site Supervisor/PSCS as appropriate will be responsible for recording attendance at toolbox talks and making sure all operators have access to the required reference material, including drawings of restricted areas/ ERZ's.
2. The appointed PCAS Site Supervisor /PSCS as appropriate as will be responsible for the scheduling of activities
3. The appointed PCAS Site Supervisor /PSCS as appropriate must be aware of any other site-specific [1]mitigation around Otter
4. The Bord na Móna Ecology Team or Project Ecologist is responsible for conformance auditing.
5. If a derogation is required, any activities under same will be overseen by the Bord na Móna Ecology Team or appointed Project Ecologist.
6. Local NPWS will be made aware of any derogated works/activities before commencement.

Carrying out Activities

1. No works or activities are to be carried out in restricted areas or identified ERZ's during the relevant period as specified by the project ecologist. No works will be carried out within 150m of an active holt.
2. NPWS will be notified of any confirmed active holts.
3. As per NRA (2006) guidelines, following consultation with NPWS, works or activities closer to such breeding holts may take place – provided appropriate mitigation measures are in place, e.g. screening and/or restricted working hours on site;
4. No wheeled or tracked vehicles (of any kind) will be used within 20m of active, but non-breeding, otter holts. Light work, such as digging by hand or scrub clearance will not take place within 15m of such holts, except under licence (NRA, 2006);
5. Where holts are present in close proximity to invasive activities, but are determined not to require destruction, such activities may commence once recommended alternative mitigation measures to address otters have been complied with (NRA, 2006);
6. Only operators who have received the required training and toolbox talks are to be assigned duties within the above period.
7. Conformance will be audited through compliance checks by the Bord na Móna Ecology Team /Project Ecologist with 'stop-works' authority.
8. Activities will only be carried out between 08.00 and 17.30 to minimise the potential for disturbance.

5) Records

Evidence of approval (electronic)
Archive files

[1] F

BORD NA MÓNA Naturally Driven	**Procedure: ECO-001**	**Rev: 1**
Title: Protection of Otter	**Approved:**	**Date: 16/03/21**

Revision Index			
Revision	Date	Description of change	Approved

BORD NA MÓNA Naturally Driven	**Procedure: ECO-002**	**Rev: 1**
Title: Disturbance to Birds of Conservation Concern	**Approved:**	**Date: 06/04/21**

1) Purpose

To describe the environmental measures required to avoid significant disturbance to bird species of conservation concern during the PCAS scheme.

2) Scope

To avoid likely significant effects of disturbance or displacement at a scale likely to result in significant effects to breeding or wintering bird species of conservation concern, which occur or are likely to occur at any locations where Bord na Móna may be carrying out PCAS activities.

The potential for negative effects will be avoided through adherence to Best Practice measures and the use of confirmatory surveys to establish any requirements such as restricted areas and/or restriction zones around confirmed breeding or roosting sites as appropriate. Suitable restriction buffers have been derived from a review of Best Practice and is provided as an Appendix to this document.

This Procedure should be read in association with any other pertinent procedures, in particular around vegetation clearance and working near water.

3) Related Documents

Bord na Mona Silt Pond Maintenance Procedure

Bord na Mona Silt Pond Inspection Procedure

National Roads Authority (2008.) Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes. The National Roads Authority, Dublin.

Livezey KB, Ferna´ndez-Juricic E, Blumstein DT. Database of bird flight initiation distances to assist in estimating effects from human disturbance and delineating buffer areas. Journal of Fish and Wildlife Management 7(1):181-191; e1944-687X. doi: 10.3996/082015-JFWM-078

Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. & Thompson, D. 2013. Raptors: a field guide to survey and monitoring (3rd Edition). The Stationery Office, Edinburgh.

Gilbert, G., Gibbons, D.W. & Evans, J. 2011 Bird Monitoring Methods. The Royal Society for the
Protection of Birds, Sandy, England.

Scottish National Heritage (2016) Dealing with Construction and birds. Guidance Version 3. SNH, Battleby, Scotland.

4) Procedure

<u>Environmental Controls</u>

1. The PCAS project team will liaise with the Bord na Móna Ecology Team who will approve and provide guidance on all on site activities which could have an ecological impact.
2. All PCAS staff will receive environmental training and/or an Environmental site induction/Toolbox talk before being allowed to work on a Bord na Móna bog.

3. Work will only be able to take place once the Bord na Móna Ecology Team has signed off on the installation of any required mitigation measures.
4. Adherence to any specified mitigation measures are to be subject to audit by the Bord na Móna Ecology Team and/or PCAS Site Supervisor/Environmental Officer or PSCS as appropriate.
5. Where non-compliance is detected, a system of follow up and corrective action will be implemented.

Preparation

1. Desktop review to check available baseline data to identify potential disturbance risks from proposed PCAS activities to breeding or wintering birds. If there is potential for disturbance risks, then confirmatory surveys are required.
2. Confirmatory surveys will be undertaken by a suitably qualified ecologist to identify the presence of any bird species of conservation concern which may potentially be disturbed. The survey will typically include habitats suitable for ground nesting birds, in particular sensitive species (e.g. Lapwing/Ringed Plover/Curlew/Red Grouse) but also buildings scheduled for decommissioning, potential winter period feeding or roosting areas for Wildfowl, roosting areas for Hen Harrier etc.
3. All surveys will take place prior to the commencement of any scheduled activities, and will follow Best Practice survey techniques.
4. The results of surveys will be communicated to the PCAS PSCS/ Site Supervisor/Environmental Officer (as appropriate) responsible for scheduling activities. For highly sensitive species such as nesting Curlew or roosting Hen Harrier precise locations of nesting or roosting will not be disseminated.
5. Zones or locations containing confirmed nesting attempts by species including but not limited to Lapwing, Ringed Plover, Black-headed Gull, Common Sandpiper, Curlew, Merlin are to be delineated at an appropriate distance to prevent disturbance.
6. Alternatively, the extent of any zones may be provided by the Ecology Team via ArcGis online Cloud for use on tablets by PCAS operators/Site Supervisor as appropriate.
7. These Ecological Restriction Zones (ERZs) (e.g. 800m around identified Curlew nests) will be marked out at regular intervals using a combination of appropriate signage or visual markers as appropriate, prior to works commencing during the identified sensitive period.
8. Any buildings will similarly be identified.
9. The above will be carried out by a suitably qualified Ecologist and/or under supervision by a suitably qualified ecologist.
10. Surveys results will be confirmed where appropriate prior to scheduled activities commencing.

Operator Training

1. All PCAS operators will receive a toolbox talk by a suitably qualified Ecologist/ Bord na Móna Ecology Team, to educate them on any relevant restrictions prior to the commencement of activities.

2. This will include any restricted areas, the requirement for same, the location of reference documentation such as the schedule of mitigation measures, and the procedure to follow if in doubt as to the locations of activities in respect of any restricted areas.
3. A copy or map illustrating the restriction zones per bog, and periods wherein activities can be undertaken will be available at all times at the site office.
4. Where pertinent, a schedule of Mitigation Measures per bog will also be available at all times in the site office.

Responsibilities

1. The appointed PCAS Site Supervisor/PSCS as appropriate will be responsible for recording attendance at toolbox talks and making sure all operators have access to the required reference material, including drawings of restricted areas/ ERZ's.
2. The appointed PCAS Site Supervisor /PSCS as appropriate as will be responsible for the scheduling of activities.
3. The appointed PCAS Site Supervisor PSCS as appropriate must be aware of any other site specific mitigation around disturbance to birds.
4. The Bord na Móna Ecology Team or Project Ecologist is responsible for conformance auditing.
5. If a derogation is required, any activities under same will be overseen by the Bord na Móna Ecology Team or appointed Project Ecologist.
6. Local NPWS will be made aware of any derogated or licensed works/activities before commencement.

Carrying out Activities

1. No PCAS works or activities are to be carried out in restricted areas or identified ERZ's during the relevant period as specified by the project ecologist.
2. Only operators who have received the required training and toolbox talks are to be assigned duties within the above period.
3. Conformance will be audited through compliance checks by the Project Ecologist/ PSCS/Environmental Officer as appropriate (with 'stop-works' authority).
4. Certain Activities may occur in ERZ's in instances where breeding attempts have finished/birds are no longer present – this can only occur following confirmation from the Project Ecologist that it is OK for activities to proceed. In general the use of headlands for travel through, and /or rail lines will be permitted within ERZ's where it is considered birds may be habituated to such regular movements.
5. Activities will only be carried out between 08.00 and 17.30 to minimise the potential for disturbance.

5) Records

Evidence of approval (electronic)
Archive files

Revision Index			
Revision	Date	Description of change	Approved

BORD NA MÓNA Naturally Driven	**Procedure: ECO-003**	**Rev: 1**
Title: Protection of Marsh Fritillary	**Approved:**	**Date: 22/04/21**

1) Purpose

To describe the environmental measures required to protect Marsh Fritillary during PCAS activities.

2) Scope

To avoid effects of disturbance/physical injury to and secondary habitat loss in respect of Marsh Fritillary which occur or are likely to occur at PCAS decommissioning and rehabilitation locations. This includes in situ larvae and adults, in known or previously identified colony locations.

The potential for negative effects will be avoided through adherence to Best Practice measures and the use of confirmatory surveys pre-commencement of PCAS activities to establish any requirements such as restriction zones around colonies/areas of suitable habitat containing larval webs etc.

This SOP should be read in association with other sheets, in particular around vegetation clearance.

3) Related Documents

SOP for vegetation clearance – ECO-004

National Roads Authority (2008.) Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes. The National Roads Authority, Dublin.

Fowles & Smith, (2006) Mapping the habitat quality of patch networks for the marsh fritillary Euphydryas aurinia (Rottemburg, 1775) (Lepidoptera, Nymphalidae) in Wales, Journal of Insect Conservation 10:161-177.

Warren, M.S (1994) The UK status and suspected metapopulation structure of a threatened European butterfly, the marsh fritillary Eurodryas aurinia. Biological Conservation 67, 239-249.

Harding, J.M. (2008). Discovering Irish Butterflies & their Habitats. Published by Jesmond Harding.

4) Procedure

<u>Environmental Controls</u>

1. The PCAS project team will liaise with the Bord na Móna Ecology Team who will approve and provide guidance on all on site activities which could have an ecological impact.
2. All PCAS staff will receive environmental training and/or an Environmental site induction/Toolbox talk before being allowed to work on a Bord na Móna bog.
3. PCAS work will only be able to take place once the Bord na Móna Ecology Team has signed off on the installation of any required mitigation measures.
4. Adherence to any specified mitigation measures are to be subject to audit by the Bord na Móna Ecology Team and/or PCAS Site Supervisor/Environmental Officer or PSCS as appropriate.

5. Where non-compliance is detected, a system of follow up and corrective action will be implemented.

Preparation

1. Desktop review to check available baseline data to identify potential disturbance risks from proposed PCAS activities to Marsh Fritillary. If there is potential for disturbance risks, then confirmatory surveys are required before any activities are carried out.
2. Confirmatory surveys will be undertaken by a suitably qualified ecologist to confirm the presence of any previously identified Marsh Fritillary colonies.
3. All surveys will take place prior to the commencement of any scheduled PCAS activities and will follow Best Practice survey techniques.
4. The results of surveys will be communicated to the PCAS PSCS/ Site Supervisor/Environmental Officer (as appropriate) responsible for scheduling activities.
5. Zones or locations containing confirmed Marsh Fritillary Colonies are to be delineated with signage at an appropriate distance to prevent disturbance.
6. Alternatively, the extent of any zones may be provided by the Ecology Team via ArcGis online Cloud for use on tablets by PCAS operators/Site Supervisors.
7. These Ecological Restriction Zones (e.g. 50m around identified colonies will be marked out at regular intervals using a combination of appropriate signage or visual markers as appropriate, prior to works commencing during the identified sensitive period.
8. The above will be carried out by a suitably qualified Ecologist and/or under supervision by a suitably qualified ecologist.
9. Surveys results will be confirmed where appropriate prior to scheduled activities commencing.

Operator Training

1. All PCAS operators will receive a toolbox talk by a suitably qualified Ecologist/ Bord na Móna Ecology Team, to educate them on any relevant restrictions prior to the commencement of activities.
2. This will include any restricted areas, the requirement for same, the location of reference documentation such as the schedule of mitigation measures, and the procedure to follow if in doubt as to the locations of activities in respect of any restricted areas.
3. A copy or map illustrating the restriction zones per bog, and periods wherein activities can be undertaken will be available at all times at the site office.
4. Where pertinent, a schedule of Mitigation Measures per bog will also be available at all times in the site office.

Responsibilities

1. The appointed PCAS site supervisor/PSCS as appropriate will be responsible for recording attendance at toolbox talks and making sure all operators have access to the required reference material, including drawings of restricted areas/ ERZ's.
2. The appointed PCAS site supervisor/PSCS as appropriate as will be responsible for the scheduling of activities
3. The appointed PCAS site supervisor/PSCS as appropriate must be aware of any other site specific mitigation around disturbance to invertebrates.

4. The Bord na Móna Ecology Team or Project Ecologist is responsible for conformance auditing
5. If a derogation/license is required, any activities under same will be overseen by the Bord na Móna Ecology Team or appointed Project Ecologist.
6. Local NPWS will be made aware of any derogated or licensed works/activities before commencement.

Carrying out Activities

1. No PCAS works or activities are to be carried out in restricted areas or identified ERZ's during the relevant period as specified by the project ecologist.
2. Only PCAS operators who have received the required training and toolbox talks are to be assigned duties within the above period.
3. Conformance will be audited through compliance checks by the Project Ecologist/ PSCS/Environmental Officer as appropriate (with 'stop-works' authority).
4. Activities may occur in ERZ's in instances where breeding has finished or larvae are confirmed by the Project Ecologist as not present – this can only occur following confirmation from the Project Ecologist that it is OK for activities to proceed.

5 Certain activities may be permitted once no usage of vehicles with the potential for trampling ground areas are being used i.e. activities by hand, carried out on foot etc, or activities of a H&S nature.

5) Records

Evidence of approval (electronic)
Archive files

Revision Index			
Revision	Date	Description of change	Approved

BORD NA MÓNA Naturally Driven	**Procedure: ECO-004**	**Rev: 1**
Title: Vegetation Clearance	**Approved:**	**Date: 04/05/21**

1) Purpose

To describe the environmental measures required for vegetation clearance during PCAS activities.

2) Scope

Section 40 of the Wildlife Act 1976, as amended by Section 46 of the Wildlife (Amendment) Act 2000, restricts the cutting, grubbing, burning or destruction by other means of vegetation growing on uncultivated land or in hedges or ditches during the nesting and breeding season for birds and wildlife, from 1st March to 31st August, inclusive.

The scope of this SOP is to ensure the protection of bird species using scrub, hedgerow or ground vegetation during PCAS activities.

The potential for negative effects will be avoided through adherence to Best Practice measures.

Typical exemptions will still apply for example, for health and safety reasons, the destruction of noxious weeds, during works permitted under statute etc.

This SOP should be read in association with other sheets, in particular around Marsh Fritillary, Birds and invasive species.

3) Related Documents

SOP for protection of Marsh Fritillary – ECO-003
SOP for Protection of Birds – ECO-002
SOP for treatment of Invasive Species – ECO-005

National Roads Authority (2008.) Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes. The National Roads Authority, Dublin.

Section 40 of the Wildlife Act 1976, as amended by Section 46 of the Wildlife (Amendment) Act 2000,

4) Procedure

<u>Environmental Controls</u>

1. The PCAS project team will liaise with the Bord na Móna Ecology Team who will approve and provide guidance on all on site activities which could have an ecological impact.
2. All PCAS staff will receive environmental training and/or an Environmental site induction/Toolbox talk before being allowed to work on a Bord na Móna bog.
3. PCAS Work will only be able to take place once the Bord na Móna Ecology Team has signed off on any required mitigation measures.
4. Adherence to any specified mitigation measures are to be subject to audit by the Bord na Móna Ecology Team and/or Site Supervisor/Environmental Officer or other specified person as appropriate.

5. Where non-compliance is detected, a system of follow up and corrective action will be implemented.

Preparation

1. Zones or locations containing confirmed sensitive receptors/areas to be avoided completely during the bird nesting season are to be delineated with signage at an appropriate distance to prevent disturbance.
2. Alternatively, the extent of any zones may be provided by the Ecology Team via ArcGis online Cloud for use on tablets by operators.
3. The above will be carried out by a suitably qualified Ecologist and/or under supervision by a suitably qualified ecologist.
4. Surveys results will be confirmed where appropriate prior to scheduled activities commencing.

Operator Training

1. All PCAS operators will receive a toolbox talk by a suitably qualified Ecologist/ Bord na Móna ecology team, to educate them on any relevant restrictions prior to the commencement of activities.
2. This will include any restricted areas, or areas where (if known) a confirmatory survey by an Ecologist is required in advance of vegetation clearance
3. A copy or map illustrating the restriction zone~~s~~'s per bog, and periods wherein activities can be undertaken will be available at all times at the site office.
4. Where pertinent, a schedule of Mitigation Measures per bog will also be available at all times in the site office.

Responsibilities

1. The appointed PCAS site supervisor/PSCS as appropriate will be responsible for recording attendance at toolbox talks and making sure all operators have access to the required reference material, including drawings of restricted areas/ ERZ's.
2. The appointed PCAS site supervisor//PSCS as appropriate as will be responsible for the scheduling of activities
3. The appointed PCAS site supervisor//PSCS as appropriate must be aware of any other site specific mitigation around vegetation clearance.
4. The Bord na Móna ecology team or Project Ecologist is responsible for conformance auditing
5. If a derogation/license is required, any activities under same will be overseen by the Bord na Móna ecology team or appointed Project Ecologist.
6. Local NPWS will be made aware of any derogated or licensed works/activities before commencement.

Carrying out Activities

1. The following approach will be taken in order to comply with the Wildlife Acts:

2. Where practical, vegetation clearance will be carried out outside of the restricted period (1st March to 31st August).
3. Where activities are required within the closed season, it is the responsibility of the Site Supervisor/Manager to inform the Project Ecologist and seek consultation as to compliance with Section 40.
4. If necessary, a survey will then be carried out by the Project Ecologist for the presence of active birds' nests (i.e. nests with eggs or young birds) as deemed likely to occur within a suitable timeframe preceding activities.
5. If such are found, where feasible the area will be avoided until the nesting attempt/breeding is complete. If avoidance is not feasible, the Project Ecologist will seek a derogation license from the NPWS. Such works cannot take place until this derogation license is received.
6. The locations of any temporarily restricted areas may be provided via ArcGIS cloud for Site Supervisor oversight.
7. Fire prevention must govern all work practices on or near all areas of gorse, bog and forestry.
8. The Project Ecologist can provide Guidance on when works may proceed.

5) Records

Evidence of approval (electronic)
Archive files

Revision Index			
Revision	Date	Description of change	Approved

BORD NA MÓNA Naturally Driven	**Procedure: ECO-005**	**Rev: 1**
Title: Protection of Amphibians and Reptiles	**Approved:**	**Date: 04/05/21**

1) Purpose

To describe the environmental measures required to protect Amphibians and Reptiles during Peatland Climate Action Scheme (PCAS) activities.

2) Scope

To avoid effects of disturbance/physical injury to and secondary habitat loss in respect of Amphibians and Reptiles which occur or are likely to occur at PCAS activities. This includes in situ spawn and adults, in suitable habitat or previously identified locations.

The potential for negative effects will be avoided through adherence to Best Practice measures and the use of confirmatory surveys pre-commencement of activities to establish any requirements such as restriction zones around colonies/areas of suitable habitat containing known Amphibian and Reptiles, and if required translocation in line with Best Practice.

This SOP sheet should be read in association with other sheets, in particular around vegetation clearance.

3) Related Documents

SOP for vegetation clearance – ECO-004

National Roads Authority (2008.) Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes. The National Roads Authority, Dublin.

'Amphibian Habitat Management Handbook'. John Baker, Trevor Beebee, John Buckley, Tony Gent and David Orchard (2011). Amphibian and Reptile Conservation, Bournemouth, ISBN: 978-0-9566717-1.

Meehan, (2013) National Smooth Newt Survey 2013 Report, Irish Wildlife Trust

4) Procedure

<u>Environmental Controls</u>

1. The PCAS Project Team will liaise with the Bord na Móna Ecology Team who will approve and provide guidance on all on site activities which could have an ecological impact.
2. All PCAS staff will receive environmental training and/or an Environmental site induction/Toolbox talk before being allowed to work on a Bord na Móna bog.
3. PCAS Work will only be able to take place once the Bord na Móna Ecology Team has signed off on the installation of any required mitigation measures.
4. Adherence to any specified mitigation measures are to be subject to audit by the Bord na Móna Ecology Team and/or Site Supervisor/Environmental Officer or PSCS as appropriate.
5. Where non-compliance is detected, a system of follow up and corrective action will be implemented.

<u>Preparation</u>

1. Confirmatory surveys will be undertaken by a suitably qualified ecologist to identify the presence of Amphibians and Reptiles.
2. All surveys will take place prior to the commencement of any scheduled PCAS activities and will follow Best Practice survey techniques.
3. The results of surveys will be communicated to the PCAS PSCS/ Site Supervisor/Environmental Officer or PSCS (as appropriate) responsible for scheduling activities.
4. Zones or locations containing confirmed high usage areas (e.g. drains containing frog spawn / Newts) are to be delineated with signage at an appropriate distance to prevent disturbance.
5. Alternatively, the extent of any zones may be provided by the Ecology Team via ArcGis online Cloud for use on tablets by operators.
6. These Ecological Restriction Zones (e.g. 5m around identified colonies will be marked out at regular intervals using a combination of appropriate signage or visual markers as appropriate, prior to works commencing during the identified sensitive period.
7. The above will be carried out by a suitably qualified Ecologist and/or under supervision by a suitably qualified ecologist.
8. Surveys results will be confirmed where appropriate prior to scheduled activities commencing.

Operator Training

1. All PCAS operators will receive a toolbox talk by a suitably qualified Ecologist/ Bord na Móna Ecology Team, to educate them on any relevant restrictions prior to the commencement of activities.
2. This will include any restricted areas, the requirement for same, the location of reference documentation such as the schedule of mitigation measures, and the procedure to follow if in doubt as to the locations of activities in respect of any restricted areas.
3. A copy or map illustrating the restriction zones per bog, and periods wherein activities can be undertaken will be available at all times at the site office.
4. Where pertinent, a schedule of Mitigation Measures per bog will also be available at all times in the site office.

Responsibilities

1. The appointed PCAS Site Supervisor /PSCS as appropriate will be responsible for recording attendance at toolbox talks and making sure all operators have access to the required reference material, including drawings of restricted areas/ ERZ's.
2. The appointed PCAS Site Supervisor /PSCS as appropriate as will be responsible for the scheduling of activities
3. The appointed PCAS Site Supervisor /PSCS as appropriate must be aware of any other site specific mitigation around disturbance to amphibians or reptiles.
4. The Bord na Móna Ecology Team or Project Ecologist is responsible for conformance auditing
5. If a derogation/license is required, any activities under same will be overseen by the Bord na Móna Ecology Team or appointed Project Ecologist.

6. Local NPWS will be made aware of any derogated or licensed works/activities before commencement, such as translocation.

Carrying out Activities

1. Should PCAS activities be proposed and scheduled for areas proximal to previously identified habitat suitable for breeding common frog or smooth newt during the species' respective breeding seasons (frogs: January-March and newts: March-May), confirmatory surveys following standardised methodologies will be required at those locations to confirm the presence/absence of breeding adults and/or spawn. Licenses may be required for certain survey types.
2. If evidence of frog or newts is confirmed proximal to the work locations, it is essential the areas are fenced off with appropriate signage in order to protect these areas during construction activities;
3. Protecting the hydrological regime of the habitat is particularly important. Thus, it is particularly important that the Project Ecologist/Site Supervisor has a clear understanding of the drainage characteristics of wet areas such as ponds, pools and drains which have the potential to support breeding amphibians along the route to ensure that these areas are maintained into the future;
4. No works or activities are to be carried out in restricted areas or identified ERZ's during the relevant period as specified by the project ecologist.
5. Only operators who have received the required training and toolbox talks are to be assigned duties within the above period.
6. Conformance will be audited through compliance checks by the PCAS Project Ecologist/ PSCS/Site supervisor as appropriate (with 'stop-works' authority).
7. Activities may occur in ERZ's in instances where breeding has finished or species are confirmed by the Project Ecologist as not present – this can only occur following confirmation from the Project Ecologist that it is OK for activities to proceed
8. Certain activities may be permitted once no usage of vehicles with the potential for trampling ground areas are being used i.e. activities by hand, carried out on foot etc.
9. As a conservation measure, translocation should be an option of last resort, and any necessary license should be obtained before undertaking translocation, following consultation with NPWS.

10. NPWS may require notification of the receiving location in advance of issuing a license.
11. NPWS License link is as follows:
12. https://www.npws.ie/licences/disturbance/breeding-places
13. See also Appendix I for extracted translocation procedure from the 'Amphibian Habitat Management Handbook'

5) Records

Evidence of approval (electronic)
Archive files

Revision Index

Revision	Date	Description of change	Approved

Appendix 1 Translocation Procedures

Translocation of Common Frog spawn

- Site security: Proposed translocation sites should have a sympathetic land owner and appropriate land management plus, ideally, nature reserve status and statutory nature conservation designation.
- Habitat quality both aquatic and terrestrial habitats should meet the criteria outlined in Section 9 of the 'Amphibian Habitat Management Handbook' or be readily restorable to such condition. Any necessary restoration should be completed prior to translocation.
- Predators and competitors: Large populations of predators such corvids, gulls, rats and aquatic invertebrates should be absent from a reintroduction site and its environs.
- Consultation and agreements: It is essential to consult widely with and gain the approval of all interested parties including landowners and managers of recipient sites.
- Preparing a reintroduction site: Where necessary the terrestrial habitat should be managed to meet the necessary criteria before ponds are created. Preference should be given to creating scrapes of differing depths based on the natural water table rather than using lined pools. An advantage of lined pools is that they may be topped up with water artificially and, even if not needed for the long term, temporary lined pools may be a useful insurance against desiccation at the start of a project. Artificial refugia should be provided to help maximise the number of froglets surviving to disperse from the damp pond margins. Discarded roof tiles, slightly raised to allow froglets to crawl beneath or leafy branches, e.g. sycamore, which dry to provide many hiding places, should be laid around the water's edge.
- Translocating Spawn: The donor population should be the closest one to the new site and certainly within the same geographical area. To ensure the best chance of success a reintroduction should take place over three successive years. This establishes a mixed-age structure in the new population relatively rapidly. The equivalent to at least approximately 4,000-8,000 eggs, should be obtained from the donor site.
- Freshly laid spawn is best because it travels well. Sections should be cut with sharp scissors and transported in a bucket containing approximately 5 l of water (at a depth of approximately 5-10 cm) from the ponds in which the spawn originated. Buckets with snap-on lids make good transport containers. A hole cut in the centre of the lid allows ventilation but prevents water spillage during transport. Spawn should be moved to the recipient site rapidly, certainly within one or two days. During transportation care should be taken to avoid exposing the spawn to extreme temperatures (for example leaving it in the sun).
- Free swimming tadpoles without any signs of limb development can also be moved. Well-developed spawn, or tadpoles showing signs of metamorphosis, should not be translocated because mortality during transportation can be high in these developmental stages. Tadpoles are susceptible to suffocation and should be moved in cool water with minimal amounts of dissolved or suspended organic matter.

Translocation of Smooth Newts

NRA (2008) provides guidance on mitigation, compensation and enhancement measures (at p80) which should be considered.

"In those situations where capturing and relocating important newt populations is considered appropriate, breeding ponds should be encircled by drift fencing and pitfall traps prior to the spring migration period, and newts captured on their way to breed. Netting and draining-down of ponds should also take place to remove as many of the remainder as possible.
Where large populations of newts are found close to the proposed works, amphibian-proof fencing can be helpful in protecting the resident animals. Permanent fencing can also be used to guide newts to purpose-built tunnels and other safe crossing structures, although their effectiveness for newts remains largely unknown."

BORD NA MÓNA Naturally Driven	**Procedure: ECO-006**	**Rev: 1**
Title: Invasive Species	**Approved:**	**Date: 04/05/21**

1) Purpose

To describe the Environmental/Biosecurity Measures required to avoid the introduction, establishment and spread of non-native invasive species (Terrestrial Flora) from activities associated with the PCAS Scheme.

2) Scope

To avoid likely significant effects from the introduction, establishment and spread of non-native invasive species to Bord na Mona works during activities undertaken under PCAS.

The potential for negative effects will be avoided through adherence to Best Practice measures and the use of confirmatory surveys pre-commencement of activities to establish any requirements such as e.g. restriction zones (15m) around Invasive Plant species infestation locations as appropriate.

This SOP should be read in association with other sheets, in particular around vegetation clearance.

3) Related Documents

SOP for vegetation clearance – ECO-004

Waste Management Procedures

Managing Japanese knotweed on development sites - The Knotweed Code of Practice produced by the Environmental Agency (2013);

NRA Guidelines on The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads (2010);

Managing Invasive Non-native Plants in or near Freshwater, Environment Agency (2010);

Best Practice Management Guidelines Japanese knotweed *Fallopia japonica*, Invasive Species Ireland (2015);

4) Procedure

<u>Environmental Controls</u>

1. The PCAS Project Team will liaise with the Bord na Móna Ecology Team who will approve and provide guidance on all on site activities which could have an ecological impact.
2. All PCAS staff will receive environmental training and/or an Environmental site induction/Toolbox talk before being allowed to work on a Bord na Móna bog.
3. PCAS Work will only be able to take place once the Bord na Móna Ecology Team has signed off on the installation of any required mitigation measures.
4. Adherence to any specified mitigation measures are to be subject to audit by the Bord na Móna Ecology Team and/or PCAS Site Supervisor/Environmental Officer or PSCS as appropriate.

5. Where non-compliance is detected, a system of follow up and corrective action will be implemented.

Preparation

1. Desktop review to check available baseline data to identify potential disturbance risks from proposed PCAS activities to known infestations of invasive species. If there is potential for disturbance risks, then confirmatory surveys are required.
2. Confirmatory surveys will be undertaken by a suitably qualified ecologist to identify the presence of any infestations or locations of invasive species.
3. All surveys will take place prior to the commencement of any scheduled PCAS activities, and will follow Best Practice survey techniques.
4. Unknown infestations that are recorded during the scheme will also be managed in the same way.
5. The results of surveys will be communicated to the PCAS PSCS/ Site Supervisor/Environmental Officer responsible for scheduling activities.
6. Zones or locations containing confirmed invasive species are to be delineated with signage at an appropriate distance to prevent disturbance.
7. Alternatively, the extent of any zones may be provided by the Ecology Team via ArcGIS online Cloud for use on tablets by operators/supervisors.
8. These Ecological Restriction Zones (e.g. 15m around identified Japanese Knotweed) will be marked out at regular intervals using a combination of appropriate signage or visual markers as appropriate, prior to activities commencing.
9. The above will be carried out by a suitably qualified Ecologist and/or under supervision by a suitably qualified ecologist.
10. Surveys results will be confirmed where appropriate prior to scheduled activities commencing.

Operator Training

1. All PCAS operators will receive a toolbox talk by a suitably qualified Ecologist/ Bord na Móna Ecology Team, to educate them on any relevant restrictions prior to the commencement of activities.
2. This will include any restricted areas, the requirement for same, the location of reference documentation such as the schedule of mitigation measures, and the procedure to follow if in doubt as to the locations of activities in respect of any restricted areas.
3. A copy or map illustrating the restriction zones per bog, and periods wherein activities can be undertaken (if applicable) will be available at all times at the site office.
4. Where pertinent, a schedule of Mitigation Measures per bog will also be available at all times in the site office.

Responsibilities

1. The appointed PCAS Site Supervisor/PSCS as appropriate will be responsible for recording attendance at toolbox talks and making sure all operators have access to the required reference material, including drawings of restricted areas/ ERZ's.
2. The appointed PCAS Site Supervisor /PSCS as appropriate as will be responsible for the scheduling of activities

3. The appointed PCAS Site Supervisor /PSCS as appropriate must be aware of any other site specific mitigation around invasive species, such as steam clean protocols.
4. The Bord na Móna Ecology Team /Project Ecologist or Environmental Officer is responsible for conformance auditing.

Carrying out Activities

Invasive terrestrial Flora such as Japanese Knotweed

1. A toolbox talk will be provided by the invasive Project Ecologist with the PSCS, Site engineers and general operatives to explain about all invasive species identified within the bog and the restrictions that will apply for the duration of any planned activities.
2. The toolbox talk will cover all pertinent topics including all relevant invasive species close to activities or works and the biosecurity measures to be implemented while working. The invasive species toolbox talk will cover the full lifecycle of every activity.
3. If required any Japanese Knotweed infestations will be treated or suitably contained.
4. This will take place under supervision from the Project Ecologist/Site Supervisor/Environmental Manager.
5. All surveys will take place prior to the commencement of activities and will follow Best Practice survey techniques.
6. No General Operative will be allowed to work without completing the toolbox talk;
7. The PSCS/Site Manager will ensure that only licensed hauliers are collecting and disposing or any potentially contaminated materials;
8. The Schedule of Mitigation Measures per bog will also be available at all times in the site office.

5) Records

Evidence of approval (electronic)
Archive files

Revision Index			
Revision	Date	Description of change	Approved

BORD NA MÓNA Naturally Driven	**Procedure: ENV017**	**Rev: 1**
Title: Archaeological Findings	**Approved: EM**	**Date: 13/10/2020**

1) Purpose

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

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

2) Procedure

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

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

Your Archaeological Liaison Officer is ……

3) Records

Revision Index			
Revision	Date	Description of change	Approved
1	13/19/2020	First release	EMcD
2			

EP 5.0 General Emergency Preparedness & Response

Has an Emergency Situation Occurred?

Yes

Refer to :
ERP 02 Spill Clean-up Procedure
ERP 03 Fire / Explosion Procedure
ERP 04 Unforeseen Emergencies

The Licence Holder assumes role of Site Incident Controller

Assess Scale of Incident

Inform Emergency Services

Direct rescue and fire-fighting operations

In absence of Licence Holder – deputy shall assume this role

Site Incident Controller records details of incident

Environmental Incident?

Yes

Refer to Environmental Communications Procedure

Complete EPA Incident Notification Form on Alder Webportal (https://alder.edenireland.ie/Login.aspx)

Emergency Contact List for AES Rosslare

EPA Headquarters, PO Box 3000, Johnstown Castle Estate, Co. Wexford. Tel. 053 916 0600/1890 335599, Fax. 053 916 0699
Email: https://alder.edenireland.ie/Login.aspx

Wexford Co.Co., County Hall, Spawell Road, Wexford
Tel. 053-9176500, Fax. 053-9143406
Email: postmaster@wexfordcoco.ie

Inland Fisheries Ireland
Citywest Business park, 3044 Lake Drive, Dublin 24
Tel. 01 8842600, Fax. +353 (0)1 278 7025
Email: blackrock@fisheriesireland.ie

Environmental Non-Conformance

Yes

No

Refer to Environmental Non-Conformance Procedure

Refer to Environmental Corrective/Preventive Action Procedure

Ref. EPA Incident Notification Form on Alder Webportal (https://alder.edenireland.ie/Login.aspx)

Complete Compliance Log with details

Discharge to Water?

Yes

Notify Local Authorities & Inland Fisheries Ireland

All emergency response equipment should be checked on a weekly basis

Out of Hours Emergency?

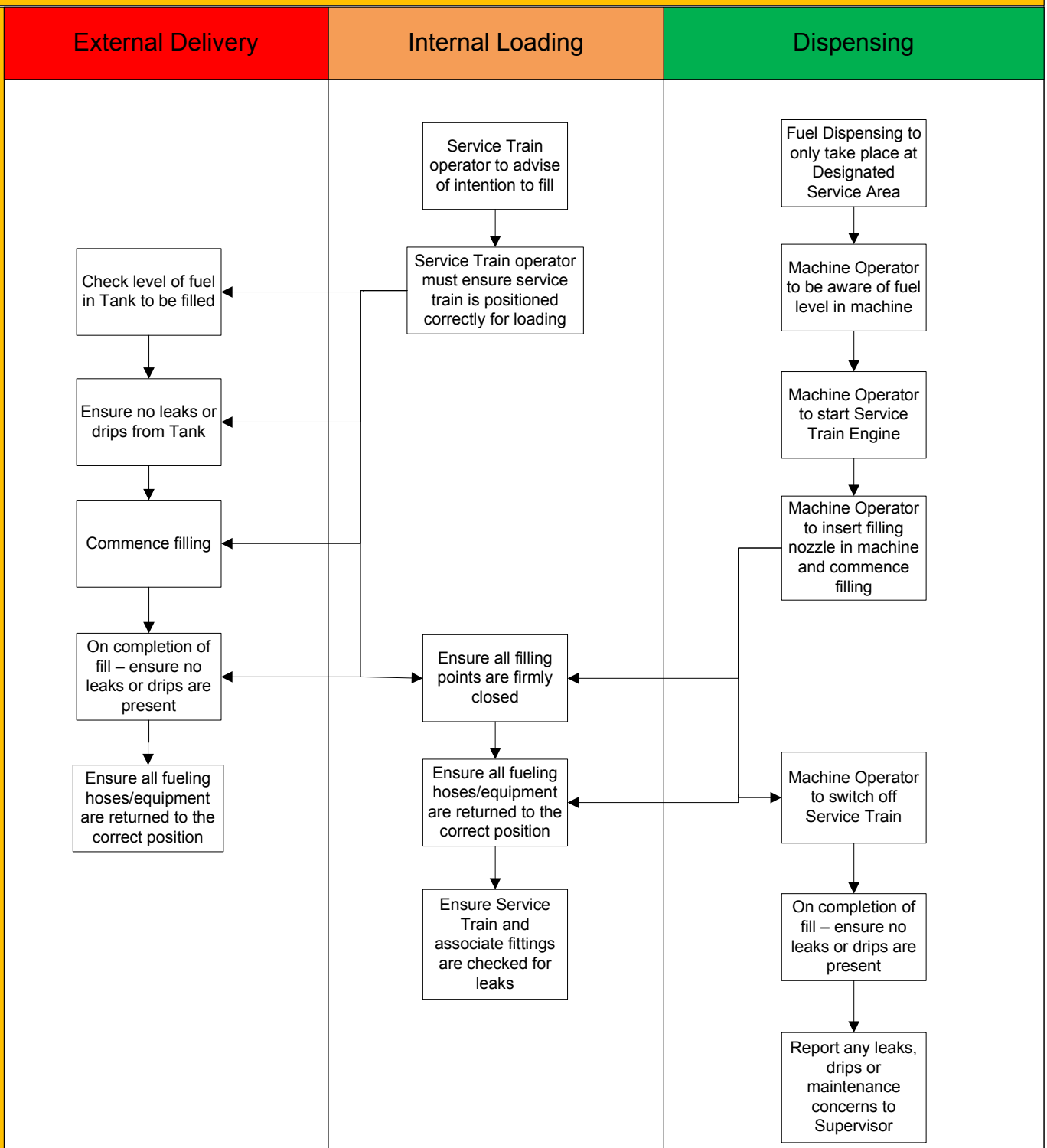
Yes

Contact Designated On-Call Person

BORD NA MÓNA
Naturally Driven

Gas Oil Loading Procedure – Rev.1

PROCEDURE



Notes:

1. Drivers must have correct permits.
2. Lorry must contain a spill kit.
3. Delivery driver to remain present at all times during filling operation.
4. Bord na Mona employees to remain present at all times during filling operation. and be aware of the location of BnM Spill Kits.
5. Bord na Mona employees must be aware of BnM Emergency Response Procedures.
6. Where Fuel Management System in place – correct user key to be used.
7. Service Trains must display Emergency Response Procedure – Spills.

BORD NA MÓNA

BORD NA MÓNA ENERGY LIMITED

Procedure: SPIP

Operations Manager _____

Page: 1 of 1

Date: _____

Rev: 3

Silt Pond
Inspection Procedure

1. Purpose

The purpose of this procedure is to provide for visual inspection of all silt ponds on a fortnightly basis in accordance with Condition 6.7 of the Bord na Mona Energy Ltd IPC Licence's P0499-01 to P0507-01. This will be used for determining the silt pond de-silting roster.

2. Scope

The scope of this procedure covers all silt ponds treating drainage water from production bogs across the licence areas P0499-01 to P0507-01. .

3. Responsibility

It is the responsibility of the Operations Leader and the Team Leader to ensure all silt ponds are inspected on a fortnightly basis and that these inspections are returned to the Environmental Co-ordinator for filing at the facility office.

4. Procedure

4.1 Record the Silt Pond identification number on the Inspection Log.

4.2 Inspect the full length of the Silt Pond including inlets and outlet, noting the location of peat silt visible on the surface.

4.3 Tick the appropriate box on the Inspection Log to indicate the condition of the pond and record the date and time.

4.4 For ponds in series, the final pond should be clean at all times.

4.5 If a pond is observed as being 3/4 full during the fortnightly inspection, or at any other time arrangements should be made for the de-silting of the pond immediately.

4.6 Inspect the Outfall from the silt pond to the receiving water (River) and record any observations.

4.7 Once the silt pond has been cleaned, the date of de-silting should be logged on the Inspection Log and recorded on the Silt Pond Wall Chart.

Procedure:SPMP

Operations Manager

Page: 1 of 2

Date: _____ **Rev: 3**

Silt Pond
Maintenance Procedure

1. Purpose.

The purpose of this procedure is to provide for a maintenance procedure of all silt ponds associated with IPC Licence's P0499-01 to P0507-01. Pond cleaning will be determined by the silt pond inspection procedure.

2. Scope.

The scope of this procedure covers all silt ponds treating drainage water from the Licence areas P0499-01 to P0507-01.

3. Responsibility.

It is the responsibility of the Operations Manager to ensure ponds are cleaned as required by the silt pond inspection procedure.

4. Procedure

4.1 If the silt pond system has a by-pass channel or a stand-by pond then the drainage should be diverted through these. If not, then the inlet to the pond should be blocked using a gate valve or by switching off any applicable pumps, for the duration of the maintenance activity.

4.2 If the outlet from the pond has a weir then the level should be lowered so as to de-water the silt. If not, then the outlet pipe should be blocked.

4.3 The pond should be cleaned from the inlet to the outlet either from one side, if the width allows, or from both sides, if not.

4.4 The silt should be deposited as far back from the silt pond as possible on top of the existing silt pond or retained in a peat berm, if sludge is at risk of leaking back into the silt pond.

4.5 When the pond has been cleaned the inlet should be opened and the pond allowed to fill before lowering the outlet weir.

4.6 If the drainage was diverted during the maintenance, then it should be redirected back into the pond.

4.7 If there are signs of peat silt deposited upstream or downstream of the pond, within the site boundary, then they should also be cleaned, starting up-stream. This should occur once the pond has been cleaned and before the outlet weir has been lowered.

4.8 Once cleaned, the date should be entered on to the inspection log.

4.9 All machine operators must be fully versed with the above procedure with a copy posted in the machine.

Waste Management Procedure

1. Purpose

To define the correct procedure to be followed when removing and disposing of wastes from sites across all licenced bogs.

2. Scope

The scope of this procedure covers all bogs in the Licence areas P0499-01 to P0507-01, and Waste Facilities WL0049-02 and WL0199-02. It also covers the requirements of Condition 7 of these IPC licences and is detailed in Bord na Mona Peat/AES Service Level Agreement (SLA).

3. Responsibility

The implementation of this Procedure is the responsibility of the Resource Manager or his/her deputy.

4. Reporting

- Prior to the recovery and handling of waste, please liaise with your Environmental Coordinator and/or Compliance Operations Lead to schedule and coordinate its disposal.
- Ensure that a record of all waste receipts is maintained and a copy provided to the relevant Environmental Coordinator.
- On a monthly basis, stores shall provide the relevant IPC Licence Coordinator with a copy of all waste receipts for the Waste Management file.
- On a quarterly basis, AES shall provide each store and the IPC Licence Coordinator with a quarterly report as per the SLA.

5. Waste Collection Procedure

Table 1 outlines the procedures for the handing of waste and subsequent disposal routes.

6. Reference Documents

Attachment 1: AES Service Level Agreement (SLA).

Litter Action Plan: Prevention and control of litter arising from Bord na Mona's activities and from unauthorised dumping on and around its property.

Table 1: Waste Management Plan		
Waste Type	**Waste Handling Procedure**	**Disposal Route**
Plant & Equipment	• All production equipment shall be transferred to tea centers/workshops for assessment for retention, sale or scrapping.	-
	• Tractors, trailers, excavators, dozers identified for D&R work, peat sales or drainage/silt pond maintenance shall be retained at the main works.	
Hazardous Waste	• Hazardous materials/liquids/batteries shall be removed from all machinery identified for scrap.	-
	• All waste or unused fuels, oils, greases, batteries etc shall be brought into the main works and deposited into existing hazardous waste receptacles i.e. barrels, waste oils tanks, battery boxes etc.	AES/ENVA
Transformers	• Redundant transformers shall be transported to workshops. Prior to disposal, transformer oils shall be testing for the presence of PCB's. Only third part contractors ENVA ltd shall be permitted to pump and disposed of transformer oils. • Transformer shall be then send for metals recycling	AES/ENVA/ (Subcontractor - metals recycling)
Scrap Metal	• All scrap metal collected shall be stored in short to medium term designated areas with adequate hard standing, space and access for collection by AES contractors using heavy equipment (scissors, grab, articulated trucks). **Note:** to maximise the potential scrap value, store scrap loose and do not deposited into skips	AES (Subcontractor - metals recycling)
Polythene	• All waste polythene, rolled and loose shall be gathered and stored at designated areas with adequate hard standing, access and easy reach for collection. In order of preference, polythene shall be disposed of as follows: 1. **Rolled Polythene** – collected by ADN Ltd for recovery/recycling - **qualifies for a financial rebate.** 2. **Loose Polythene** - collected by ADN Ltd for recovery/recycling - no financial rebate due to transportation costs. 3. **Contaminated Polythene** – polythene rejected by ADN Ltd shall be disposed of to landfill via AES ltd.	ADN Ltd / AES
Polybrane	• All waste polybrane recovered from both permanent and temporary rail shall be stored separately to polythene and assessed for reuse/ disposal. Polybrane designated for disposal shall be directly transferred to Drehid landfill.	Reuse – to be determined Disposal - Drehid Landfill
Tyres	• All used tyres shall be gathered and stored in a suitable hard standing area for collection	AES

Concrete Pipes	• Redundant concrete pipes shall be:
	  • collected and transported to the nearest compound for reuse (D&R projects/Drainage/neighboring farm use).
	  • Crushed in-situ.
		-

Asbestos	• Removal and disposal of asbestos carried out by specialist's waste contractors only. If found, do not handle or disturbed and ensure Health & safety guidelines are adhered to.	Specialist's waste contractors

C&D Waste	• All C&D waste shall be segregated to ensure disposal costs are minimised as follows:
	  • Remove of all internal appliances, furniture, windows, roof felt, guttering etc to general waste skip.
	  • Segregate timber from concrete and place in separate skips
	  • Segregate metals and transport to nearest loose metals storage compound
		AES (Subcontractor - metals recycling)

Peat Stockpiles	• Unsalable stockpiles shall be leveled/decommissioned as per SOP FS-BM-02 "Bog Maintenance Plan"	Operations
Illegal fly tipping	• The locations of illegal dumping and fly tipping sites shall be documented and reported to local BnM environmental officers. Note: The local county council should be notified of the dumping and a landfill levy exemption letter requested prior to the removal or disposal of waste.	AES

Appendix F Protection of Otter Standard Operating Procedures

Bord na Móna Naturally Driven	**Procedure: ECO-001**	**Rev: 1**
Title: Protection of Otter	**Approved:**	**Date: 16/03/21**

1) Purpose

To describe the environmental measures required to protect Otter across all Bord na Móna activities.

2) Scope

To avoid likely significant effects of disturbance, displacement or physical injury to Otter which occur or are likely to occur at any locations where Bord na Móna may be carrying out activities with the potential for effects.

The potential for negative effects will be avoided through adherence to Best Practice measures and the use of confirmatory surveys to establish any requirements such as derogations and/or restriction zones around confirmed breeding or resting sites as appropriate.

This Procedure should be read in association with any other pertinent procedures, in particular around vegetation clearance and working near water.

3) Related Documents

Bord na Mona Silt Pond Maintenance Procedure

Bord na Mona Silt Pond Inspection Procedure

National Roads Authority (2006). Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes. The National Roads Authority, Dublin.

National Roads Authority (2008.) Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes. The National Roads Authority, Dublin.

Highways Agency (1999). Design Manual for Roads and Bridges - Nature Conservation Advice in Relation to Otters HA81/99. The Highways Agency, London.

4) Procedure

<u>Environmental Controls</u>

1. Each project, scheduled activity or proposed works will liaise with the Bord na Móna ecology team who will approve and provide guidance on all on site activities which could have an ecological impact.
2. All staff will receive environmental training and/or an Environmental site induction/Toolbox talk before being allowed to work on a Bord na Móna bog.
3. Work will only be able to take place once the Bord na Móna ecology team has signed off on the installation of any required mitigation measures.
4. Adherence to any specified mitigation measures are to be subject to audit by the Bord na Móna ecology team and/or Site Supervisor/Environmental Officer or PSCS as appropriate.
5. Where non-compliance is detected, a system of follow up and corrective action will be implemented.

<u>Preparation</u>

1. Confirmatory surveys will be carried out 150m upstream and downstream of suitable Otter habitat where relevant activities are programmed to occur. This will include silt ponds (cleaning and maintenance), channelized sections of watercourses and bog drainage channels with connectivity to suitable habitat. These confirmatory Otter surveys will be undertaken no more than 12 months in advance of proposed activities, during the period November and April when vegetation cover is reduced. For silt ponds surveys will include an area comprising the pond plus a 50m buffer.
2. Confirmatory surveys will be undertaken by a suitably qualified ecologist.
3. The results of surveys will be communicated to the site manager responsible for scheduling activities on a need to know basis.
4. Zones or locations containing confirmed breeding or resting locations (holts/couches) are to be delineated with signage at an appropriate distance (150m) to prevent disturbance.
5. In addition, any restriction zones are to be digitised and provided in shapefile format for upload to machine PDA's where this facility is available.
6. These Ecological Restriction Zones will be marked out at regular intervals using a combination of appropriate signage or visual markers as appropriate, prior to works or activities commencing during the identified sensitive period.
7. The above will be carried out by a suitably qualified Ecologist/ Bord na Móna ecology team.
8. Surveys results will be confirmed no less than 3 days prior to scheduled activities commencing.
9. If required any derogation applications will be made by the Bord na Móna ecology team/designated project manager.

<u>Operator Training</u>

1. All operators will receive a toolbox talk by a suitably qualified Ecologist/ Bord na Móna ecology team, to educate them on any relevant restrictions prior to the commencement of activities.
2. This will include any restricted areas, the requirement for same, the location of reference documentation such as the schedule of mitigation measures, and the procedure to follow if in doubt as to the locations of activities in respect of any restricted areas.
3. A copy or map illustrating the restriction zones's per bog, and periods wherein activities can be undertaken will be available at all times at the site office.
4. Where pertinent, a schedule of Mitigation Measures per bog will also be available at all times in the site office.

<u>Responsibilities</u>

1. The appointed site manager/PSCS as appropriate will be responsible for recording attendance at toolbox talks and making sure all operators have access to the required reference material, including drawings of restricted areas/ ERZ's.
2. The appointed site manager/PSCS as appropriate as will be responsible for the scheduling of activities
3. The appointed site manager/PSCS as appropriate must be aware of any other site specific mitigation around Otter
4. The Bord na Móna ecology team or Project Ecologist is responsible for conformance auditing

5. If a derogation is required, any activities under same will be overseen by the Bord na Móna ecology team or appointed Project Ecologist.
6. Local NPWS will be made aware of any derogated works/activities before commencement.

Carrying out Activities

1. No works or activities are to be carried out in restricted areas or identified ERZ's during the relevant period as specified by the project ecologist. No works will be carried out within 150m of an active holt.
2. NPWS will be notified of any confirmed active holts.
3. As per NRA (2006) guidelines, following consultation with NPWS, works or activities closer to such breeding holts may take place – provided appropriate mitigation measures are in place, e.g. screening and/or restricted working hours on site;
4. No wheeled or tracked vehicles (of any kind) will be used within 20m of active, but non-breeding, otter holts. Light work, such as digging by hand or scrub clearance will not take place within 15m of such holts, except under licence (NRA, 2006);
5. Where holts are present in close proximity to invasive activities, but are determined not to require destruction, such activities may commence once recommended alternative mitigation measures to address otters have been complied with (NRA, 2006);
6. Only operators who have received the required training and toolbox talks are to be assigned duties within the above period.
7. Conformance will be audited through compliance checks by the Bord na Móna ecology team /Project Ecologist with 'stop-works' authority.
8. Activities will only be carried out between 08.00 and 17.30 to minimise the potential for disturbance.

5) Records

Evidence of approval (electronic)
Archive files

Revision Index			
Revision	Date	Description of change	Approved

Appendix G Drainage Management Plan

BORD NA MÓNA – BLACKWATER BOG

Drainage Management Plan

IBE1933
Rp22
February 2022

rpsgroup.com

Document status

Version	Purpose of document	Authored by	Reviewed by	Approved by	Review date
D01	Draft	Various	Francis Mackin	Grace Glasgow	03/05/2022

Approval for issue

Grace Glasgow		3 May 2022

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EXECUTIVE SUMMARY

Blackwater Bog is located in Co. Offaly, approximately 2.5km north east of Shannonbridge. Blackwater Bog discharges directly to the Blackwater stream south of the Bog which flows west to meet the River Shannon south of the bog. The bog also discharges to the west via adjacent land drains to the River Shannon

The rehabilitation measures will generally result in reduced runoff and drainage from the existing peat fields through a mixture of techniques including wetland creation, drain blocking, cell bunding and re-profiling. It is assumed that these measures will not significantly alter the existing topographical catchments, water table rise, increased runoff from the bog and low flow risk.

Potential impacts were considered: the potential for changes in flows downstream and the potential for increased water table levels impacting adjacent lands. Observations from previous rehabilitation measures, which have returned peatlands to their natural water retention function, has shown a reduction in the downstream run off. Based on this evidence the rehabilitation of Blackwater Bog will result in reduced downstream flows.

The potential for increased water table levels and to a lesser extent marginal alteration of the topographical catchments has been assessed based on a precautionary approach. The rehabilitation measures proposed for Blackwater Bog will result in the alteration of existing wetland areas and it is expected that rehabilitated water levels will be higher than the peat field surface. In this scenario adjacent lands which are at a lower level than these parts of the bog could potentially be impacted. These vulnerable areas have been defined through a zone of influence approach.

Risk of low flow conditions in drains downstream of Blackwater Bog was found to be moderate in two subcatchments and low in the other subcatchments therefore no further assessment was recommended for Blackwater bog.

Each of the land parcels have been assessed based on its vulnerability to increased water table levels within the bog. With a lack of suitable boundary drains in some locations to separate the rehabilitation area and potentially vulnerable lands, constraints to the bog rehabilitation plan were considered.

DMP measures include,

- Retention of existing boundary drains including the Blackwater stream which bounds the bog and its tributary which flows through the bog acting as a hydraulic break between the PCAS extent and constraint areas.
- Maintenance of existing discharge points with silt control
- Retention of 2 drains through the bog to ensure flow from adjacent constraint bog
- Retaining 1 drain outside the boundary which will act as a hydraulic break where a water sensitive environment exists between the boundary and the drain.
- Wetland measure restricting water level to either surface or current level in 3 locations

In the event that the monitoring, which will be undertaken by BnM, identifies an adverse water table or drainage impact to adjacent lands in relation to present day conditions accounting for seasonal variability, a suite of measures can be chosen from and will be implemented to establish suitable mitigation. This approach accounts for unknowns and limitations inherent in this DMP study and provides a precautionary approach to drainage management.

1 INTRODUCTION

Blackwater Bog is located in Co. Offaly, approximately 2.5km northeast of Shannonbridge, further site details are described in the Blackwater Bog Site Characterisation Report 2022, thereafter referred to as the Characterisation Report. Blackwater Bog is part of the Blackwater Bog Group. Bord na Móna operated peat extraction within the Blackwater Bog Group under IPC Licence (Ref. P0501-01) issued and administered by the EPA. Condition 10.2 of this licence requires the preparation of Blackwater Bog-Cutaway bog decommissioning and rehabilitation plan 2021[1], thereafter referred to as the Rehabilitation Plan, for permanent rehabilitation of the boglands within the licensed area. The rehabilitation plan includes approx. 190ha of the over 200ha bog within the PCAS extent.

It is proposed by Government that Bord na Móna carry out enhanced decommissioning, rehabilitation and restoration under the Peatlands Climate Action Scheme on peatlands previously used for energy production. This proposed Scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations under existing EPA IPC licence conditions. Improvements supported by the Scheme will ensure that environmental stabilisation is achieved and significant additional benefits, particularly relating to climate action and other ecosystem services, will also be delivered.

One of the key issues for Bord na Móna is the potential hydrological impact rehabilitation of this bog may have on the bog, surrounding lands and lands downstream which may be hydrologically linked to the bog. Rehabilitation measures generally seek to increase water table levels and surface water retention such that they are closer to the surface to encourage peat formation, the associated ecological benefits and carbon sequestration capacity. While in general terms this will reduce the volume of water released from the bog following a rainfall event, the impact on flood run-off is less predictable. Furthermore the increase in the local water table could result in negative impacts to surrounding lands if mitigation measures are not applied.

This Drainage Management Plan (DMP) for the Blackwater Bog PCAS extent seeks to establish the baseline hydrological performance of the bog and the surrounding drainage network. The plan sets out the characterisation of the bog and surrounding lands, the existing performance of the drainage network and the level of flood risk. The plan identifies the potential hydrological zone of influence of the bog and the objectives, risks and opportunities associated with the rehabilitation of the bog. The plan assesses the potential impact of the various rehabilitation measures which are proposed on the local drainage network and flood risk. It sets out, where necessary, mitigation measures required to reduce or avoid impacts. The plan sets out the measures which are required to be delivered in advance or in parallel with the rehabilitation plan as well as the long term operation and retention of the drainage network and associated infrastructure. The plan assesses the level of residual risk, the potential impact due to climate change and the adaptability of measures in response to these climate change impacts.

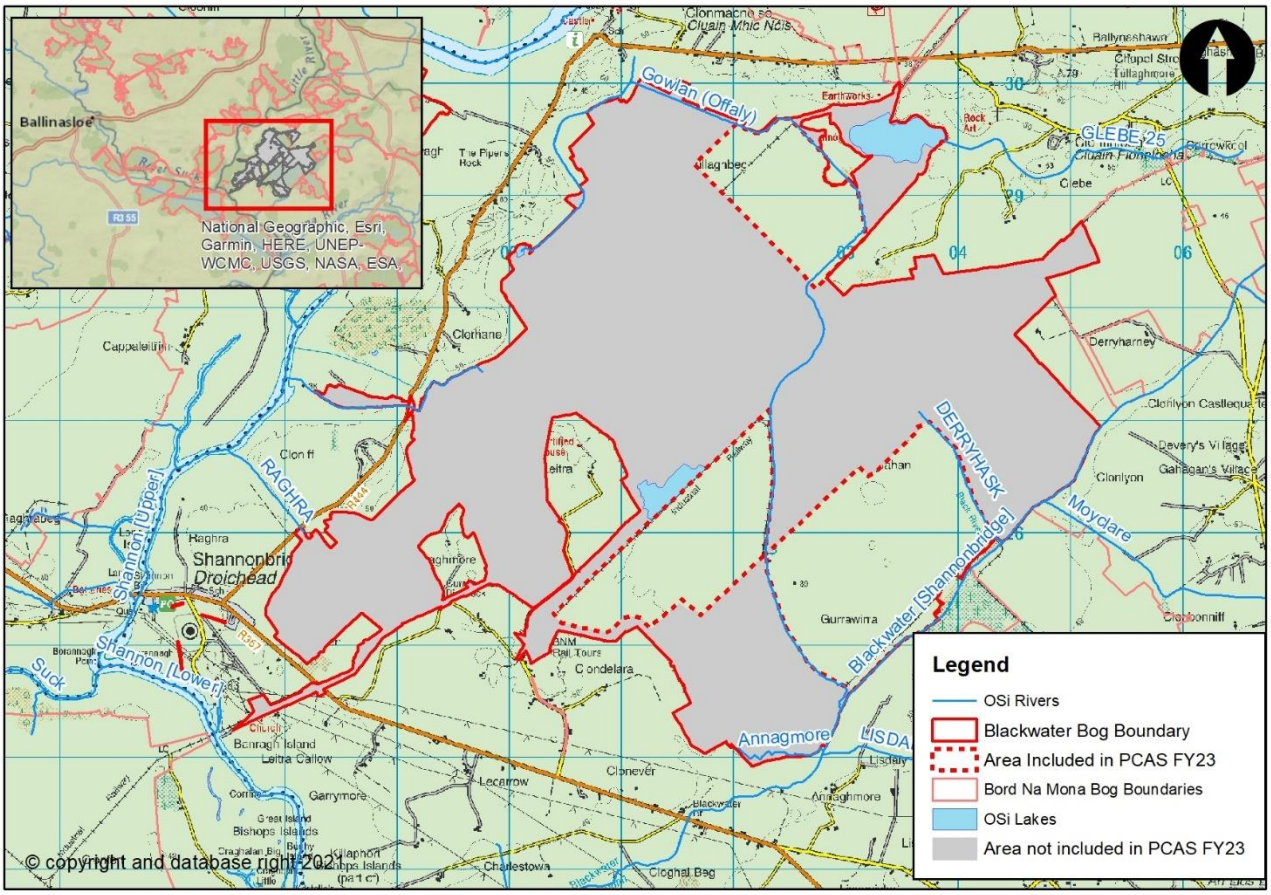

Figure 1-1 Location of Blackwater Bog[1]

[1] Further maps and figures can be found in the Blackwater Bog GIS map book 2022

2 BASELINE ASSESSMENT

Through cessation of peat extraction and implementation of the Rehabilitation Plan there is the potential to hydrologically impact the adjacent land. The extent of the impact will depend on the existing baseline characteristics of the catchments which drain the bog and the adjacent lands.

The purpose of characterising the catchment area is to develop an understanding of how the catchment currently operates and drains. The characterisation also investigates the risks, constraints and opportunities to the operation and drainage.

2.1 Study Area

To characterise the catchments a study area was determined encompassing the total catchment area draining the bog. Blackwater Bog discharges directly to the Blackwater stream South of the Bog which flows west to meet the River Shannon south of the bog. The bog also discharges to the west via adjacent land drains to the River Shannon. A review was carried out to delineate the external drains around the bog as presented in Figure 2.1 along with their associated hydrological catchment area.

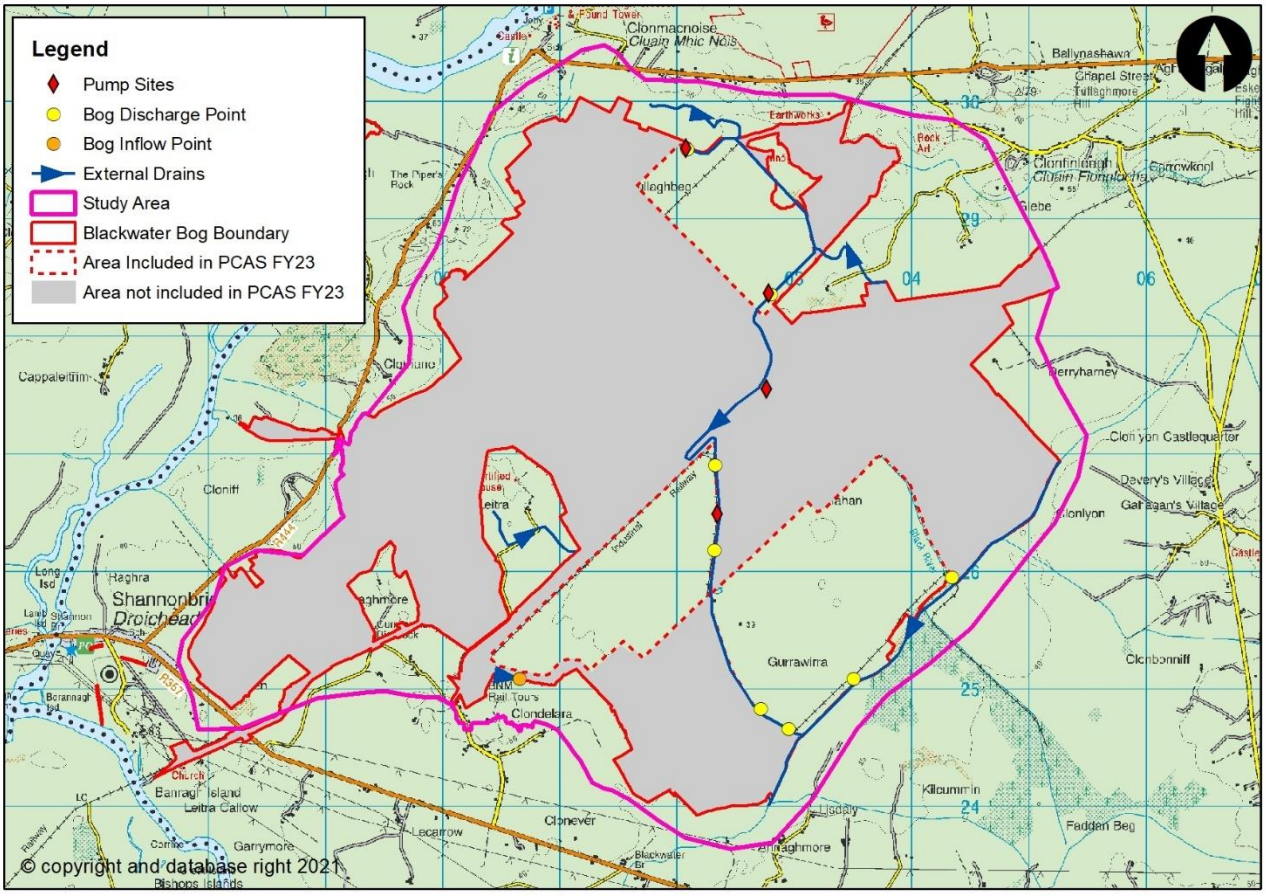

Figure 2-1 Blackwater Bog

2.2 Catchment Runoff Characterisation

A hydrological analysis was carried out within the study area to delineate the sub catchments of the bog drains and the external drains. A recent survey of drainage was carried out by Bord na Móna and this was reviewed, and the bog sub-catchments confirmed. Sub-catchments of the external drains were identified using ARC GIS Hydrology tools. The sub catchments are presented in Figure 2.2.

The Flood Studies Update (FSU) catchment characteristics provide an overview of how much rain a catchment receives, how impermeable the catchment is and how quickly the water will runoff the catchment due to topography and drainage. Table 2.1 summarises the FSU catchment descriptors for the sub-catchments identified in Figure 2-2.

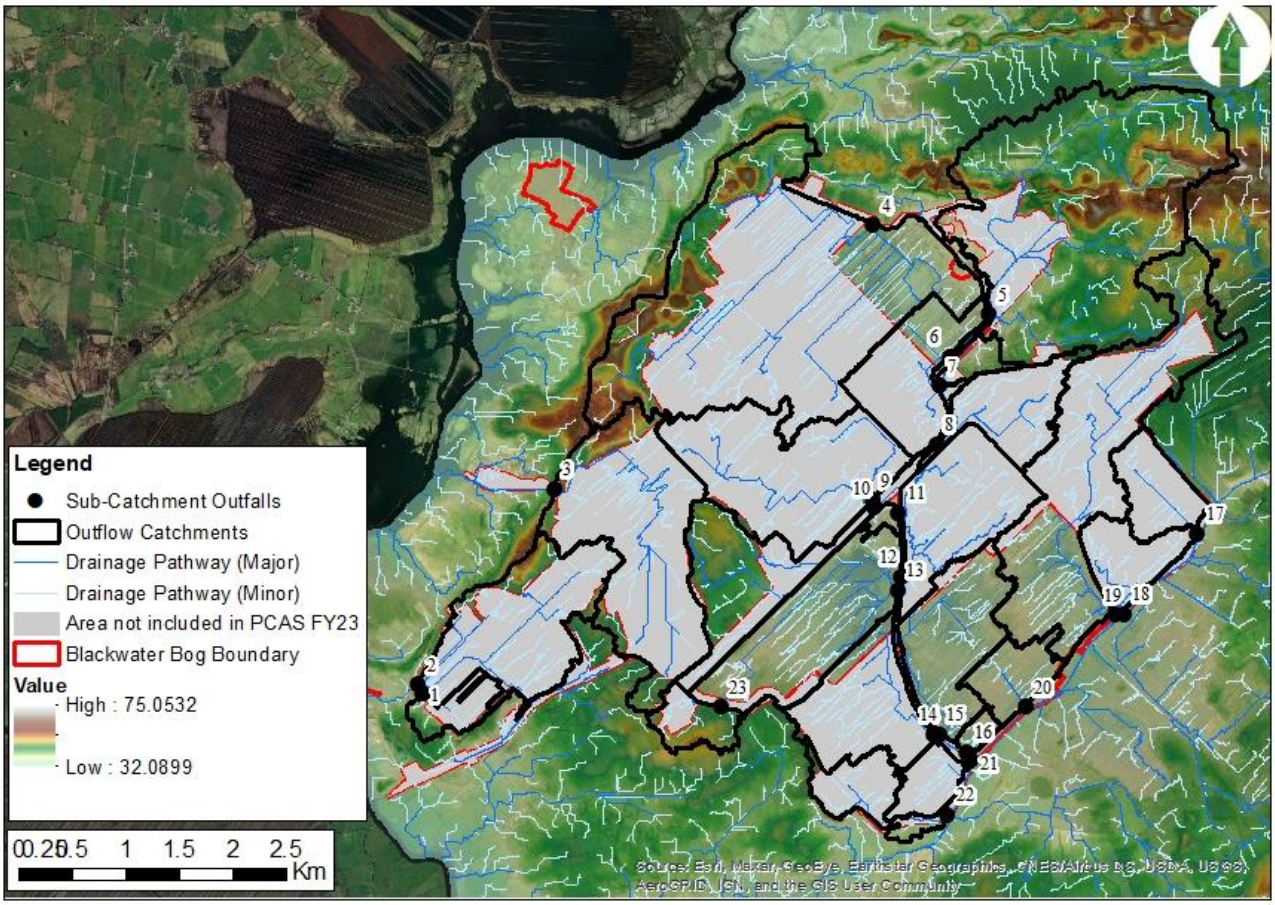

Figure 2-2 Drainage Networks and Sub-Catchments Draining Blackwater Bog

There are 22 sub-catchments draining Blackwater Bog, and one inflow catchment ranging in area from 0.06km^2 to 4.75km^2 of which 9 are relevant to the proposed PCAS extent . The catchments are subject to an average precipitation of 872-1046mm/year. The Baseflow Index for the catchments is between 0.379 and 0.674 representing a moderate to high catchment permeability. The catchments range from moderately flat to steep. This information is based on wider catchment characteristics, and it is acknowledged that these will vary within the bog.

The Index Flood Flow (Q_{med}) values, which represent the typical peak flood flow which might be anticipated (a 50% chance of being exceeded in any given year), for each of the sub-catchments have been calculated. This is based on two different methods, the Flood Studies Update (FSU) 5 variable equation designed for small and / or urbanised catchments in Ireland, and the RPS derived Peat Q_{med} equation, derived in support of the Drainage Management Plan project for SAC sites on behalf of NPWS. Both methods result in very similar Q_{med} values where the proportion of arterial drainage (ARTDRAIN2) is assumed to match the proportion of the catchment managed by Bord na Móna (i.e.drained).

Table 2-1 Physical Catchment Descriptors of Sub-Catchments Draining the Bog

Sub-Catchment Number	Area (km^2)	SAAR (mm)	BFI	FARL	ARTDRAIN2	PEAT (%)	S1085 (m/km)	FSU5 Q_{MED} (m^3/s)	Peat Q_{MED} (m^3/s)
1	0.29	1046	0.674	0.753	0.161	89	0.279	0.024	0.042
2	1.63	1046	0.674	0.753	0.161	92	0.279	0.121	0.191
3	2.43	1046	0.674	0.753	0.161	86	0.279	0.174	0.270
4	5.51	905	0.517	0.933	0.000	81	2.159	1.078	0.756
5	4.75	899	0.475	0.991	0.000	45	1.907	1.122	0.809
6	0.97	898	0.472	0.993	0.000	100	1.989	0.263	0.202
7	0.18	898	0.472	0.994	0.000	100	1.848	0.054	0.046
8	0.77	897	0.444	0.994	0.000	100	1.542	0.211	0.176
9	2.03	897	0.444	0.994	0.000	100	1.542	0.516	0.409
10	1.13	897	0.444	0.994	0.000	82	1.542	0.302	0.246
11	0.06	896	0.416	0.995	0.000	100	1.279	0.021	0.021
12	1.23	896	0.415	0.995	0.000	100	1.279	0.329	0.281
13	1.90	896	0.415	0.995	0.000	87	1.279	0.495	0.412
14	1.07	894	0.379	0.997	0.000	100	1.254	0.315	0.272
15	1.13	894	0.379	0.997	0.000	100	1.254	0.332	0.286
16	0.09	894	0.379	0.997	0.000	100	1.203	0.032	0.032

17	0.54	874	0.597	1	0.000	100	1.822	0.119	0.093
18	0.53	884	0.339	1	0.000	100	1.046	0.173	0.161
19	2.96	884	0.339	1	0.000	93	1.046	0.844	0.721
20	0.44	872	0.586	1	0.000	100	1.281	0.092	0.079
21	0.32	894	0.379	0.997	0.000	100	1.203	0.101	0.094
22	0.51	880	0.509	0.999	0.000	93	1.232	0.120	0.104
23	0.34	894	0.379	0.997	0.000	26	1.279	0.110	0.100

2.3 Hydrogeological & Soil Characterisation

Full details of the hydrological and soil characterisation can be found in the Blackwater Bog – site characterisation report 2022.

In summary, Blackwater bog is underlain by several geological formations, the main bedrock units being the Ballysteen formation and Waulsortian Limestones which underlie the majority of the site. In addition, the Navan Beds underlie a small section of the bog towards the north-east and the Lucan Formaiton underlies a small portion to the south-east. All of these bedrock units are classified as Locally Important Aquifers (Bedrock which is Moderately Productive only in Local Zones). There are several bedrock faults trending through Blackwater Bog and the surrounding areas. Geological Survey of Ireland (GSI) mapping identifies several karst features, these are springs and superficial solution features within close proximity to the bog, with the nearest feature being located c. 250m from the north-western boundary of the bog. No data exists concerning depth to bedrock whilst the closest bedrock outcrop occurs 0.8km to the east of the bog.

Quaternary Sediment maps show Blackwater underlain by peat, yet surrounded by inorganic deposits, including till derived from limestone which occurs to the south-east and south-west of the bog and gravels derived from limestone which occur to the north-east, north and north-west. There are a number of eskers towards the north of the bog. While Groundwater Vulnerability is typically used to indicate the susceptibility to groundwater pollution, it can provide a useful proxy indication of likely groundwater flow rates in the surrounding area. Groundwater vulnerability for the surrounding areas is generally high; however, a number of extreme vulnerability areas can be identified in the surrounding area, typically associated with gravel deposits or bedrock outcrop.

2.4 Morphological and Hydraulic Characterisation

A desk top review was carried out of bog drains and external drains. Morphological and hydraulic features were identified.

The external drains are generally small with gentle bed slopes. Aerial photography shows no signs of erosion or deposition however, given that the drains are considered small with gentle bed slopes there would be a risk of deposition, and therefore reduced land drainage efficiency. Risk of deposition would occur where there is potential for an erosion or debris source from the surrounding land and where there is potential head loss in the channel due to instream features. Figure 2.3 details the reaches of the external drains where there are potential erosion or debris sources and where instream features may facilitate deposition. The figure shows that due to the location of woodlands, commercial forest, and peat in the surrounding lands outside of BnM ownership and control there are existing potential sediment sources that could enter the external drains. Given the presence of culverts, sharp bends, and inflows along the external drains there would be a potential of sediment settling and deposition occurring. The potential for Blackwater bog being a sediment source to the external drains is considered low as silt ponds upstream of the discharge points mitigate this potential and where deemed necessary additional silt control measures will be provided.

A review of the bog drains was carried out. The Bord na Móna drainage survey details the open drains, settlement silt ponds and discharge points. All discharge points from the production fields have a silt pond located upstream. The drains in the bog have very gentle bed slopes before discharging from the bog. It is anticipated that the bog drainage network would be sensitive to drain and pipe alterations.

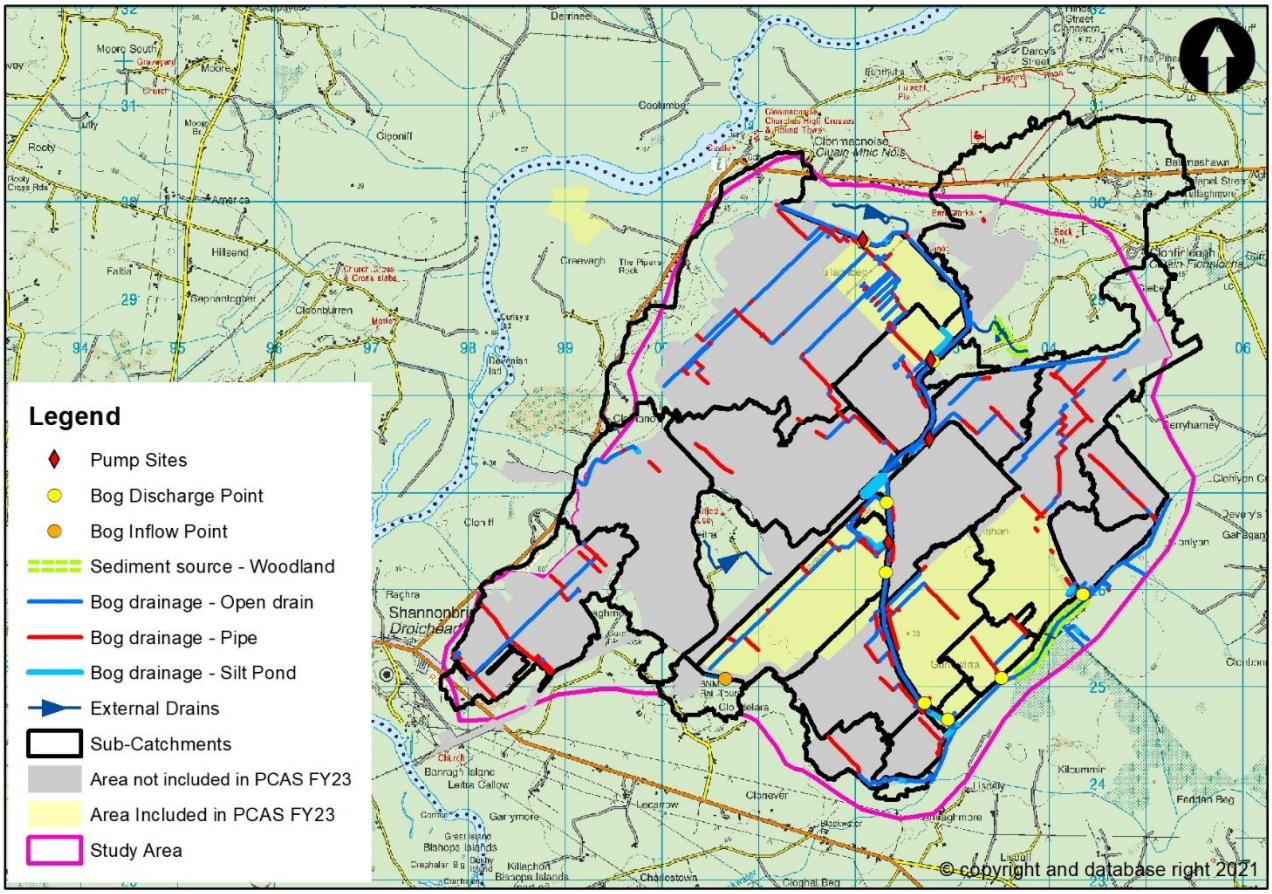

Figure 2-3 Morphological and Hydraulic Characteristics of Blackwater Bog and Environs

2.5 Land Use Character

The majority of the land within the study area is peat bog. The remaining areas of the study area consist of pasture, transitional woodland-shrub and coniferous forest. The CORINE land use dataset was used to identify landuse types. This dataset was then reviewed using aerial photography to establish land use amendments or land use alterations. The review observed no land use changes within the study area. Minor roads are located in the study area also.

The pasture land is mainly used for livestock which provides food production. The commercial forests provide for timber production. The peat bogs outside of the Blackwater bog boundary are, Belmount, Ballaghurt and Bloomhill which are under the possession of Bord na Móna, Finn Lough SAC is immediately adjacent to the bog in the northeast and Mongan Bog SAC is also north of the site. Other areas of peat bog are undisturbed which contribute to carbon storage and biodiversity. The woodland and shrub areas are likewise providing carbon storage and biodiversity albeit as a different habitat to the peat bogs. There is also an Ash Deposition Facility located on the bog. The roads within the study area provides access to the pastures, forests and peat bogs.

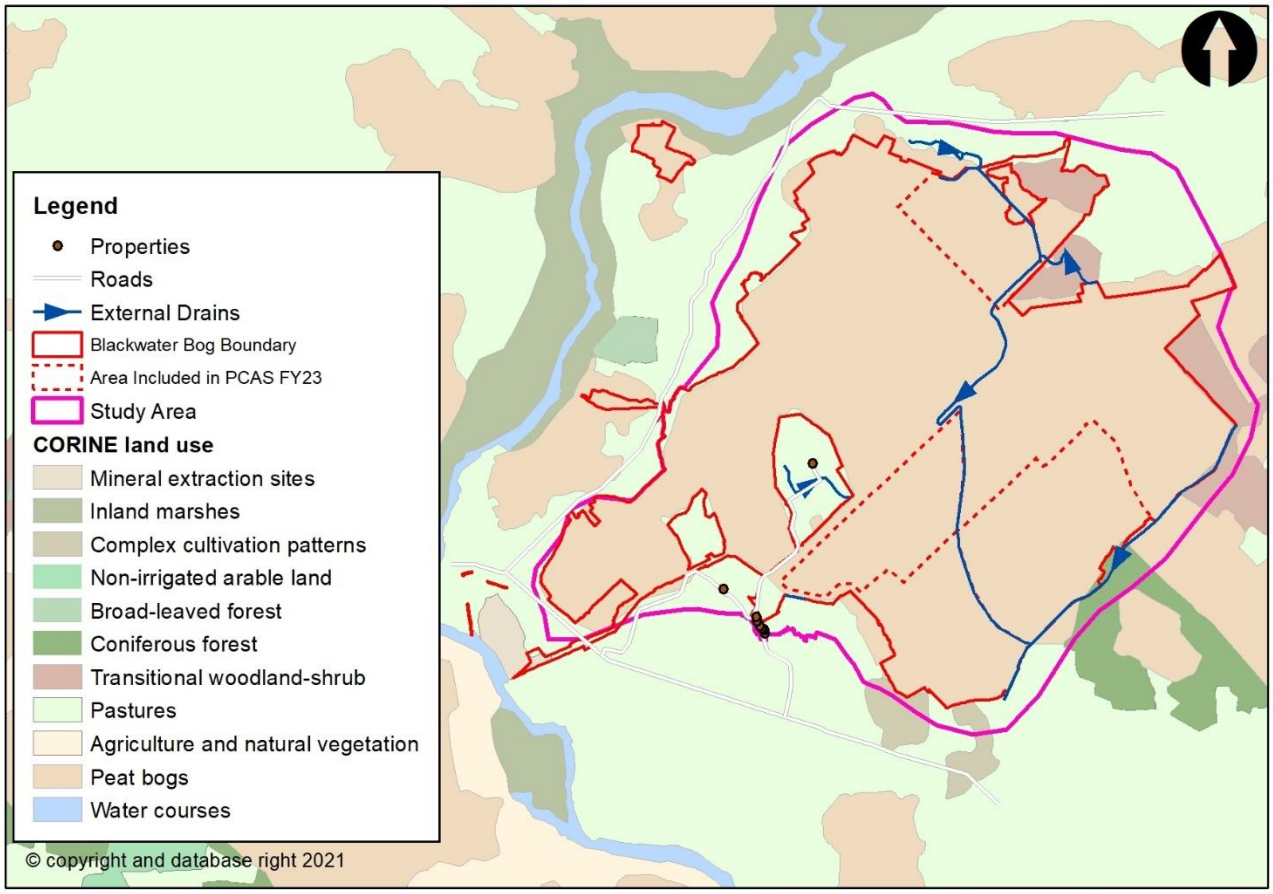

Figure 2-4 Land Use Characteristics of Blackwater Bog and Environs

2.6 Flood Risk

A number of sources of flood risk information are available, both predicted and simulated, in proximity to Blackwater. These include:

- CFRAM Study maps setting out the predicted fluvial 10%, 1% and 0.1% Annual Exceedance Probability (AEP) fluvial flood scenarios
- GSI predicted water table flood maps for high, medium and low probability events
- Mapped fluvial flood extents for the 2009 flood event
- Mapped flood extents for the 2015 flood event (from Sentinel-1 satellite imagery) and a GSI surface water flooding dataset for the same event
- Anecdotal evidence from Bord na Móna

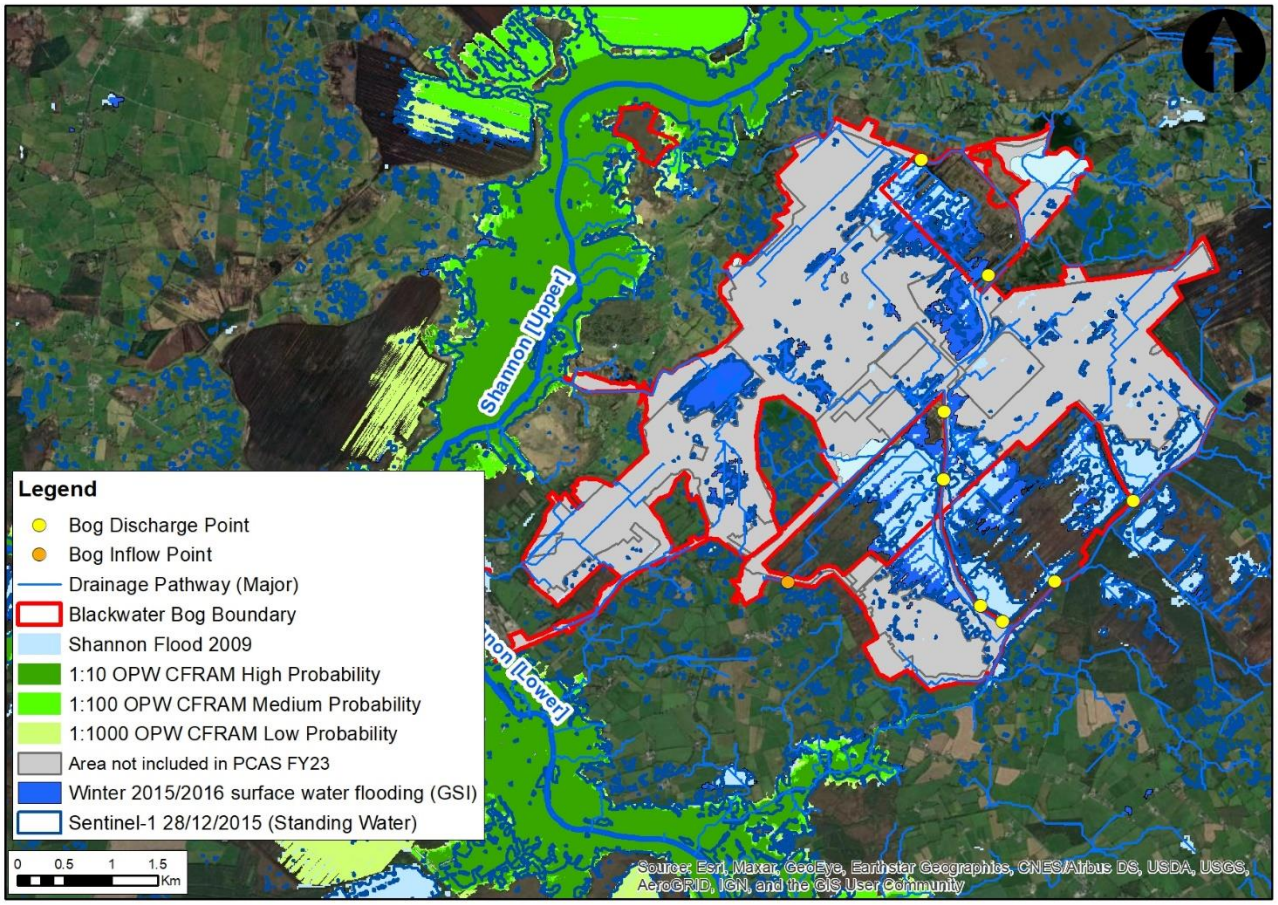

Figure 2-5 Flood Risk and Blackwater Bog

The CFRAM maps show that there is no risk of Blackwater bog flooding from the Shannon River. It should be noted this analysis did not consider the fluvial flood risk from the smaller watercourses which drain the land adjacent to Blackwater bog. However the Shannon Flood event in 2009 and the 2015/2016 surface water flooding data indicate flooding has occurred on the bog in the past. This is consistent with the local knowledge from Bord na Móna operatives familiar with Blackwater Bog.

Historical anecdotal evidence was reviewed to ascertain if there are any known flooding or drainage issues from these smaller watercourses to the bog or adjacent land. No drainage issues have been identified along the Blackwater Bog boundary drains.

There is no predicted groundwater flooding to the bog indicated on the GSI datasets.

2.7 Summary

The drainage network sub-catchments within Blackwater Bog and its environs were used to delineate the study area for the Blackwater Drainage Management Plan. The overall catchment area was characterised within the context of hydrology, hydrogeology, morphology, landuse and flood risk.

A detailed drainage network delineation was carried out. Drains within the bog and external drains were identified. The assessment showed that Blackwater Bog discharges directly to the Blackwater stream south

of the Bog which flows west to meet the River Shannon south of the bog. The bog also discharges to the west via adjacent land drains to the River Shannon.

The catchment area is considered to be relatively small, flat, moderate-high permeability with 872-1046mm annual rainfall. Peak flood flows range from around 0.11-0.35 m^3/s per square kilometre (1.1-3.5 l/s per hectare) for the Q_{med} event to 0.26-0.81 m^3/s per square kilometre (2.6-8.1 l/s per hectare) for the Q_{100} year plus climate change event.

The bedrock within the catchment (Ballysteen formation, the Waulsortian Limestone,Navan Beds and Lucan Formation) may lead to moderate rates of groundwater flow. A several karst features were identified in the immediate vicinity of the bog including spring and superficial solution features. The subsoil overlying the bedrock is till and gravel derived from limestone which are considered to have a high permeability with areas of extreme vulnerability.

The morphological and hydraulic characteristics of the external drains were assessed. No signs of erosion of deposition could be observed. Areas of deposition risk were identified along each drain. Woodlands, commercial forest and peat adjacent to the drains were identified as potential sources of sediment. The potential for Blackwater bog being a sediment source to the external drains during proposed PCAS activities is considered low due to the presence of silt ponds at all discharge points. In addition to the cessation of peat harvesting.

The land use was assessed within the study area. The majority of land is peat bog. The remaining areas of the study area consist of pasture, transitional woodland-shrub and coniferous forest. The land provides important services such as food production, timber production, carbon storage, industry, biodiversity and habitat creation.

Table 2.2 summarises the constraints, risks and opportunities identified as part of the baseline assessment.

Table 2-2 Potential Opportunities / Constraints

Land Parcel / Feature	Risk or Opportunity?	Details
Agricultural land	Constraint	It is important to maintain the productivity of agricultural land surrounding the bog
Peat bog	Constraint	The adjacent peatland is in the possession of BnM. The impact from Blackwater bog should be considered.
Roads	Constraint	Minor roads providing access to dwellings, agricultural land and peat bogs are located in the study area. Access to these roads should be maintained.
Rivers	Constraint	The Blackwater stream and the Shannon River are downstream of Blackwater Bog. No activity should adversely impact this area.
External drains	Risk	Risk of deposition in the drains is considered high due to potential sediment sources in adjacent lands and features within the external drains. External drains may be sensitive to change. Risk of reduced flows in drains.
Bog rehabilitation plan	Opportunity	To improve water quality discharging from the bog; stabilisation or improvement in water quality parameters (e.g. suspended solids)
Bog rehabilitation plan	Opportunity	To reduce carbon emissions from the bog and to set bog on a trajectory towards naturally functioning peatlands habitats. Blackwater has potential to develop embryonic Sphagnum-rich vegetation that has potential to be a carbon sink.
Bog rehabilitation plan	Opportunity	To improve biodiversity by vegetating bare peat and creating more habitat for flora and fauna.
Bog rehabilitation plan	Opportunity	To reduce runoff and restore a more natural runoff regime, thus contributing to flood risk management.

3 BOG REHABILITATION PLAN

The measures identified for the bog rehabilitation plan are detailed in the Rehabilitation PIan report.

Each measure while designed to promote the rehabilitation and re-wetting of the bog will have a potentially positive and/or negative impact on the adjacent land. This section identifies and assesses these potential impacts.

3.1 Impact Screening

Table 3.1 summarises the rehabilitation measures proposed for the Blackwater Bog and their potential impact to adjacent land.

Table 3-1 BRP measures proposed at Blackwater Bog

BnM rehabilitation measure	Description	Potential Impact	Potential Impact Description
Drain blocking, berm.	Existing production field drains within the bog areas that convey surface water away from the former peat production fields towards the bog discharge points will be modified to reduce conveyance or removed altogether by infilling. Surface water runoff through the bog will be slowed allowing the bog to store more water	Positive and negative	Reduced runoff from the bog discharge points resulting in less flow in the external drains located downstream. Reduced conveyance at bog inflow point resulting in increased water volume in external drain located upstream if conveyance channels through the bog are blocked.
Blocking outfalls	Most production field drain systems drain into a headland pipe running perpendicular to the peat field. This intersection is known as an outfall. By blocking the outfalls each production field drain will be prevented from operating resulting in the ditch storing water and raising the water table level in the bog. This will allow the bog to store more water and bring the water table level to the surface.	Positive and negative	Reduced runoff from the bog discharge points resulting in less flow in the external drains located downstream. Raised water table levels to the bog surface will create a hydraulic gradient across the bog into the adjacent land. Water table levels in lands within this hydraulic gradient will potentially rise. The effect will be greatest immediately beside the bog.
Managing overflows with overflow pipes	This measure is usually combined with blocking outfalls which cause water table levels to rise. As the bog fills up it will want to overtop at the lowest part of the bog boundary. Overflow pipes control the location this occurs and where the overtopping water is discharged to.	Neutral	The control features will determine the location of the discharge from the bog. However the flow leaving the bog once it is full will be the same as prior to remedial works. Overall the volume of water discharging from the bog will be reduced but will contribute to raised water table levels within

			the bog and potentially within the zone of influence (subject to mitigation).
Sphagnum moss inoculation	This measure will propagate sphagnum moss within the bog. Sphagnum moss will cause bog regeneration as it grows and layers.	Positive	Sphagnum moss can hold up to 10 times its weight in water. As such this measure will store water reducing the runoff from the bog into the exterior drains. This will help retain the external drainage efficiency which adjacent land relies on. This measure may also contribute to runoff reduction and wider catchment FRM goals but in a piecemeal way.
Silt ponds	Existing silt ponds will be maintained to store runoff water from the bog and allow any suspended peat to settle out of the water before it is discharge to the external drains.	Neutral	Maintained capacity from the bog discharge points to the external drains and river located downstream. Maintained quality of water being discharged from the bogs into the external drains or river.
Wetland creation	Areas prone to flooding and depressions on shallow peat are designated for wetland creation. Shallow standing water will be allowed to occur resulting in increased water storage. Establishment of reeds and other rhizomes will form part of the wetland creation.	Positive and negative	Reduced runoff from the bog discharge points resulting in less flow in the external drains and river located downstream.

3.2 Impact Assessment

Three potential impact sources were identified; water table rise, increased runoff from the bog and low flow risk. These impact sources have the potential to make the adjacent land wetter and drain less efficiently or reduce water supply in adjacent drains. An assessment was carried out to delineate the zone of influence resulting from these potential impact sources. Figure 3.1 presents the areas which are at potential risk.

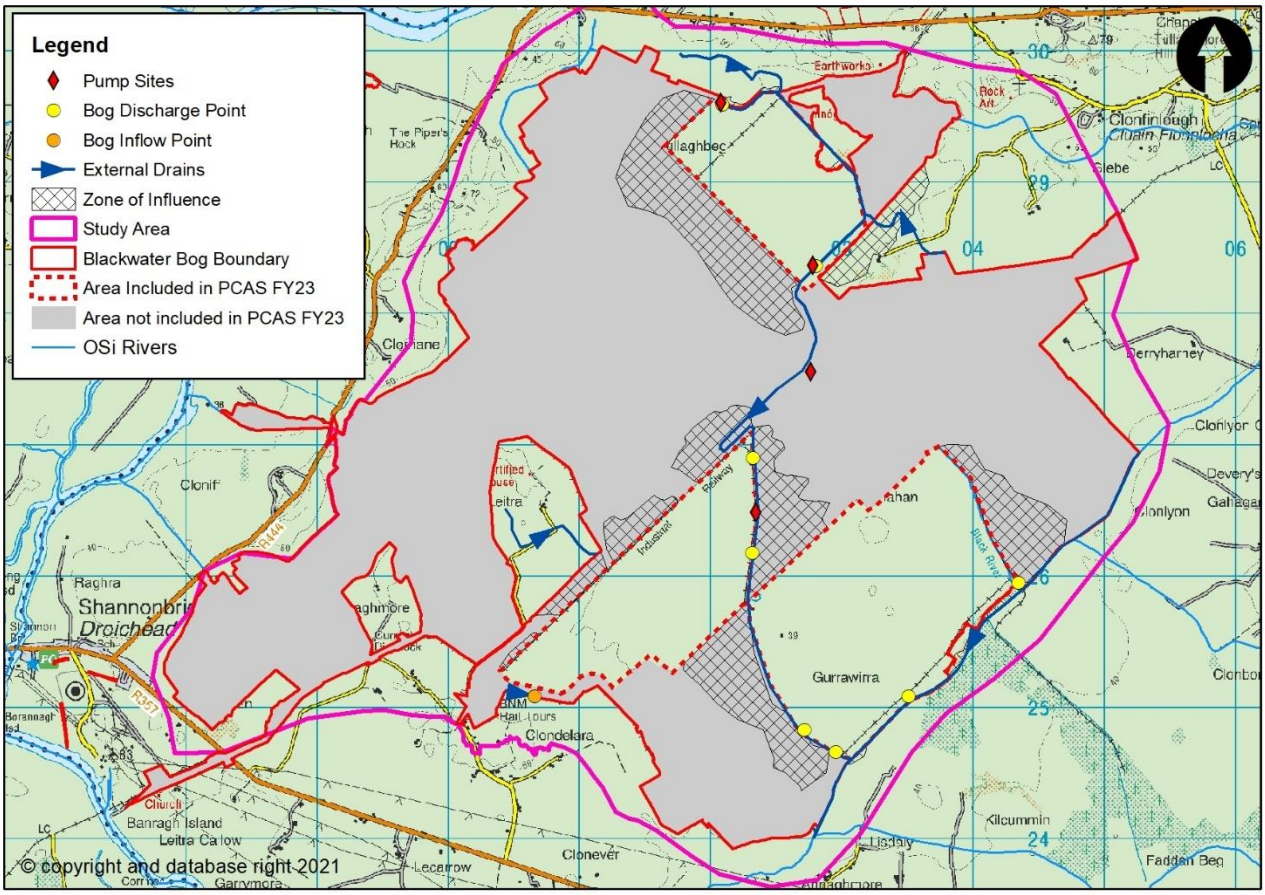

Figure 3-1 Blackwater Bog Rehabilitation Plan- Zone of Influence

3.2.1 Water Table Impact

The impact of rehabilitation measures on water table levels within and adjacent to the bog is difficult to assess quantitatively in the absence of long term monitoring data and hydro-geological models of the bog. Nevertheless, it can be assumed that water table levels will rise within the bog itself given that this is an objective of the rehabilitation measures – to restore the hydrological conditions for peat formation. It can also be assumed that the maximum level which the water table will reach outside areas zoned as wetland is the surface of the peat fields post-rehabilitation. This is because topographical flow paths for surface water out of the bog (by gravity) will be retained. The pump site at the Ash facility will remain active as this area is outside the FY23 extents. As this pump is located a considerable distance from the in-scope FY23 areas it is considered that these pumps will not have an influence on the local groundwater levels post FY23 rehabilitation. For areas zoned as wetland the maximum water level will be at or above surface level as shallow water ponding is promoted through rehabilitation measures.

The surface of the bog may lie higher or lower that the adjacent land. This relationship between the bog and adjacent land needs to be considered when assessing potential water table rise. Figure 3.2 show these two relationship scenarios. Where the bog is lower than the adjacent land it would be expected that the water table would remain lower on the bog side even when the water table is raised to the bog surface. If wetland areas are created and the water level is raised above the surface it may result in higher levels than the water table in adjacent lands. In this case the presence of a boundary drain can act as a hydraulic break bringing the water table down to its original level and preventing a rise in the water table in the adjacent land. Where the surface level of the bog is higher that the adjacent land the risk of raising the water table in the adjacent land is greater. However, in this scenario the presence of an effective boundary drain will collect runoff from the bog and act as a hydraulic break bringing the water table back down and preventing a rise in the water table in the adjacent land.

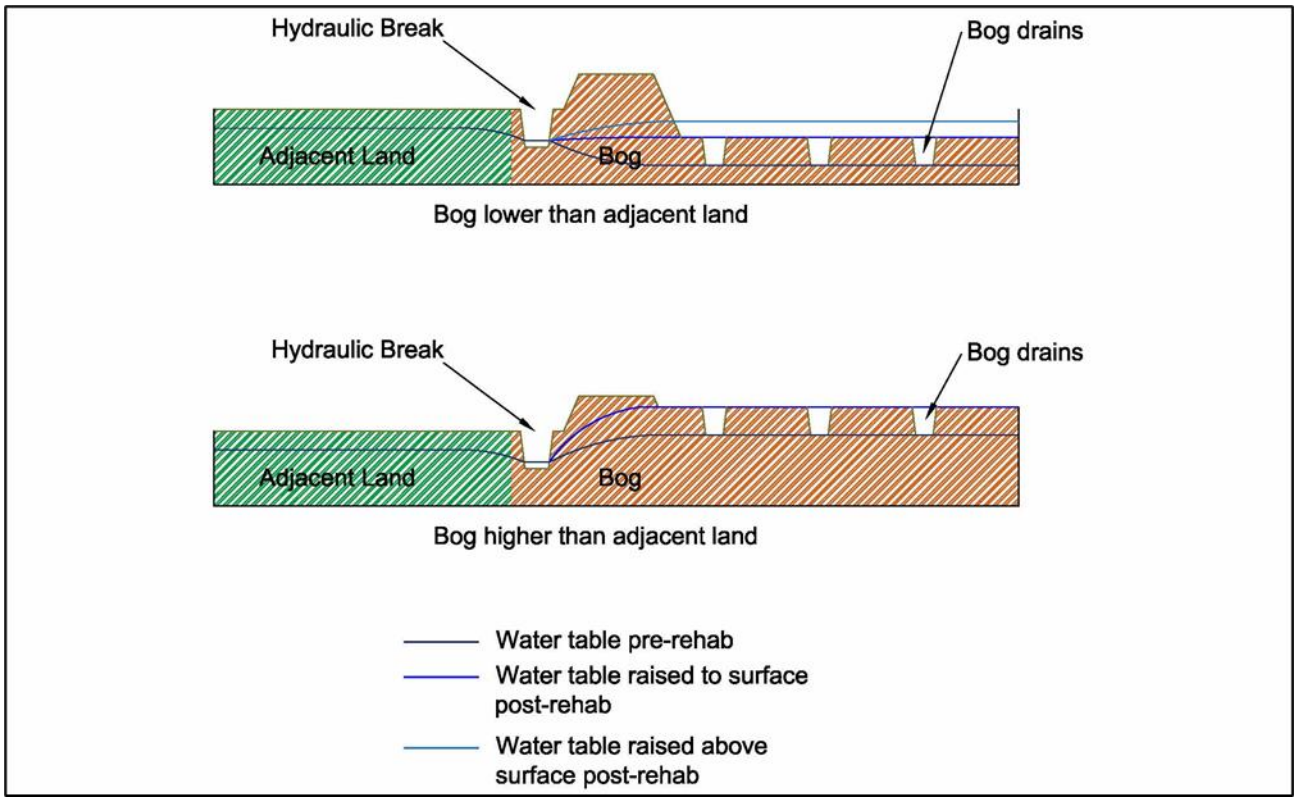

Figure 3-2 The effect of water table rise due to bog rehabilitation

For Blackwater Bog the adjacent land lies lower than the bog in some locations, identified in Figure 3.1 as the Zone of Influence, and higher in other locations. Water table rise in lands adjacent to the Blackwater was assessed firstly by estimating the potential rise in water table within the bog. The drainage system in the bog is typically 0.7m deep. It can be expected that the water table would rise by 0.7m to bring it to the surface. A cross section was surveyed, as shown in Figure 3.3, to assess the potential impact of a water table rise.

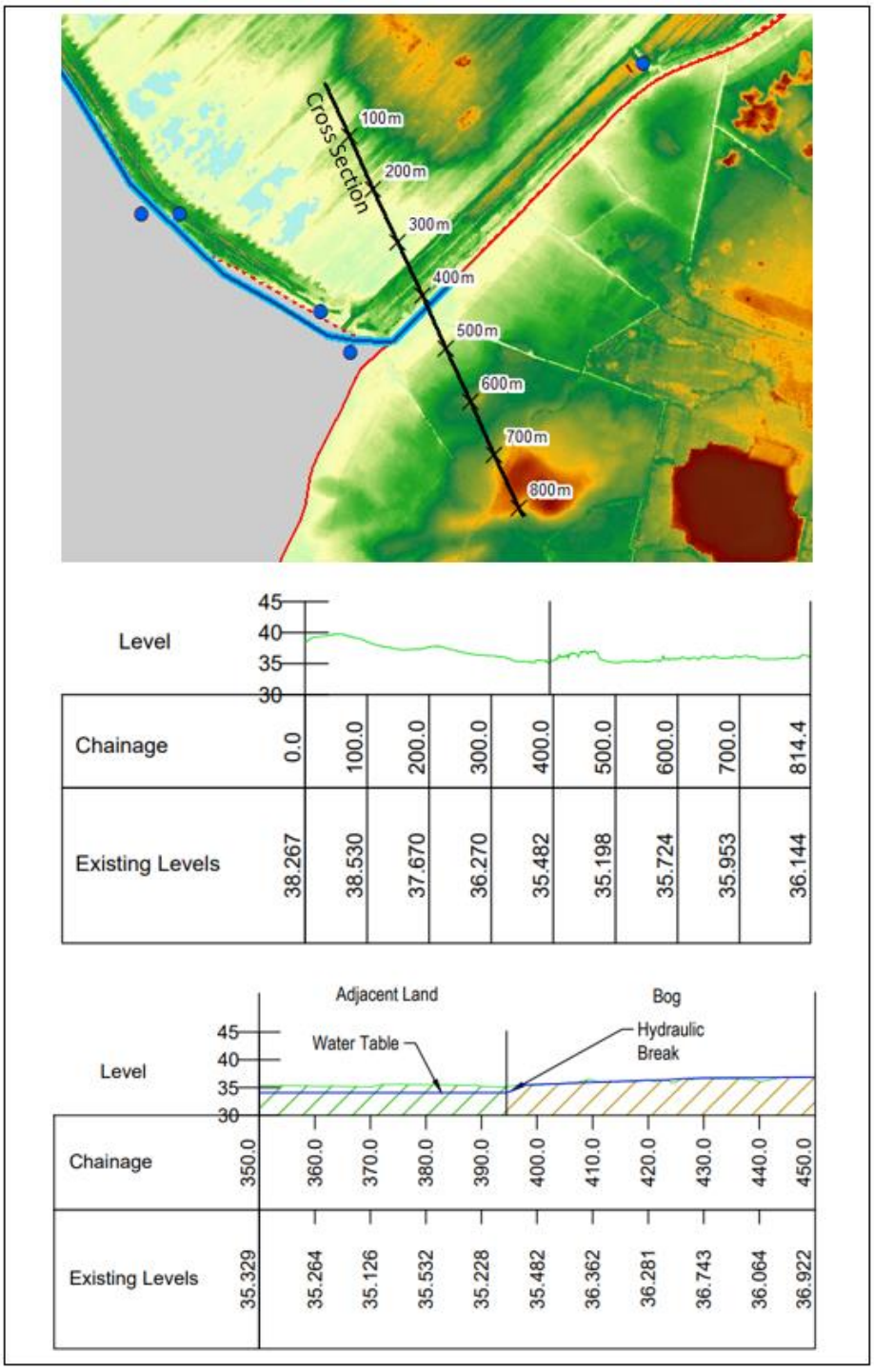

Figure 3-3 Conditions affecting water table

The cross section shows that a rising head in the bog would create a hydraulic gradient across into the adjacent land with the potential for a raised water table in the adjacent land also. This action determines the zone of influence and the areas of potentially wetter ground. The presence of boundary drains however will act as a hydraulic break controlling the hydraulic gradient and reducing the zone of influence. As these boundary drains lie lower that the adjacent land it is expected that they will function as a hydraulic break. This however is dependent on the drain's ability to adequately convey flow.

Drains that are inefficient with high water levels (independent from the bog rehabilitation measures) will also raise the water table in the bog and potentially in the adjacent lands to the bog would be wet. The avoidance of the drain full condition is dependent on the retention of a positive gravity drainage function of the boundary drains the adequate functioning of which is maintained.

Boundary drains were identified by aerial imagery and lidar for Blackwater, which provide the water table cut-off function to agricultural lands. It is assumed that these drains would be able to convey Q_{med} (2 year return period) flows under non-backwater conditions which would be typical of natural watercourses in Ireland. Therefore under non-flood conditions it is expected that the external drains identified around Blackwater Bog will act as a hydraulic break to any hydraulic gradient created by bog re-wetting. However there is a risk that should the flow regime in any external drain be changed post rehabilitation that the land adjacent to the drain would become wetter.

Caution should be exercised during any alterations of boundary drains around Blackwater Bog. As described in section 2.3, the peat overlays permeable bedrock. It is important to avoid the creation of new flow paths into the bedrock which has the potential of increasing water table flood risk elsewhere or altering the hydrogeological conditions for peat formation. If deepening of drains is undertaken it should therefore be undertaken with care so as not to deepen the drain beyond the base of the peat.

There is also a risk that as the bog fills with water and wants to discharge, and that unintended discharge locations would occur. A review of the bog boundary was carried out. No low points were identified that may become an unintended discharge location. Blackwater Bog discharges directly to the Blackwater stream South of the Bog which flows west to meet the River Shannon south of the bog. The bog also discharges to the west via adjacent land drains to the River Shannon. There is little risk to adjacent lands from increased flows from the bog owing to elevated water table levels. As previously set out this is dependent on existing boundary drainage network isolating the bog from lower level adjacent lands and providing a positive gravity drainage function. In other words capacity to convey Q_{med} or 2 year return period flows and a free flow (constantly falling) away from the bog.

3.2.2 Increased Runoff

Evidence from bogs that have previously been the subject of restoration measures demonstrates that the measures proposed at Blackwater, which are all aimed at reducing runoff and retaining water within the bog, have the effect of reducing the frequency and magnitude of flood events by restoring a more natural hydrological regime. Restoration / rehabilitation has been successfully applied to numerous Bord na Móna bog sites as well as SAC sites such as Clara Bog (East), Raheenmore Bog, Carrownagappul Bog and Lisnageeragh Bog. Elsewhere, the restoration of peatland catchments in numerous sites across the UK, such as Exmoor National Park in Snowdonia, has demonstrated positive flood alleviation as a result of following rehabilitation measures and monitoring has shown reduced runoff from the moorland as a result of increased storage in the peat.

The risk of increased runoff from Blackwater Bog is low. All rehabilitation measures being proposed will reduce runoff. However, there is a potential that if bog re-profiling is carried out as part of the bog rehabilitation measures that the bog sub-catchments will be modified. Changes in sub-catchments could result in certain

discharge points draining larger areas. This would result in increased flows that could outweigh the effect of the reduced runoff arising from the rehabilitation. This is a moderately low risk at Blackwater as the re-profiling of the bog, if carried out, will generally result in the same topographical flow paths, catchment watersheds and discharge locations as in the pre-rehabilitation state. Similarly, the effect of reducing or turning off the pumps at discharge points could result in raised water levels and a transfer of water across sub-catchments leading to increased runoff through other discharge points. This would be a low risk provided the alteration to the pumped discharge points allow for continued discharge and for ponding within the bog if necessary, to store the runoff. In the absence of a full pre and post rehabilitation runoff model and a precautionary approach has been adopted to ensure that all drainage infrastructure from the bog is retained and is fit for purpose.

3.2.3 Low Flow Assessment

A low flow risk assessment was completed to identify whether any discharge locations from the bog are at high risk of low flow during periods of low rainfall and high evapotranspiration. While it is anticipated that rehabilitation will generally lead to dampening of peak flows and support sustained flows during dry periods, there is a potential risk that during prolonged dry periods that the rehabilitation measures may lead to downstream watercourses drying out as a result of increased infiltration, increased rates of evapotranspiration along with the additional storage capacity created within the bog.

A high level risk assessment was carried out to identify the particular discharge locations where this may be a risk. The following are considered the key factors that are most likely to influence the risk of drains previously unaffected experiencing low flow:

1. The contributing catchment area to each discharge location (as this is one of the main factors that will influence the range of flow rates);
2. The intensity of the rehabilitation works within the catchment (both in terms of measures proposed and proportion of the catchment undergoing rehabilitation)

The larger the contributing catchment area it is considered less likely that a drain will be to dry out, while the more intensive the rehabilitation works the more likely a drain will be to low flow. In order to simplify the risk assessment process three risk categories (High, Moderate and Low) were identified for catchment area and restoration intensity based on experiences from other bogs where this issue has occurred. For rehabilitation intensity the proportion of the catchment area undergoing rehabilitation was used as an indicator of risk. The overall risk category assigned is determined based on Catchment area risk multiplied by Rehabilitation intensity risk as summarised below:

Table 3-2 Parameters of Catchment Low Flow Risk

Risk category	Catchment area (ha)	Rehabilitation intensity (% of catchment area)	Overall risk category
Low (1)	>20	<30%	Low (1-3)
Moderate (2)	5-20	30-60%	Moderate (4-6)
High (3)	<5	>60%*	High (7-9)

*Note: Rehabilitation intensity (% of catchment area) capped at Moderate for where the rehabilitation measure only involves drain blocking on vegetated high bog (MLT2)

Where any discharge locations are identified as high risk, it is recommended that Bord na Móna undertake a review of the drainage channel downstream of the bog to identify the potential impact to the land owners.

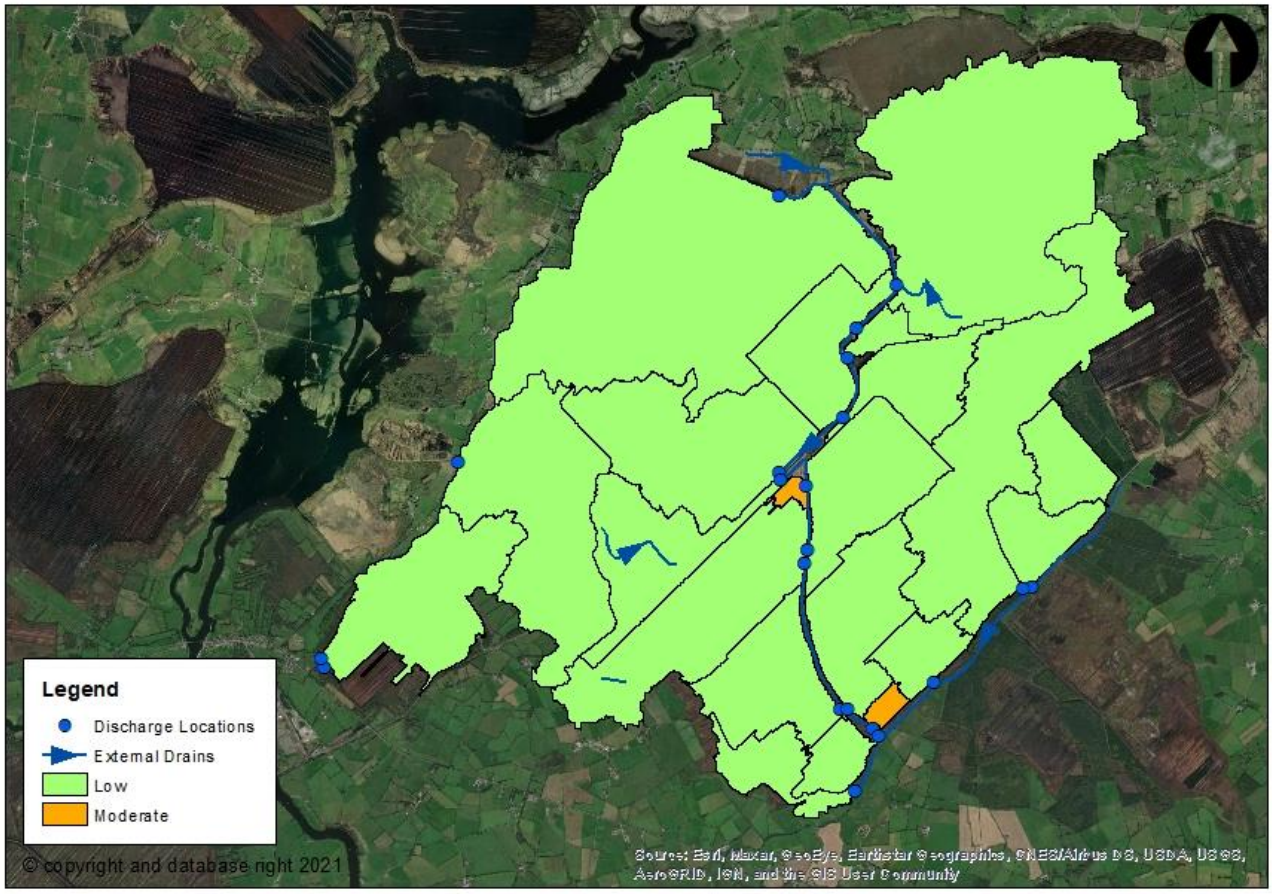

Figure 3-4 Overall Catchment Risk

Through assessing the catchment areas and rehabilitation intensity, most catchments were classified as low risk and two were classified as moderate risk. No high risk catchments were identified that would require further survey and assessment.

3.3 Potential Risk Areas

The following assets have been identified as being at potential risk from flooding or wetter conditions as a result of measures described in Table 3.1 being implemented.

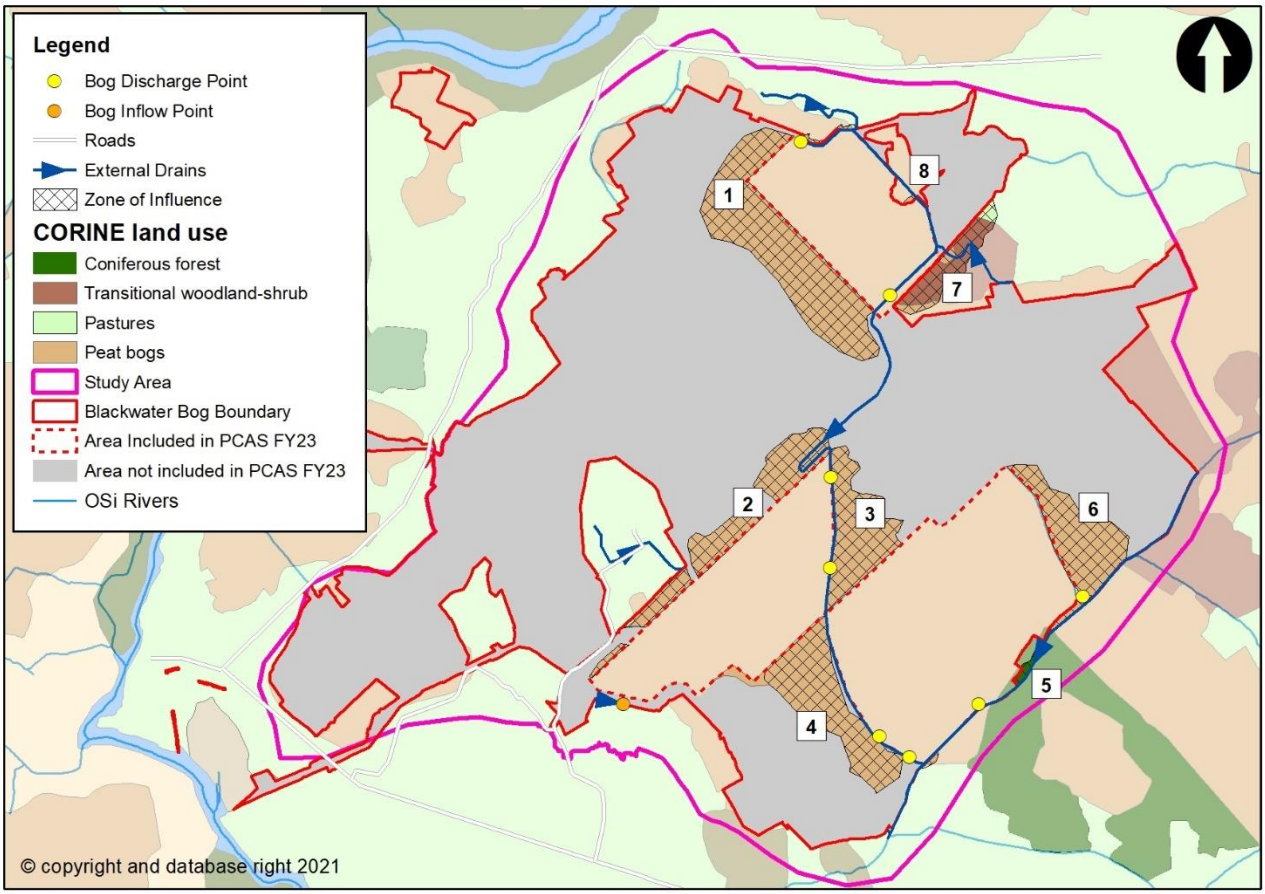

Figure 3-5 Blackwater Bog Rehabilitation Plan- Assets at risk

The assets at risk are set out in Table 3.3 along with the vulnerability, based on the current landuse, of the asset. It should be noted that the appraisal of the assets at risk considers the consequences of flooding or wetter conditions, not the likelihood of flooding or wetter conditions occurring.

Table 3-3 Assets at Risk

Item	Asset	Vulnerability to flooding and/or wetter conditions
1	Peat Bog- BnM Renewables area	Low Vulnerability. Peat could tolerate wetter conditions however the area is constrained for renewables and rehabilitation measures should not impact this development.
2	Peat Bog- BnM Renewables area	Low Vulnerability. Land currently floods and could tolerate wetter conditions however the area is

		constrained for renewables and rehabilitation measures should not impact this development.
3	Peat Bog- BnM Renewables area	Low Vulnerability. Land currently ponds and could tolerate wetter conditions however the area is constrained for renewables and rehabilitation measures should not impact this development.
4	Peat Bog- BnM Renewables area	Low Vulnerability. Land currently ponds and could tolerate wetter conditions however the area is constrained for renewables and rehabilitation measures should not impact this development.
5	Coniferous forest	Low vulnerability. Coniferous forest could tolerate wetter conditions.
6	Peat Bog- BnM Renewables area	Low Vulnerability. Land currently ponds and could tolerate wetter conditions however the area is constrained for renewables and rehabilitation measures should not impact this development.
7	Woodland and pasture	Low Vulnerability. Woodland could tolerate wetter conditions and acts as a buffer to the adjacent pasture land.
8	Peat	Low Vulnerability. Peat could tolerate wetter conditions.
9	Roads	Low vulnerability. Road level slightly higher than surrounding land. Risk of flooding is low.

In addition to the above risks there is a general low risk that should degradation of the bog boundary occur surface water could be released into adjacent lands.

4 OBJECTIVES

The overarching objective of the Blackwater Drainage Management Plan is to facilitate the rehabilitation of bog through management of potential adverse impacts to adjacent land and waterbodies. SMART[2] objectives were developed for the Drainage Management Plan that provides direction for the overarching objective. These objectives consider constraints, risks and opportunities that were identified in chapters 2 and 3 and are detailed as follows:

1. To manage potential water table impacts between adjacent land and Blackwater bog during and after rehabilitation measures.
2. To maintain or reduce flows released from the bog at the discharge locations.
3. To manage sediment entering the Blackwater Stream and the River Shannon during and after rehabilitation, these measures are to ensure compliance with current discharge limits in IPC Licence.

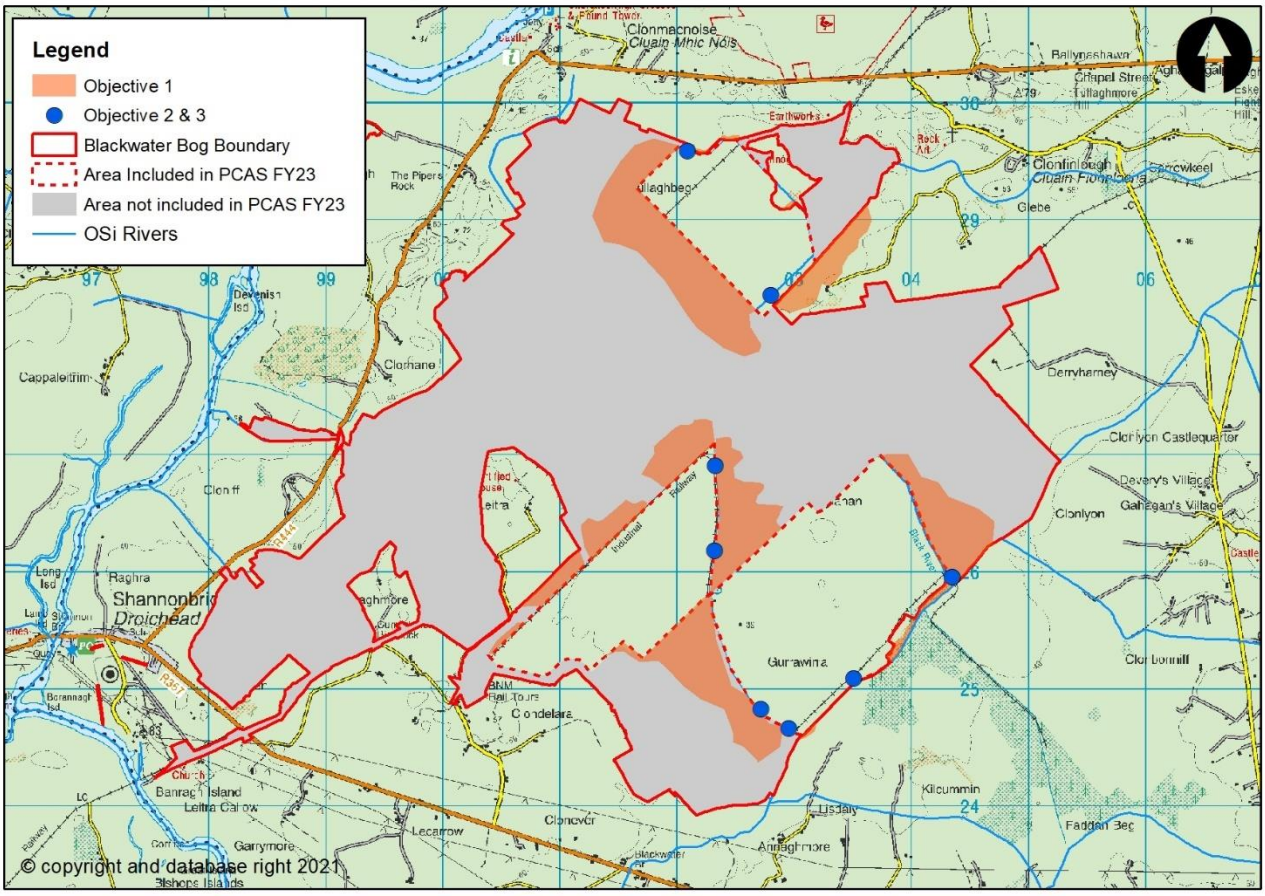

Figure 4-1 Blackwater Bog DMP objectives

[2] SMART – Specific, Measureable, Achievable, Relevant, Time bound

5 DRAINAGE MANAGEMENT MEASURES

5.1 Key Drainage Features

Drainage management measures were identified in relation to the objectives set in chapter 4 and are described below. Objective 1 considers the potential impact to adjacent land from water table rise. Objectives 2 and 3 consider the control mechanisms to flow discharging from the bog.

An assessment was carried out to identify the existing key drainage features available to meet the objectives set. Figure 5.1 presents the key drainage features identified. It can be seen in the figure that for water table level rise to be managed between the bog and adjacent land that a hydraulic break will be required where available. To ensure that the flow and sediment discharging from the bog is managed the discharge control points will need to be maintained.

Outside the Bord na Móna bog boundary key external drains were identified. These drains are hydrologically connected to the bog drainage network. While no drainage issues were identified along these external drains, see section 2.4, a risk of sediment deposition was highlighted from sources outside the bog. The maintenance of the existing silt ponds will mitigate the risk of sediment deposition arising from rehabilitation. Post implementation of the measures there will be in general a reduction in risk of sediment/silt escape once the bog reaches environmental stabilisation. It is noted that sediment deposition in the external drains could impede the drainage of the bog and adversely impact adjacent lands.

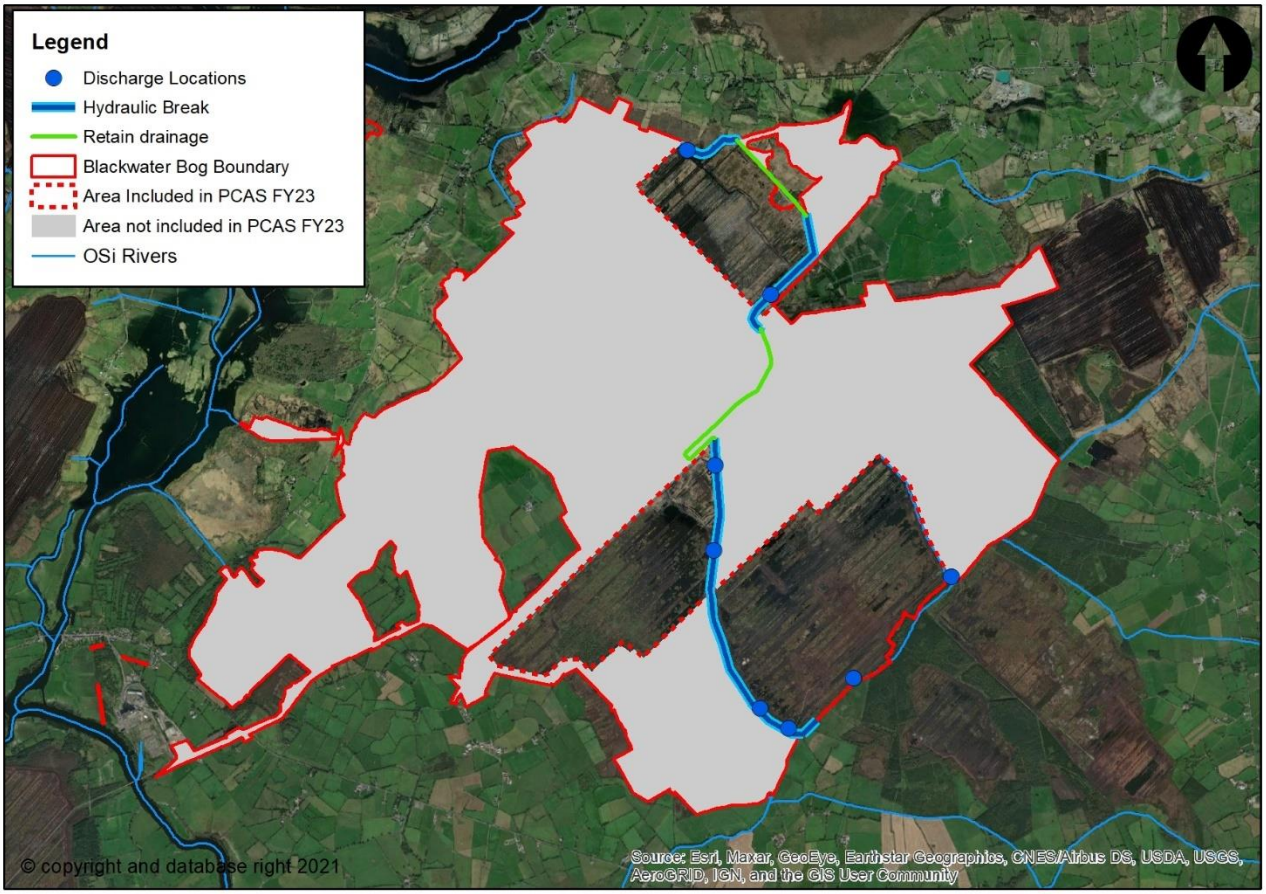

Figure 5-1 Key drainage features for Blackwater Bog

When identifying measures to provide the key drainage features a review was carried out of the drains. LiDAR, topographical surveys and local knowledge from Bord na Móna operatives were used in this review. While the review gave a good indication of the key drainage features' performance it is acknowledged that gaps in information or changes to features post survey could change the expected performance. Blackwater Drainage Management Plan therefore outlines a suite of responsive measures taking into account such factors as robustness and ongoing on-site observations. The Drainage Management Plan would therefore allow the bog to be managed and adapted as the rehabilitation plan progresses and is retained in the future. The following sections describe the suite of measures that can feasibly be implemented for the Blackwater Bog Drainage Management Plan.

5.1.1 Boundary Drains

Boundary drains can provide hydraulic breaks between the bog and adjacent land, see Figure 5.1. In most areas of the Blackwater Bog where hydraulic break would be required there are existing boundary drains. Available information indicate that these drains are suitable to provide hydraulic breaks and can be designated as such and retained in the future. Observing and recording the suitability of the boundary drains is recommended and where they are found to be not functioning as predicted upgrade works will be required. This would involve modification of the drain to make them larger/deeper/wider/steeper. This may be only in specific locations along the drain or an entire reach may require upgrading. Where there is no boundary drain present an alternative measure may be required. This might include a new drain in order to create the hydraulic break required, in these cases a channel of specified dimensions and slope will be required and where possible will not extend into the mineral soils (See section 3.2.1).

5.1.2 Bog Rehabilitation Modification

Where a boundary drain is not suitable to act as a hydraulic break or where none exists it may be possible to review the bog rehabilitation plan to provide the required mitigation measure. This can take the form of sacrificing rehabilitation of the last peat field, or equivalent rehabilitation area, closest to the adjacent land where an existing field drain could provide the hydraulic break function. The field's drainage network would be retained keeping the water table to current conditions and providing a water table cut-off in relation to the adjacent land.

In areas zoned as wetland within the rehabilitation plan control of the water levels may be required. Where there is a potential backwater into adjacent lands or where raised water levels could potentially raise water levels on adjacent lands setting a maximum control water level may be required. This control level will allow water to drain freely from the wetland area although water levels may rise higher than the control level during flood conditions.

5.1.3 Maintenance of Discharge Points

Existing silt ponds are located upstream of the bog discharge points. They help regulate the flow and ensure that's suspended solids are settled in the pond, maintaining compliance with the emission limit values regulated

by the EPA. Bord na Móna have legal responsibility to maintain these silt ponds and ensure their proper functioning capacity under the existing IPC Licence (Ref. P0500-01).

If alterations occur where no silt point exists upstream of a discharge point and no subsequent silt pond will be utilised before flow would leave the bog alternative silt control measures may be required. This can include blocking and or diverting the discharge point so that the relevant sub-catchment of the bog drains to a different discharge point with a silt pond. The rehabilitation plan can be adapted where required to allow proposed wetlands to act as a silt control measure.

5.1.4 Monitoring

As mentioned above DMP measures were selected based on level of certainty and on-site observations. The most appropriate measure was selected from a suite of measures representing varying levels of intervention. Monitoring of the measure and adjacent land will be required prior, during and after the rehabilitation measures. A monitoring programme can be implemented to observe the impact from the bog rehabilitation to the adjacent land. Monitoring would be observational where the condition of the asset in question is assessed in relation to present day conditions accounting for seasonal variability. Where negative impacts are observed other measures can be implemented that will establish a hydraulic break or other features with the same functional requirement. Otherwise monitoring should continue until environmental stabilisation.

5.2 Identification of Measures

The following section along with Figure 5.2 and Table 5.1 lists and describes the DMP measures for Blackwater Bog.

DMP 1. The boundary drains identified in Section 5.1 as key drains are proposed to act as hydraulic breaks. The boundary drains' ability to carry out this function is dependant on their condition and being free draining. Section 5.1 indicates how all boundary drains appear to be functioning sufficiently with no known drainage issues identified along the drains or in adjacent lands.

Topographical surveys, LiDAR and anecdotal evidence suggests that the boundary drains identified for retention are functional and can be used as drainage management measures. They would therefore be suitable to act as hydraulic breaks provided they are retained with their current estimated carrying capacity. If issues are identified during walkover surveys, a higher level of intervention, drain upgrade, can be applied in these locations.

DMP 2. Existing silt ponds would be required to be maintained.

DMP 3. Retain drains through the bog to ensure drainage from areas of the bog which are not undergoing restoration.

DMP 4. At DMP 4 existing drains are recommended for retention in order to provide a hydraulic break. It is noted that parts of these drains are outside the Bord na Móna boundary. They do however provide the break between the bog and adjoining land. The land between Blackwater Bog and the drains is a known water sensitive environment. There would be no added value to any stakeholder therefore in creating a new drain along the Blackwater boundary. While Bord na Móna cannot ensure the retention of the existing drain, monitoring with take place and other measures considered if required.

DMP 5. DMP 5 is an area outside the PCAS FY23 extent that is currently not being developed and where the water level is likely to increase due to rehabilitation methods. No development should take place in these locations which would be impacted by a water table at surface level. Otherwise additional measures would be required to protect the development from the raised water table.

DMP 6. DMP measures were identified to control water levels in the wetland areas. By ensuring water levels remain below set levels the risk of water flow across the bog into adjacent areas of the bog which are constraint out and subsequent water table rise would remain low.

A review was carried out to ascertain where water would first spill from any proposed wetland area into adjacent land. The ground level at this location, minus 500mm to allow a freeboard, was used to determine a Water Control Level (WCL) in the wetland areas. Standing water would be allowed to pond up to the WCL before free discharge from the wetland would occur.

The ground level in wetland area DMP 3 does not allow for a 500mm freeboard to the adjacent peatland proposed for renewable development. Generally the area is a depression making it suitable for wetland however, several spill points were identified to the adjacent constraint peatland. At DMP 3 the water level should be controlled to surface level or where ponding already exists aim to keep levels as they are currently.

DMP 5 should be carried out in conjunction with DMP 1, the retention of boundary drains. The WCL is not prescribed as a target water level. It has been derived from the principle that under normal free draining conditions, which will generally align with summertime, the water level of the rewetted bog will not adversely impact adjoining lands. The optimal water depths for rehabilitation and the functioning of the drainage are designed, under normal free draining conditions, so that the WCL's are not exceeded controlling the potential water table level rise in adjacent lands.

It should be noted that during extreme flood conditions, that are beyond Bord na Móna's control, water levels in the wetland areas may rise above the invert of the outfalls as they regulate the discharge. The proposed wetland areas can be adapted to function as silt control measures before the relevant part of the bog discharges to the River Shannon. A review of the internal drains would be required to ensure no drain bypass the wetlands.

The remaining measures are of low intervention consisting of maintaining the existing features or monitoring lands and features

Table 5.1 list the DMP measures identified for Blackwater Bog and where they sit within the suite of possible measures that could be taken.

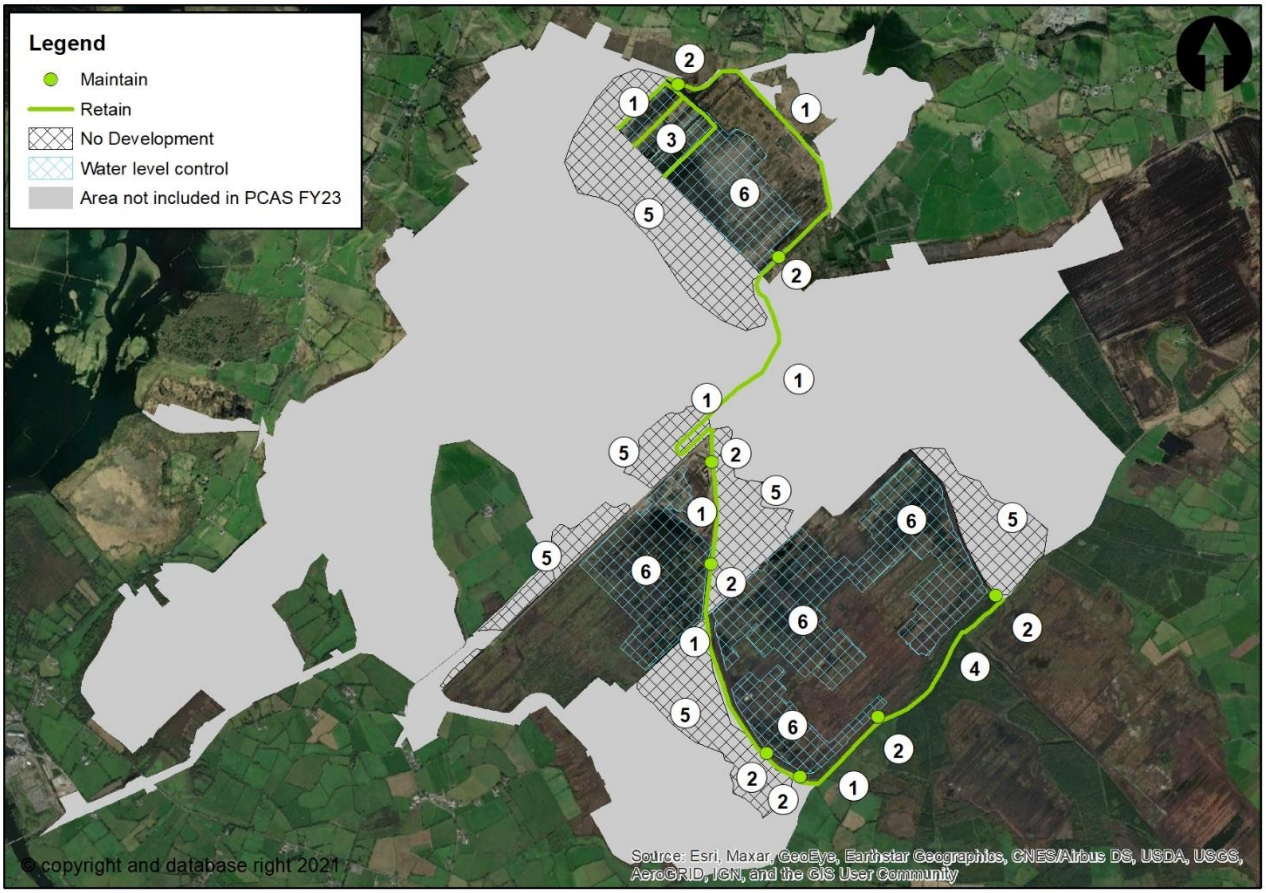

Figure 5-2 DMP measures for Blackwater Bog

Table 5-1 Selection of DMP Measures

Measures Item	Feature	Function required	Suite of measures Level of intervention			
			Low			High
1	Boundary drain	Hydraulic break	**Retain drain**	Upgrade drain	Maintain outside bog field	Create new drain
2	Silt ponds	Silt and flow control	**Maintain pond**	Upgrade pond	-	-
3	Internal drain	Retain flow	**Retain drain**	Upgrade drain	Maintain outside bog field	Create new drain
4	Boundary drain	Hydraulic break	**Retain drain**	Upgrade drain	Maintain outside bog field	Create new drain
5	Constraint land	No development		**No development**	Create measures	
6	Wetland	Water level control	-	Upgrade pond	**Update rehabilitation plan**	-

5.3 Interaction with Monitoring Plan

As part of the bog rehabilitation plan groundwater level monitors have been installed at Blackwater Bog. These monitors will record water table and groundwater levels over the coming months. It will therefore be possible to ascertain if the water table is rising within the bog following the implementation of the rehabilitation plan.

This data should be considered during the monitoring measures of adjacent land. When water table levels are known to be rising within the bog, monitoring of the adjacent land (as described in Section 5.1.4) should take place on a more regular basis to ascertain if impacts to lands outside the bog are observed.

5.4 Residual Risk & Limitations

The level of flood risk to the bog and the surrounding lands has been shown to be low (Section 2.6) generally but with small areas of the bog susceptible to poor drainage and flooding. The impact of the proposed rehabilitation measures will generally be to reduce runoff from the bog but this will lead to increased water table levels and surface water flooding in the bog itself. During flood events no increase in flood risk is envisaged as a result of the rehabilitation measures. During normal low flow regime the Drainage Management Plan seeks to identify the measures that should provide a hydrological cut off between the bog and the surrounding lands.

As indicated in previous sections there are limitations to the assessments associated with the drainage network both within the bog and outside. Factors such as flow estimations of small catchments, lack of survey data limiting drain capacity estimations and high level definition of soil porosity all contribute to these limitations. Nevertheless the measures recommended represent a pre-cautionary approach based on conservative assumptions.

The DMP measures proposed set a baseline approach and a suite of measures in any given location has been provided. This will facilitate a reactive approach to be taken if required. In the event that a measure not be operating efficiently a higher intervention measure can and will be implemented. This will allow Bord na Móna to identify the most appropriate measure while proceeding with drainage function uncertainties.

5.5 Climate Change Adaptability

There is high uncertainty in relation to the effects of climate change, particularly in how it may manifest in terms of small catchment runoff. Ireland is predicted to have drier summers and wetter winters. The most appropriate guidance in an Irish context can be found in the OPW's Flood Risk Management Climate Change Sectoral Adaptation Plan[3]. For the Mid-Range Future Scenario, representing a central emissions estimate on a 100 year time horizon, it is recommended that allowances for peak flow and rainfall are increased by 20%. If such increases in runoff are realised over the timeframe of establishment of rehabilitation measures this could lead to a perception that bog rehabilitation measures at Blackwater are the cause of increased flood risk.

[3] Accessed on 10/12/2020 at https://www.gov.ie/pdf/?file=https://assets.gov.ie/46534/3575554721374f7ab6840ee11b8b066a.pdf#page=1

It is anticipated however that the rehabilitation measures will lead to reduced peak runoff as the water storage function of the bog is increased. This will serve to regulate peak runoff in winter and potentially smooth out the flows in drier periods, essentially acting against the anticipated effects of climate change.

It is therefore anticipated that the bog rehabilitation measures themselves will provide the mitigation of the effects of climate change on runoff and no additional measures will be needed. There are unknowns however in the effectiveness of the rehabilitation measures in this regard and also the severity of climate change impacts. Continued monitoring of the adjacent lands is therefore also crucial to gauge the effectiveness of the bog rehabilitation measures in mitigating these climate change impacts.

6 SUMMARY OF DRAINAGE MANAGEMENT PLAN

The Drainage Management Plan for Blackwater consists of a series of measures to be implemented at different stages of the rehabilitation process. Drains along the boundary were identified as hydraulic breaks in order to mitigate against any potential impacts from the bog rehabilitation measures. The effectiveness of all drains acting as hydraulic breaks is dependent on their ability to convey flow which have been outlined in Section 5.1 and deemed suitable subject to the measures recommended. Factors such as channel size and slope will determine this along with any downstream feature which may control water levels. The external drains which these boundary drains discharge into are also key drainage features that will affect the operation of the drainage network.

Measures will range from low intervention to high and consist of monitoring, retention of existing features, upgrading features. Maintenance of measures are proposed to the silt ponds within the bog to ensure that discharge from the bog and sediment is controlled. This is a legal obligation for Bord na Mona and will continue at all existing silt ponds.

Monitoring of adjacent land is included in the plan. The monitoring will observe agricultural land, adjacent bog, and woodland for adverse impacts from the bog rehabilitation. In the event that adverse impacts are confirmed, higher intervention measures can and will be implemented to mitigate the impacts.

Monitoring measures will therefore be ongoing during and after the bog rehabilitation measures. Continued retention and maintenance of the key drains and silt ponds will also be required after the bog rehabilitation measures. Throughout the process landowner engagement is recommended to ensure both the rehabilitation plan and Drainage Management Plan are understood and to promote collaborative working to manage impacts as they arise.

Table 6-1 Drainage Management Plan

Measures required PRE bog rehabilitation measures	Measures required DURING bog rehabilitation measures	Measures required POST bog rehabilitation measures
Landowner engagement if required via community liaison	Landowner engagement if required via community liaison	Landowner engagement if required via community liaison
Retention of boundary drains (see section 5.1.1)	-	-
	No development areas in constraint land	No development areas in constraint land
-	Wetland water level control (see section 5.1.2)	Wetland water level control (see section 5.1.2)
Monitoring boundary drains (section 5.1.4)	IF REQUIRED – Consideration of need for higher intervention measures	-
Maintenance of discharge points (see section 5.1.3)	Maintenance of silt ponds (see section 5.1.3)	Maintenance of silt ponds (see section 5.1.3)
Monitoring of adjacent land (see section 5.1.4)	Monitoring of adjacent land (see section 5.1.4)	Monitoring of adjacent land (see section 5.1.4)

-	-	IF REQUIRED – boundary drain upgrades (see section 5.1.1)
-	-	Retention of key drains and pipes

Appendix H Blackwater Bog GIS Map Book

Bord na Móna

Blackwater Bog
GIS Map Book
2022

MAKING COMPLEX EASY

Document Control Sheet	
Document Name:	Blackwater Bog GIS Map Book 2022
Document File Path:	
Document Status:	**Final v1.0**

This document comprises:	DCS	TOC	Text (Body)	References	Maps	No. of Appendices
	1	1	0	0	32	0

Rev. 0.1	Author(s):	Checked By:	Approved By:
Name(s):	BG	ML	MMcC
Date:	25/05/2022	25/05/2022	25/05/2022

Rev. 1.0	Author(s):	Checked By:	Approved By:
Name(s):	BG	ML	MMcC
Date:	02/06/2022	02/06/2022	02/06/2022
Rev. 1.1	**Author(s):**	**Checked By:**	**Approved By:**
Name(s):			
Date:			

Bord na Móna would like to thank and acknowledge RPS Consultants for their input into this document and the provision of data for inclusion in these maps.

Note: This Document is confidential and commercially sensitive – not for release under FOI or AIE

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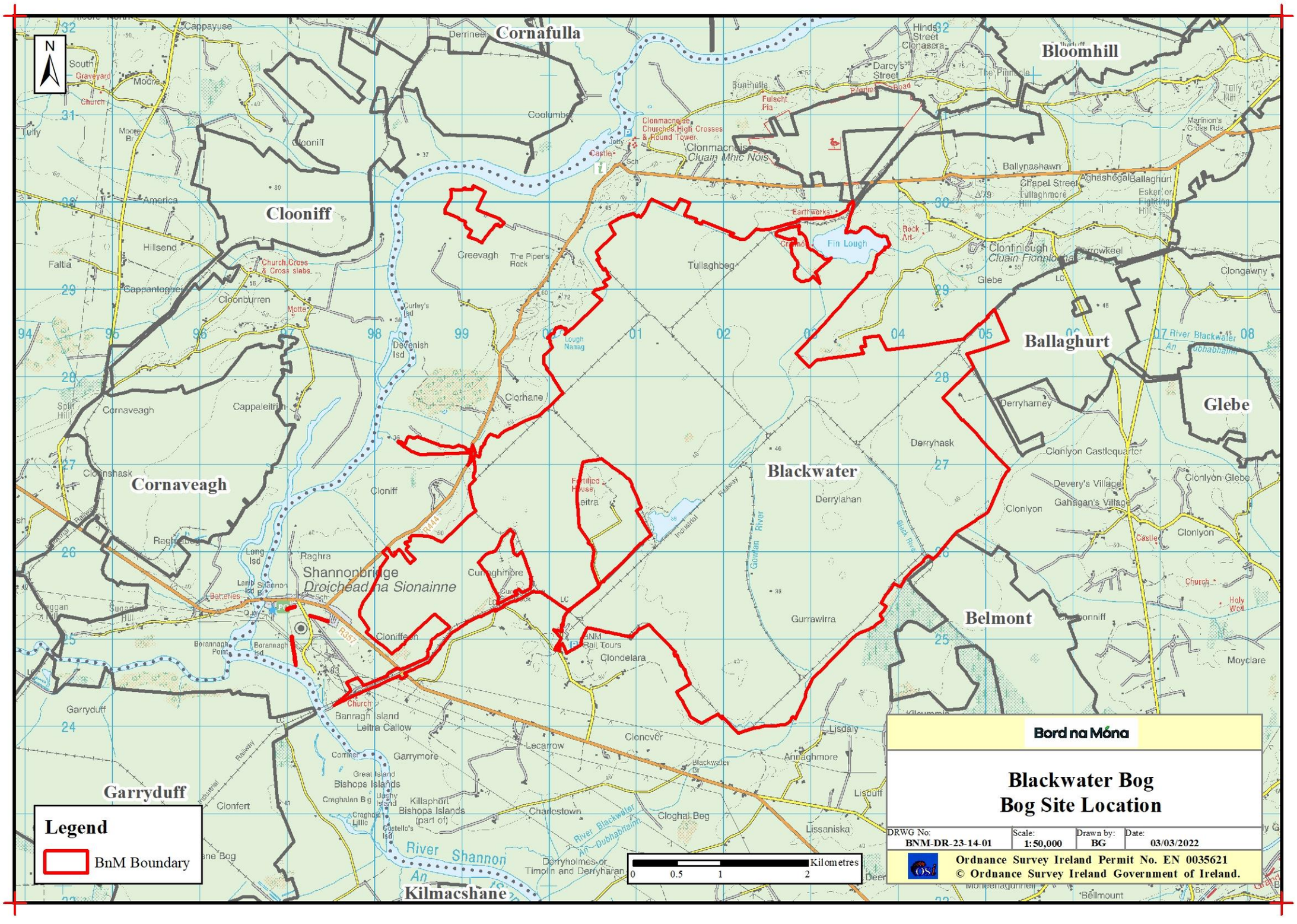

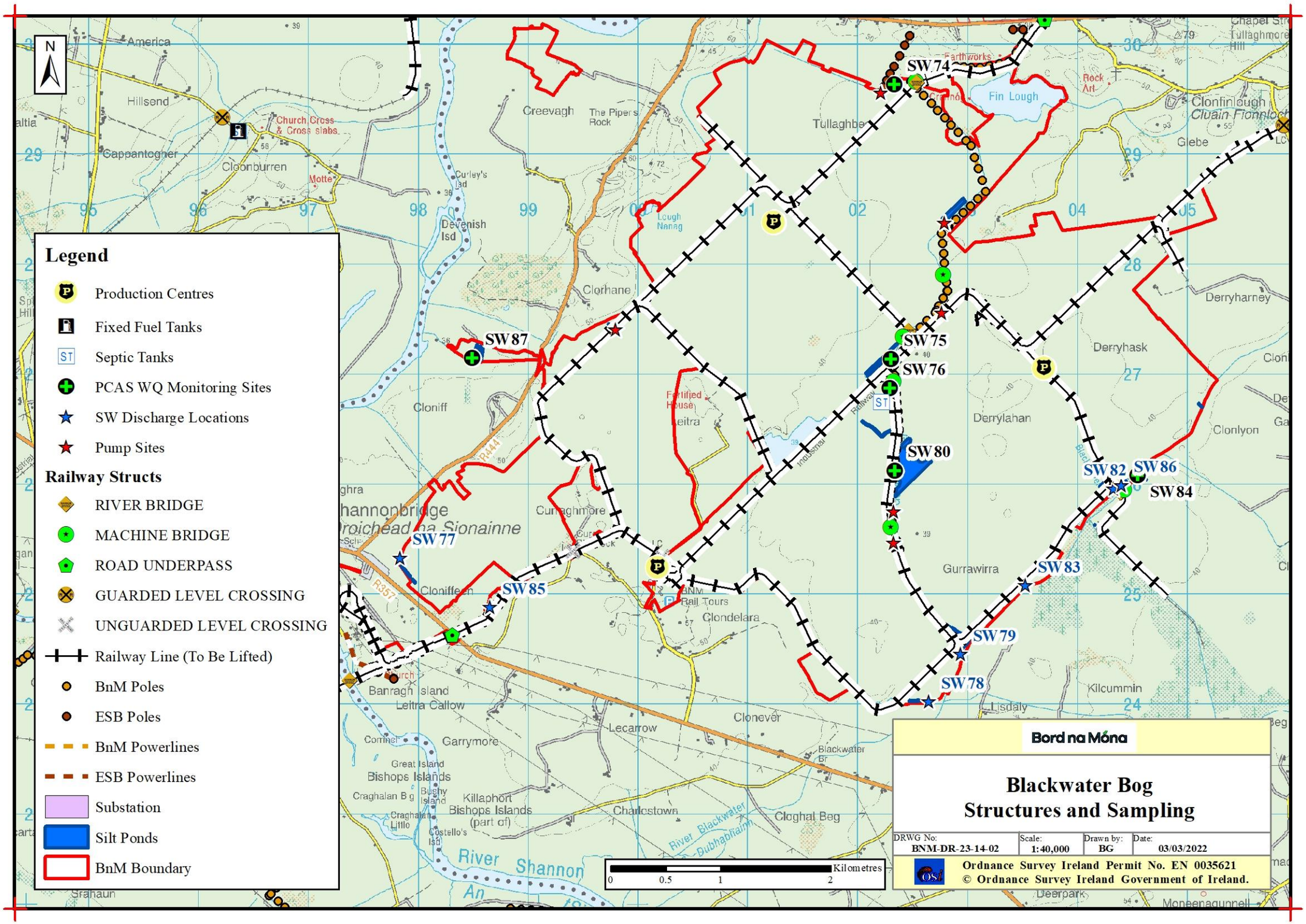
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ESB Poles
BnM Powerlines
ESB Powerlines
Substation
Silt Ponds
BnM Boundary
SW74
SW75
SW76
SW77
SW78
SW79
SW80
SW82
SW83
SW84
SW85
SW86
SW87
Kilometres
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0.5
1
2
Bord na Móna
Blackwater Bog
Structures and Sampling
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Scale: 1:40,000
Drawn by: BG
Date: 03/03/2022
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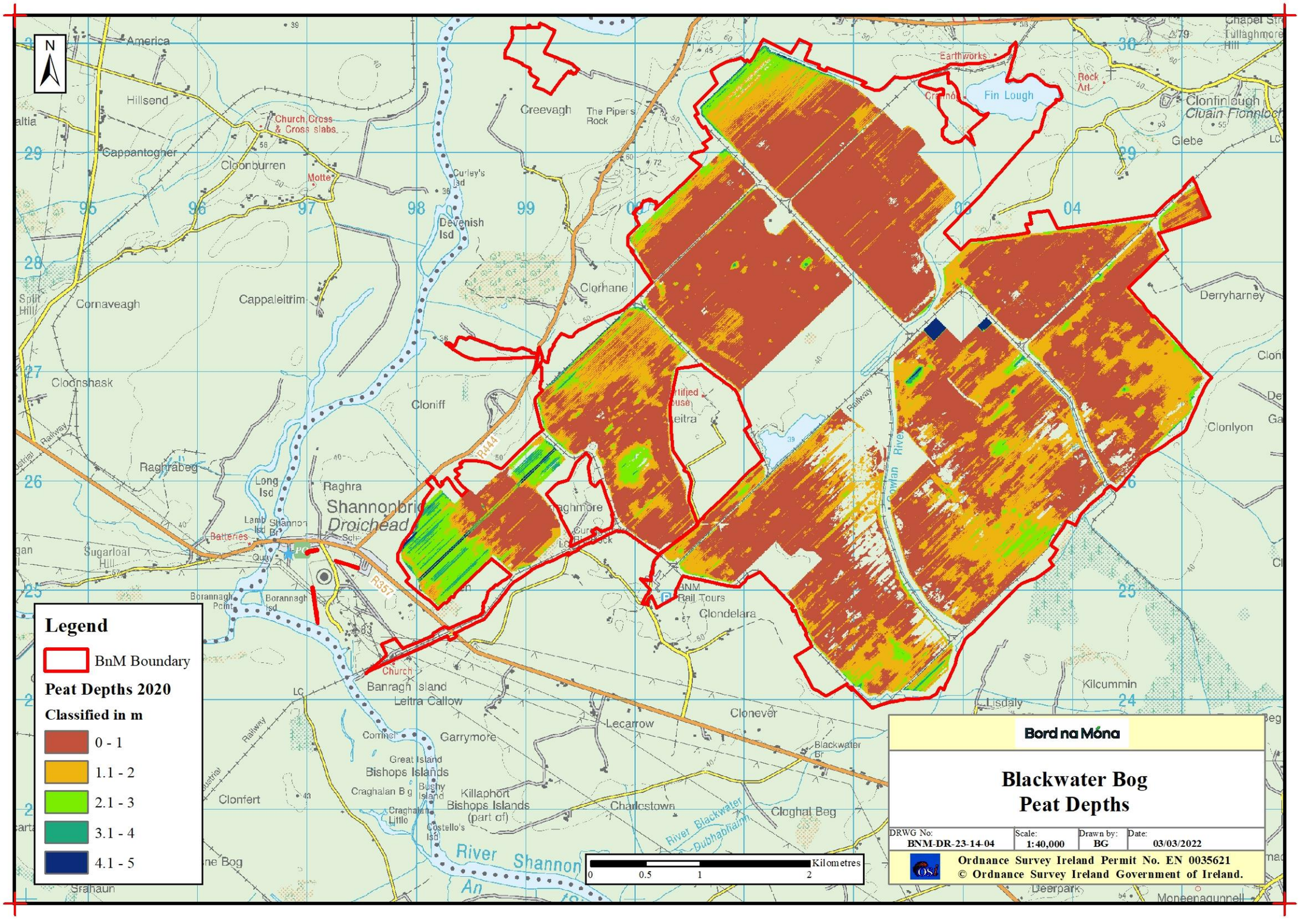

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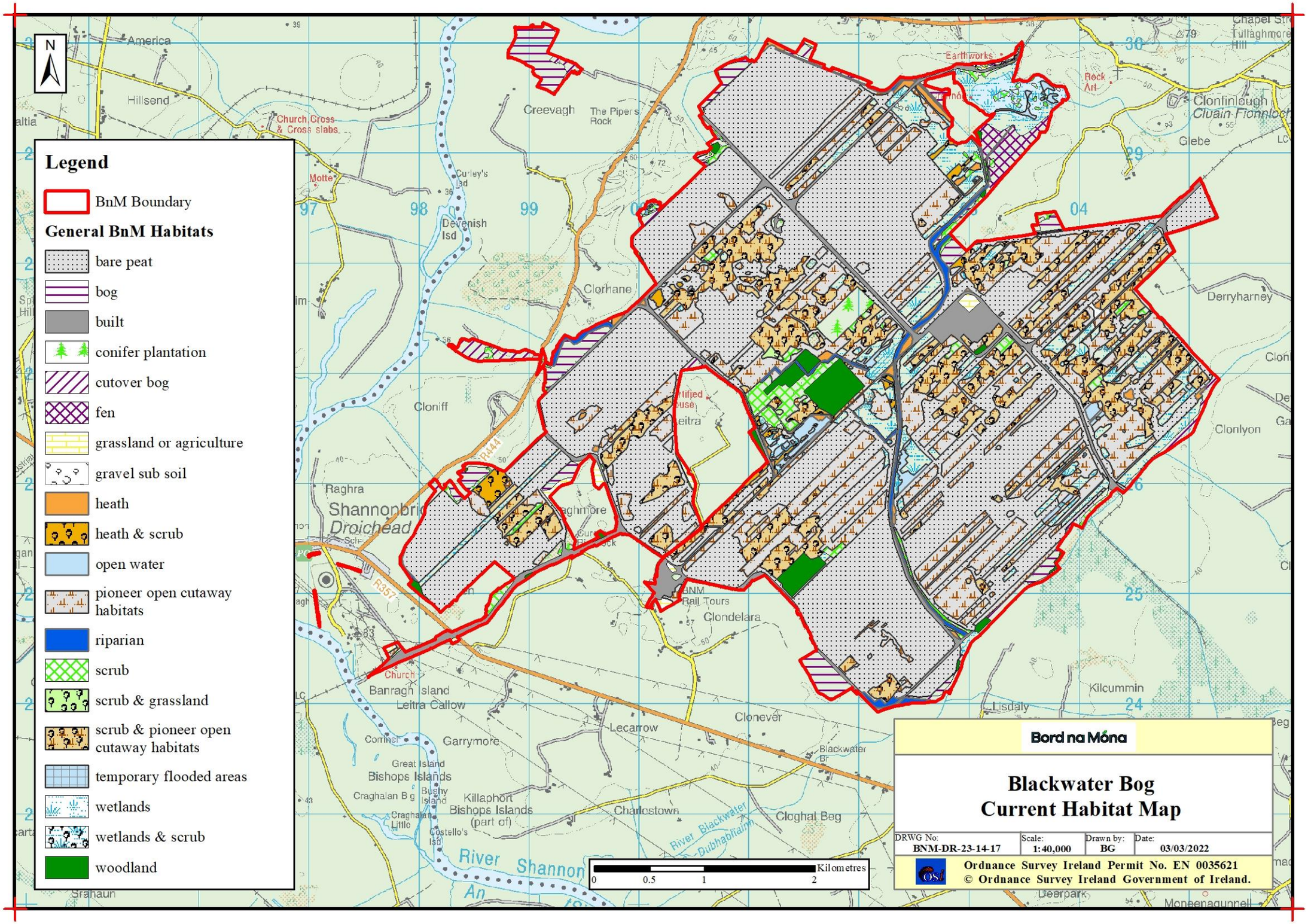

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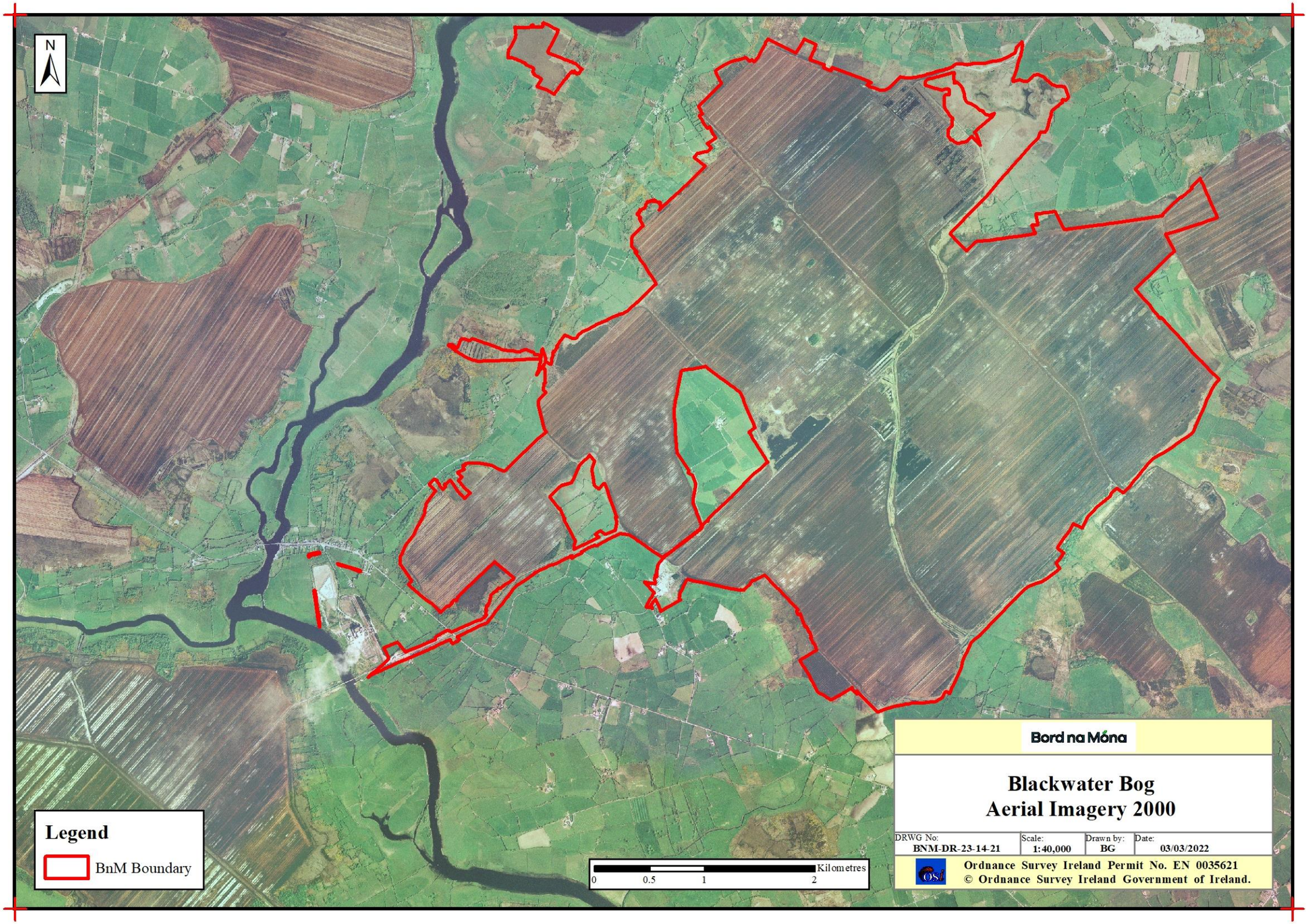

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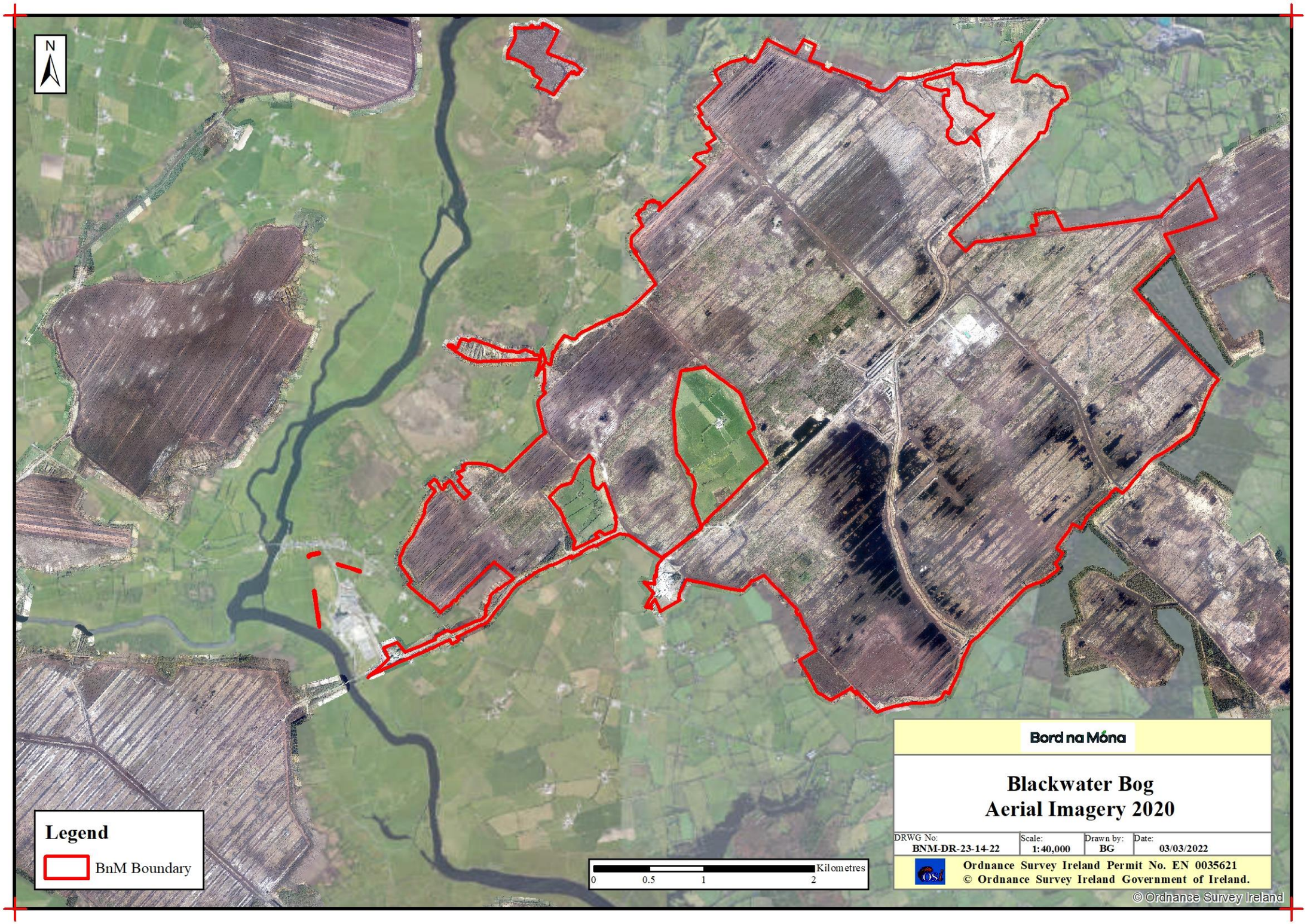

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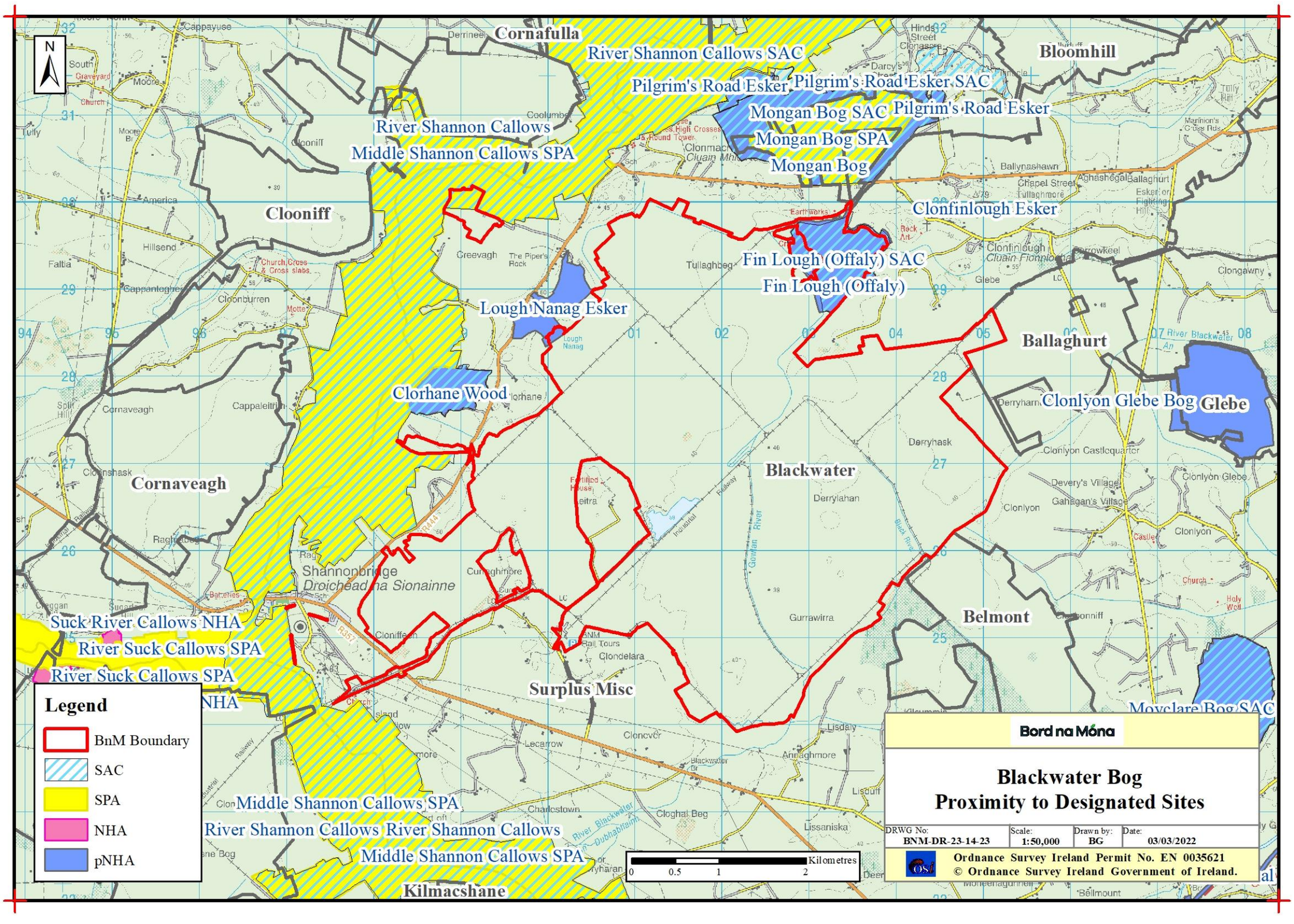

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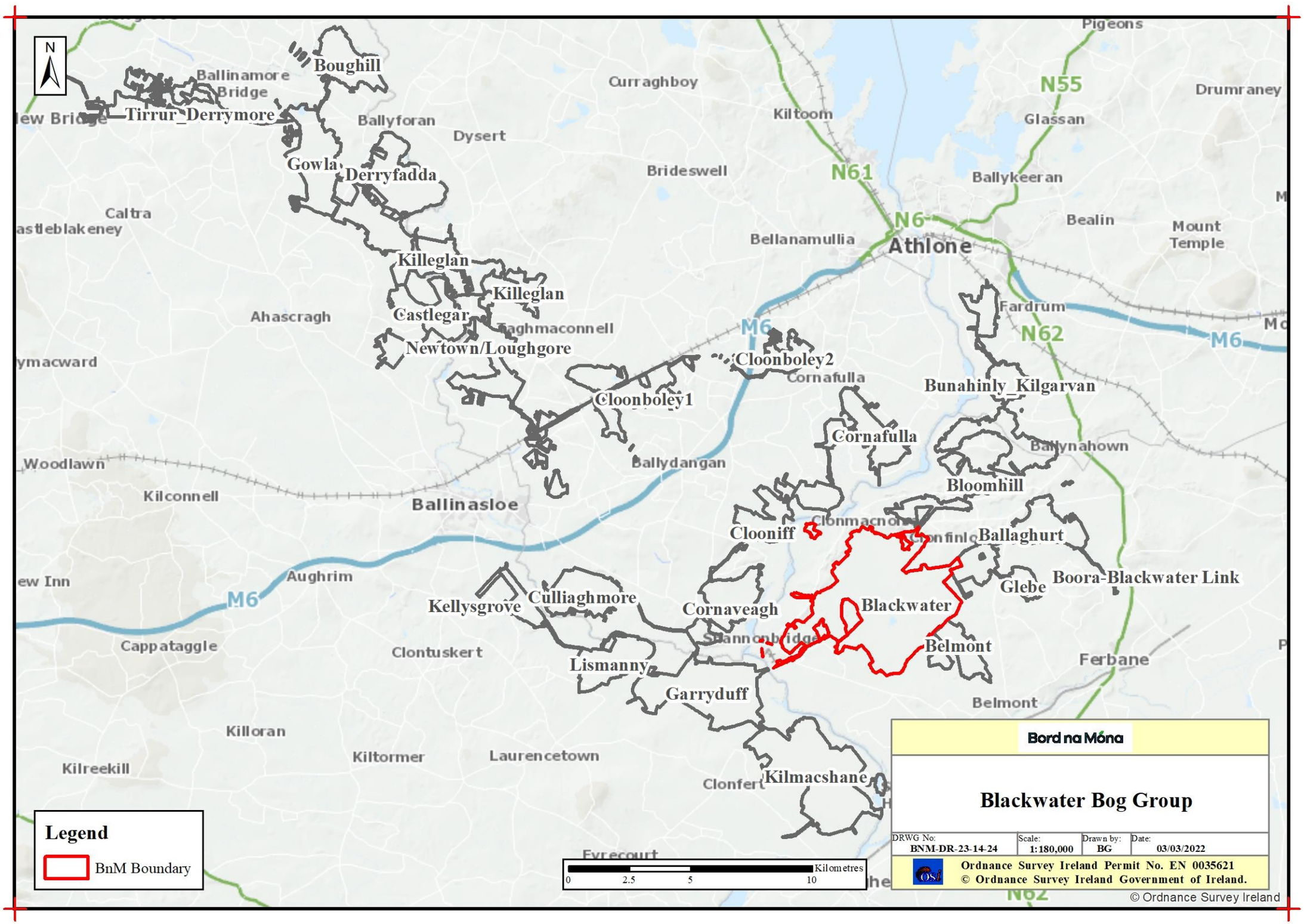

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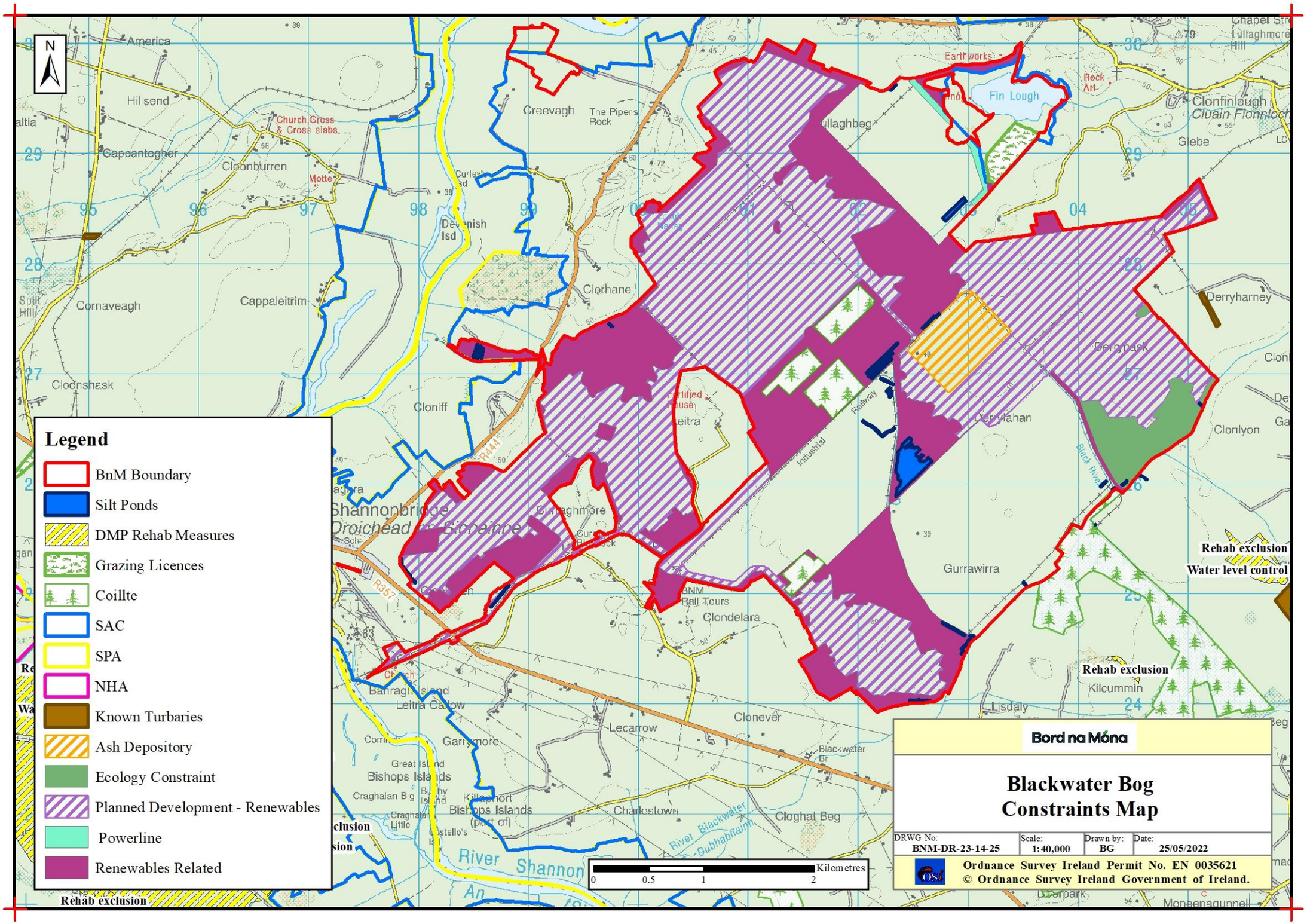

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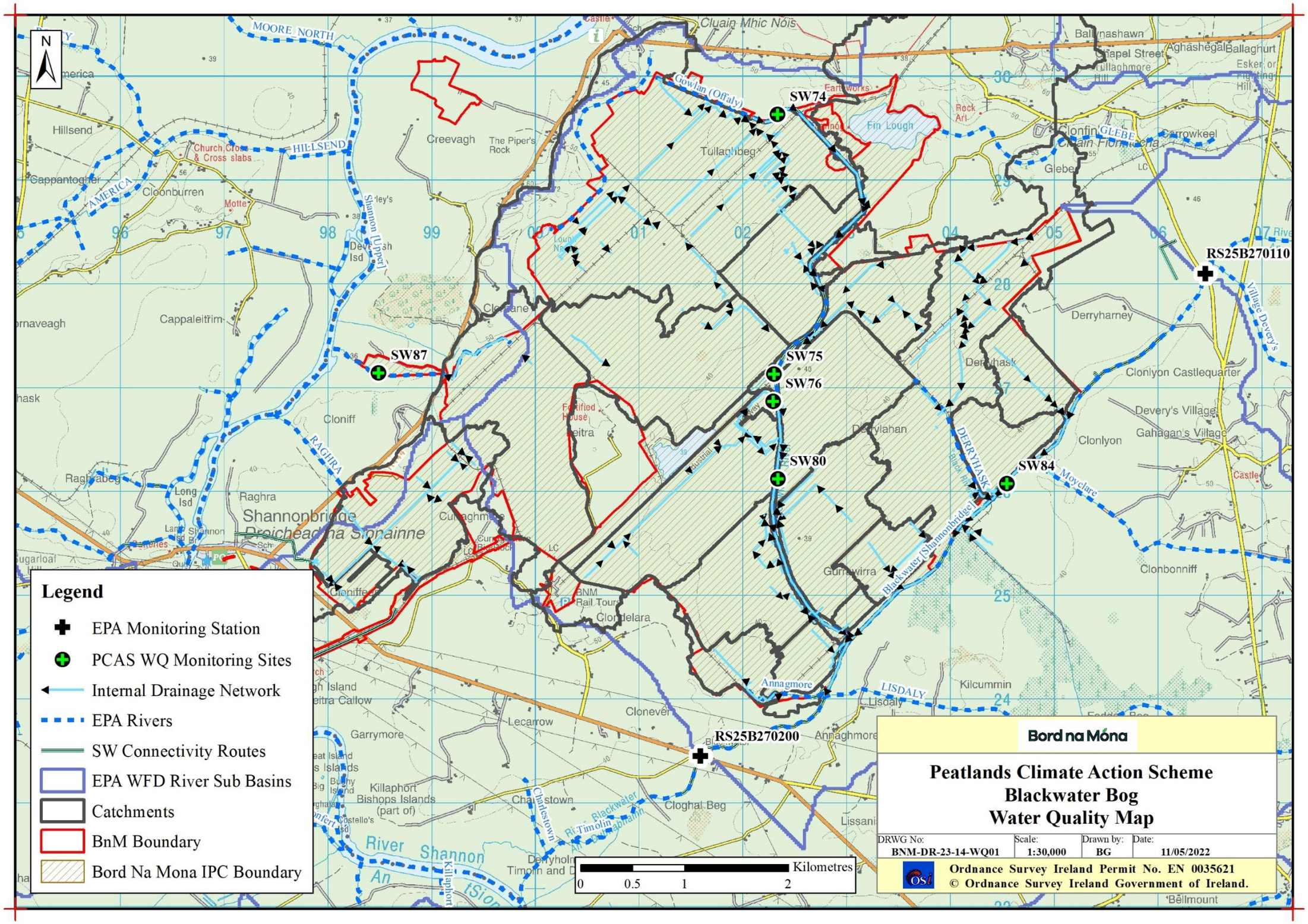

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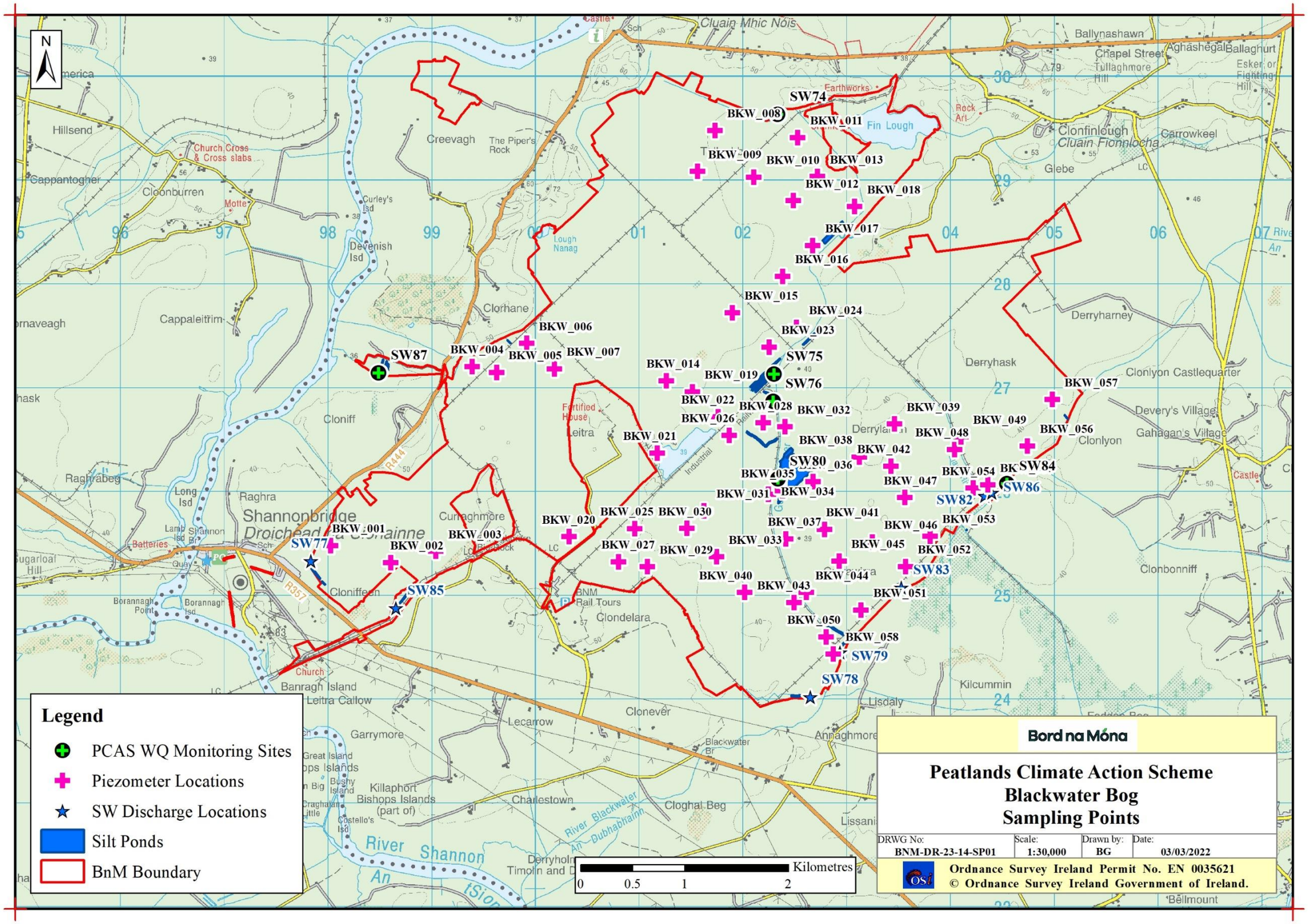

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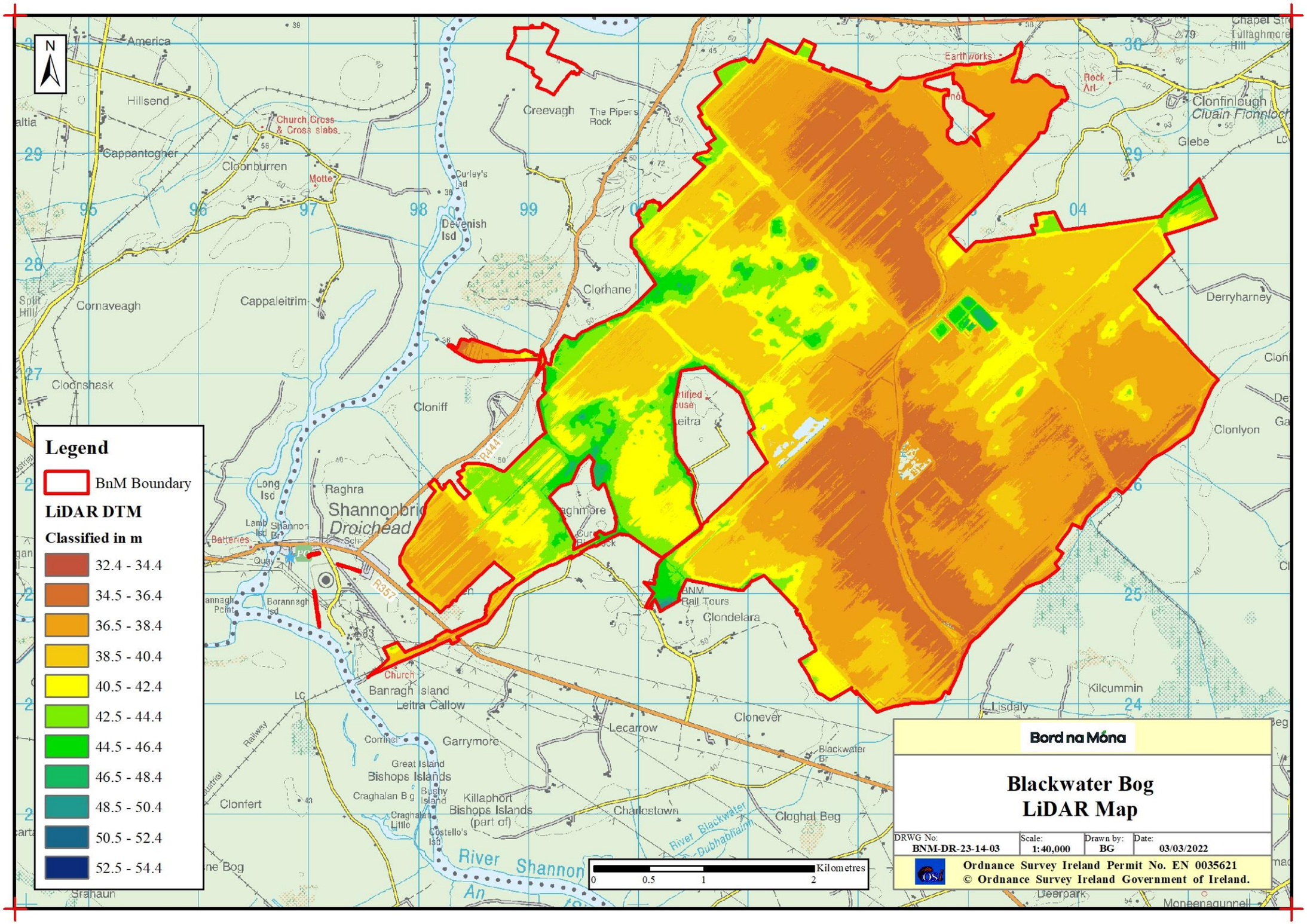

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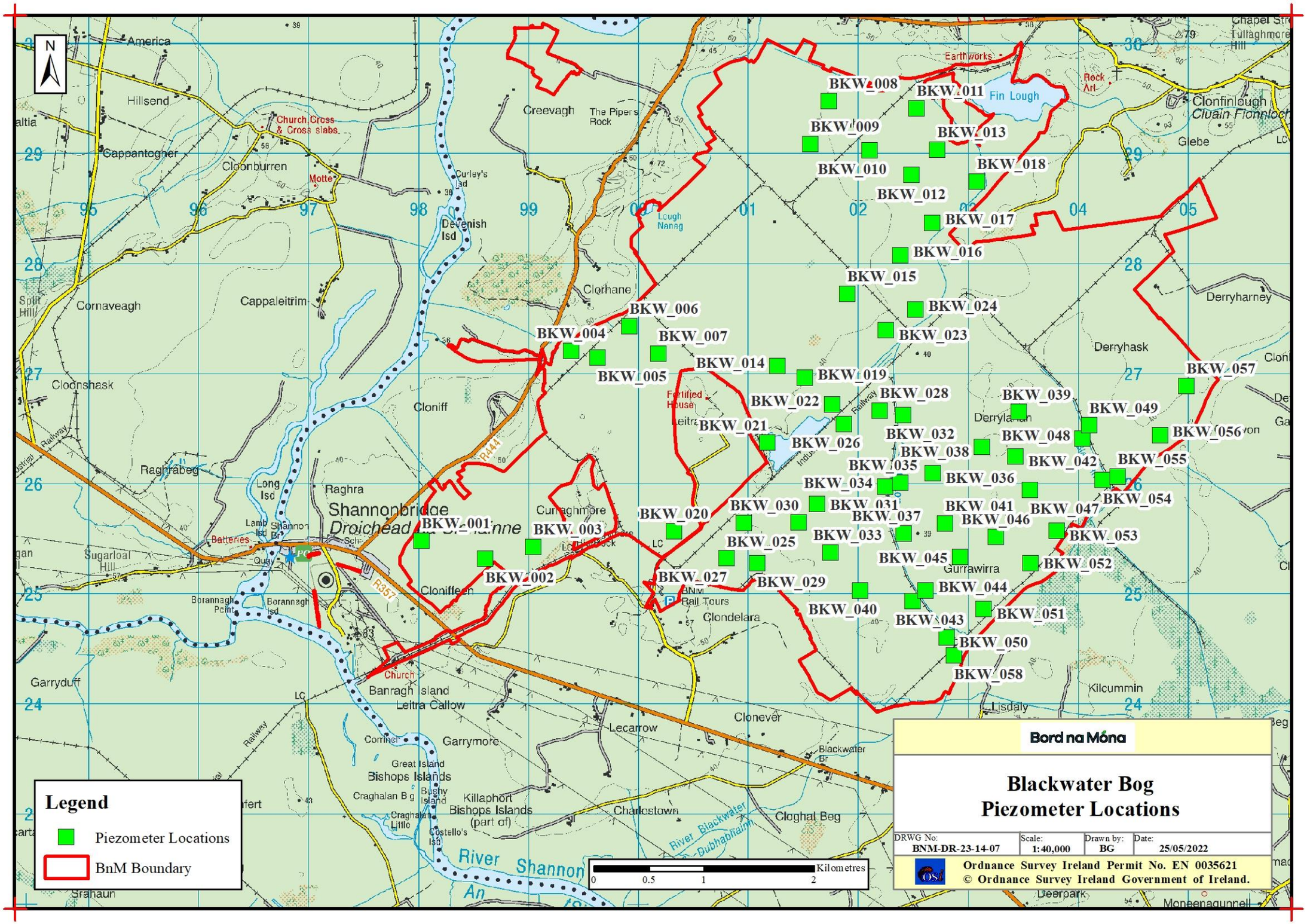

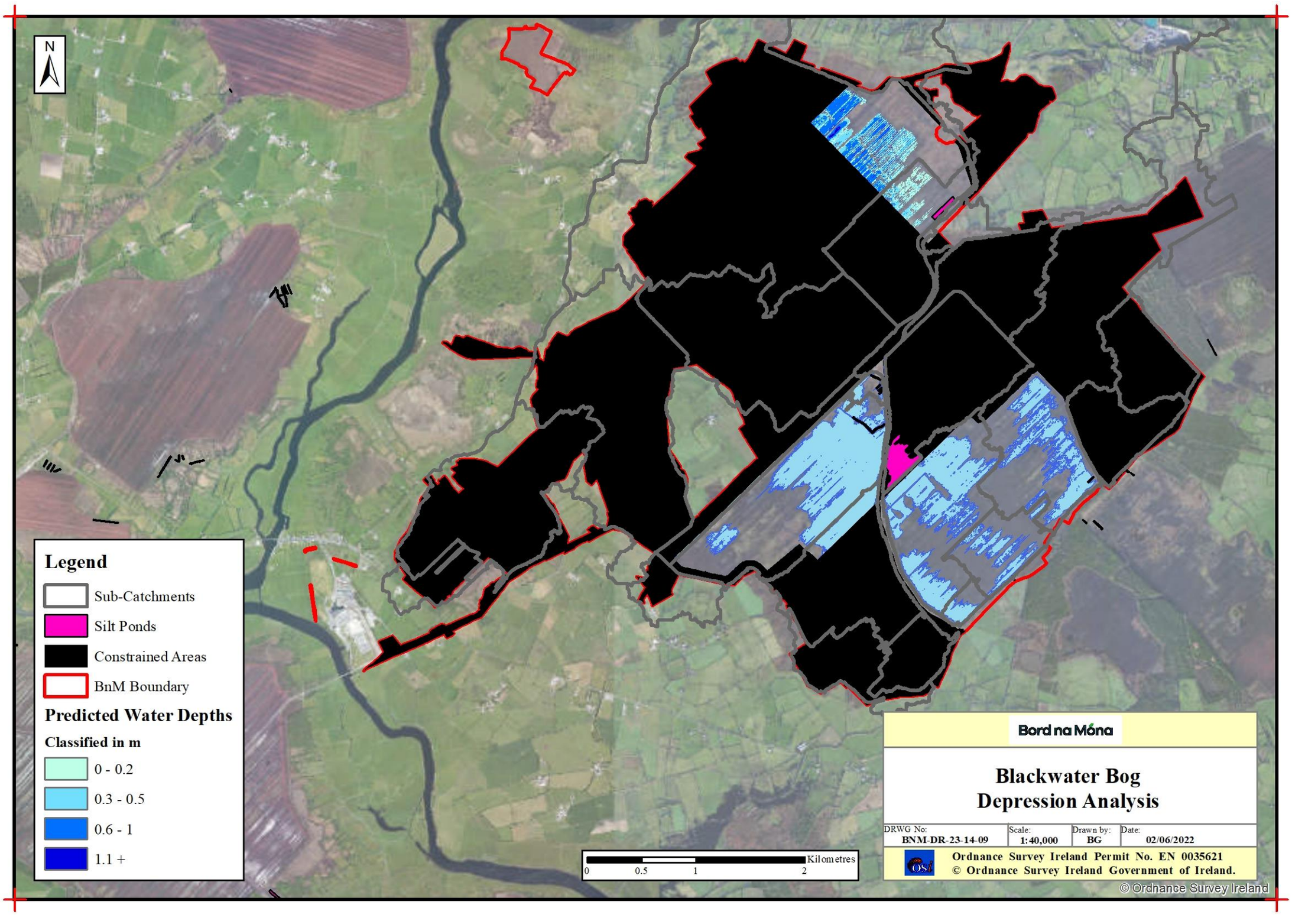
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Sub-Catchments
Silt Ponds
Constrained Areas
BnM Boundary
Predicted Water Depths
Classified in m
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0.3 - 0.5
0.6 - 1
1.1 +
Kilometres
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0.5
1
2
Bord na Móna
Blackwater Bog
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Drawn by: BG
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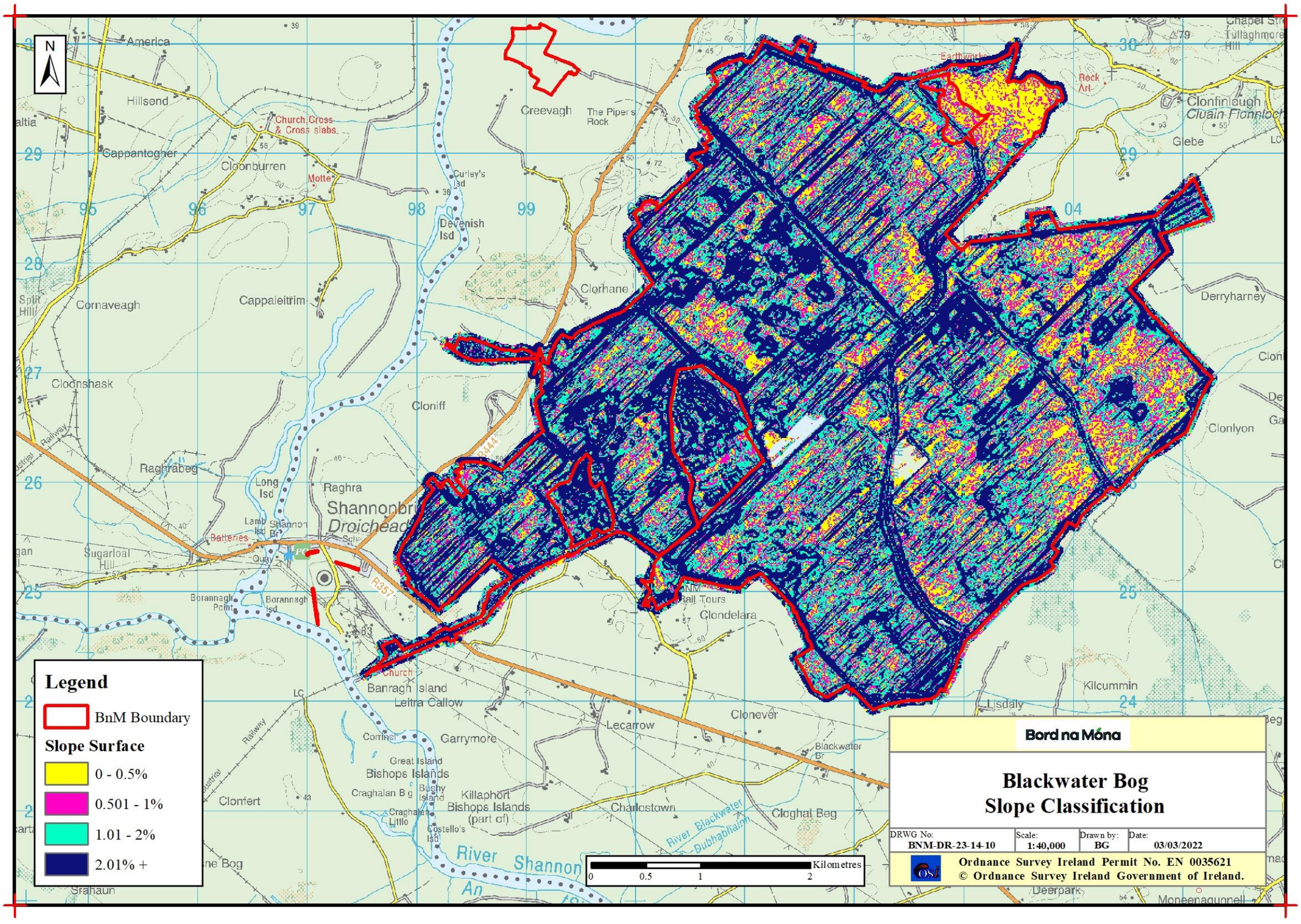

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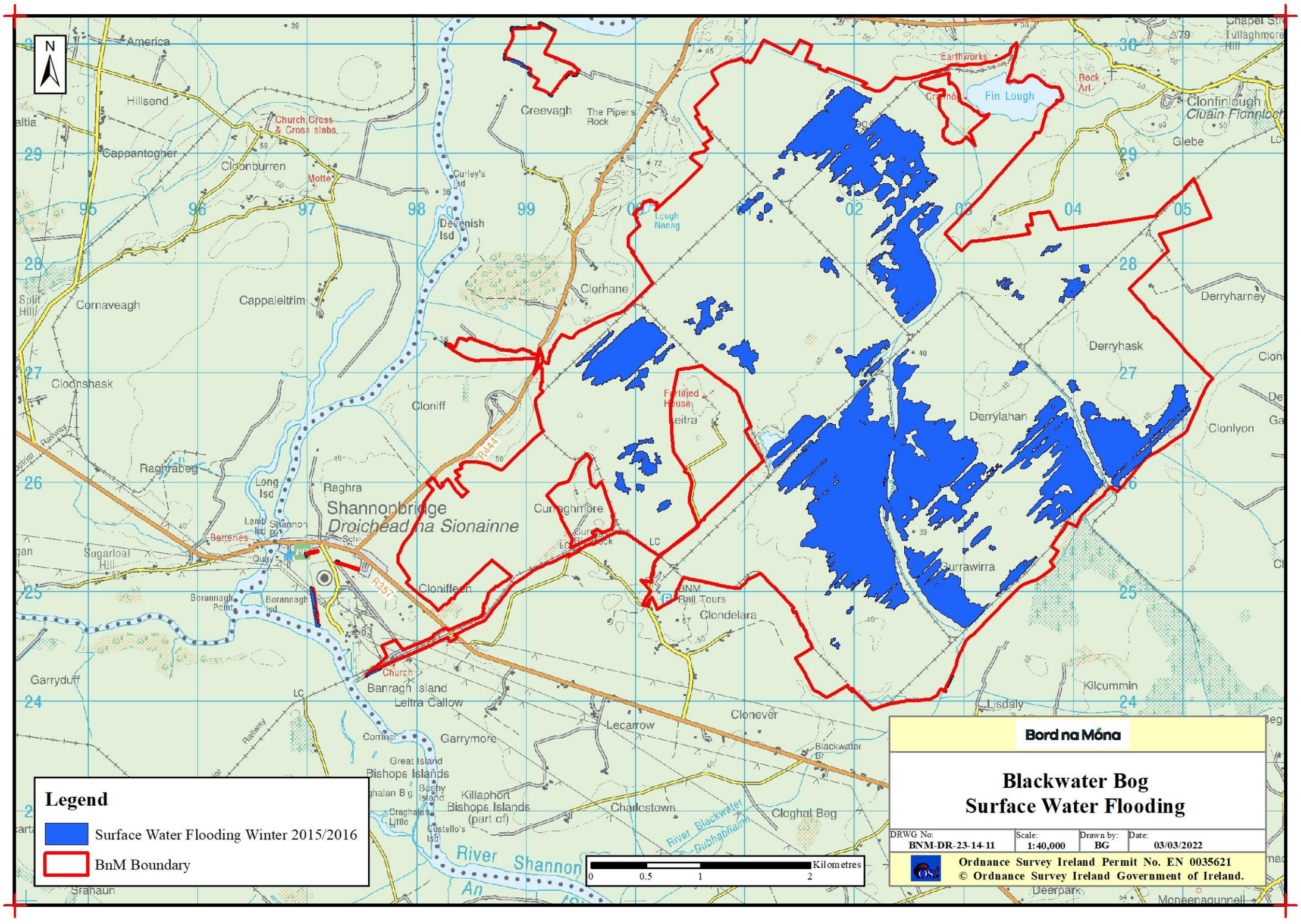

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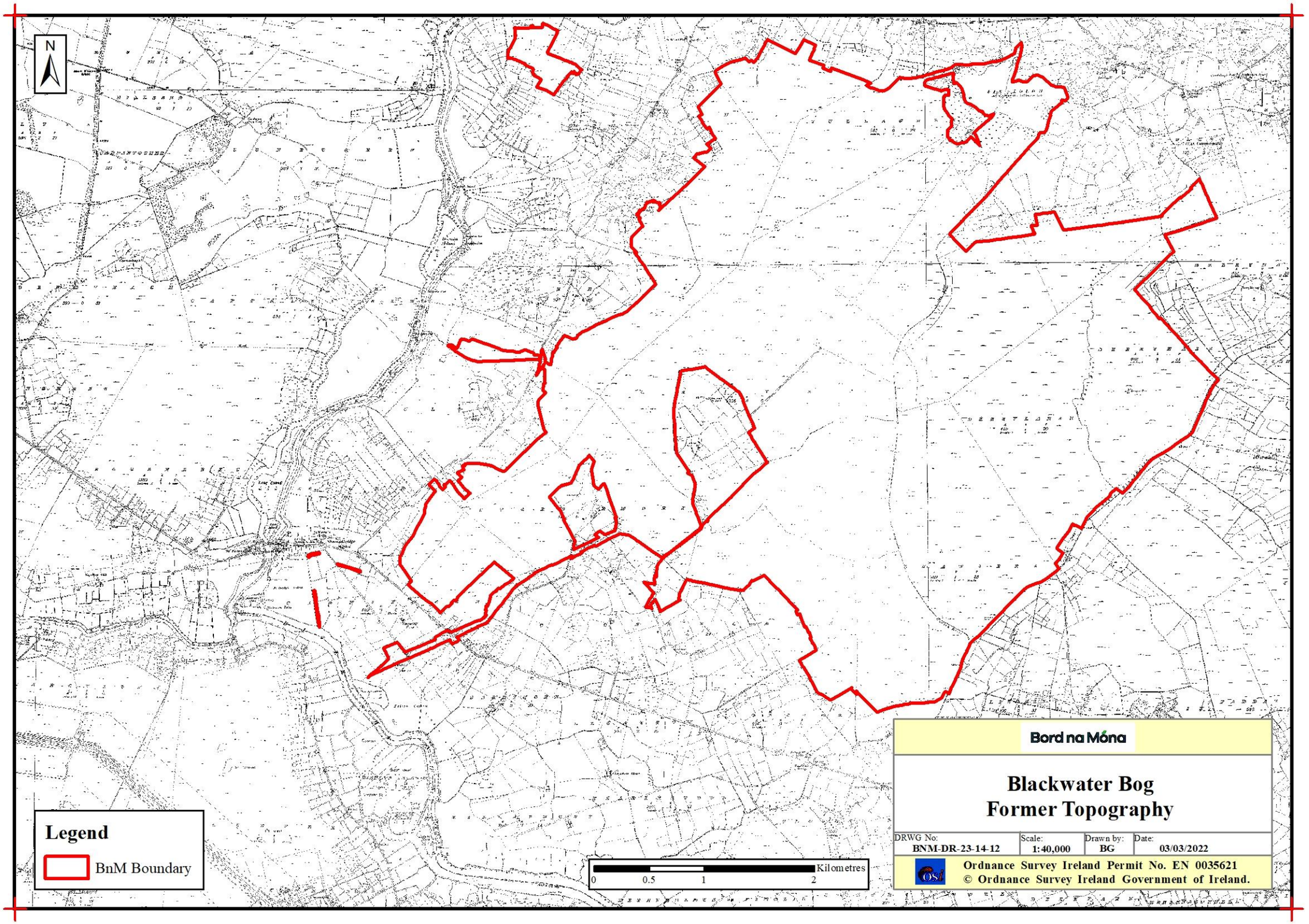

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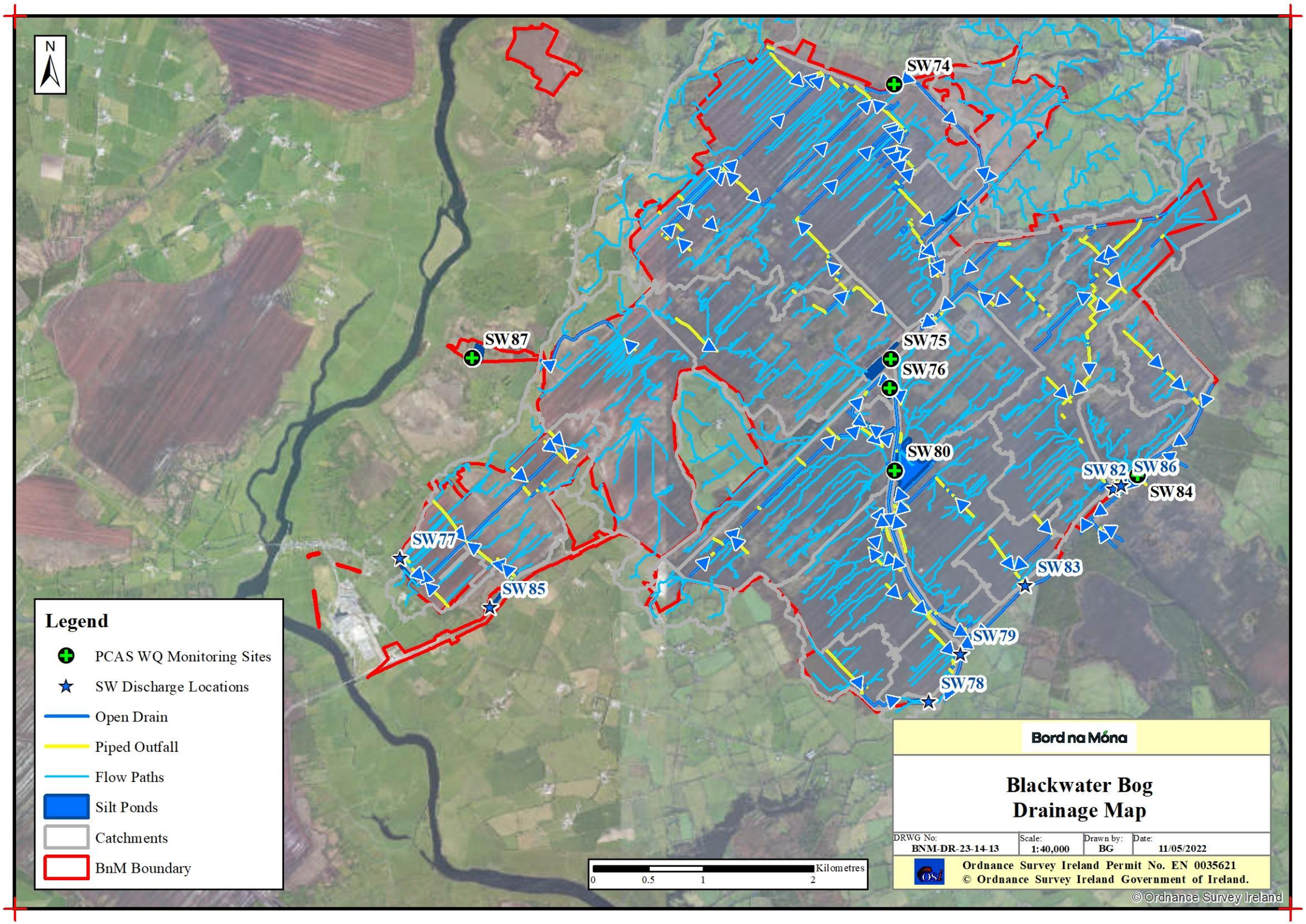

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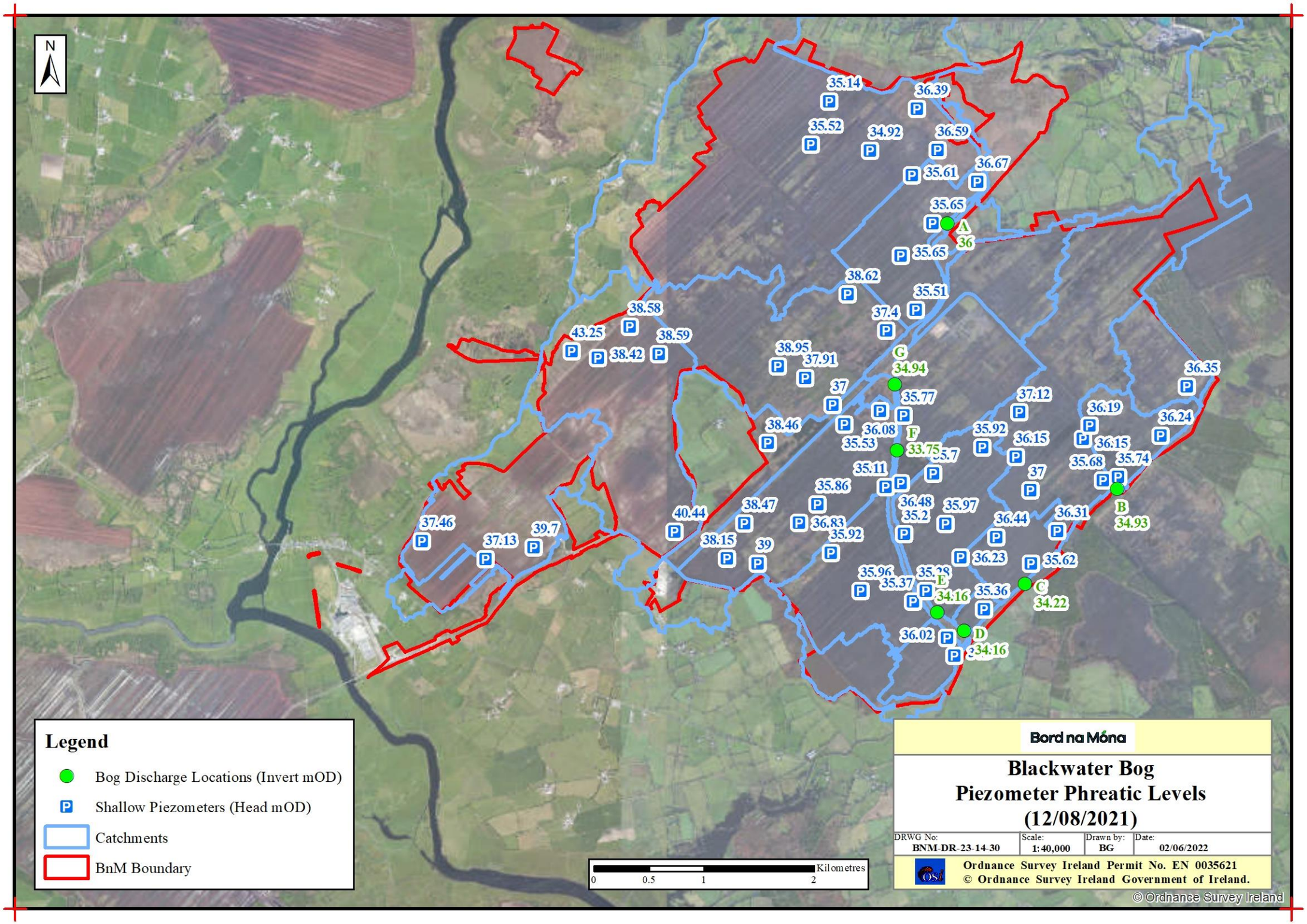

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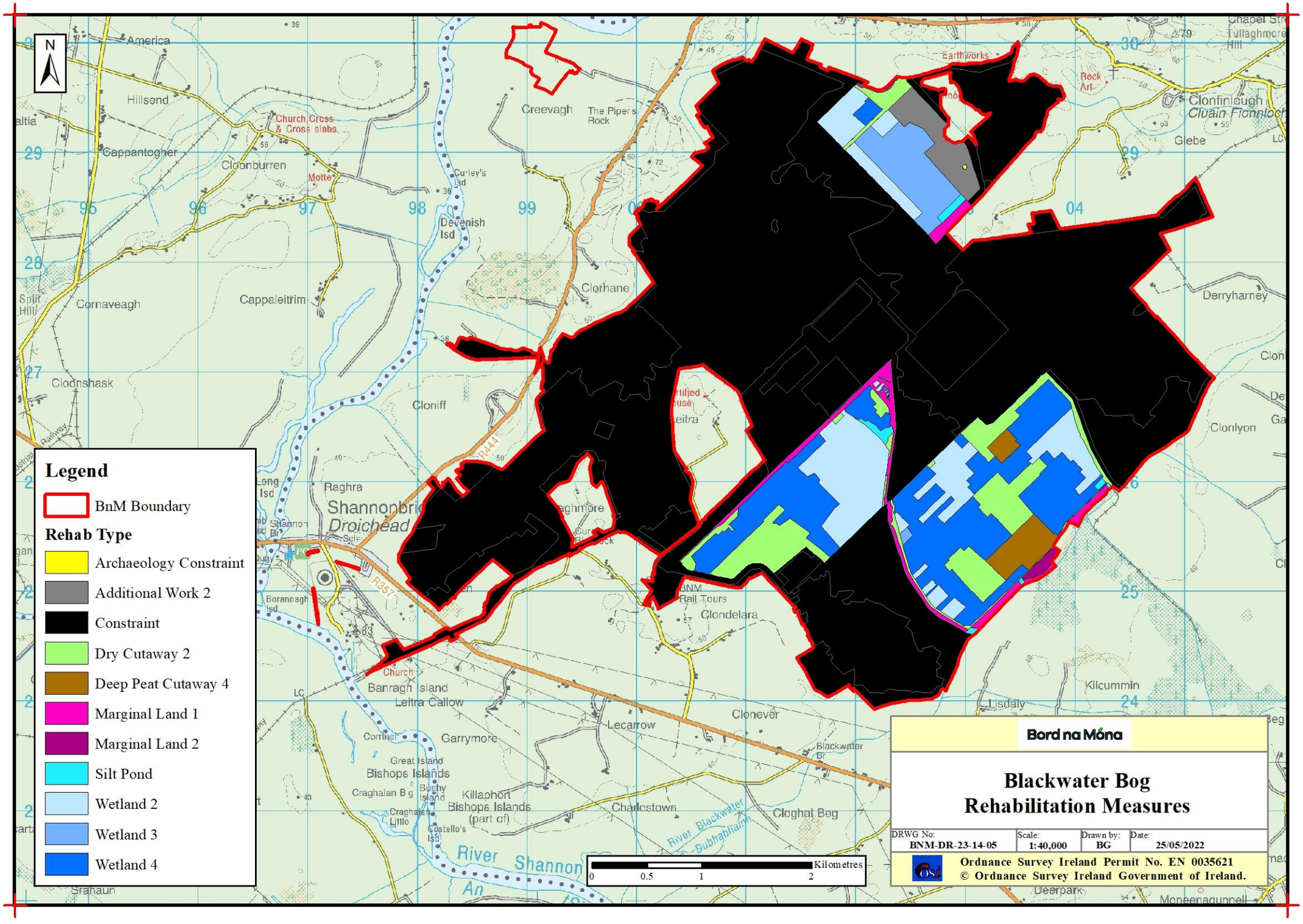

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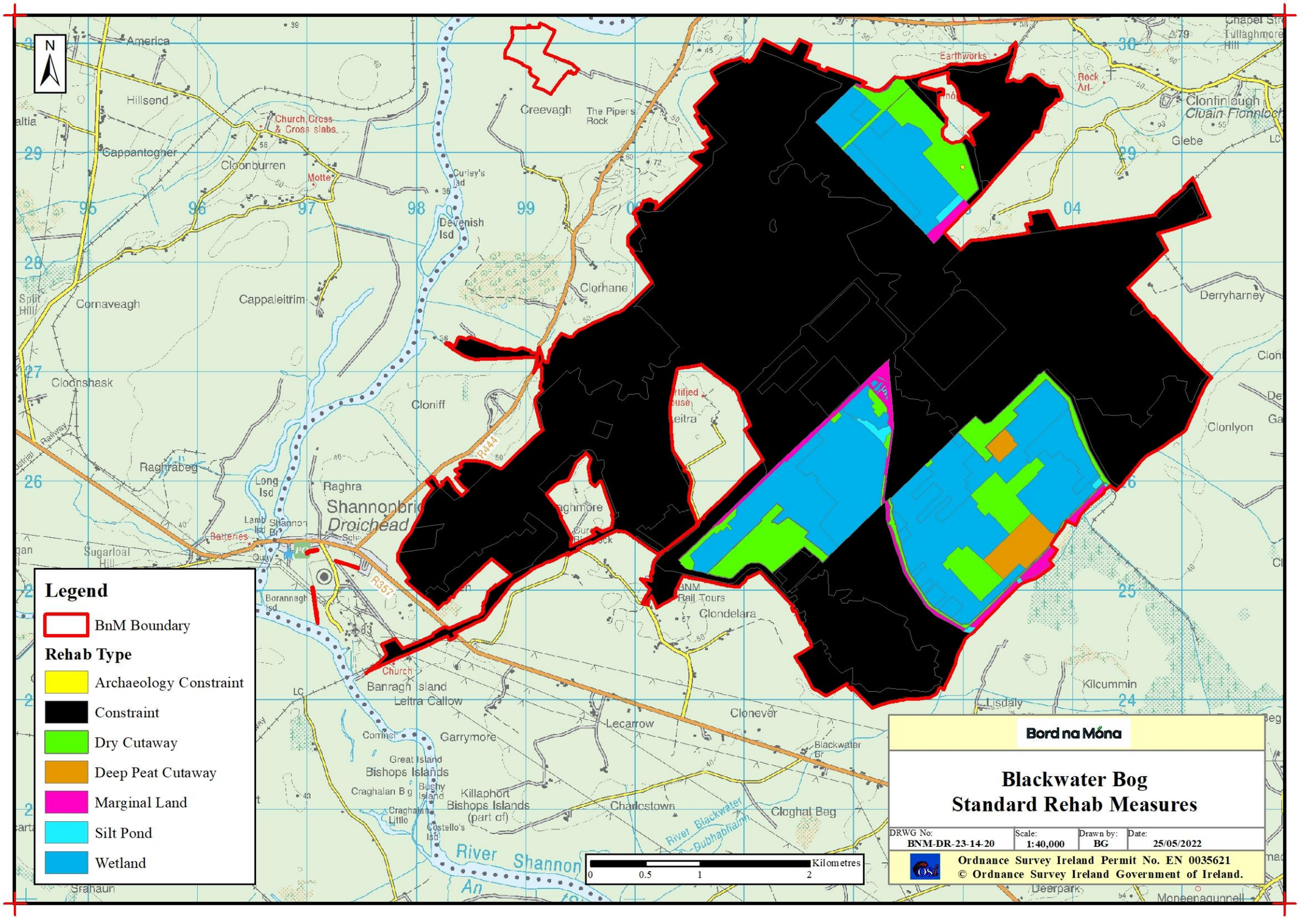

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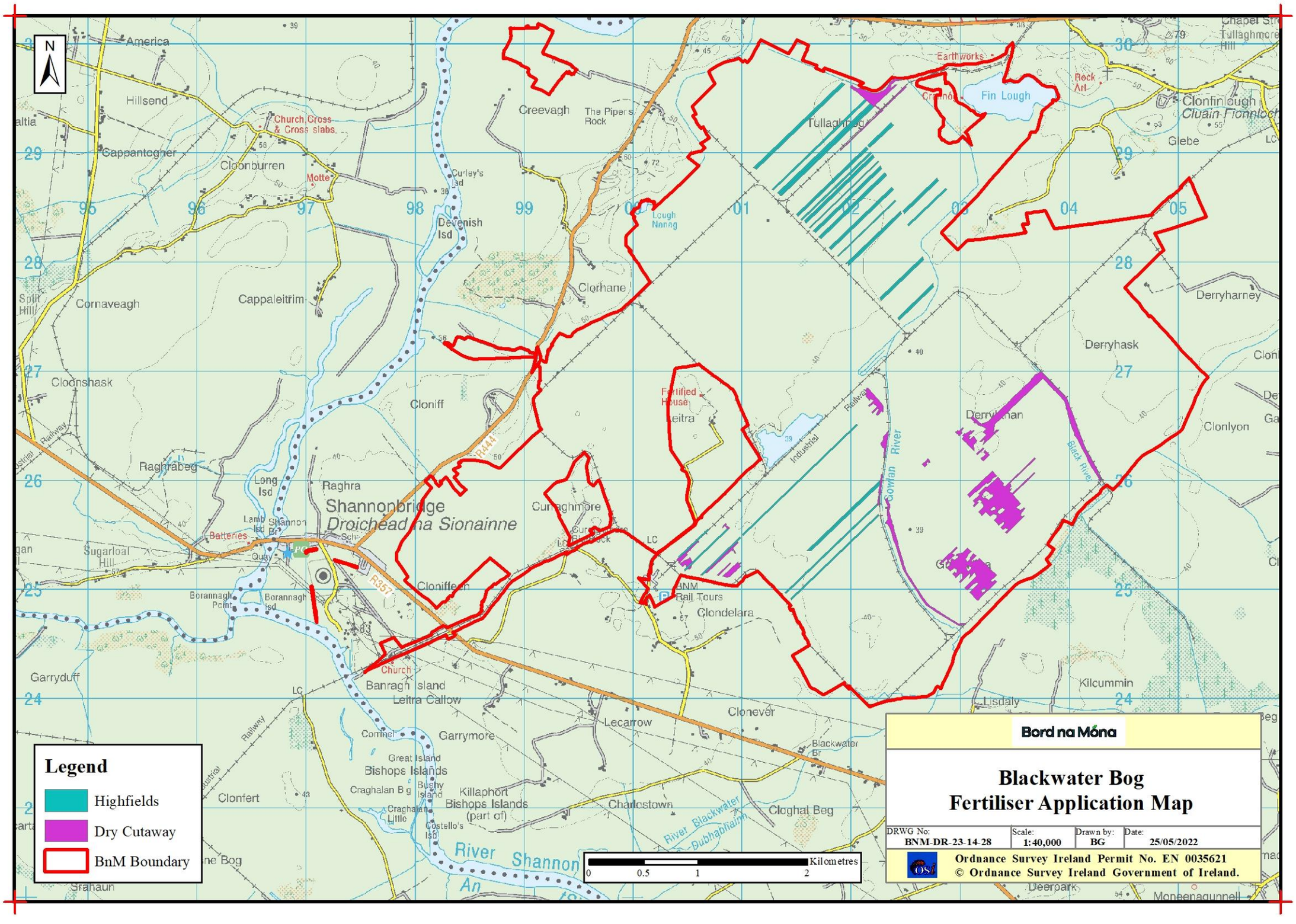

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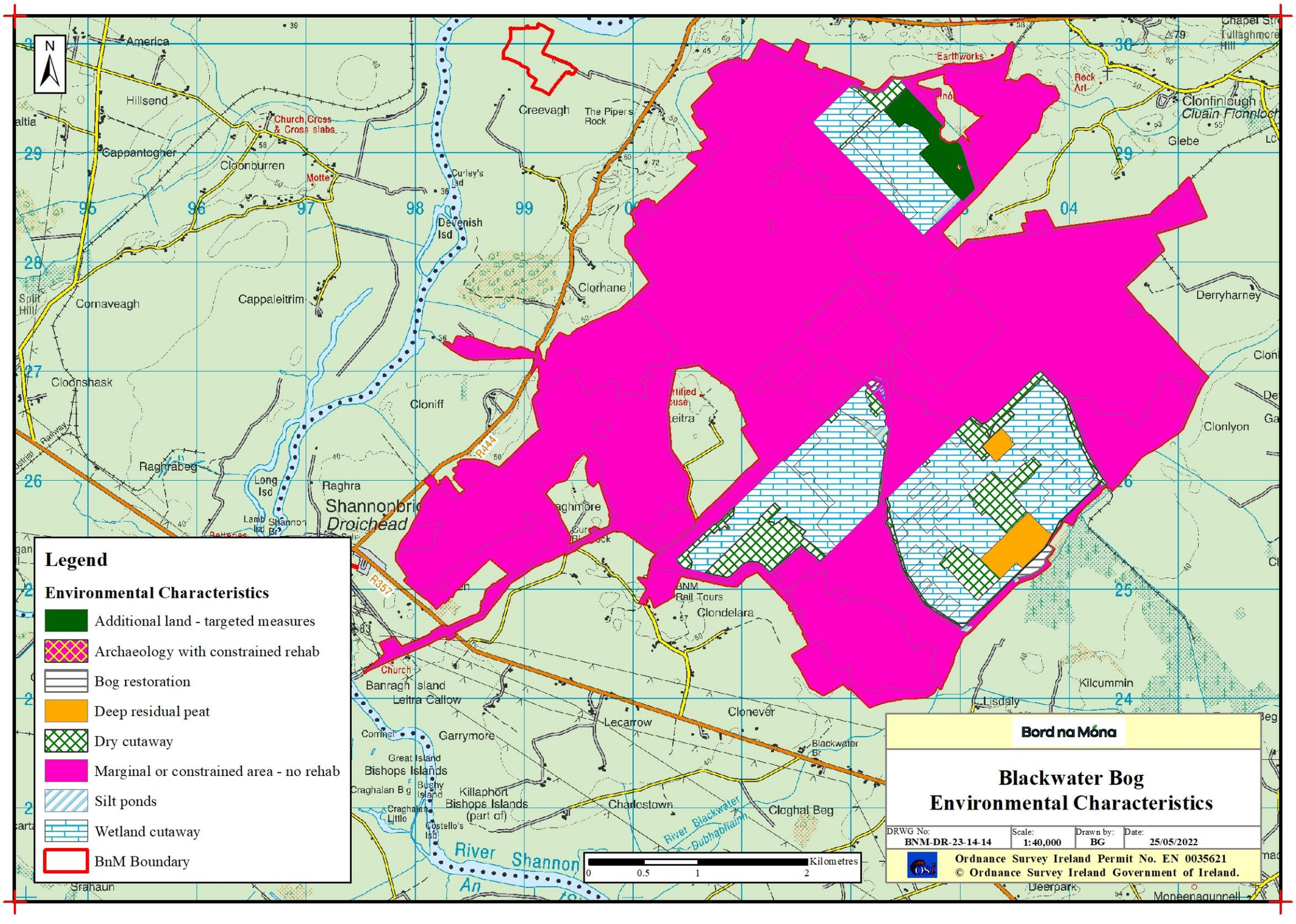

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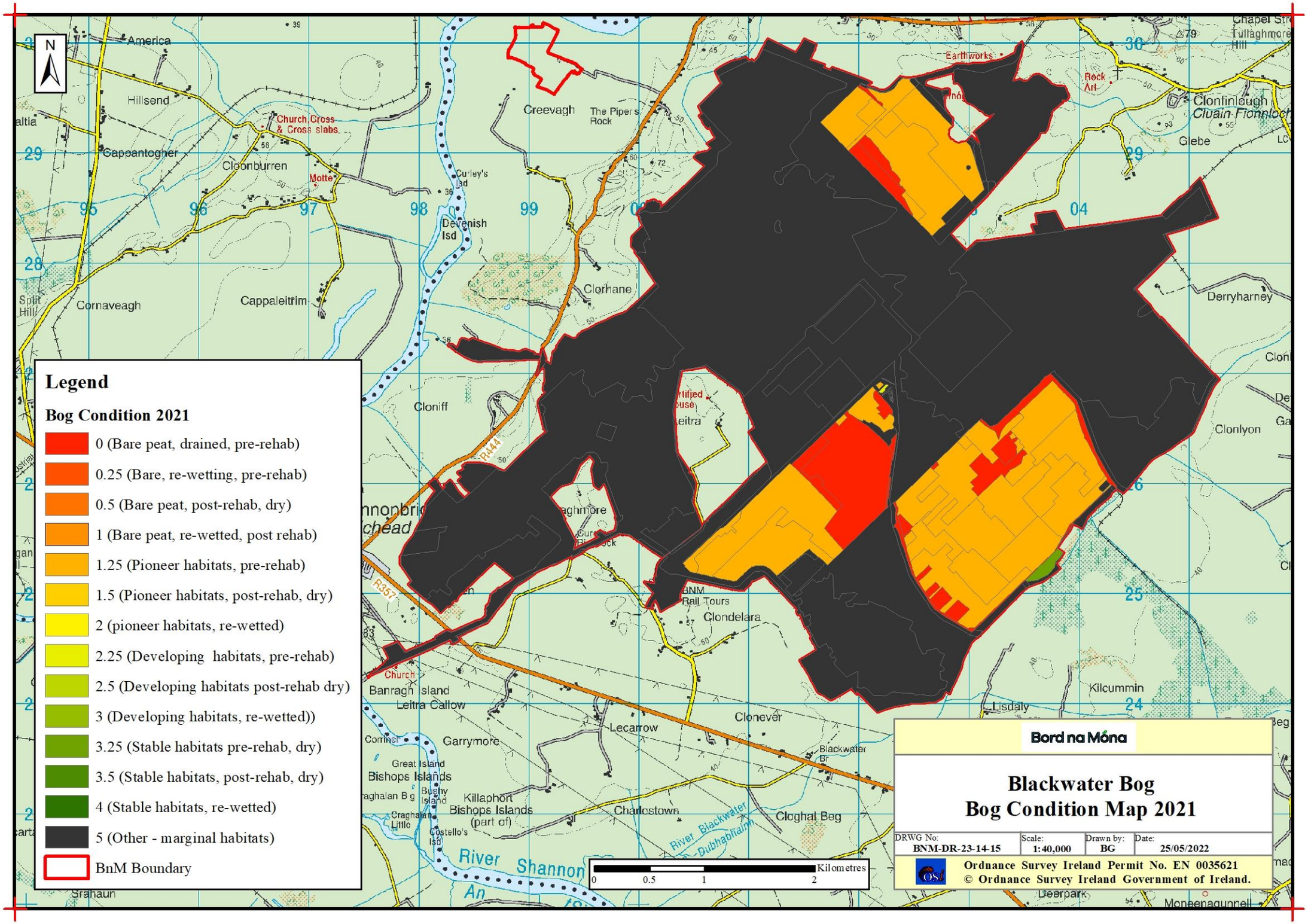

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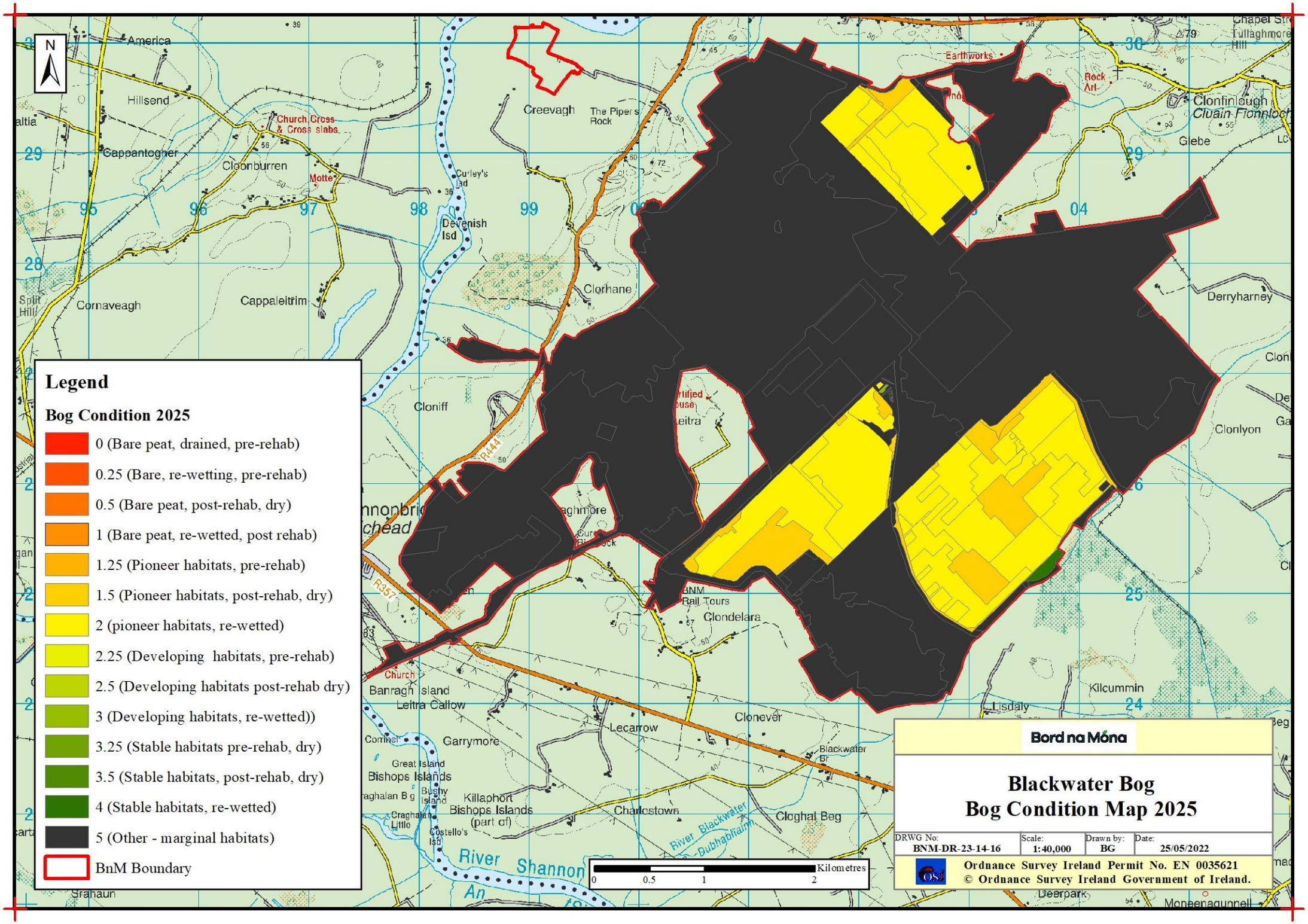

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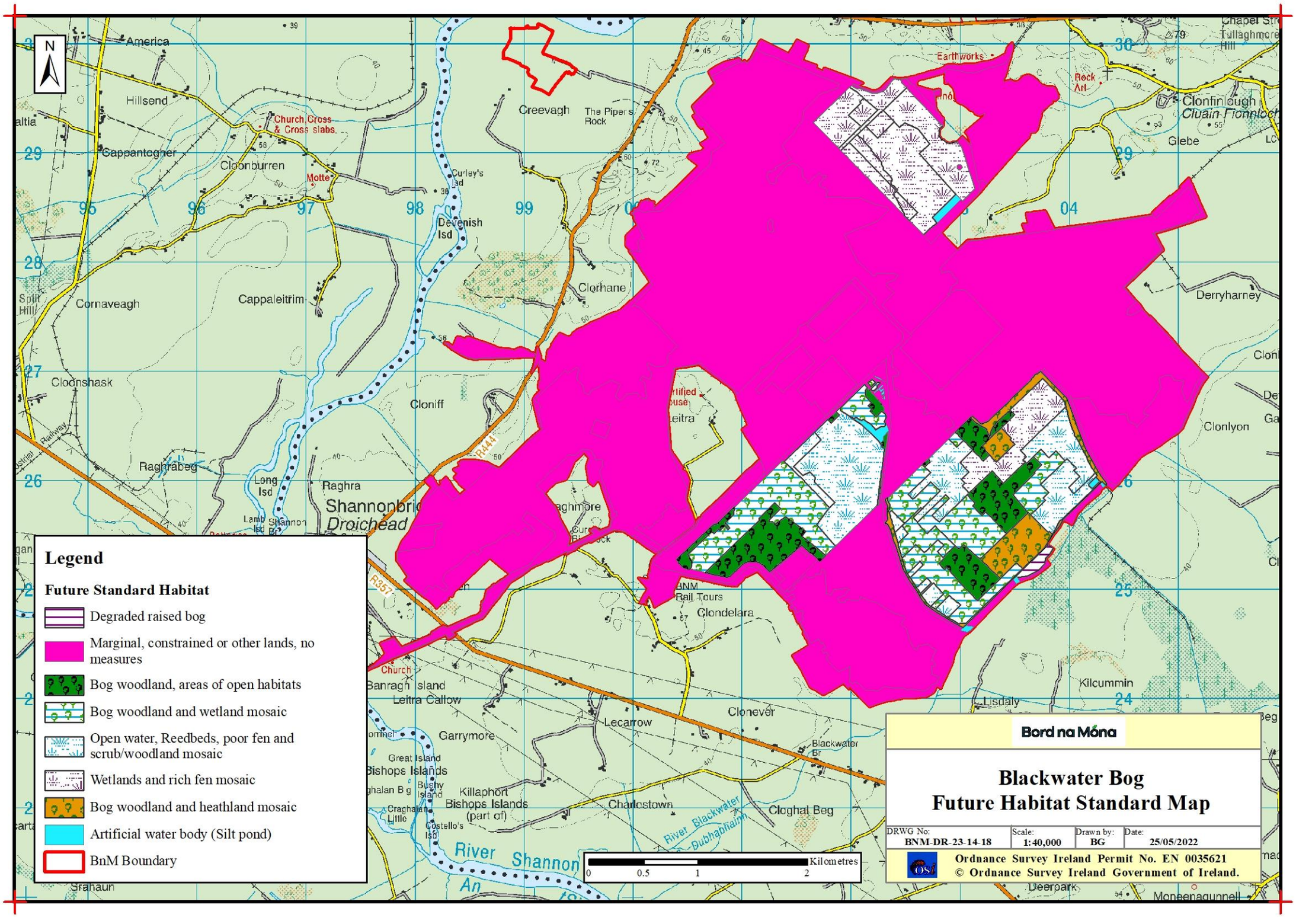

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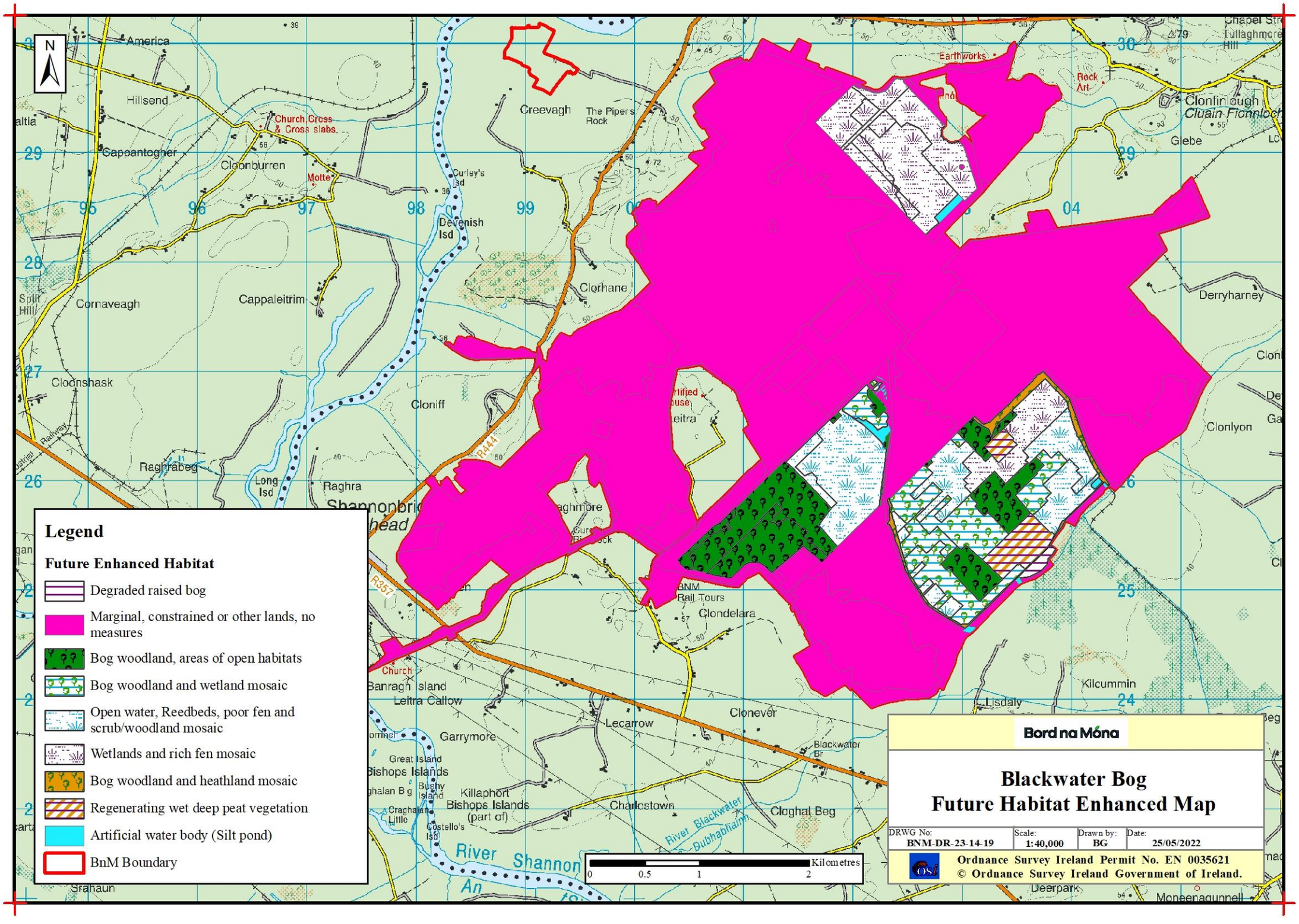

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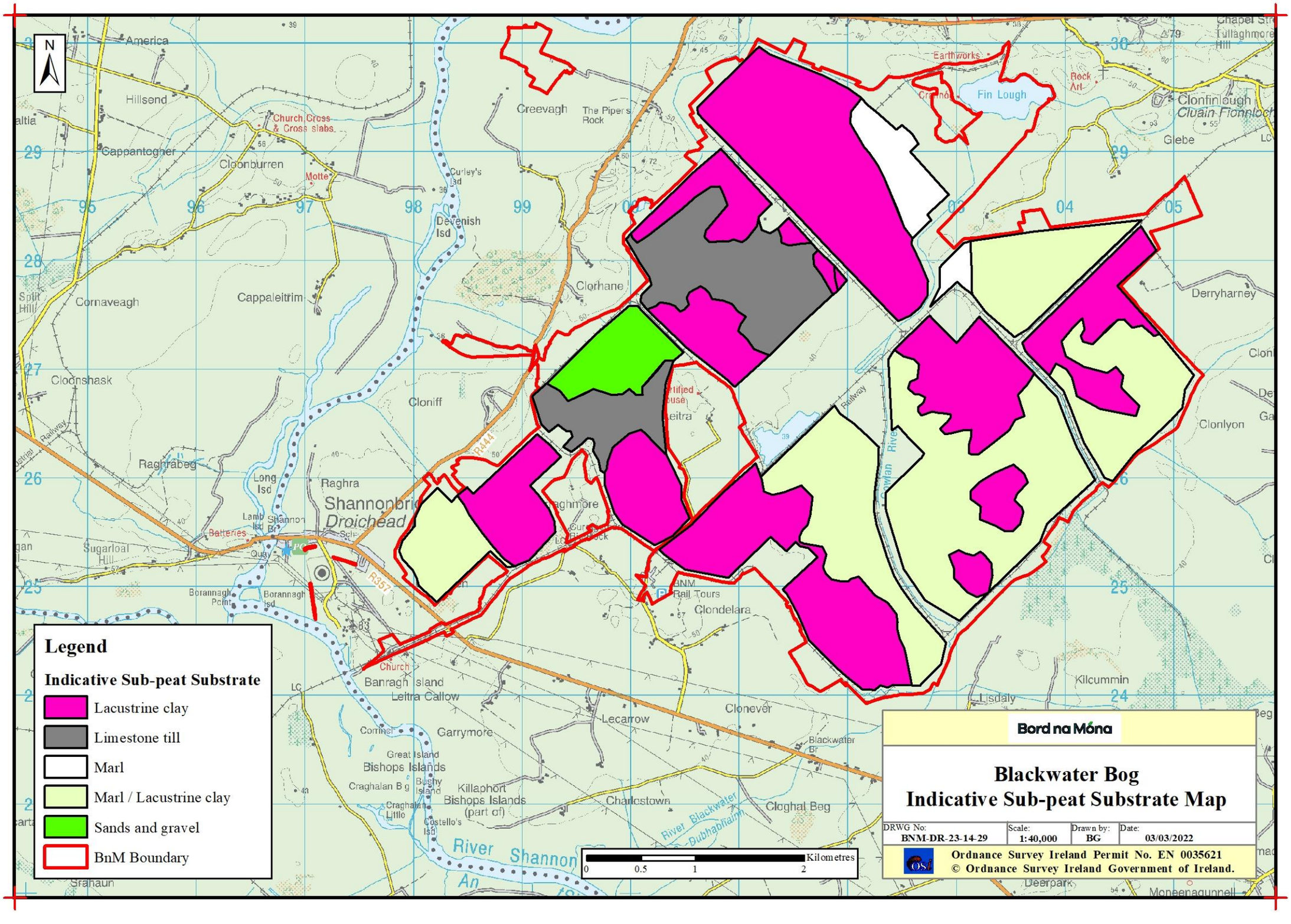

Figure 1: Topographic Map of Blackwater Bog, showing the location of shallow/deep monitoring well (piezometer) pairs (RPS, 2021)

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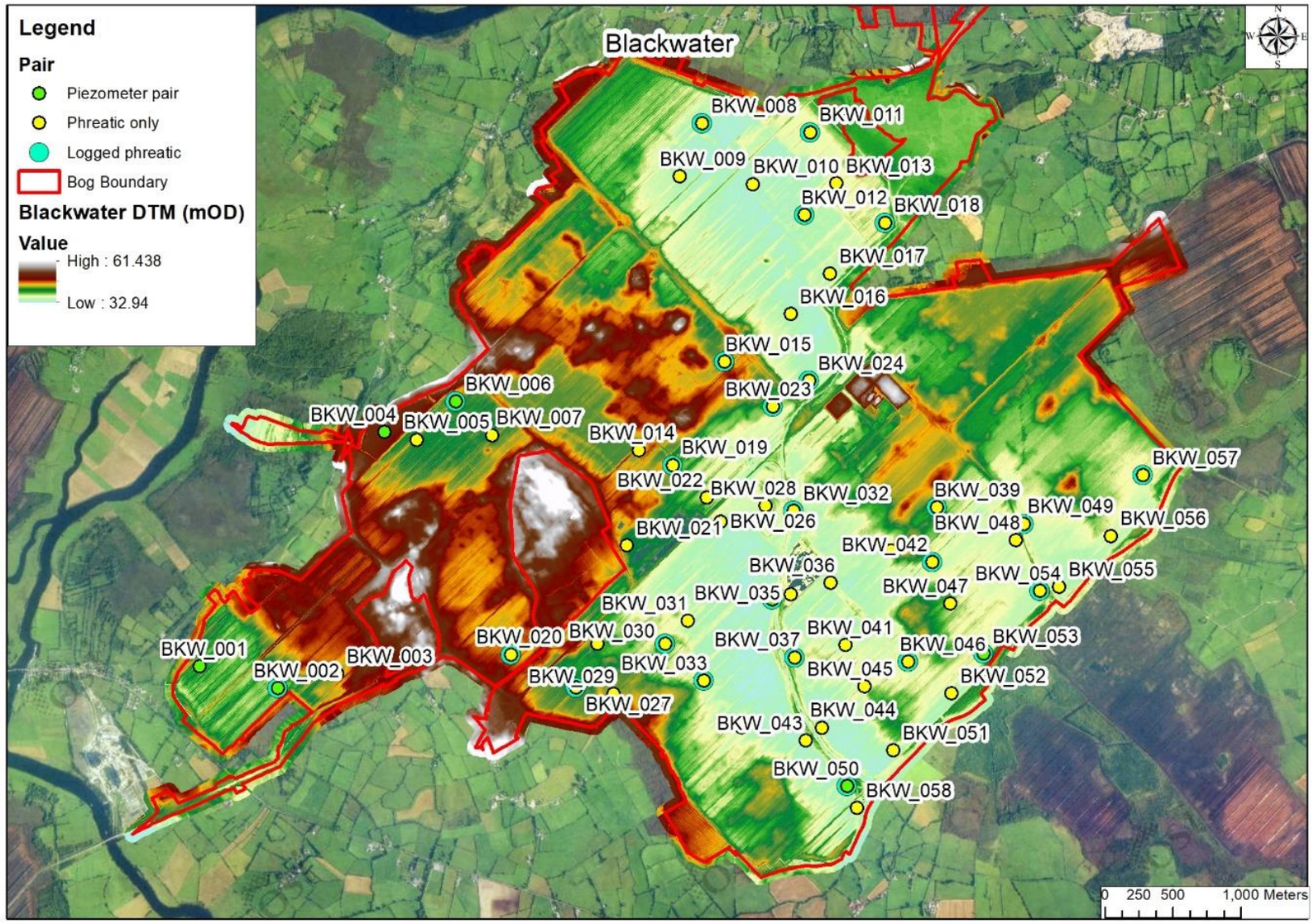

Figure 2: Aquifer map of Blackwater Bog and surrounding areas, illustrating the bog is situated on a locally important aquifer (RPS, 2021)

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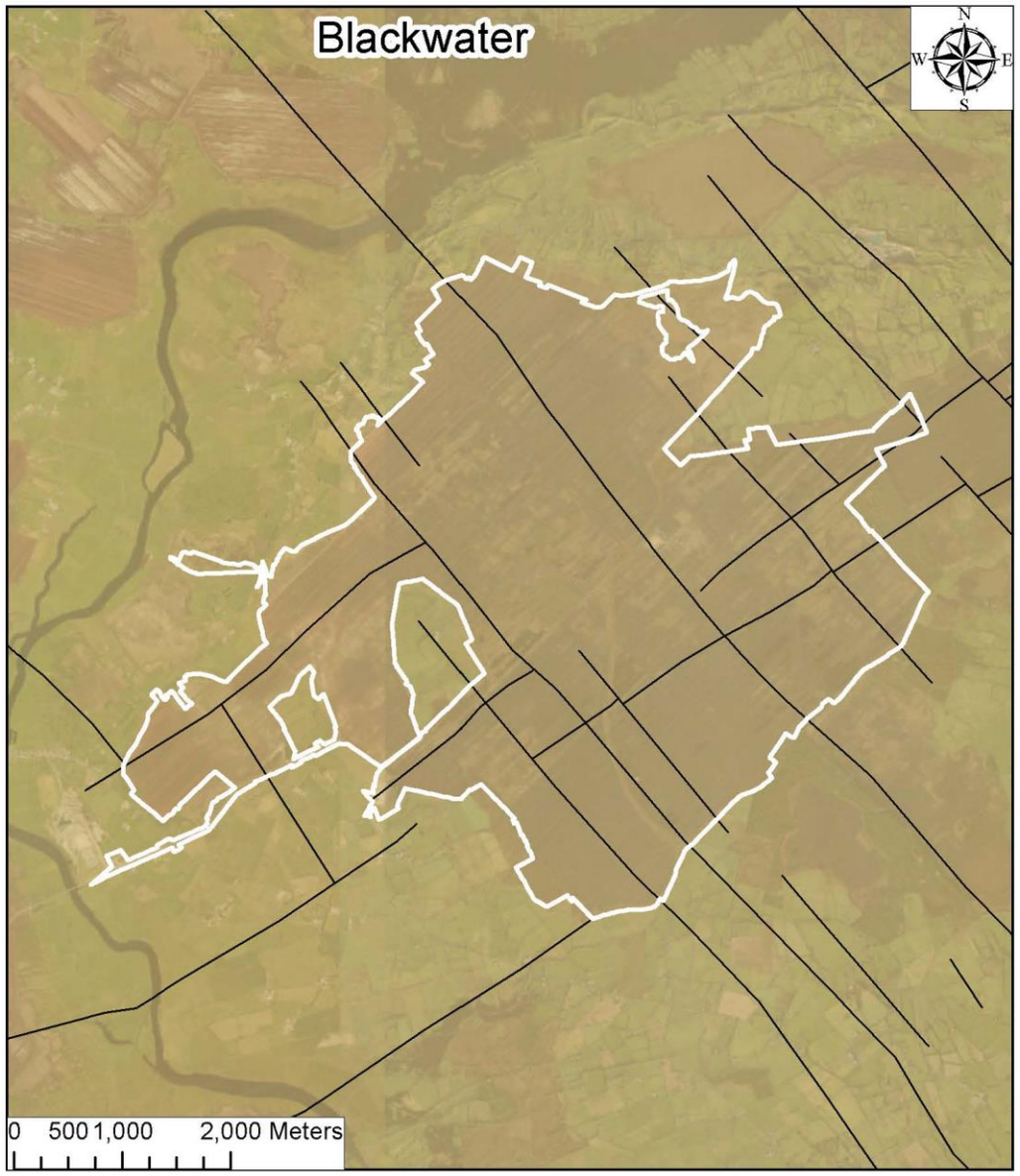

Legend

Bedrock Aquifer Faults

LI - Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones

Figure 3: Quaternary Geological Map of Blackwater Bog and its immediate surroundings (RPS, 2021)

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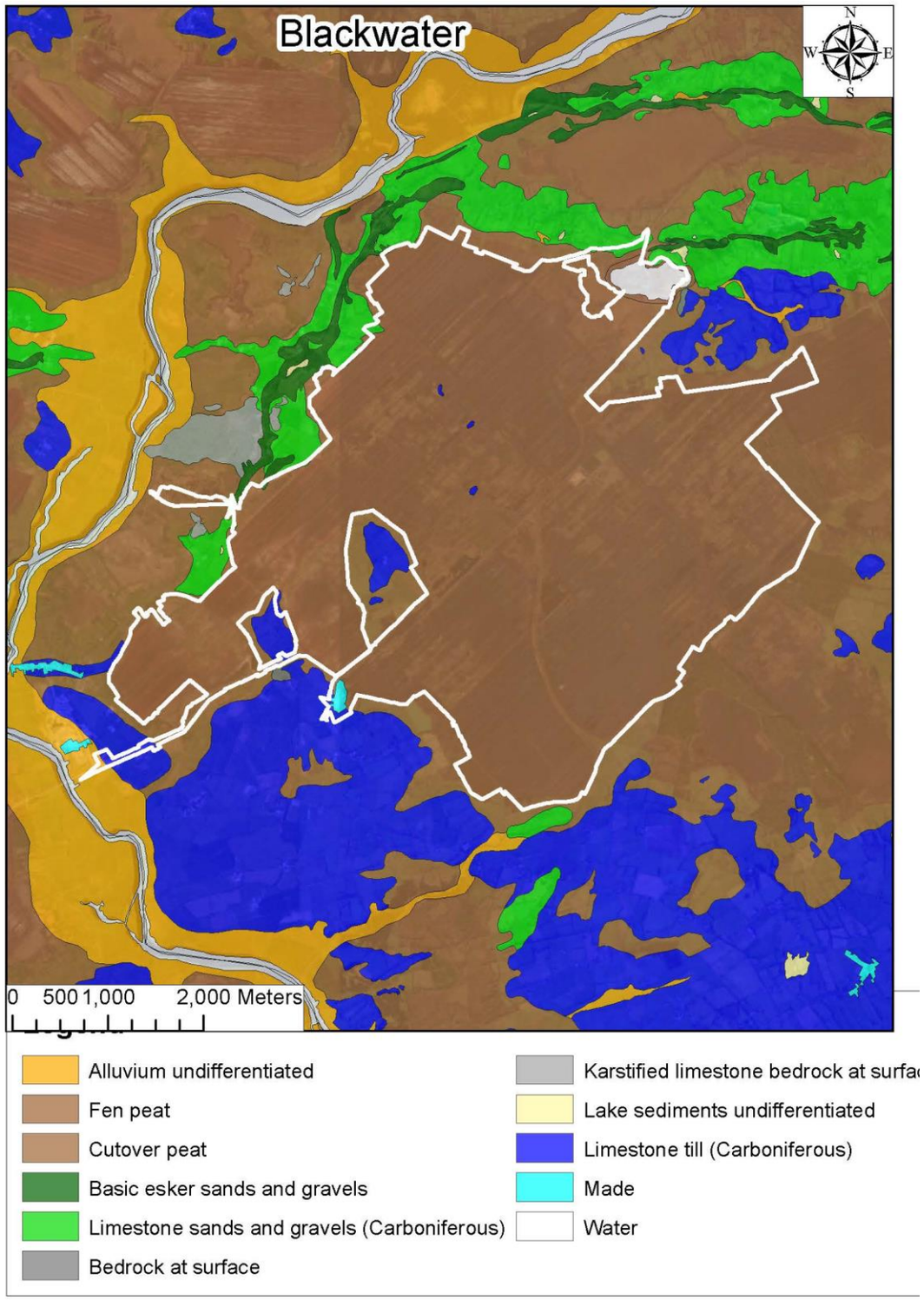

Figure 4: Initial water levels in phreatic wells relative to ground surface measured at Blackwater Bog on 12/08/2021 (RPS, 2021)

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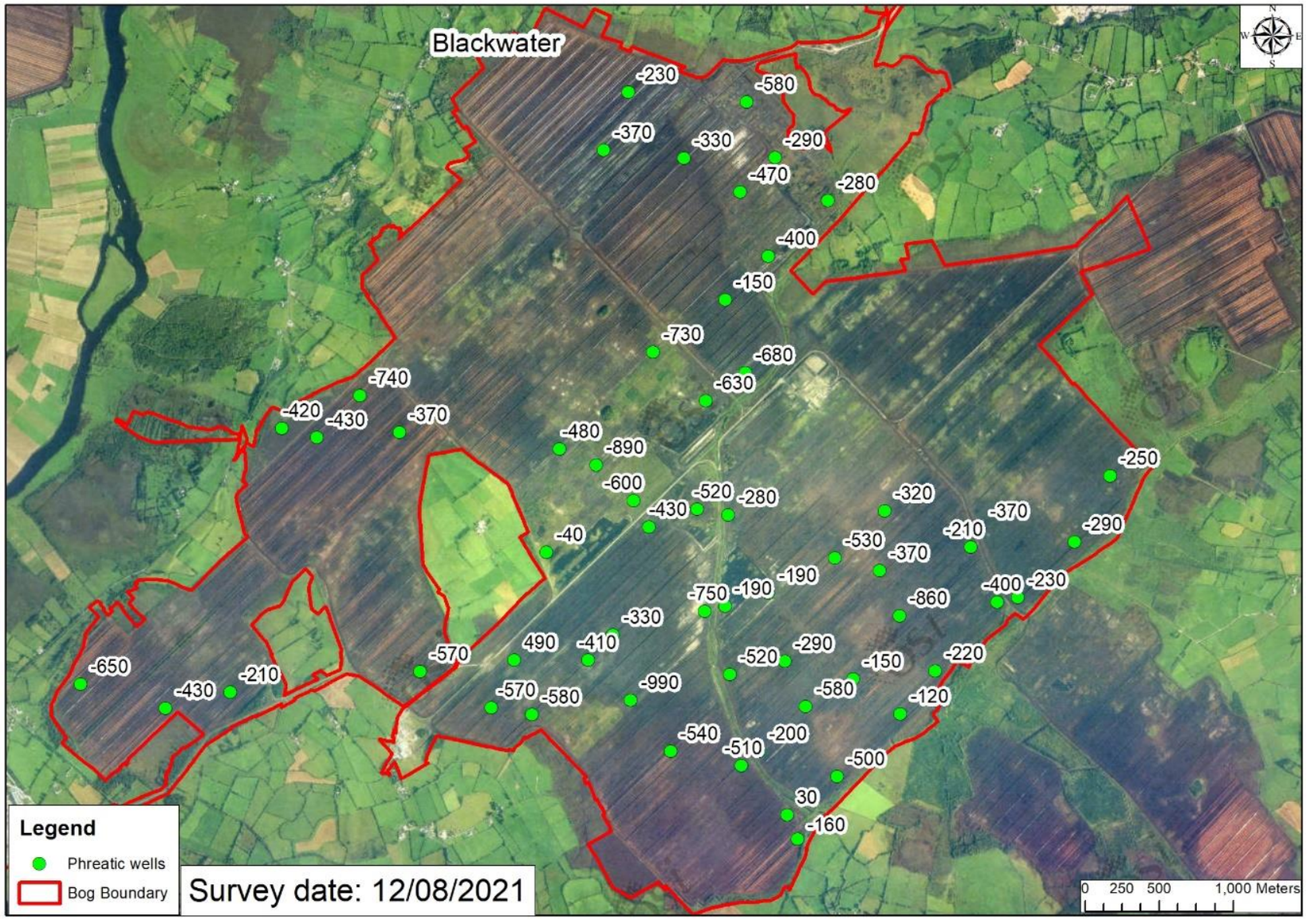

Appendix I Silt Pond Maintenance Procedure

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<tr><td colspan="2">Control Location</td><td>Page</td></tr>
<tr><td colspan="2">Compliance Office</td><td>1 of 1</td></tr>
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1. Purpose.

The purpose of this procedure is to provide for a maintenance procedure of all silt ponds associated with IPC Licence's P0499-01 to P0507-01. Pond cleaning will be determined by the silt pond inspection procedure.

2. Scope.

The scope of this procedure covers all silt ponds treating drainage water from the Licence areas P0499-01 to P0507-01.

3. Responsibility.

It is the responsibility of the Operations Manager to ensure ponds are cleaned as required by the silt pond inspection procedure.

4. Procedure

4.1 If the silt pond system has a by-pass channel or a stand-by pond then the drainage should be diverted through these. If not, then the inlet to the pond should be blocked using a gate valve or by switching off any applicable pumps, for the duration of the maintenance activity.

4.2 If the outlet from the pond has a weir then the level should be lowered so as to de-water the silt. If not, then the outlet pipe should be blocked.

4.3 The pond should be cleaned from the inlet to the outlet either from one side, if the width allows, or from both sides, if not.

4.4 The silt should be deposited as far back from the silt pond as possible on top of the existing silt pond or retained in a peat berm, if sludge is at risk of leaking back into the silt pond.

4.5 When the pond has been cleaned the inlet should be opened and the pond allowed to fill before lowering the outlet weir.

4.6 If the drainage was diverted during the maintenance, then it should be redirected back into the pond.

4.7 If there are signs of peat silt deposited upstream or downstream of the pond, within the site boundary, then they should also be cleaned, starting up-stream. This should occur once the pond has been cleaned and before the outlet weir has been lowered.

4.8 Once cleaned, the date should be entered on to the inspection log.

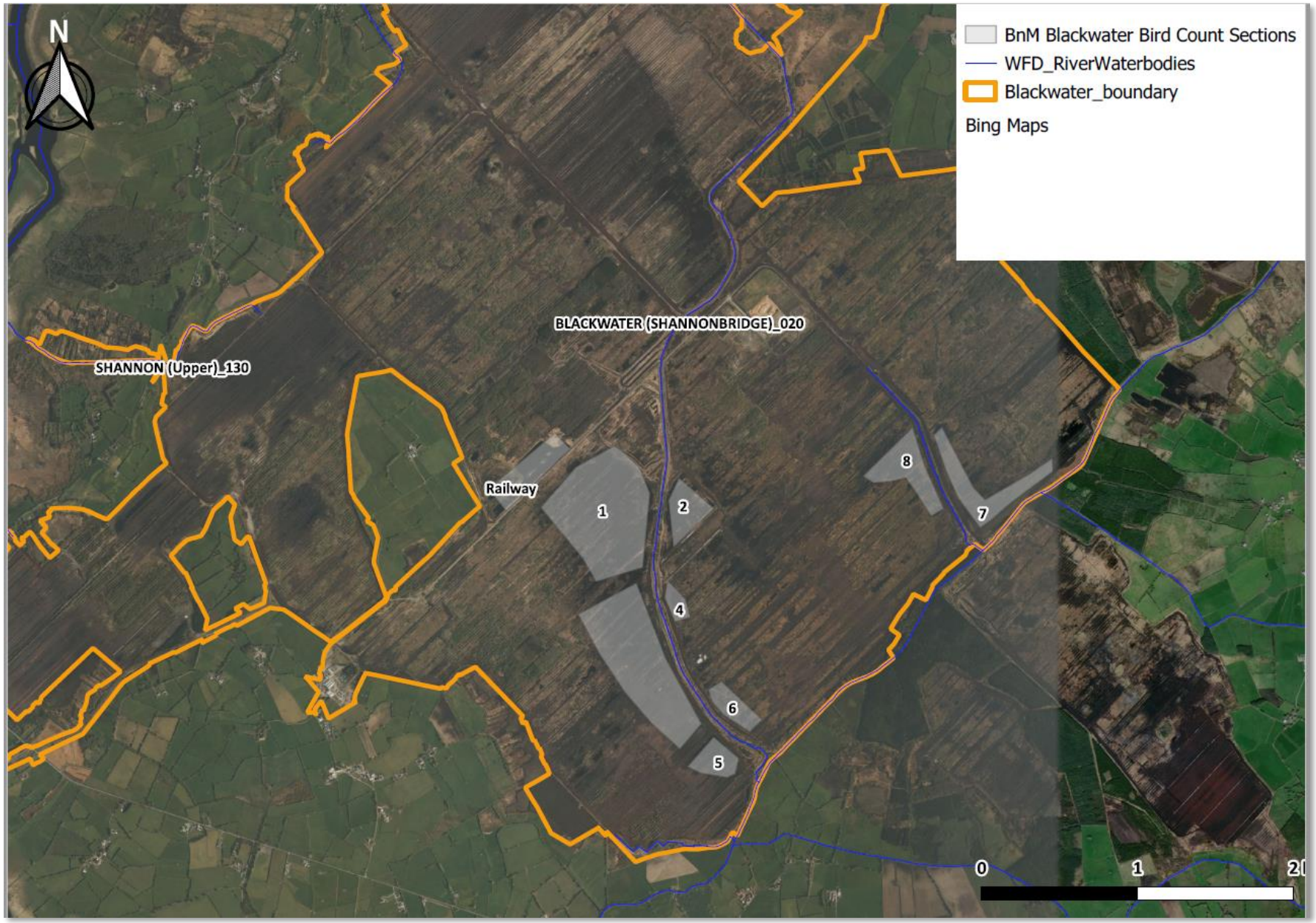
4.9 All machine operators must be fully versed with the above procedure with a copy posted in the machine.

Appendix J BnM Wintering Bird Counts

Species	Count Unit	January	February	March	Number
Cormorant	Railway	1	2	0	3
Grey Heron	Railway	1	0	1	2
Whooper Swan	Railway	3	0	0	3
Mute Swan	Railway	3	0	1	4
Mallard	Railway	1	10	5	16
Moorhen	Railway	0	0	1	1
Greylag Goose	Railway	0	0	6	6
Coot	Railway	0	0	1	1
Water Rail	Railway	0	0	1	1
Mute Swan	1	2	2	0	4
Whooper Swan	1	1	0	0	1
Grey Heron	1	1	1	0	2
Lapwing	1	18	0	0	18
Water Rail	1	0	1	1	2
Common Snipe	1	0	1	0	1
Mallard	1	0	0	1	1
Black Headed Gull	1	0	0	2	2
Moorhen	1	0	0	2	2
Ringed Plover	1	0	0	10	10
Mallard	2	13	2	3	18
Grey Heron	2	1	0	0	1
Water Rail	2	2	0	0	2
Whooper Swan	2	0	8	0	8
Mallard	3	1	6	3	10
Water Rail	3	1	0	0	1
Teal	3	35	0	0	35
Pochard	3	3	0	0	3
Mute Swan	3	3	0	0	3
Grey Heron	3	1	0	1	2
Whooper Swan	3	11	0	0	11

Species	Count Unit	January	February	March	Number
Mute Swan	3	1	4	0	5
Cormorant	3	0	2	0	2
Common Snipe	5	1	0	0	1
Jack Snipe	5	1	0	0	1
Ringed Plover	5	0	0	2	2
Grey Heron	6	0	0	1	1
Mute Swan	6	0	2	0	2
Teal	6	5	0	0	5
Mallard	6	6	8	2	16
Common Snipe	6	1	1	0	2
Eurasian Wigeon	6	0	2	0	2
Kingfisher	6	0	0	1	1
Little Grebe	6	0	0	1	1
Mallard	7	88	5	0	93
Lapwing	7	4	5	0	9
Common Snipe	7	2	1	0	3
Teal	7	14	0	0	14
Whooper Swan	7	0	10	0	10
Mallard	8	0	8	1	9
Whooper Swan	8	0	9	0	9
Greylag Goose	8	0	5	0	5
Lapwing	8	0	0	2	2
NOTES:					
RL= Railway Lake					
Hen Harrier seen in both January and February					

Species	Count Unit	January	February	March	Number
Kingfisher at Silt pond SW 83 during March Visit this was subsequently checked for breeding - none present. Kingfisher pair by 2 seen in April of 2022 near ADF.					
2 no. Lapwing recorded in 8 during March visit were outside the previously defined unit boundary					


N
BnM Blackwater Bird Count Sections
WFD_RiverWaterbodies
Blackwater_boundary
Bing Maps
BLACKWATER (SHANNONBRIDGE)_020
SHANNON (Upper)_130
Railway
1
2
4
5
6
7
8
0
1